

L.S. Starrett

(1836-1922)

**Over 125 Years of Leadership and Service to Craftsmen and Industry throughout the World.**

The L.S. Starrett Company has been a continuous symbol of leadership and dependable service in the manufacture of fine precision tools.

The following quotation sums up the philosophy of our founder:

**“I have believed that I could do no greater good than help create a business that would give people employment and a chance to earn an honest living.”**

L.S. Starrett kept his word. From the first combination square which he invented, the Starrett line has expanded to over 5,000 products used wherever metals and other materials are cut off, laid out, machined, inspected and assembled.



## Catalog 31B – New Products

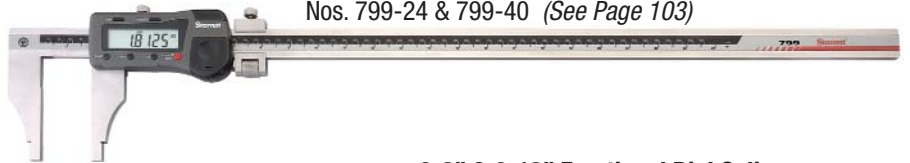
**IP67 Electronic Micrometers**

No. 795 Series with Output,  
No. 796 without Output.

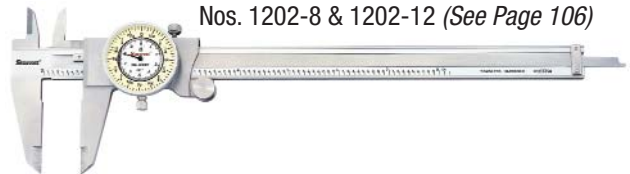
Right: No. 795 shown with a DataSure  
Wireless Data Collection End Node)  
(See Page 6)



**24" & 40" Extended Length Electronic Calipers,**  
Nos. 799-24 & 799-40 (See Page 103)



**0-8" & 0-12" Fractional Dial Calipers**  
Nos. 1202-8 & 1202-12 (See Page 106)



**Electronic Height Gage**  
(0-6"/0-50mm)  
No. 3751  
(See Page 121)



**5-in-1 Combination Protractor**  
No. CP505A-12  
(See Page 556)



**Electronic Durometer, No. 3805A** (See Page 271)

**Toolmakers Grade Stainless Steel Square, No. 3020** (See Page 317)

**Hacksaw Frame, No. K140** (See Pages 404 or 621)

**MicroAccurate B-Grade Metric Gage Block Sets** (See Page 454)






























**Level Extender, No. LE-48** (See Page 542)

**Die Pro Band Saw Blades** (See Page 570)

**Easy Out Hole Saw Arbors, Nos. E01 & E02** (See Page 600)

**High Carbon, High Chromium Steel Ground Flat Stock, Nos. 401 & 402**  
(See pages 636-637)

*On the front cover: A Starrett 797 Electronic Caliper equipped with a DataSure End Node measuring a part used in the manufacture of a Starrett 505 Protractor.*

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The Starrett line is continuously evolving, with new products added and others phased out. Because of this, the presence of a product in this catalog does not guarantee current availability.



## CORPORATE HEADQUARTERS AND MAIN FACTORY

### The L.S. Starrett Company

121 Crescent Street  
Athol, MA 01331-1915 U.S.A.  
Telephone: (978) 249-3551  
FAX: (978) 249-8495  
Internet: <http://www.starrett.com>

International Sales Department:  
Telephone: (978) 249-3551  
(extension 281)  
FAX: (978) 249-2609

## INTERNATIONAL LOCATIONS

(Dialing Codes Vary Worldwide)

### BRAZIL

#### Starrett Indústria e Comércio Ltda.

Av. Laroy S. Starrett, 1880-Bairro Pinheirinho  
Caixa Postal 171  
13306-900 Itu, S.P., Brazil  
Telephone: 55 11 2118-8200  
FAX: 55 11 2118-8003

### SCOTLAND

#### The L.S. Starrett Company Ltd.

#### Starrett Precision Optical Ltd.

Jedburgh TD8 6LR, Scotland  
Telephone: 44 1 835 863501  
FAX: 44 1 835 863018

### CHINA

#### Starrett Tools (Suzhou) Company Limited

Suzhou Industrial Park  
20 Bai He Street  
Suzhou, Jiangsu Province  
P.R. China 215021  
Telephone: 86 512 6 741 1940  
FAX: 86 512 6 741 5697



**Athol, Massachusetts** – Today, most precision tools are manufactured at The L.S. Starrett Company World Headquarters.



**Mount Airy, North Carolina** – This facility manufactures precision ground flat stock, hole saws and band saw blades.



**Waite Park, Minnesota** – This facility is the home of our True-Stone Technologies Division and manufactures custom granite products, granite surface plates and accessories.



**Itu, S.P., Brazil** – This facility manufactures complete lines of precision tools, saw blades, tape measures, and hand tools.



**Jedburgh, Scotland** – This facility manufactures and stocks full lines of precision tools and saw blades and the complete line of optical measuring projectors and accessories.



**Suzhou, China** – This facility manufactures saw blades and precision tools.



## International Locations

### **TORONTO CANADA**

The L.S. Starrett Company of Canada Ltd.  
1244 Kamato Road  
Mississauga, Ontario L4W 1Y1  
Telephone: (905) 624-2750  
FAX: (905) 624-0901

### **SALTILLO MEXICO**

The L.S. Starrett Company of Mexico S. de C.V.  
Blvd. Vito Alessio Robles 7005-2  
Zona Industrial  
Saltillo, Coah, Mexico  
Telephone: (844) 432-46-60  
FAX: (844) 432-46-61  
e-mail: starrettmexico@starrett.com

### **AUSTRALIA**

The L.S. Starrett Company  
Unit 2, 57 Prince William Drive  
Seven Hills, N.S.W. 2147, Australia  
Telephone: 61 2 9620 6944  
FAX: 61 2 9620 6988

### **GERMANY**

Starrett GmbH  
Feldwies 12  
61389 Schmittent/Taunus  
Germany  
Telephone: 49 6084 959510  
FAX: 49 6084 959511

### **SHANGHAI**

Starrett Tools (Shanghai) Co. Ltd.  
No. 55, Fei La Road, D Area,  
Wai Gao Qiao Free Trade Zone  
Pu Dong-Shanghai 200131  
P.R. China  
Telephone: 86 21 5866 6938  
FAX: 86 21 5064 0130  
e-mail: esales@starrett.com.cn

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## Divisions

### **Starrett Construction Division**

5965 Core Road  
Suite 618  
North Charleston, SC 29406  
Telephone: (843) 746-3577  
FAX: (843) 747-7913

### **Starrett Saw Division**

121 Crescent Street  
Athol, MA 01331-1915  
Telephone: (978) 249-3551  
FAX: (978) 249-5979

### **Starrett Metrology Systems Division**

1372 Boggs Drive  
P.O. Box 1268  
Mount Airy, NC 27030-1268  
Telephone: (336) 789-5141  
FAX: (336) 789-8160

### **For Sales, Service, Applications and Training:**

2105 Barrett Park Drive  
Suite 105  
Kennesaw, GA 30144  
Telephone: (770) 590-7737  
FAX: (770) 590-7511

### **Starrett Kinematic Engineering, Inc.**

26052 Merit Circle, Suite 103  
Laguna Hills, CA 92653  
Telephone: (949) 348-1213  
FAX: (949) 582-8040

### **Starrett Webber Gage Division**

24500 Detroit Road  
Cleveland, OH 44145-2579  
Telephone: (440) 835-0001  
FAX: (440) 892-9555

### **Tru-Stone Technologies Division**

P. O. Box 430  
1101 Prosper Drive  
Waite Park, MN 56387  
Telephone: (320) 251-7171  
FAX: (320) 259-5073

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## Industrial Distribution

Ample stocks of Starrett products to meet your needs are maintained by leading industrial distributors throughout the world.

Your Starrett distributors have a thorough knowledge of the Starrett line and can help you with your inquiries. They will provide you with quick and reliable support, and they are as close as the nearest telephone. Please use their services.

## QUALITY & ACCURACY

### Be Sure of Your Quality with Starrett Quality, Accuracy and Reliability

While many factors are important in manufacturing, its hard to think of anything that matters more than quality. Without a doubt, the quality of your products is only as good as the accuracy and reliability of your measurements.

That reliability is only possible with the best measuring tools and gages. Today, as in the past, the name on the very best measuring tools and gages is Starrett.

In most cases, there is a Starrett measuring tool to meet your needs. You can count on Starrett for the best high-precision measuring tools.

### Accuracy

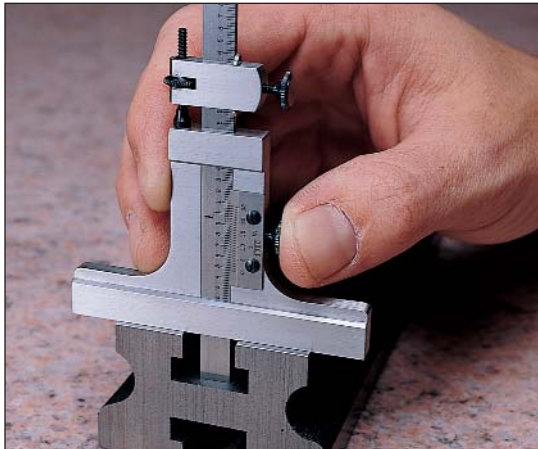
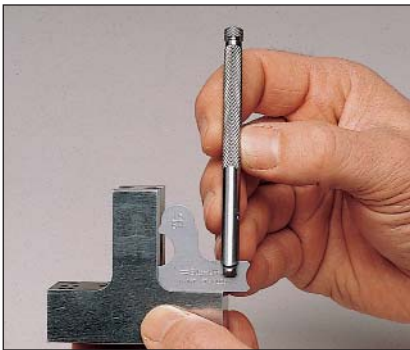
Starrett precision measuring tool accuracies are based on their traceability through our grand master gage blocks as certified by the National Institute of Standards and Technology (NIST).

**No one in the world except Starrett/Webber has produced the accuracy and stability of our croblox® Grand Masters.**

They were produced in 1955 out of chromium carbide material to an accuracy within one millionth of an inch (.0000254mm) and have been checked periodically by the National Bureau of Standards and the National Institute of Standards and Technology (NIST) and have remained stable over this period.

Most of our tools meet or exceed accuracy and performance requirements of United States Specifications and all known International Specifications. Standards used for inspection are traceable to the National Institute of Standards and Technology. Your measuring needs from millionths to fractions can be met by Starrett precision measuring instruments.

Starrett products are characterized by fine craftsmanship and the ergonomic, balanced design necessary to assure the accuracy of each tool.





### Quality Assurance Worldwide

In our business, the level of quality and accuracy must be related to a specific standard. Starrett offers precision measuring tools that are all individually inspected to specific standards and we offer calibration services to meet your requirements for documentation of new or in-service measuring tools.

Starrett offers calibration services at several of our facilities, with different emphasis and capabilities at each location. Overall, Starrett can now be your single source for your calibration and repair requirements, and you have the assurance of dealing with the most trusted name in precision.

Starrett facilities worldwide offer a variety of repair and calibration services, and have earned various accreditations and certifications as appropriate for the function and location.

#### Starrett Tools & Gages – Athol, MA

121 Crescent Street, Athol, MA 01331-1915

- ◆ Calibration of Starrett Precision Tools
- ◆ Repair, refurbishing, and rebuilding of your Starrett tools by the same craftsmen who originally made them
- ◆ Accredited by A2LA in accordance with ANSI/NCSL Z540-1 and ISO/IEC 17025\*



#### Starrett Webber Gage Division – Cleveland, OH

24500 Detroit Road, Cleveland, OH 44145-2579

- ◆ Accredited calibrations of Linear Gage Blocks, Webber Height Gages and Standard Reference Bars, Angle Gage Blocks and True Squares, Optical Cubes, Optical Polygons and Optical Flats
- ◆ For detailed information about Starrett Weber calibration and repair services, see pages 479-480 at the end of the Gage Block section
- ◆ Accredited by NVLAP in accordance with ANSI/NCSL Z540-1 and ISO/IEC 17025\*
- ◆ Calibrations also performed in accordance with ISO 10012-1 and former MIL-STD-45662A



#### Tru-Stone Technologies Division – Waite Park, MN

1101 Prosper Drive, P. O. Box 430, Waite Park, MN 56387

- ◆ Calibration of granite surface plates, granite parallels (2 and 4-sided), granite straight edges, granite tri-squares, granite angle plates and granite squares (see page 482 for more detail)
- ◆ Surface plate and granite metrology and accessory resurfacing
- ◆ Starrett Granite Surface Plates meet or exceed U.S. Federal Specification GGG-P-463c.
- ◆ NIST-traceable calibration certificate provided that is ISO/IEC 17025\* compliant
- ◆ A2LA accredited calibration certificate available upon request
- ◆ ISO 9001:2000 certified and A2LA accredited per the ISO/IEC 17025\* standard



\* Accreditations are site-specific and tool-specific. The Scope of Accreditation is available upon request to each location.

#### Starrett Calibration Services™ – Duncan, SC

321 Tucapau Road, PO Box 537, Duncan, SC 29334

- ◆ Fast, economical calibration for all major brands
- ◆ Repair for all major brands with a large stock of parts on hand
- ◆ Highly experienced staff and modern, fully equipped facilities
- ◆ Many services can also be performed at your location
- ◆ Accredited by A2LA in accordance with ANSI/NCSL Z540-1, and ISO/IEC 17025\*



#### Starrett Indústria e Comércio Ltda.

Av. Laroy S. Starrett, 1880-Bairro Pinheirinho, Caixa

Postal 171, 13306-900 Itu, S.P., Brazil

- ◆ Received ISO 9001 accreditation for the manufacture of hand and power hacksaw blades, band saw blades, and hole saws
- ◆ Certified by INMETRO for the calibration of measuring tools and gage blocks



#### The L. S. Starrett Company, Ltd.

Jedburgh TD8 6LR, Scotland

- ◆ ISO 9001 accredited for precision tool, band saw blade, and hole saw manufacturing
- ◆ Accredited by UKAS (United Kingdom Accreditation Service), for the calibration of Profile Projectors as Calibration Laboratory No. 0169



Starrett Precision Optical Ltd.  
Calibration Division

### Standard Letter of Certification (SLC)

The Standard Letter of Certification certifies that the tool listed is a product of The L.S. Starrett Company and meets all applicable federal or manufacturing specifications. The SLC includes a unique serial number, a tolerance parameter, and traceability to The National Institute of Standards and Technology (NIST).

Many tool series are available with a redemption card for a SLC (Standard Letter of Certification). Their catalog numbers include the letters "W/SLC".

### Calibration Certificate (available by request)

The Calibration Certificate includes the information that is on the SLC and the actual readings taken during the calibration of the listed tool. This certificate includes an environmental control statement, actual before and after data, standards used to perform calibration, applicable NIST test number, and uncertainty statement. This certificate conforms to the requirements of ANSI/NCSL Z540-1, ISO/IEC 17025 and ISO Guide 25.

### Global Series Tools

While the Starrett brand is synonymous with "American Made", we have manufactured products worldwide for over 50 years. Some of these products are available in the U.S.A. and identified as "Global Series". Global Series Tools in this catalog are identified by our Global Icon:



Regardless of country of origin, the Starrett brand remains your assurance of unmatched precision, quality and value.

**(See Industrial Distributor Terms bulletin for specific customer disclaimers conditions.)**

Starrett tools are made to the highest standard of quality and workmanship. We want every tool in the hands of our customers to be accurate and satisfactory. If any tool is found that is not of Starrett quality, we shall consider it a favor if our customers will send us the tool to the attention of our Repair Dept. Any tool proving defective in material or workmanship at our discretion will be gladly repaired or replaced at no charge.

Our tools will not be replaced, however, if they have been improperly used, stamped or mutilated, or if the tool has been altered or repaired by personnel not authorized by the L.S. Starrett Company.

NO RESPONSIBILITY FOR CLAIMS FOR CONSEQUENTIAL DAMAGE WILL BE ACCEPTED. It is always the responsibility of every workman to keep his tools clean and usable and checked for accuracy as he or she deems necessary.

## REPAIRS

Precision tools to be repaired should be sent to: Repair Department, The L.S. Starrett Company, 165 Crescent Street, Athol, MA 01331-1915 U.S.A., or to the international location that is your supplier. Tools which have been deformed or misaligned, chipped, marred, rusted, stamped, or etched cannot be accepted for credit, exchange, or replacement. However, we will gladly advise you of repair costs.

## SPECIAL ORDERS

We build thousands of special tools to meet the unique needs of our customers. If special tools are required, please send complete information, sketches, and dimensions with your order to our Special Order Department, 121 Crescent Street, Athol, MA 01331-1915 U.S.A.; or call (978) 249-3551, or send to the international location that is your supplier.

## STARRETT VALUE

No one's precision tools are guaranteed to work for life, regardless of the use or abuse they receive. It is worthy to note, however, that we at The L.S. Starrett Company regularly **service** and **repair** our precision measuring tools that have been passed from generation to generation and predate World War II. You can count on Starrett for **full value**.

## ACCURACY

Most all precision measuring tools meet or exceed accuracy and performance requirements of national and international standards and are traceable to the United States National Institute of Standards and Technology. From a practical point of view, most Starrett mechanical-reading tools are more accurate than the normal eye can read.

## CERTIFICATES AND CALIBRATIONS

Most customers ask: 1) Does a particular tool meet a specific standard?; or 2) They want to have the tool actually calibrated through its entire range for them. Some customers also ask for something specific to their own needs. We regularly furnish all of these and the charges to the customer are based upon the complexity of each request. To save time and expense, be as specific as possible as to exactly what information is needed.

## SPECIFICATIONS

Specifications and information appearing in any catalog or flyer are current at the time of printing but are subject to change without notice.

## WHERE TO ORDER

Starrett tools are sold through authorized Starrett distributors. Orders should be placed with one of our distributors in your area. Names of authorized distributors are readily available on our website ([www.starrett.com](http://www.starrett.com)) or by calling our home office, nearest branch office, or appropriate International location. For the most recent distributor and technical information, please refer to the website.

## HOW TO ORDER

For your ordering convenience, products in this catalog are identified in two ways. First, by **catalog number in bold face**. Second, by EDP (Electronic Data Processing) number. Order by either number, but when ordering by EDI, you must at least use the EDP number.

## PRICES

Please refer to the separate price booklet that is available from your distributor. All prices are subject to change without notice. All previous prices, if different, are hereby canceled.

## FOR SHORTAGE OR DAMAGE

You will promptly and thoroughly inspect all goods shipped by us for damage and shortage before signing the carrier receipt, and note the nature and extent of such damage or shortage directly on this receipt. In the event of either obvious or concealed damage, you must notify The L.S. Starrett Company within 15 days of receipt, retaining both goods and damaged packaging for possible inspection by the carrier. In the event the carrier does not exercise its right to issue a damage call tag, you will return such damaged goods to us, packaged carefully and freight pre-paid by you, for inspection. We will determine, in our discretion, whether the goods were, at the time of shipment F.O.B. our facilities, damaged. Replacement of items may be made immediately if you so choose, and will be invoiced. Credit for the original net invoice price will be issued provided that the above conditions have been met. This procedure applies with equal force to goods that we drop-ship to customers.

## RETURNED GOODS

If you make an error in ordering goods, you may return such goods to Starrett, whereupon Starrett will provide you with a credit memo provided that (A) the goods to be returned have not been damaged or used, are otherwise in a resalable condition (as determined by us in our sole discretion), are of current design and finish and are in current production (e.g., were not custom-made or from a special order), (B) proof of purchase is established for such returned goods, (C) you have received a Return Merchandise Authorization from Starrett covering all returned goods, and (D) such returned goods are shipped properly to the applicable following address within 60 days from the date of invoice:

**Tool returns to be sent to:**  
**The L. S. Starrett Co.**  
**Repair Department**  
**121 Crescent Street**  
**Athol, MA 01331**

**Saw returns to be sent to:**  
**The L. S. Starrett Co.**  
**Saw Division**  
**121 Crescent Street**  
**Athol, MA 01331**



**Electronic and Mechanical: Pages**

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| Special Function Outside Micr. . . . . | 37-66  |
| Micrometer Heads . . . . .             | 67-79  |
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When buying a micrometer or any other fine tool, probably the most important factor is selecting a reliable tool on which you can depend. The name STARRETT assures this. It is your guarantee of quality and precision.

The precision micrometer is the most accurate hand-held tool available to skilled operators. Slide calipers are versatile because of length capabilities, but when close measurements are necessary, the micrometer is the tool that will do the job because measurement and reading are in the same axis and the anvil end is supported by a strong frame.

The following selection of micrometers is the result of more than 125 years of constant improvements in design and accuracy.

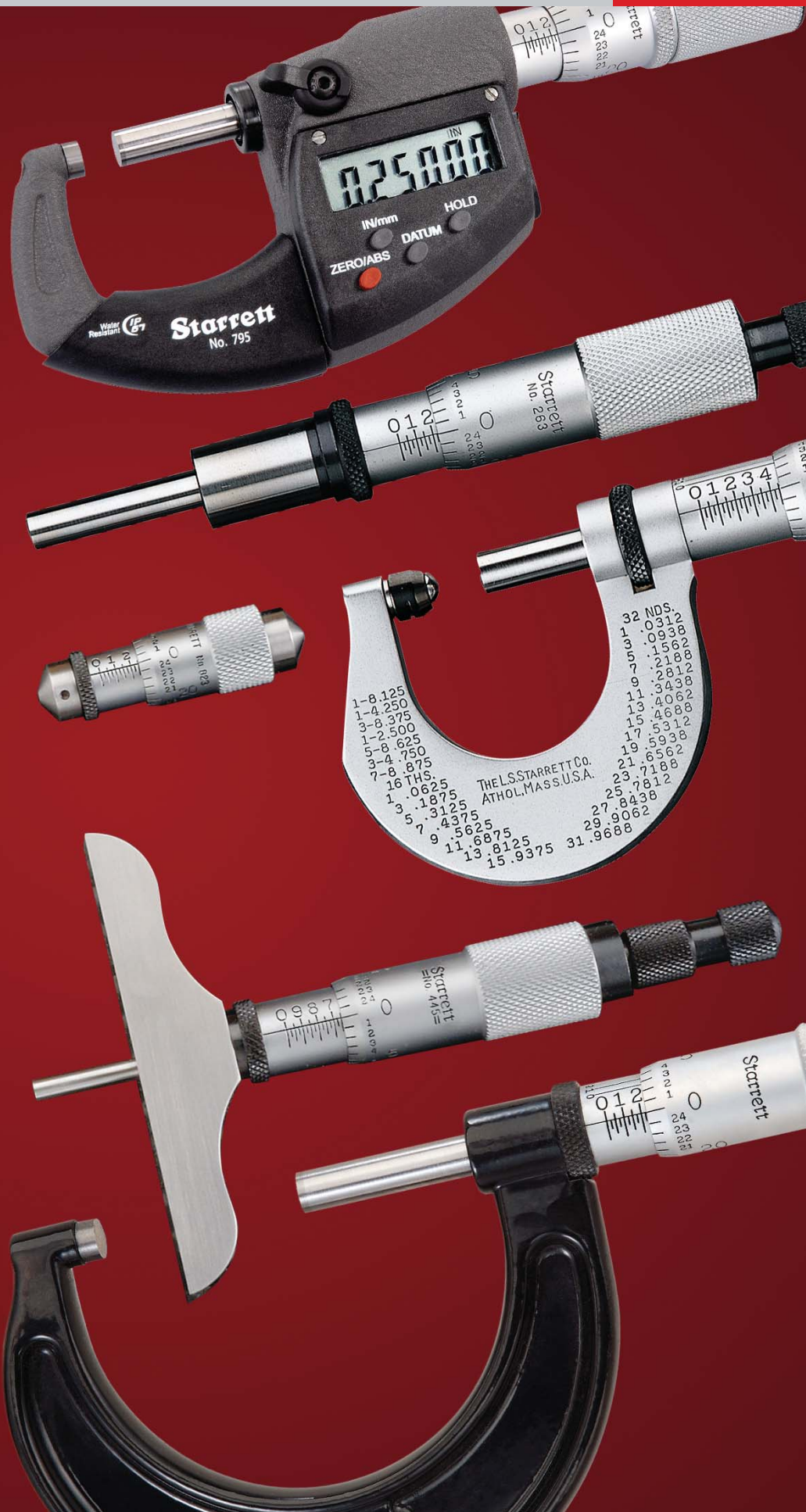
**Key to Starrett Micrometer Numbering System:**

**Prefixes:**

- S – Micrometer Set
- T – .0001" Reading
- V – 0.001mm or 0.002mm Reading, as specified

**Suffixes:**

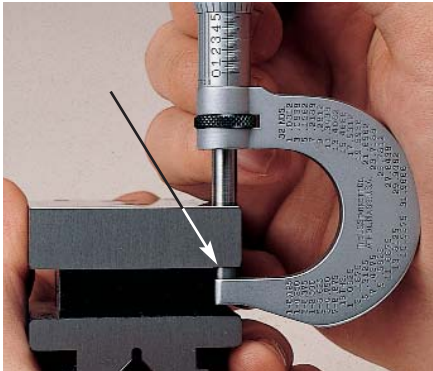
- F – Friction Thimble
- L – Lock Nut
- M – Metric
- P – Plain
- R – Ratchet Stop
- X – Carbide Measuring Faces
- Z – With Case
- ZZ – Case Only



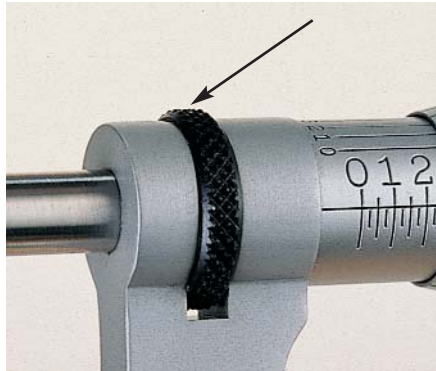




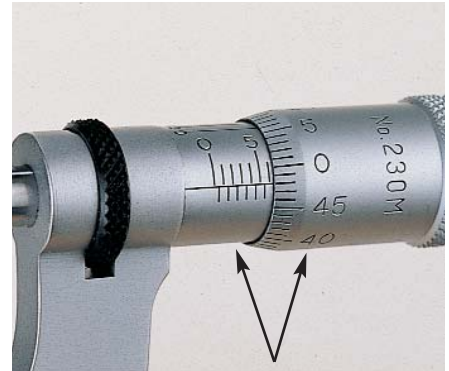
## **Starrett Reliable Precision Micrometer Design and Manufacturing Features**



**Tapered frame – a Starrett original feature –** permits measurements in narrow slots and tight places. Standard with Starrett.



**Ring-type lock nut** convenient to use. Permits locking of spindle at any reading.



**Easy to read** with distinct black figures against satin-chrome finish.



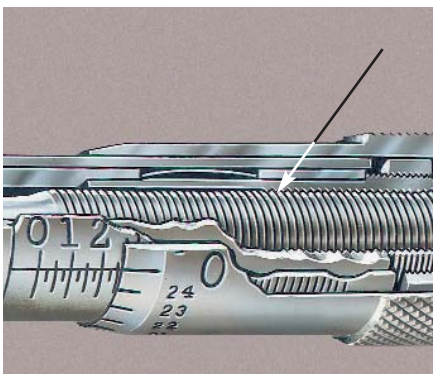
**Staggered graduations, advanced design, a Starrett original feature.** Quick reading figures on inch reading micrometers. Every graduation numbered for quick, positive identification. **Easy to read** with distinct black figures against satin-chrome finish.



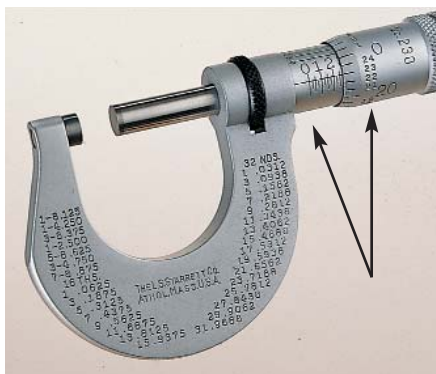
**Friction thimble**, smooth uniform pressure independent of “feel.”



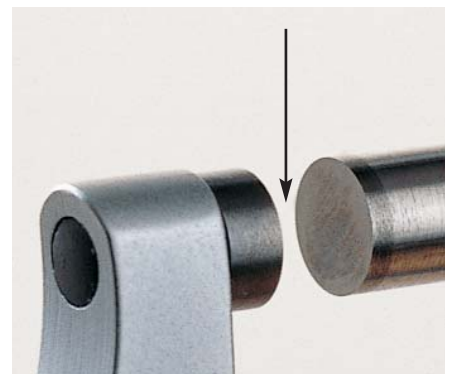
**Ratchet stop/speeder** for consistent measurements and to speed opening or closing of tool.



**EXTRA HARD THREADS WITH EXTREME LEAD ACCURACY.** Special high carbon steel gives harder threads which are hardened, stabilized, and precision ground from the solid to insure long and accurate life.



**Balanced design; plus no-glare satin chrome finish** makes the tool easy to hold and read, plus resistant to stains, corrosion and wear.



**MICRO-LAPPED “MIRROR” FINISH** on the measuring faces – a Starrett original feature that insures more accurate measurements. Available with carbide faces or hardened, high-carbon steel faces.

**NOTE:** No. 230 Micrometer series used in illustrations.



### Micrometer Quality and Accuracy

Product quality and accuracy cannot be valid unless referenced to a quality and accuracy standard.

All Starrett precision measuring tool standards meet or exceed accuracy and performance specifications of national and international standards and are traceable to the National Institute of Standards and Technology.

The Starrett Company does not rely on statistical sampling inspection. Every precision measuring tool is individually inspected.

### Starrett Micrometer Accuracy Standards

(Unless Otherwise Noted on the Catalog Page)

|                   | Range | Readout | Accuracy |
|-------------------|-------|---------|----------|
| <b>Mechanical</b> | 1"    | .001"   | ±.0001"  |
|                   | 1"    | .0001"  | ±.00005" |
|                   | 25mm  | 0.01mm  | ±0.002mm |
|                   | 25mm  | 0.001mm | ±0.002mm |
| <b>Electronic</b> | 1"    | .00005" | ±.0001"  |
|                   | 25mm  | 0.001mm | ±0.002mm |

All Starrett micrometers have the same accurate heads as outlined in the chart. Further inaccuracies because of size can be minimized if the tools are set accurately to

standard, and measurements are carried out in a similar position with similar pressure.

### Measuring Tips from Our Experience

- ◆ Most obvious to everyone is to keep the work to be measured and the micrometer anvil and spindle faces clean.
- ◆ For very fine measurements, the micrometer should be set to zero or to a standard by your "feel", by the friction thimble, or by the ratchet, whichever you will be using.
- ◆ The most popular micrometer option has been the ratchet speeder because it does three things well – it speeds opening and closing, it applies uniform pressure from the ratchet, and it allows for using the thimble for individual "feel".
- ◆ The speeder is helpful because it takes forty turns to cover the range of a typical English-reading tool and fifty turns to cover the range of a metric-reading tool.
- ◆ Large micrometers especially should be set to a standard in the same approximate position in which they will be used, that is, vertical or horizontal, to minimize any frame flexure influence.
- ◆ Too much speed in approaching the work will result in an inaccurate measurement.
- ◆ If the micrometer has been set to a flat standard, you can get approximately .0001" (0.0025mm) difference when measuring over a round because the same pressure is being applied to a point or line contact.
- ◆ Carbide or hardened steel measuring faces are a matter of choice. Carbide wears longer but many craftsmen think they get a better "feel" with highly finished steel measuring surfaces.
- ◆ Insulating pads on micrometers are a matter of personal preference. With the Starrett balanced micrometer design, there is no need for insulation. Insulation from hand heat is usually more beneficial on long sections, such as end measuring rods.

### How to Adjust Starrett Micrometers

Adjustments to Starrett Micrometers are rarely needed; however, if it becomes necessary, they can be readily adjusted in two easy operations as follows:



**1.** If any play should develop in the spindle screw threads due to wear of the spindle nut after long use, first back off the thimble, insert the spanner wrench in the slot of the adjusting nut and tighten just enough to eliminate play. Illustration shows how easily this is done.



**2.** After carefully cleaning all dirt or grit from the measuring faces of anvil and spindle, bring them together and insert the spanner wrench in the small slot of the sleeve. Then turn the sleeve until the line on the sleeve coincides with the zero line on the thimble as shown.



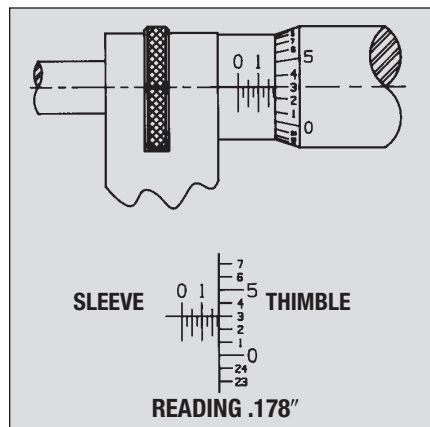
## How to Read a Starrett Micrometer Graduated in Thousandths of an Inch (.001")

The pitch of the screw thread on the spindle is 40 threads per inch. One revolution of the thimble advances the spindle face toward or away from the anvil face precisely 1/40" or .025 inches.

The reading line on the sleeve is divided into 40 equal parts by vertical lines that correspond to the number of threads on the spindle. Therefore, each vertical line designates 1/40" or .025 inches. Lines vary in length for easy reading. Every fourth line, which is longer than the others, designates a hundred thousandth. For example: the line marked "1" represents .100" and the line marked "2" represents .200", etc.

The beveled edge of the thimble is divided into 25 equal parts with each line representing .001" and every line numbered consecutively. Rotating the thimble from one of these lines to the next moves the spindle longitudinally 1/25 of .025", or .001". Rotating two divisions represents .002", etc. Twenty-five divisions indicate a complete revolution of .025" or 1/40 of an inch.

To read the micrometer in thousandths, multiply the number of vertical divisions visible on the sleeve by .025", and to this add the number of thousandths indicated by the line on the thimble which coincides with the reading line on the sleeve.



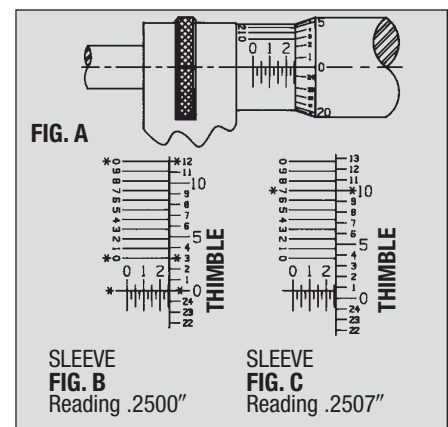
**EXAMPLE:**  
 The "1" line on sleeve is visible, representing .100"  
 There are 3 additional lines visible, each representing .025"  
 $3 \times .025" = .075"$   
 Line "3" on the thimble coincides with the reading line on the sleeve, each line representing .001"  
 $3 \times .001" = .003"$   
 The micrometer reading is .178"

## How to Read a Starrett Micrometer Graduated in Ten-Thousandths of an Inch (.0001")

Starrett micrometers graduated in ten-thousandths of an inch read like micrometers graduated in thousandths, except that an additional reading in ten-thousandths is obtained from a vernier scale on the sleeve.

The vernier consists of ten divisions on the sleeve, which occupy the same space as nine divisions on the thimble (Fig. B). Therefore, the difference between the width of one of the ten spaces on the vernier and one of the nine spaces on the thimble is one-tenth of a division on the thimble, or one ten-thousandth (.0001").

To read a ten-thousandths micrometer, first obtain the thousandths reading, then see which of the lines on the vernier coincides with a line on the thimble. If it is the line marked "1" on the sleeve, add one ten-thousandth, if it is the line marked "2", add two ten-thousandths, etc.



**FIGURE C – READING .2507"**  
 The "2" line on sleeve is visible, representing .200"  
 There are two additional lines visible, each representing .025" .050"  
 The reading line on the sleeve lies between the "0" and "1" on the thimble indicating that a vernier reading must be added  
 The "7" line is the only line on the vernier that coincides with a line on the thimble, representing  
 $7 \times .0001" = .0007"$   
 The micrometer reading is .2507"





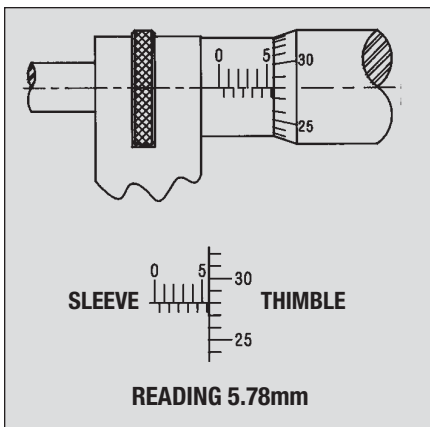
### How to Read a Starrett Micrometer Graduated in Hundredths of a Millimeter (0.01mm)

The pitch of the screw thread is one-half millimeter (0.5mm). One revolution of the thimble advances the spindle face toward or away from the anvil face precisely 0.5mm.

The reading line on the sleeve is graduated above the line in millimeters (1.0mm) with every fifth millimeter being numbered from 0 to 25. Each millimeter is also divided in half (0.5mm) below the reading line. It requires two revolutions of the thimble to advance the spindle 1.0mm.

The beveled edge of the thimble is divided into fifty equal parts, with each line representing 0.01mm and every fifth line being numbered from 0 to 50. Rotating the thimble from one of these lines to the next moves the spindle longitudinally 0.01mm; rotating two divisions represents 0.02mm, etc.

To read the micrometer, add the number of millimeters and half-millimeters visible on the sleeve to the number of hundredths of a millimeter indicated by the thimble graduation which coincides with the reading line on the sleeve.



**EXAMPLE:**

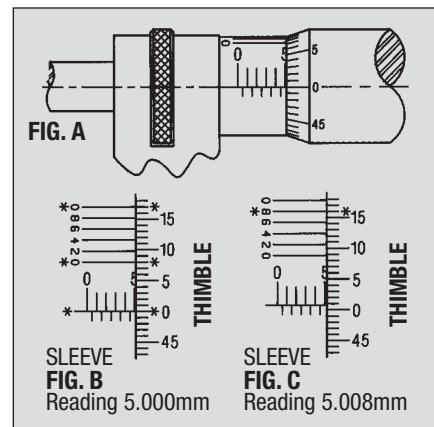
The 5mm sleeve graduation is visible ..... 5.00mm  
 One additional 0.5mm line is visible on the sleeve ..... 0.50mm  
 Line 28 on the thimble coincides with the reading line on the sleeve, so 28 x 0.01mm ..... = 0.28mm  
 The micrometer reading is .... 5.78mm

### How to Read a Starrett Vernier Micrometer Graduated in Two-Thousandths of a Millimeter (0.002mm)

Metric vernier micrometers graduated in 0.002mm are used like those graduated in hundredths of a millimeter (0.01mm), except that an additional reading in two-thousandths of a millimeter (0.002mm) is obtained from a vernier scale on the sleeve.

The vernier consists of five divisions on the sleeve, which occupy the same space as nine divisions on the thimble (Fig. B). Therefore, the difference between the width of one of the five spaces on the vernier and one of the nine spaces on the thimble is one-fifth or two-tenths of a division on the thimble, or two-thousandths (0.002mm).

To read a 0.002mm micrometer, first obtain the hundredth of a millimeter (0.01mm) reading, then see which of the lines on the vernier coincides with a line on the thimble. If it is the line marked "2" add 0.002mm, if it is the line marked "4" add 0.004mm, etc.



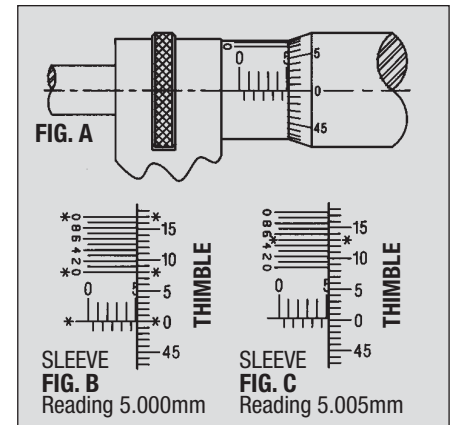
**FIGURE C – READING 5.008mm**

The 5mm sleeve graduation is visible ..... 5.000mm  
 No additional lines on the sleeve are visible ..... 0.000mm  
 The reading line on the sleeve lies between zero and the first line on the thimble, indicating that a vernier reading must be added. ....  
 Line 8 on the vernier is the only line that coincides with a line on the thimble ..... 0.008mm  
 The micrometer reading is ..... 5.008mm

### How to Read a Starrett Vernier Micrometer Graduated in One-Thousandth of a Millimeter (0.001mm)

Reading a 0.001mm micrometer is exactly like reading a 0.002mm micrometer except that there are ten divisions on the vernier occupying the same space as nine divisions on the thimble (Fig. B). Therefore, the difference between the width of one of the spaces on the vernier and one of the nine spaces on the thimble is one-tenth of a division on the thimble, or one-thousandth (0.001mm).

First obtain the hundredth of a millimeter (0.01mm) reading. Next, see which of the lines on the vernier coincides with a line on the thimble. If it is the first line add 0.001mm to the reading, if it is the second line add 0.002mm, etc. Only every second vernier line is numbered on a 0.001mm reading tool because of space congestion.



**FIGURE C – READING 5.005mm**

The 5mm sleeve graduation is visible, representing ..... 5.000mm  
 No additional lines on the sleeve are visible ..... 0.000mm  
 The reading line on the sleeve lies between zero and the first line on the thimble, indicating that a vernier reading must be added .....  
 Line 5 on the vernier is the only line that coincides with a line on the thimble ..... 0.005mm  
 The micrometer reading is ..... 5.005mm



NEW

## Electronic Micrometers

**No. 795 Series (with output) 0-1" (0-25mm)**

**No. 796 Series (without output) 0-1" (0-25mm)**

Starrett 795 and 796 Electronic Micrometers provide an IP67 level of protection against coolant, water, chips, dirt, dust, and other contaminants in hostile shop environments.

The 795 includes an RS232 output port for data transmission and works well with Starrett DataSure® Wireless Data Collection Systems. The 796 has all of the features of the 795 except that it does not include output.

These full-featured electronic micrometers are built with customary Starrett quality and workmanship.

### Features and Specifications

- ◆ Large, easy-to-read (.275"/7mm), high-contrast LCD digital readout
- ◆ IP67 level of protection against coolant, water, dust and dirt
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve
- ◆ Balanced, tapered frame for comfortable and accurate measuring
- ◆ Smooth friction thimble for uniform pressure
- ◆ Extremely hard, and stable one piece spindle, the heart of our accuracy and smooth operating one-piece friction thimble
- ◆ Two 3-volt batteries included for more than one year of normal usage
- ◆ Micro-lapped carbide measuring faces
- ◆ Automatic OFF after 20 minutes of nonuse
- ◆ Instant inch/millimeter conversion
- ◆ Measurement HOLD button
- ◆ 795 model includes RS232 output
- ◆ Ability to zero tool at any position as well as retain and return to the true zero reading of the micrometer
- ◆ Resolution: .00005" (0.001mm)
- ◆ Accuracies: Inch: ±.0001" Metric: ±.002mm



**796XRL Electronic Micrometer**



**795XFL Electronic Micrometer with Output**



The output jack on the 795 allows data transmission by connecting to a Starrett DataSure® Wireless Data Collection System End Node (above) or through a traditional wire.

| Range            | Description   | Cat. No.           | EDP   |
|------------------|---|--------------------|-------|
| 0-1" & 0-25mm    | Friction Thimble, spindle lock, carbide faces, shell & thimble inch grads., with output & case    | <b>795XFL-1</b>    | 67827 |
| 0-1" & 0-25mm    | Ratchet stop, lock nut, carbide faces, shell & thimble inch grads., with output & case            | <b>795XRL-1</b>    | 69085 |
| 0-25mm & 0-.984" | Friction Thimble, spindle lock, carbide faces, shell & thimble metric grads., with output & case  | <b>795MEXFL-25</b> | 69077 |
| 0-1" & 0-25mm    | Friction Thimble, spindle lock, carbide faces, shell & thimble inch grads., with case, no output  | <b>796XFL-1</b>    | 67828 |
| 0-1" & 0-25mm    | Ratchet stop, lock nut, carbide faces, shell & thimble inch grads., with case, no output          | <b>796XRL-1</b>    | 69089 |
| 0-25mm & 0-.984" | Friction Thimble, spindle lock, carbide faces, shell & thimble metric grads.,with case, no output | <b>796MXFL-25</b>  | 69084 |

### Accessories

|   |                  |       |
|---|------------------|-------|
| 1m Shielded Cable to Starrett 795                             | <b>PT62680-1</b> | 62021 |
| 2m Shielded Cable to Starrett 795                             | <b>PT62680-2</b> | 62022 |
| 3m Shielded Cable to Starrett 795                             | <b>PT62680-3</b> | 62023 |
| Adaptor from PT62680-1, PT62680-2 and PT62680-3 to PC (RS232) | <b>PT61768</b>   | 66454 |
| Two 3-volt Batteries, No. CR2032                              | <b>PT99492</b>   | 65650 |



**795 & 796 Micrometers have IP67 protection against coolant, water, chips, dirt, and dust**

Micrometers include protective cases. Packed one per box with instructions.



### Electronic Micrometers

#### No. 733 Series

(with output) 0-24" (0-600mm)

#### No. 734 Series

(without output) 0-1" (0-25mm)

The 733 and 734 are full function electronic outside micrometer a full range of features.

The 733 Series is offered in a wide variety of sizes up to 24" and includes output.

The 734 Series is available in a 0-1" (0-25mm) inch/millimeter version and a 0-25mm metric-only version, both without output.

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve
- ◆ Balanced frame design for comfortable and accurate measuring
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Smooth friction thimble for uniform pressure
- ◆ The anvil and spindle diameter is .250" (6.35mm)
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places
- ◆ Extremely hard and stable one-piece spindle
- ◆ Micro-lapped carbide measuring faces
- ◆ Includes one 3-volt battery for over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Instant inch/millimeter conversion (except on 734 metric-only model)
- ◆ "ME" millimeter models will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits except on straight metric models
- ◆ The output jack (733 Series only) allows data transmission, either through a traditional wire or by connecting to a Starrett DataSure® Wireless Data Collection System end node



The 733 provides the ability to output measurements to a variety of peripherals, either through a traditional wire (left), or by connecting to a Starrett DataSure® Wireless Data Collection System End Node (below).



#### 734 Series (without output)

This tool is a basic electronic micrometer. It has no output but has all the ease of handling and accuracy features of the No. 733 full function micrometer.



The 734 Series (above) without output

| Catalog No. | EDP No. | Range        | Description                      |
|-------------|---------|--------------|----------------------------------|
| 734XFL-1    | 64253   | 0-1", 0-25mm | Inch and millimeter measurements |
| 734MXFL-25  | 65442   | 0-25mm       | Millimeter only measurements     |
| 949         | 63874   |              | Case Only for No. 734 Series     |

#### Specifications (733 & 734 Series)

| Description                   | Inch    | Millimeter |
|-------------------------------|---------|------------|
| Resolution through 4" (100mm) | .00005" | 0.001mm    |
| Resolution over 4" (100mm)    | .0001"  | 0.001mm    |
| Accuracy**                    | ±.0001" | ±0.002mm   |

\*\*Accuracies above 1" (25mm) are as good as setting to a gage because the mechanical and electronic components are the same on all ranges.





**No. 733 Series  
Specifications**

**With Standard Inch Graduations on Shell and Thimble**

|       | Range     |                  | Resolution |                   | Catalog No.            | EDP No.          |
|-------|-----------|------------------|------------|-------------------|------------------------|------------------|
|       | Inch      | Approx. mm       | Inch       | mm                |                        |                  |
|       | 0 - 1     | 0 - 25.4         | .00005     | 0.001             | <b>733XFL-1</b>        | 64239            |
|       |           |                  |            |                   | <b>733XFL-1 W/SLC*</b> | 66905            |
|       | 1 - 2     | 25.4 - 50.8      | .00005     | 0.001             | <b>733XFLZ-2</b>       | 64241            |
|       | 2 - 3     | 50.8 - 76        |            |                   | <b>733XFLZ-3</b>       | 64242            |
|       | 3 - 4     | 76 - 101         |            |                   | <b>733XFLZ-4</b>       | 64243            |
|       | 4 - 5     | 101 - 127        | .0001      |                   | <b>733XFLZ-5</b>       | 64244            |
| 5 - 6 | 127 - 152 | <b>733XFLZ-6</b> |            |                   | 64245                  |                  |
|       | 6 - 7     | 152 - 178        | .0001      |                   | 0.001                  | <b>733XFLZ-7</b> |
|       | 7 - 8     | 178 - 203        |            | <b>733XFLZ-8</b>  |                        | 64247            |
|       | 8 - 9     | 203 - 228        |            | <b>733XFLZ-9</b>  |                        | 64248            |
|       | 9 - 10    | 228 - 254        |            | <b>733XFLZ-10</b> |                        | 64249            |
|       | 10 - 11   | 254 - 279        |            | <b>733XFLZ-11</b> |                        | 64250            |
|       | 11 - 12   | 279 - 305        |            | <b>733XFLZ-12</b> |                        | 64251            |
|       | 12 - 13   | 305 - 330        |            | <b>733XFLZ-13</b> |                        | 64415            |
|       | 13 - 14   | 330 - 355        |            | <b>733XFLZ-14</b> |                        | 64416            |
|       | 14 - 15   | 355 - 381        |            | <b>733XFLZ-15</b> |                        | 64417            |
|       | 15 - 16   | 381 - 406        |            | <b>733XFLZ-16</b> |                        | 64418            |
|       | 16 - 17   | 406 - 432        |            | <b>733XFLZ-17</b> |                        | 64419            |
|       | 17 - 18   | 432 - 457        |            | <b>733XFLZ-18</b> |                        | 64420            |
|       | 18 - 19   | 457 - 482        |            | <b>733XFLZ-19</b> |                        | 64421            |
|       | 19 - 20   | 482 - 508        |            | <b>733XFLZ-20</b> |                        | 64422            |
|       | 20 - 21   | 508 - 533        |            | <b>733XFLZ-21</b> |                        | 64423            |
|       | 21 - 22   | 533 - 559        |            | <b>733XFLZ-22</b> |                        | 64424            |
|       | 22 - 23   | 559 - 584        |            | <b>733XFLZ-23</b> |                        | 64425            |
|       | 23 - 24   | 584 - 609        |            | <b>733XFLZ-24</b> |                        | 64426            |

Furnished with standards.

\* Includes redemption card for Standard Letter of Certification (SLC).

**No. 733 Series Accessories**

|  |                |       |
|--|----------------|-------|
| Computer Interface Cable Complete to PC (RS232C)                               | <b>PT61963</b> | 66636 |
| Adaptor from No. PT22938 Cable to PC (RS232C)                                  | <b>PT61768</b> | 66454 |
| Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor | <b>PT22938</b> | 64059 |
| One 3-Volt Battery No. CR2450 (for both Nos. 733 & 734)                        | <b>PT61120</b> | 65446 |



Micrometers are furnished in protective cases.  
Deluxe padded case for 1" micrometer available  
by ordering No. 949, EDP 63874.  
Packed one per box with instructions.

**For millimeter models, see next page.**



### No. 733 Series Specifications

#### With Standard Millimeter Graduations on Shell and Thimble

|   | Range         |                     | Resolution          |        | Catalog No.         | EDP No. |
|---|---------------|---------------------|---------------------|--------|---------------------|---------|
|   | mm            | Approx. Inch        | mm                  | Inch   |                     |         |
|  | 0 - 25        | 0 - .984            | 0.001               | .00005 | <b>733MEXFL-25</b>  | 65440   |
|   | 25 - 50       | .984 - 1.968        | 0.001               | .00005 | <b>733MEXFL-50</b>  | 65441   |
|   | 50 - 75       | 1.968 - 2.950       |                     |        | <b>733MEXFL-75</b>  | 66079   |
|   | 75 - 100      | 2.950 - 3.930       |                     |        | <b>733MEXFL-100</b> | 66080   |
|   | 100 - 125     | 3.930 - 4.920       |                     | .0001  | <b>733MEXFL-125</b> | 66081   |
|   | 125 - 150     | 4.920 - 5.900       |                     |        | <b>733MEXFL-150</b> | 66082   |
| 150 - 175   | 5.900 - 6.890 | <b>733MEXFL-175</b> |                     |        | 66083               |         |
|  | 175 - 200     | 6.890 - 7.870       | 0.001               | .0001  | <b>733MEXFL-200</b> | 66084   |
|   | 200 - 225     | 7.870 - 8.850       |                     |        | <b>733MEXFL-225</b> | 66085   |
|   | 225 - 250     | 8.850 - 9.840       |                     |        | <b>733MEXFL-250</b> | 66086   |
|   | 250 - 275     | 9.840 - 10.820      |                     |        | <b>733MEXFL-275</b> | 66087   |
|   | 275 - 300     | 10.820 - 11.810     |                     |        | <b>733MEXFL-300</b> | 66088   |
|   | 300 - 325     | 11.810 - 12.790     |                     |        | <b>733MEXFL-325</b> | 66089   |
|   | 325 - 350     | 12.790 - 13.770     |                     |        | <b>733MEXFL-350</b> | 66090   |
|   | 350 - 375     | 13.770 - 14.760     |                     |        | <b>733MEXFL-375</b> | 66091   |
|   | 375 - 400     | 14.760 - 15.740     |                     |        | <b>733MEXFL-400</b> | 66092   |
|   | 400 - 425     | 15.740 - 16.730     |                     |        | <b>733MEXFL-425</b> | 66093   |
|   | 425 - 450     | 16.730 - 17.710     |                     |        | <b>733MEXFL-450</b> | 66094   |
|   | 450 - 475     | 17.710 - 18.700     |                     |        | <b>733MEXFL-475</b> | 66095   |
|   | 475 - 500     | 18.700 - 19.680     |                     |        | <b>733MEXFL-500</b> | 66096   |
|   | 500 - 525     | 19.680 - 20.660     |                     |        | <b>733MEXFL-525</b> | 66097   |
|   | 525 - 550     | 20.660 - 21.650     |                     |        | <b>733MEXFL-550</b> | 66098   |
|   | 550 - 575     | 21.650 - 22.630     |                     |        | <b>733MEXFL-575</b> | 66099   |
|   | 575 - 600     | 22.630 - 23.620     | <b>733MEXFL-600</b> | 66100  |                     |         |

Furnished with standards.

#### Accessories

|  |                |       |
|--|----------------|-------|
| Computer Interface Cable Complete to PC (RS232C)                               | <b>PT61963</b> | 66636 |
| Adaptor from No. PT22938 Cable to PC (RS232C)                                  | <b>PT61768</b> | 66454 |
| Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor | <b>PT22938</b> | 64059 |
| One 3-Volt Battery No. CR2450 (for 733 & 734)                                  | <b>PT61120</b> | 65446 |

| Description                          | Millimeter | Inch    |
|--------------------------------------|------------|---------|
| <b>Resolution through 100mm (4")</b> | 0.001mm    | .00005" |
| <b>Resolution over 100mm (4")</b>    | 0.001mm    | .0001"  |
| <b>Accuracy*</b>                     | ±0.002mm   | ±.0001" |

Micrometers are furnished in protective plastic case No. 957, EDP 66565. Deluxe padded case for 25mm micrometer available by ordering No. 949, EDP 63874. Packed one per box with instructions.

\*Accuracies above 25mm (1") are as good as setting to a gage because the mechanical and electronic components are the same on all ranges.



## Digital Micrometers

**No. 216 Series 0-12"**

**No. 216M Series 0-300mm**

This is the Starrett mechanical digital micrometer – simple to use even by the inexperienced. The anvil and spindle are sized at .250" (6.35mm).

### Readability Features

- ◆ Clear, easily read numbers reduce errors
- ◆ No-glare black finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve
- ◆ .001" or .01mm is read directly from the counter
- ◆ .0001" or .001mm is read from the vernier scale on the micrometer sleeve

### Ease-of-Handling Features

- ◆ Balanced frame design for comfortable and accurate measuring
- ◆ Ring-type knurled lock nut for quick and sure locking



Available in inch and millimeter models. Shown above: top, No. T216XFL-2 (2" model); bottom, No. 216MXRL-25 (25mm model).

- ◆ A choice of smooth friction thimble for uniform pressure on the 1-4" sizes or the combination ratchet and speeder for uniform pressure and quicker adjustment on all sizes
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

### Accuracy and Long-Life Features

- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Starrett workmanship

## Digital Micrometer Set

**No. S216 0-3"**

Set of three digital micrometers – furnished with ratchet stop, lock nut, and standards, in case.

- ◆ Set consists of three micrometers: 0-1", 1-2", and 2-3"
- ◆ .001" is read directly from the counter
- ◆ .0001" is read from the sleeve
- ◆ Clear, easily read numbers
- ◆ Balanced frame design and extremely hard and stable one-piece spindle
- ◆ Micro-lapped carbide measuring faces



| Catalog No. | EDP No. | Description  |
|-------------|---------|--|
| ST216AXRLZ  | 66526   | Set 0-3", .0001" Grad., Carbide Faces, Ratchet Stop, Lock Nut, with Standards, in Case |





### No. 216 Series Graduation - .001" Specifications

| Range  | Measuring Faces | Ratchet Stop and Lock Nut |         | Friction Thimble and Lock Nut |         | Plain         |         | Case Only      |            |       |
|--------|-----------------|---------------------------|---------|-------------------------------|---------|---------------|---------|----------------|------------|-------|
|        |                 | Catalog No.               | EDP No. | Catalog No.                   | EDP No. | Cat. No.      | EDP No. | Cat. No.       | EDP No.    |       |
| 0-1"   | Steel           | <b>216RL-1</b>            | 55953   | <b>216FL-1</b>                | 55954   | <b>216P-1</b> | 55952   | <b>942</b>     | 55961      |       |
|        | Carbide         | <b>216XRL-1</b>           | 55955   | <b>216XFL-1</b>               | 55956   |               |         |                |            |       |
| 1-2"   | Steel           | <b>216RL-2</b>            | 56153   | <b>216FL-2</b>                | 56257   |               |         | <b>216ZZ-2</b> | 56171      |       |
| 2-3"   |                 | <b>216RL-3</b>            | 56205   | <b>216FL-3</b>                | 56206   |               |         |                | <b>922</b> | 55222 |
| 3-4"   |                 | <b>216RL-4</b>            | 56208   | <b>216FL-4</b>                | 56209   |               |         |                | <b>952</b> | 55223 |
| 4-5"   |                 | <b>216RL-5</b>            | 63470   |                               |         |               |         |                | <b>953</b> | 55224 |
| 5-6"   |                 | <b>216RL-6</b>            | 63471   |                               |         |               |         |                | <b>954</b> | 55225 |
| 6-7"   | Carbide         | <b>216XRL-7</b>           | 63628   |                               |         |               |         | <b>930</b>     | 55276      |       |
| 7-8"   |                 | <b>216XRL-8</b>           | 63629   |                               |         |               |         |                | <b>931</b> | 55277 |
| 8-9"   |                 | <b>216XRL-9</b>           | 63630   |                               |         |               |         |                | <b>932</b> | 55278 |
| 9-10"  |                 | <b>216XRL-10</b>          | 63631   |                               |         |               |         |                | <b>933</b> | 55279 |
| 10-11" |                 | <b>216XRL-11</b>          | 63632   |                               |         |               |         |                | <b>934</b> | 55280 |
| 11-12" |                 | <b>216XRL-12</b>          | 63633   |                               |         |               |         |                | <b>935</b> | 55281 |

### Graduation - .0001"

|        |                   |                         |       |                         |            |       |  |                |       |            |       |
|--------|-------------------|-------------------------|-------|-------------------------|------------|-------|--|----------------|-------|------------|-------|
| 0-1"   | Carbide           | <b>T216XRL-1</b>        | 55959 | <b>T216XFL-1</b>        | 55960      |       |  | <b>942</b>     | 55961 |            |       |
|        |                   | <b>T216XRL-1 W/SLC*</b> | 66904 | <b>T216XFL-1 W/SLC*</b> | 66903      |       |  |                |       |            |       |
| 1-2"   |                   | <b>T216XRL-2</b>        | 56156 | <b>T216XFL-2</b>        | 56157      |       |  | <b>216ZZ-2</b> | 56171 |            |       |
| 2-3"   |                   | <b>T216XRL-3</b>        | 63491 | <b>T216XFL-3</b>        | 63634      |       |  |                |       | <b>922</b> | 55222 |
| 3-4"   |                   | <b>T216XRL-4</b>        | 63492 | <b>T216XFL-4</b>        | 63635      |       |  |                |       | <b>952</b> | 55223 |
| 4-5"   |                   | <b>T216XRL-5</b>        | 63493 |                         |            |       |  |                |       | <b>953</b> | 55224 |
| 5-6"   |                   | <b>T216XRL-6</b>        | 63494 |                         |            |       |  |                |       | <b>954</b> | 55225 |
| 6-7"   |                   | <b>T216XRL-7</b>        | 63495 |                         |            |       |  |                |       | <b>930</b> | 55276 |
| 7-8"   |                   | <b>T216XRL-8</b>        | 63496 |                         |            |       |  |                |       | <b>931</b> | 55277 |
| 8-9"   |                   | <b>T216XRL-9</b>        | 63497 |                         |            |       |  |                |       | <b>932</b> | 55278 |
| 9-10"  |                   | <b>T216XRL-10</b>       | 63498 |                         |            |       |  |                |       | <b>933</b> | 55279 |
| 10-11" |                   | <b>T216XRL-11</b>       | 63499 |                         |            |       |  |                |       | <b>934</b> | 55280 |
| 11-12" | <b>T216XRL-12</b> | 63500                   |       |                         | <b>935</b> | 55281 |  |                |       |            |       |

### Graduation - 0.01mm

|           |         |                    |       |                   |       |  |  |            |       |
|-----------|---------|--------------------|-------|-------------------|-------|--|--|------------|-------|
| 0-25mm    | Carbide | <b>216MXRL-25</b>  | 55983 | <b>216MXFL-25</b> | 55984 |  |  | <b>942</b> | 55961 |
| 25-50mm   |         | <b>216MXRL-50</b>  | 65602 |                   |       |  |  |            |       |
| 50-75mm   |         | <b>216MXRL-75</b>  | 65603 |                   |       |  |  | <b>922</b> | 55222 |
| 75-100mm  |         | <b>216MXRL-100</b> | 65604 |                   |       |  |  | <b>952</b> | 55223 |
| 100-125mm |         | <b>216MXRL-125</b> | 64351 |                   |       |  |  | <b>953</b> | 55224 |
| 125-150mm |         | <b>216MXRL-150</b> | 64352 |                   |       |  |  | <b>954</b> | 55225 |
| 150-175mm |         | <b>216MXRL-175</b> | 64353 |                   |       |  |  | <b>930</b> | 55276 |
| 175-200mm |         | <b>216MXRL-200</b> | 64354 |                   |       |  |  | <b>931</b> | 55277 |
| 200-225mm |         | <b>216MXRL-225</b> | 64355 |                   |       |  |  | <b>932</b> | 55278 |
| 225-250mm |         | <b>216MXRL-250</b> | 64356 |                   |       |  |  | <b>933</b> | 55279 |
| 250-275mm |         | <b>216MXRL-275</b> | 64357 |                   |       |  |  | <b>934</b> | 55280 |
| 275-300mm |         | <b>216MXRL-300</b> | 64358 |                   |       |  |  | <b>935</b> | 55281 |

### Graduation - 0.001mm

|          |         |                     |       |                    |       |  |  |            |       |
|----------|---------|---------------------|-------|--------------------|-------|--|--|------------|-------|
| 0-25mm   | Carbide | <b>V216MXRL-25</b>  | 56037 | <b>V216MXFL-25</b> | 56036 |  |  | <b>942</b> | 55961 |
| 25-50mm  |         | <b>V216MXRL-50</b>  | 64348 |                    |       |  |  |            |       |
| 50-75mm  |         | <b>V216MXRL-75</b>  | 64349 |                    |       |  |  | <b>922</b> | 55222 |
| 75-100mm |         | <b>V216MXRL-100</b> | 64350 |                    |       |  |  | <b>952</b> | 55223 |

**NOTE:** \* Includes redemption card for Standard Letter of Certification (SLC).

No. 234 (inch) and No. 234M (millimeter) standards are available.

1" and 25mm models are sent in plastic fitted case No. 957, EDP 66565. Deluxe padded case available by ordering No. 942, EDP 55961. All other models are sent without case, unless otherwise ordered. Packed one in a box.



**No. 232 Series 0-1/2"**

**No. 232M Series 0-13mm**

These micrometers are the 1/2" (13mm) companions of the top-of-the-line No. 230 series micrometers. The spindle and anvil are sized at .200" (5mm).

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Convenient decimal equivalents on inch tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

**Accuracy and Long-Life Features**

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



No. 232 is available in inch and millimeter models. Shown (top) No. 232RL and (bottom) No. 232MRL.

**0-1/2" range**

| Catalog No. | EDP No. | Graduation | Description                           |
|-------------|---------|------------|---------------------------------------|
| 232RL       | 50953   | .001"      | Ratchet Stop, Lock Nut                |
| T232RL      | 50955   | .0001"     | Ratchet Stop, Lock Nut                |
| T232XRL     | 50968   | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces |

**0-13mm range**

|          |       |         |                                       |
|----------|-------|---------|---------------------------------------|
| 232MRL   | 50954 | 0.01mm  | Ratchet Stop, Lock Nut                |
| V232MXRL | 64231 | 0.002mm | Ratchet Stop, Lock Nut, Carbide Faces |

Packed one in a box. Attractive, protective case available by ordering No. 921, EDP 55213.



### No. 230 Series 0-1"

### No. 230M Series 0-25mm

This is the jewel of precision micrometers used by skilled workmen worldwide.

The spindle and anvil are sized at .235" (6mm) to reach places most micrometers cannot reach.

#### Readability Features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools
- ◆ Convenient decimal equivalents on inch tools

#### Ease-of-Handling Features

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ A choice of smooth friction thimble for uniform pressure or the combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

#### Accuracy and Long-Life Features

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



Shown above (top) inch model No. T230RL and (bottom) mm model No. V230MXFL.

#### 0-1" range

| Catalog No.          | EDP No. | Graduation | Description  |
|----------------------|---------|------------|--|
| <b>230P</b>          | 50932   | .001"      | Plain  |
| <b>230RL</b>         | 50935   |            | Ratchet Stop, Lock Nut   |
| <b>230FL</b>         | 50938   |            | Friction Thimble, Lock Nut   |
| <b>T230RL</b>        | 50943   | .0001"     | Ratchet Stop, Lock Nut   |
| <b>T230XRL</b>       | 50944   |            | Ratchet Stop, Lock Nut, Carbide Faces  |
| <b>T230XRL W/SLC</b> | 64401   |            | Ratchet Stop, Lock Nut, Carbide Faces, Standard Letter of Certification*     |
| <b>T230FL</b>        | 50946   |            | Friction Thimble, Lock Nut   |
| <b>T230XFL</b>       | 50947   |            | Friction Thimble, Lock Nut, Carbide Faces                                    |
| <b>T230XFL W/SLC</b> | 66916   |            | Friction Thimble, Lock Nut, Carbide Faces, Standard Letter of Certification* |

#### 0-25mm range

|                 |       |         |   |
|-----------------|-------|---------|---|
| <b>V230MXRL</b> | 56017 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces     |
| <b>V230MXFL</b> | 56016 |         | Friction Thimble, Lock Nut, Carbide Faces |

#### CASE

|            |       |                                |
|------------|-------|--------------------------------|
| <b>910</b> | 55397 | Case for 1" (25mm) Micrometers |
|------------|-------|--------------------------------|

\* Includes redemption card for Standard Letter of Certification (SLC).

Sent in fitted case. Deluxe padded case available by ordering No. 910, EDP 55397.





**No. 2 Series 1-2"**

**No. 2M Series 25-50mm**

These micrometers are the 2" (50mm) companions of the top-of-the-line No. 230 micrometer series.

The spindle and anvil are sized at .235" (6mm) to reach places other micrometers cannot.

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered and distinct figures for precise and easy readability
- ◆ Convenient decimal equivalents on inch tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ A choice of smooth friction thimble for uniform pressure or the combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

**Accuracy and Long-Life Features**

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Gage block standard furnished with micrometers
- ◆ Starrett workmanship



The No. 2 Micrometer is available in inch and millimeter models. Left, No. T2XRL; right, No. 2MXRL.

**1-2" range**

| Catalog No. | EDP No. | Graduation | Description   |
|-------------|---------|------------|---|
| T2XRL       | 50024   | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces, 1" Gage Block Standard     |
| T2XFL       | 50025   |            | Friction Thimble, Lock Nut, Carbide Faces, 1" Gage Block Standard |
| 2G          | 64171   |            | 1" Gage Block Standard only                                       |

**25-50mm range**

|        |       |         |   |
|--------|-------|---------|---|
| 2MXRL  | 50026 | 0.01mm  | Ratchet Stop, Lock Nut, Carbide Faces, 25mm Gage Block Standard |
| V2MXRL | 63793 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces, 25mm Gage Block Standard |
| 2MG    | 64172 |         | 25mm Gage Block Standard only                                   |

**CASE**

|     |       |                                  |
|-----|-------|----------------------------------|
| 912 | 55399 | Case for 2" and 50mm Micrometers |
|-----|-------|----------------------------------|

Packed one in a box; sent without case – Attractive, protective case available by ordering No. 912, EDP 55399.



**Outside Micrometers  
with attachment**

**No. 2A 0-2"**

**No. 2MA 0-50mm**

These micrometers are versions of the Nos. 2 and 2M that include an attachment to handle measurements from 0-1" or 0-25mm, thereby extending the total range from 0-2" or 50mm.

Easily and quickly attached to the anvil of the micrometer, it is only necessary to tighten a locking screw to make the conversion. The anvil extension is hardened, ground and lapped. No-glare satin chrome finish.



The No. 2ARL with attachment.

**0-2" range**

| Catalog No. | EDP No. | Graduation | Description  |
|-------------|---------|------------|--|
| 2ARL        | 50027   | .001"      | Ratchet Stop, Lock Nut, Carbide Anvil and Spindle, Hardened Steel Attachment, 1" Gage Block Standard |
| 2G          | 64171   |            | 1" Gage Block Standard only  |

**0-50mm range**

|       |       |        |  |
|-------|-------|--------|--|
| 2MARL | 50029 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Anvil and Spindle, Hardened Steel Attachment, 25mm Gage Block Standard |
| 2MG   | 64172 |        | 25mm Gage Block Standard only  |

Packed one in a box; sent without case. Padded deluxe case for 2" and 50mm micrometers available by ordering No. 912, EDP 55399.



**Micrometers with insulated frames**

**No. 231** 0-1"

**No. 231M** 0-25mm

This is a slightly heavier micrometer with thermal insulators mounted on the frame front and rear. This spindle and anvil are sized at .250" (6.35mm).

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ A combination ratchet and speeder for uniform pressure and quicker adjustment on all sizes
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

**Accuracy and Long-Life Features**

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



**0-1" range**

| Catalog No.    | EDP No. | Graduation | Description                           |
|----------------|---------|------------|---------------------------------------|
| <b>T231XRL</b> | 63967   | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces |

**0-25mm range**

|                 |       |         |                                       |
|-----------------|-------|---------|---------------------------------------|
| <b>V231MXRL</b> | 63969 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces |
|-----------------|-------|---------|---------------------------------------|

Sent in fitted plastic case No. 957, EDP 66565.  
Deluxe padded case available by ordering No. 942, EDP 55961.





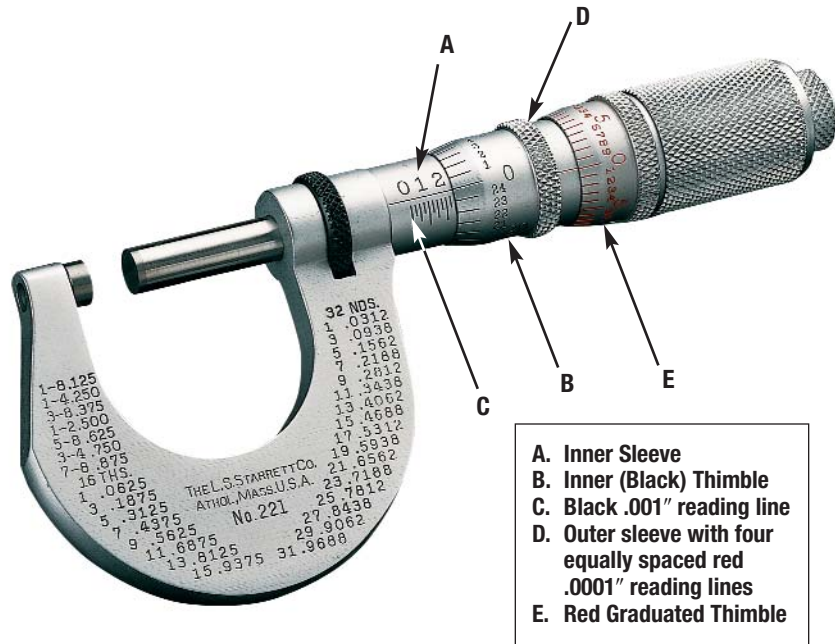
### Hi-Precision Micrometer

#### No. 221 0-1"

No. 221 Hi-Precision Micrometer permits direct readings in ten-thousandths of an inch (.0001") without a vernier, plus automatic control of spindle pressure.

This micrometer features a black graduated inner thimble and sleeve reading in thousandths and a red graduated outer thimble and sleeve with large, widely spaced graduations which give direct readings in ten-thousandths.

It also features an exclusive constant pressure mechanism which eliminates "feel" and automatically insures consistent spindle pressure for every measurement. Extremely easy to use.



**A. Inner Sleeve**  
**B. Inner (Black) Thimble**  
**C. Black .001" reading line**  
**D. Outer sleeve with four equally spaced red .0001" reading lines**  
**E. Red Graduated Thimble**

#### Readability Features

- ◆ Precise instant, direct readings in ten-thousandths of an inch (.0001") – no vernier readings necessary
- ◆ Gives constant spindle pressure for all readings
- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Convenient decimal equivalents on inch tools

#### Ease-of-Handling Features

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

#### Accuracy and Long-Life Features

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship

### How to Read a Starrett Hi-Precision Micrometer

This micrometer is accurate within .00005" throughout the range.

**(1)** Using the micrometer conventionally, bring the measuring faces up snug to the piece being measured, and then "load" the micrometer by continuing to rotate the red graduated thimble through ten of its divisions. (There are four equally spaced red reading lines on the .0001" reading sleeve and four sets of numbered red graduations on the .0001" thimble reading zero to nine. This allows you to read the .0001" graduations no matter what position the micrometer is held.)

**(2)** Hold this "loaded" position and now observe the black .001" graduations on the inner thimble in relation to the reading line on the sleeve. Slowly let the red graduated thimble return until the first **black** thimble graduation aligns with the **black** reading line on the sleeve. Now hold this position with the black graduations aligned.

**(3)** At this point the black graduations will be your .001" reading and you can then take the .0001" reading directly from the red graduated thimble as it lines up to the red reading lines at any one of the four positions, and add it to the .001" reading.

**CAUTION:** Do not force the red graduated thimble if you feel it hit the stop. Also, do not at any time let the red graduated thimble snap back from its "loaded" position. Damage could occur due to either circumstance.

**NOTE:** Constant pressure mechanism available on micrometers in larger sizes on special order.

| Catalog No. | EDP No. | Graduation | Description             |
|-------------|---------|------------|-------------------------|
| T221XL      | 50754   | .0001"     | Lock Nut, Carbide Faces |

Sent in fitted case. Deluxe padded case available by ordering No. 910, EDP 55397.



## Stainless Steel Micrometers

**No. 1230** 0-1"

**No. 1230M** 0-25mm

**No. 1212** 1-2"

**No. 1212M** 25-50mm

This micrometer is made from stainless steel for use under adverse atmospheric and operating conditions.

### Readability Features

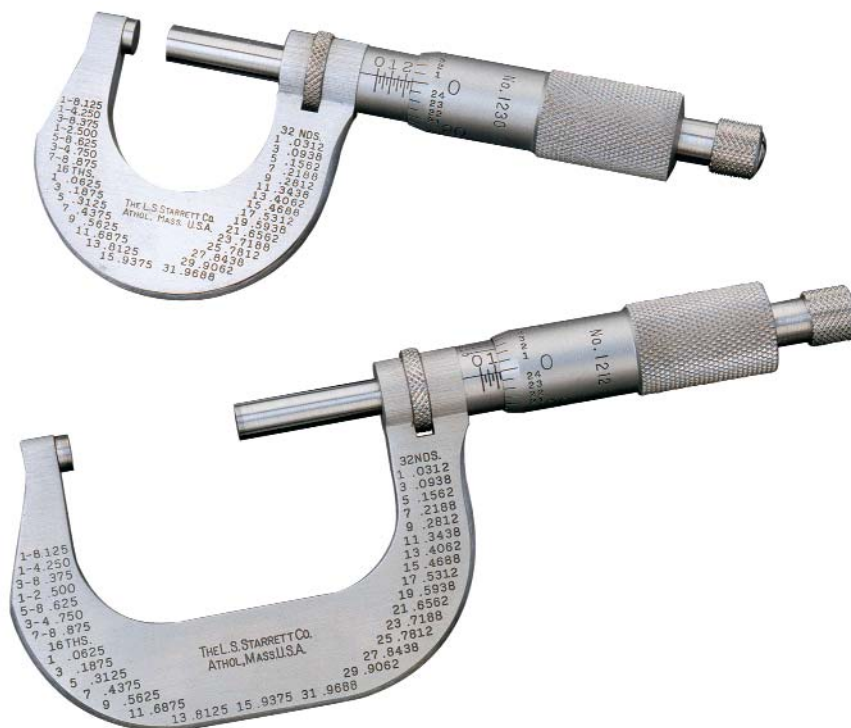
- ◆ Satin finish stainless steel – no glare – rust and stain resistant
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Convenient decimal equivalents on inch tools

### Ease-of-Handling Features

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ The combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

### Accuracy and Long-Life Features

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Carbide measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



Top: No. 1230XRL; Bottom No. T1212XRL.

### 0-1" range

| Catalog No. | EDP No. | Graduation | Description                           |
|-------------|---------|------------|---------------------------------------|
| 1230XRL     | 53196   | .001"      | Ratchet Stop, Lock Nut, Carbide Faces |
| T1230XRL    | 53197   | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces |

### 0-25mm range

|           |       |         |                                       |
|-----------|-------|---------|---------------------------------------|
| V1230MXRL | 64263 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces |
|-----------|-------|---------|---------------------------------------|

### 1-2" range

|          |       |        |  |
|----------|-------|--------|--|
| 1212XRL  | 53178 | .001"  | Ratchet Stop, Lock Nut, Carbide Faces, Gage Block Standard |
| T1212XRL | 53179 | .0001" | Ratchet Stop, Lock Nut, Carbide Faces, Gage Block Standard |

### 25-50mm range

|           |       |         |  |
|-----------|-------|---------|--|
| V1212MXRL | 64264 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces, Gage Block Standard |
|-----------|-------|---------|--|

1" and 25mm Models sent in fitted case – 2" and 50mm Models packed one in a box without case. Deluxe padded cases available by ordering No. 910, EDP 55397 for No.1230 and No. 912, EDP 55399 for No.1212.



## Quick Adjusting Micrometer

### No. 204L 0-1"

By pressing the plunger on the end of the thimble, the spindle is instantly disengaged and can be adjusted by sliding the spindle in or out to any desired setting. This speeds measurements since rotation of the thimble is only required for final size adjustment.

#### Readability Features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

#### Ease-of-Handling Features

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

#### Accuracy and Long-Life Features

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



| Catalog No. | EDP No. | Graduation | Description |
|-------------|---------|------------|-------------|
| 204L        | 56259   | .001"      | Lock Nut    |

Sent in fitted plastic case No. 957, EDP 66565.  
Deluxe padded case available by ordering No. 942, EDP 55961.





**No. 226 Series 1-6"**

**No. 226M Series**

25-150mm

This series of micrometers features rugged construction and extremely attractive design. These micrometers are for those craftsmen who want a precision micrometer with a different and outstanding Starrett design and finish. The micrometer's strong ribbed frame has a smooth black enamel finish with polished steel ribs and hub.

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking

**Accuracy and Long-Life Features**

- ◆ Rugged frame ribbed for extra strength
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship

These tools are also available in sets as specified on the next page.



**Graduation - .001"**

| Range | Ratchet Stop and Lock Nut |         | Standard (extra) |         |
|-------|---------------------------|---------|------------------|---------|
|       | Catalog No.               | EDP No. | Catalog No.      | EDP No. |
| 0-1"  | 226RL-1                   | 12209   |                  |         |
| 1-2"  | 226RL-2                   | 50820   | 234B-1           | 51017   |
| 2-3"  | 226RL-3                   | 50825   | 234B-2           | 51019   |
| 3-4"  | 226RL-4                   | 50830   | 234B-3           | 51021   |
| 4-5"  | 226RL-5                   | 50835   | 234B-4           | 51023   |
| 5-6"  | 226RL-6                   | 50840   | 234B-5           | 51025   |

**Graduation - .0001", With Carbide Faces**

|      |           |       |        |       |
|------|-----------|-------|--------|-------|
| 0-1" | T226XRL-1 | 12211 |        |       |
| 1-2" | T226XRL-2 | 50903 | 234B-1 | 51017 |
| 2-3" | T226XRL-3 | 50904 | 234B-2 | 51019 |
| 3-4" | T226XRL-4 | 50905 | 234B-3 | 51021 |
| 4-5" | T226XRL-5 | 50906 | 234B-4 | 51023 |
| 5-6" | T226XRL-6 | 50907 | 234B-5 | 51025 |

**Graduation - 0.001mm, With Carbide Faces**

|           |              |       |           |       |
|-----------|--------------|-------|-----------|-------|
| 0-25mm    | V226MXRL-25  | 12212 |           |       |
| 25-50mm   | V226MXRL-50  | 64265 | 234MB-25  | 51018 |
| 50-75mm   | V226MXRL-75  | 64266 | 234MB-50  | 51020 |
| 75-100mm  | V226MXRL-100 | 64267 | 234MB-75  | 51022 |
| 100-125mm | V226MXRL-125 | 64268 | 234MB-100 | 51024 |
| 125-150mm | V226MXRL-150 | 64269 | 234MB-125 | 51026 |

Packed one in a box without case – attractive, protective cases are available by ordering:

- No. 910, EDP 55397 for the 1" (25mm)
- No. 913, EDP 55400 for the 2" (50mm)
- No. 922, EDP 55222 for the 3" (75mm)
- No. 952, EDP 55223 for the 4" (100mm)
- No. 953, EDP 55224 for the 5" (125mm)
- No. 954, EDP 55225 for the 6" (150mm)

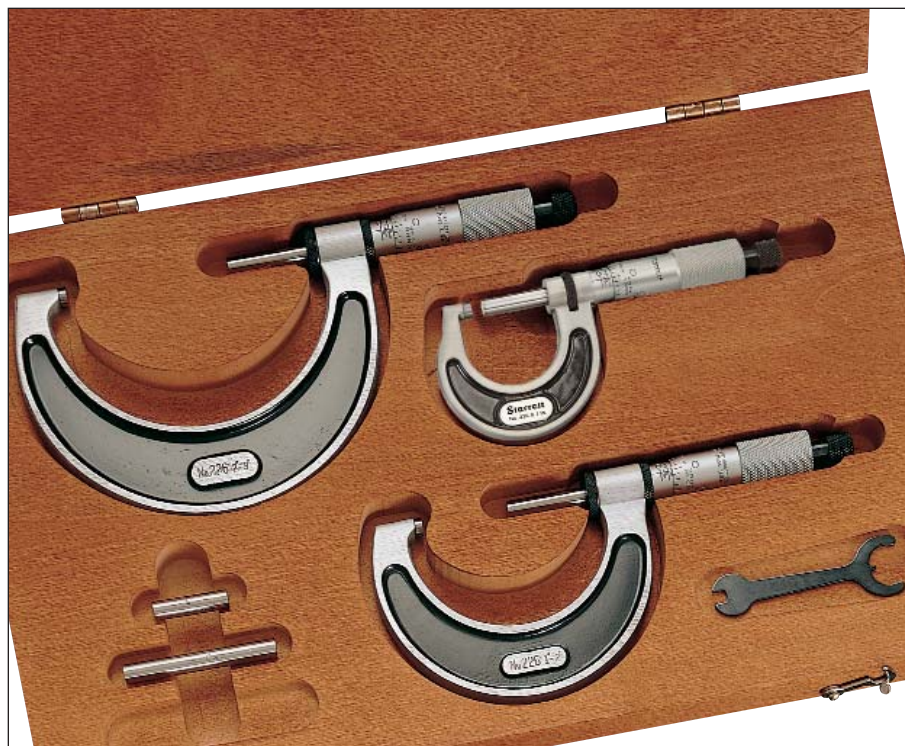


### Micrometer Sets with standards in case

**No. S226 Series Sets**  
0-6"

**No. S226M Series Sets**  
0-150mm

These sets are recommended for mechanics, automotive service and machine shops, toolrooms, inspection departments, and wherever gaging involves a wide range of measurements. All sets come with attractive, protective cases that keep micrometer and standards together, readily accessible.



Set shown here is No. S226ARLZ, 0-3" range.

#### 0-3" range

| Range | Catalog No.       | EDP No. | Graduation | Description                           | Set Description  |
|-------|-------------------|---------|------------|---------------------------------------|--|
| 0-3"  | <b>S226ARLZ</b>   | 50854   | .001"      | Ratchet Stop, Lock Nut                | Includes 1", 2" and 3" Micrometers, Two Standards, Adjusting Wrench, in Case |
|       | <b>ST226AXRLZ</b> | 56448   | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces |  |

#### 0-6" range

|      |                    |       |        |                                       |  |
|------|--------------------|-------|--------|---------------------------------------|--|
| 0-6" | <b>S226BRLZ</b>    | 50862 | .001"  | Ratchet Stop, Lock Nut                | Includes 1", 2", 3", 4", 5" and 6" Micrometers, Set of Five Standards, Adjusting Wrench, in Case |
|      | <b>ST226BXRZLZ</b> | 56798 | .0001" | Ratchet Stop, Lock Nut, Carbide Faces |  |

#### 0-75mm range

|        |                    |       |         |                                       |  |
|--------|--------------------|-------|---------|---------------------------------------|--|
| 0-75mm | <b>SV226MAXRLZ</b> | 65237 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces | Includes 25mm, 50mm and 75mm Micrometers, Two Standards, Adjusting Wrench, in Case |
|--------|--------------------|-------|---------|---------------------------------------|--|

#### 0-150mm range

|         |                     |       |         |                                       |   |
|---------|---------------------|-------|---------|---------------------------------------|---|
| 0-150mm | <b>SV226MBXRZLZ</b> | 65238 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces | Includes 25mm, 50mm, 75mm, 100mm, 125mm and 150mm Micrometers, Set of Five Standards, Adjusting Wrench, in Case |
|---------|---------------------|-------|---------|---------------------------------------|---|

#### CASES ONLY

|            |       |   |
|------------|-------|---|
| <b>955</b> | 55226 | Case for 0-3" and 0-75mm Micrometer Sets  |
| <b>956</b> | 55227 | Case for 0-6" and 0-150mm Micrometer Sets |



**No. 436.1 Series 0-6"**

**No. 436 Series 6-24"**

**No. 436.1M Series  
0-150mm**

**No. 436M Series  
150-600mm**

These are the most popular precision micrometers used by skilled workmen worldwide. They are accurate, rugged, and easy to use.

The 0-6" sizes and 0-150mm sizes have rugged spindles and anvils sized at .250" (6.35mm) diameter.

No other micrometer manufacturer can match the breadth and depth of the Starrett product line. We also stand willing and able to meet special requirements upon request.

**Readability**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability

**Ease-of-Handling**

- ◆ Balanced frame and thimble design insure easy handling
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Smooth friction thimble for uniform pressure, the combination ratchet and speeder for uniform pressure and quicker adjustment, or a plain micrometer that depends on your own "feel"
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

**Accuracy and Long-Life**

- ◆ Rigid steel frame ribbed for extra strength on sizes through 6" (150mm)
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



Shown above, top, No. 436.1MRL-50 millimeter model; bottom, inch model No. 436.1FL-1.

**0-1" range**

| Catalog No.              | EDP No. | Graduation   | Description  |
|--------------------------|---------|--|--|
| <b>436.1P-1</b>          | 67990   | .001"  | Plain  |
| <b>436.1XP-1</b>         | 67991   |  | Plain, Carbide Faces   |
| <b>436.1RL-1</b>         | 67993   |  | Ratchet Stop, Lock Nut   |
| <b>436.1XRL-1</b>        | 67994   |  | Ratchet Stop, Lock Nut, Carbide Faces                                    |
| <b>436.1XRL-1 W/SLC</b>  | 67995   |  | Ratchet Stop, Lock Nut, Carbide Faces, Standard Letter of Certification* |
| <b>436.1FL-1</b>         | 67996   | .0001"   | Friction Thimble, Lock Nut   |
| <b>T436.1XP-1</b>        | 67992   |  | Plain, Carbide Faces   |
| <b>T436.1XRL-1</b>       | 67997   |  | Ratchet Stop, Lock Nut, Carbide Faces                                    |
| <b>T436.1XRL-1 W/SLC</b> | 67998   |  | Ratchet Stop, Lock Nut, Carbide Faces, Standard Letter of Certification* |
| <b>T436.1XFL-1</b>       | 67999   |  | Friction Thimble, Lock Nut, Carbide Faces                                |
| <b>T436.1XFL-1 W/SLC</b> | 68000   | Friction Thimble, Lock Nut, Carbide Faces, Standard Letter of Certification* |  |

\* Includes redemption card for Standard Letter of Certification (SLC).

- ◆ **1-6" and 25-150mm models** sent in fitted plastic case. Deluxe padded case for 1" and 25mm sizes available by ordering No. 910.
- ◆ **7" and 175mm up to 12" and 300mm models** sent without case, packed one each to a box. See individual listings on following pages to order cases only.
- ◆ **13" and 325mm up to 24" and 600mm models** furnished in attractive, protective case.
- ◆ **Also, see detailed case information within the following pages.**




**No. 436.1 Series 1-6"**
**1-2" range**
**2-3" range**

| Catalog No.                      | EDP No.        | Catalog No.                      | EDP No.        | Graduation | Description  |
|----------------------------------|----------------|----------------------------------|----------------|------------|--|
| 436.1P-2                         | 68001          | 436.1P-3                         | 68009          | .001"      | Plain  |
| 436.1RL-2<br>436.1XRL-2          | 68002<br>68003 | 436.1RL-3<br>436.1XRL-3          | 68010<br>68011 |            | Ratchet Stop, Lock Nut<br>Ratchet Stop, Lock Nut, Carbide Faces  |
| 436.1FL-2                        | 68004          | 436.1FL-3                        | 68012          |            | Friction Thimble, Lock Nut   |
| T436.1XRL-2<br>T436.1XRL-2 W/SLC | 68005<br>68006 | T436.1XRL-3<br>T436.1XRL-3 W/SLC | 68013<br>68014 | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces<br>Ratchet Stop, Lock Nut, Carbide Faces,<br>Standard Letter of Certification*         |
| T436.1XFL-2<br>T436.1XFL-2 W/SLC | 68007<br>68008 | T436.1XFL-3<br>T436.1XFL-3 W/SLC | 68015<br>68016 |            | Friction Thimble, Lock Nut, Carbide Faces<br>Friction Thimble, Lock Nut, Carbide Faces,<br>Standard Letter of Certification* |
| 234B-1                           | 51017          | 234B-2                           | 51019          |            | 1" Standard for 2" Micrometers<br>2" Standard for 3" Micrometers   |

**CASES**

|     |       |     |       |  |  |
|-----|-------|-----|-------|--|--|
| 913 | 55400 | 922 | 55222 |  | Case for 2" Micrometer<br>Case for 3" Micrometer |
|-----|-------|-----|-------|--|--|

**3-4" range**
**4-5" range**

|                                  |                |                                  |                |       |  |
|----------------------------------|----------------|----------------------------------|----------------|-------|--|
| 436.1RL-4<br>436.1XRL-4          | 68017<br>68018 | 436.1RL-5<br>436.1XRL-5          | 68023<br>68024 | .001" | Ratchet Stop, Lock Nut<br>Ratchet Stop, Lock Nut, Carbide Faces  |
| T436.1XRL-4<br>T436.1XRL-4 W/SLC | 68019<br>68020 | T436.1XRL-5<br>T436.1XRL-5 W/SLC | 68025<br>68026 |       | .0001"   |
| T436.1XFL-4<br>T436.1XFL-4 W/SLC | 68021<br>68022 | T436.1XFL-5<br>T436.1XFL-5 W/SLC | 68027<br>68028 |       |  |
| 234B-3                           | 51021          | 234B-4                           | 51023          |       | 3" Standard for 4" Micrometers<br>4" Standard for 5" Micrometers |

**CASES**

|     |       |     |       |  |  |
|-----|-------|-----|-------|--|--|
| 952 | 55223 | 953 | 55224 |  | Case for 4" Micrometer<br>Case for 5" Micrometer |
|-----|-------|-----|-------|--|--|

**5-6" range**

|                                  |                |        |  |
|----------------------------------|----------------|--------|--|
| 436.1RL-6<br>436.1XRL-6          | 68029<br>68030 | .001"  | Ratchet Stop, Lock Nut<br>Ratchet Stop, Lock Nut, Carbide Faces  |
| T436.1XRL-6<br>T436.1XRL-6 W/SLC | 68031<br>68032 |        |  |
| T436.1XFL-6<br>T436.1XFL-6 W/SLC | 68033<br>68034 | .0001" | Friction Thimble, Lock Nut, Carbide Faces<br>Friction Thimble, Lock Nut, Carbide Faces,<br>Standard Letter of Certification* |
| 234B-5                           | 51025          |        |  |

**CASE**

|     |       |  |                        |
|-----|-------|--|------------------------|
| 954 | 55225 |  | Case for 6" Micrometer |
|-----|-------|--|------------------------|

\* Includes redemption card for Standard Letter of Certification (SLC).

**NOTE:** 1-6" models sent in fitted plastic case.



**No. 436 Series 6-24"**

**No. 436.1M Series**

0-150mm

**No. 436M Series**

150-600mm

These micrometers have the same balanced design as the smaller sizes but proportioned to these larger sizes. They have .300" (7.6mm) anvil and spindle diameters for ease of use on larger work.

These sizes have all the features of the 0-6" and 0-150mm ranges No. 436.1 Series Micrometers, except:

- ◆ The larger sizes are furnished with the combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Rigid and stable special cast iron frame with perforations for lightness and ribbed for strength and stability



Model No. 436RL-18.

**6-7" range**

**7-8" range**

| Catalog No.      | EDP No. | Catalog No.      | EDP No. | Graduation | Description                           |
|------------------|---------|------------------|---------|------------|---------------------------------------|
| <b>436RL-7</b>   | 51684   | <b>436RL-8</b>   | 51712   | .001"      | Ratchet Stop, Lock Nut                |
| <b>436XRL-7</b>  | 51698   | <b>436XRL-8</b>  | 51726   |            | Ratchet Stop, Lock Nut, Carbide Faces |
| <b>T436XRL-7</b> | 51702   | <b>T436XRL-8</b> | 51730   | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces |
| <b>234B-6</b>    | 51027   | <b>234B-7</b>    | 51029   |            | 6" Standard for 7" Micrometers        |
|                  |         |                  |         |            | 7" Standard for 8" Micrometers        |

**CASES**

|            |       |            |       |  |  |
|------------|-------|------------|-------|--|--|
| <b>930</b> | 55276 | <b>931</b> | 55277 |  | Case for 7" Micrometers<br>Case for 8" Micrometers |
|------------|-------|------------|-------|--|--|

**8-9" range**

**9-10" range**

|                  |       |                   |       |        |                                       |
|------------------|-------|-------------------|-------|--------|---------------------------------------|
| <b>436RL-9</b>   | 51740 | <b>436RL-10</b>   | 51768 | .001"  | Ratchet Stop, Lock Nut                |
| <b>436XRL-9</b>  | 51754 | <b>436XRL-10</b>  | 51782 |        | Ratchet Stop, Lock Nut, Carbide Faces |
| <b>T436XRL-9</b> | 51758 | <b>T436XRL-10</b> | 51786 | .0001" | Ratchet Stop, Lock Nut, Carbide Faces |
| <b>234B-8</b>    | 51031 | <b>234B-9</b>     | 51033 |        | 8" Standard for 9" Micrometers        |
|                  |       |                   |       |        | 9" Standard for 10" Micrometers       |

**CASES**

|            |       |            |       |  |   |
|------------|-------|------------|-------|--|---|
| <b>932</b> | 55278 | <b>933</b> | 55279 |  | Case for 9" Micrometers<br>Case for 10" Micrometers |
|------------|-------|------------|-------|--|---|

**NOTE:** 7-12" models sent without case, packed one each to a box. See individual micrometer listing for case information.


**No. 436 Series 10-24"**
**10-11" range**
**11-12" range**

| Catalog No. | EDP No. | Catalog No. | EDP No. | Graduation | Description                           |
|-------------|---------|-------------|---------|------------|---------------------------------------|
| 436RL-11    | 51796   | 436RL-12    | 51824   | .001"      | Ratchet Stop, Lock Nut                |
| 436XRL-11   | 51810   | 436XRL-12   | 51838   |            | Ratchet Stop, Lock Nut, Carbide Faces |
| T436XRL-11  | 51814   | T436XRL-12  | 51842   | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces |
| 234B-10     | 51035   | 234B-11     | 51037   |            | 10" Standard for 11" Micrometers      |
|             |         |             |         |            | 11" Standard for 12" Micrometers      |

**CASES**

|     |       |     |       |  |  |
|-----|-------|-----|-------|--|--|
| 934 | 55280 | 935 | 55281 |  | Case for 11" Micrometers<br>Case for 12" Micrometers |
|-----|-------|-----|-------|--|--|

**12-13" range**
**13-14" range**

|            |       |            |       |       |  |
|------------|-------|------------|-------|-------|--|
| 436XRLZ-13 | 51871 | 436XRLZ-14 | 51872 | .001" | Ratchet Stop, Lock Nut, Carbide Faces, with Case |
| 234B-12    | 51039 | 234A-13    | 50993 |       | 12" Standard for 13" Micrometers                 |
|            |       |            |       |       | 13" Standard for 14" Micrometers                 |

**14-15" range**
**15-16" range**

|            |       |            |       |       |  |
|------------|-------|------------|-------|-------|--|
| 436XRLZ-15 | 51873 | 436XRLZ-16 | 51874 | .001" | Ratchet Stop, Lock Nut, Carbide Faces, with Case |
| 234A-14    | 50995 | 234A-15    | 50997 |       | 14" Standard for 15" Micrometers                 |
|            |       |            |       |       | 15" Standard for 16" Micrometers                 |

**16-17" range**
**17-18" range**

|            |       |            |       |       |  |
|------------|-------|------------|-------|-------|--|
| 436XRLZ-17 | 51875 | 436XRLZ-18 | 51876 | .001" | Ratchet Stop, Lock Nut, Carbide Faces, with Case |
| 234A-16    | 50999 | 234A-17    | 51001 |       | 16" Standard for 17" Micrometers                 |
|            |       |            |       |       | 17" Standard for 18" Micrometers                 |

**18-19" range**
**19-20" range**

|            |       |            |       |       |  |
|------------|-------|------------|-------|-------|--|
| 436XRLZ-19 | 51877 | 436XRLZ-20 | 51878 | .001" | Ratchet Stop, Lock Nut, Carbide Faces, with Case |
| 234A-18    | 51003 | 234A-19    | 51005 |       | 18" Standard for 19" Micrometers                 |
|            |       |            |       |       | 19" Standard for 20" Micrometers                 |

**20-21" range**
**21-22" range**

|            |       |            |       |       |  |
|------------|-------|------------|-------|-------|--|
| 436XRLZ-21 | 51879 | 436XRLZ-22 | 51880 | .001" | Ratchet Stop, Lock Nut, Carbide Faces, with Case |
| 234A-20    | 51007 | 234A-21    | 51009 |       | 20" Standard for 21" Micrometers                 |
|            |       |            |       |       | 21" Standard for 22" Micrometers                 |

**22-23" range**
**23-24" range**

|            |       |            |       |       |  |
|------------|-------|------------|-------|-------|--|
| 436XRLZ-23 | 51881 | 436XRLZ-24 | 51882 | .001" | Ratchet Stop, Lock Nut, Carbide Faces, with Case |
| 234A-22    | 51011 | 234A-23    | 51013 |       | 22" Standard for 23" Micrometers                 |
|            |       |            |       |       | 23" Standard for 24" Micrometers                 |

**NOTE:** 13-24" models are furnished in a case at no extra charge.





**No. 436.1M Series 0-150mm**

**No. 436M Series 150-250mm**

NOTE: All products made in the U.S.A.  except where noted as Global. 

**0-25mm range 25-50mm range**

| Catalog No.   | EDP No. | Catalog No.   | EDP   | Graduation | Description                               |
|---------------|---------|---------------|-------|------------|---|
| 436.1MP-25    | 68047   |               |       | 0.01mm     | Plain                                     |
| 436.1MRL-25   | 68048   | 436.1MRL-50   | 68052 |            | Ratchet Stop, Lock Nut                    |
| 436.1MXRL-25  | 68049   | 436.1MXRL-50  | 68053 |            | Ratchet Stop, Lock Nut, Carbide Faces     |
| 436.1MXFL-25  | 68050   |               |       | 0.001mm    | Friction Thimble, Lock Nut, Carbide Faces |
| V436.1MXRL-25 | 68051   | V436.1MXRL-50 | 68054 |            | Ratchet Stop, Lock Nut, Carbide Faces     |
|               |         | 234MB-25      | 51018 |            | 25mm Standard for 50mm Micrometers        |

**CASE**

|  |  |     |       |  |                           |
|--|--|-----|-------|--|---------------------------|
|  |  | 913 | 55400 |  | Case for 50mm Micrometers |
|--|--|-----|-------|--|---------------------------|

**50-75mm range 75-100mm range**

|               |       |                |       |         |                                       |
|---------------|-------|----------------|-------|---------|---------------------------------------|
| 436.1MRL-75   | 68055 | 436.1MRL-100   | 68058 | 0.01mm  | Ratchet Stop, Lock Nut                |
| 436.1MXRL-75  | 68056 | 436.1MXRL-100  | 68059 |         | Ratchet Stop, Lock Nut, Carbide Faces |
| V436.1MXRL-75 | 68057 | V436.1MXRL-100 | 68060 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces |
| 234MB-50      | 51020 |                |       |         | 50mm Standard for 75mm Micrometers    |
|               |       | 234MB-75       | 51022 |         | 75mm Standard for 100mm Micrometers   |

**CASES**

|     |       |     |       |  |   |
|-----|-------|-----|-------|--|---|
| 922 | 55222 | 952 | 55223 |  | Case for 75mm Micrometers<br>Case for 100mm Micrometers |
|-----|-------|-----|-------|--|---|

**100-125mm range 125-150mm range**

|                |       |                |       |         |                                       |
|----------------|-------|----------------|-------|---------|---------------------------------------|
| 436.1MRL-125   | 68061 | 436.1MRL-150   | 68064 | 0.01mm  | Ratchet Stop, Lock Nut                |
| 436.1MXRL-125  | 68062 | 436.1MXRL-150  | 68065 |         | Ratchet Stop, Lock Nut, Carbide Faces |
| V436.1MXRL-125 | 68063 | V436.1MXRL-150 | 68066 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces |
| 234MB-100      | 51024 |                |       |         | 100mm Standard for 125mm Micrometers  |
|                |       | 234MB-125      | 51026 |         | 125mm Standard for 150mm Micrometers  |

**CASES**

|     |       |     |       |  |  |
|-----|-------|-----|-------|--|--|
| 953 | 55224 | 954 | 55225 |  | Case for 125mm Micrometers<br>Case for 150mm Micrometers |
|-----|-------|-----|-------|--|--|

**150-175mm range 175-200mm range**

|             |       |             |       |        |                                       |
|-------------|-------|-------------|-------|--------|---------------------------------------|
| 436MXRL-175 | 51706 | 436MXRL-200 | 51734 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces |
| 234MB-150   | 51028 |             |       |        | 150mm Standard for 175mm Micrometers  |
|             |       | 234MB-175   | 51030 |        | 175mm Standard for 200mm Micrometers  |

**CASES**

|     |       |     |       |  |  |
|-----|-------|-----|-------|--|--|
| 930 | 55276 | 931 | 55277 |  | Case for 175mm Micrometers<br>Case for 200mm Micrometers |
|-----|-------|-----|-------|--|--|

**200-225mm range 225-250mm range**

|             |       |             |       |        |                                       |
|-------------|-------|-------------|-------|--------|---------------------------------------|
| 436MXRL-225 | 51762 | 436MXRL-250 | 51790 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces |
| 234MB-200   | 51032 |             |       |        | 200mm Standard for 225mm Micrometers  |
|             |       | 234MB-225   | 51034 |        | 225mm Standard for 250mm Micrometers  |

**CASES**

|     |       |     |       |  |  |
|-----|-------|-----|-------|--|--|
| 932 | 55278 | 933 | 55279 |  | Case for 225mm Micrometers<br>Case for 250mm Micrometers |
|-----|-------|-----|-------|--|--|

NOTES: 25-150mm models sent in fitted plastic case. 175-300mm models sent without case, packed one each to a box. See individual micrometer listing for case information.


**No. 436M Series 250-600mm**
**250-275mm range**
**275-300mm range**

| Catalog No.        | EDP No. | Catalog No.        | EDP No. | Graduation | Description  |
|--------------------|---------|--------------------|---------|------------|--|
| <b>436MXRL-275</b> | 51818   | <b>436MXRL-300</b> | 51846   | 0.01mm     | Ratchet Stop, Lock Nut, Carbide Faces  |
| <b>234MB-250</b>   | 51036   | <b>234MB-275</b>   | 51038   |            | 250mm Standard for 275mm Micrometers<br>275mm Standard for 300mm Micrometers |

**CASES**

|            |       |            |       |  |  |
|------------|-------|------------|-------|--|--|
| <b>934</b> | 55280 | <b>935</b> | 55281 |  | Case for 275mm Micrometers<br>Case for 300mm Micrometers |
|------------|-------|------------|-------|--|--|

**300-325mm range**
**325-350mm range**

|                     |       |                     |       |        |  |
|---------------------|-------|---------------------|-------|--------|--|
| <b>436MXRLZ-325</b> | 64301 | <b>436MXRLZ-350</b> | 64302 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces, with Case                             |
| <b>234MB-300</b>    | 51040 | <b>234MA-325</b>    | 50994 |        | 300mm Standard for 325mm Micrometers<br>325mm Standard for 350mm Micrometers |

**350-375mm range**
**375-400mm range**

|                     |       |                     |       |        |  |
|---------------------|-------|---------------------|-------|--------|--|
| <b>436MXRLZ-375</b> | 64303 | <b>436MXRLZ-400</b> | 64304 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces, with Case                             |
| <b>234MA-350</b>    | 50996 | <b>234MA-375</b>    | 50998 |        | 350mm Standard for 375mm Micrometers<br>375mm Standard for 400mm Micrometers |

**400-425mm range**
**425-450mm range**

|                     |       |                     |       |        |  |
|---------------------|-------|---------------------|-------|--------|--|
| <b>436MXRLZ-425</b> | 64305 | <b>436MXRLZ-450</b> | 64306 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces, with Case                             |
| <b>234MA-400</b>    | 51000 | <b>234MA-425</b>    | 51002 |        | 400mm Standard for 425mm Micrometers<br>425mm Standard for 450mm Micrometers |

**450-475mm range**
**475-500mm range**

|                     |       |                     |       |        |  |
|---------------------|-------|---------------------|-------|--------|--|
| <b>436MXRLZ-475</b> | 64307 | <b>436MXRLZ-500</b> | 64308 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces, with Case                             |
| <b>234MA-450</b>    | 51004 | <b>234MA-475</b>    | 51006 |        | 450mm Standard for 475mm Micrometers<br>475mm Standard for 500mm Micrometers |

**500-525mm range**
**525-550mm range**

|                     |       |                     |       |        |  |
|---------------------|-------|---------------------|-------|--------|--|
| <b>436MXRLZ-525</b> | 64309 | <b>436MXRLZ-550</b> | 64310 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces, with Case                             |
| <b>234MA-500</b>    | 51008 | <b>234MA-525</b>    | 51010 |        | 500mm Standard for 525mm Micrometers<br>525mm Standard for 550mm Micrometers |

**550-575mm range**
**575-600mm range**

|                     |       |                     |       |        |  |
|---------------------|-------|---------------------|-------|--------|--|
| <b>436MXRLZ-575</b> | 64311 | <b>436MXRLZ-600</b> | 64312 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces, with Case                             |
| <b>234MA-550</b>    | 51012 | <b>234MA-575</b>    | 51014 |        | 550mm Standard for 575mm Micrometers<br>575mm Standard for 600mm Micrometers |

**NOTE:** 325-600mm models are furnished in a case at no extra charge.



**Micrometer Sets with standards, in attractive, protective cases**

**No. S436.1 Series Sets**  
0-6"

**No. S436 Series Sets**  
6-24"

**No. S436.1M Series Sets**  
0-150mm

**No. S436M Series Sets**  
150-600mm

Recommended for mechanics, automotive service and machine shops, toolrooms, inspection departments, and wherever gaging involves a wide range of measurements. All sets come with attractive, protective cases which keep micrometers and standards together, readily accessible.

For further information on each type of micrometer, refer to its listing on the previous Nos. 436.1 and 436 Series pages.



**Box type cases available for sets 0-6", 6-12", 12-24" with 6, 12, or 24 micrometers and flat type cases available for sets 0-3" or 0-4" with 3 or 4 micrometers.**



**0-3" range**

| Catalog No.  | EDP No. | Graduation | Description                               | Set Description   |
|--------------|---------|------------|---|---|
| S436.1ARLZ   | 68035   | .001"      | Ratchet Stop, Lock Nut                    | Each Set Includes:<br>1", 2" and 3" Micrometers,<br>with Two Standards, in Case |
| S436.1AXRLZ  | 68036   |            | Ratchet Stop, Lock Nut, Carbide Faces     |   |
| ST436.1AXRLZ | 68037   | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces     |   |
| ST436.1AXFLZ | 68038   |            | Friction Thimble, Lock Nut, Carbide Faces |   |
| S234C        | 50852   |            | Set of Two Standards Only                 |   |

**CASE ONLY**

|     |       |  |                              |  |
|-----|-------|--|------------------------------|--|
| 955 | 55226 |  | Case Only for No. S436A Sets |  |
|-----|-------|--|------------------------------|--|

**0-4" range**

|              |       |        |   |   |
|--------------|-------|--------|---|---|
| S436.1BRLZ   | 68039 | .001"  | Ratchet Stop, Lock Nut                    | Each Set Includes:<br>1", 2", 3" and 4" Micrometers,<br>with Three Standards, in Case |
| S436.1BXRLZ  | 68040 |        | Ratchet Stop, Lock Nut, Carbide Faces     |   |
| ST436.1BXRLZ | 68041 | .0001" | Ratchet Stop, Lock Nut, Carbide Faces     |   |
| ST436.1BXFLZ | 68042 |        | Friction Thimble, Lock Nut, Carbide Faces |   |
| S234D        | 51897 |        | Set of Three Standards Only               |   |

**CASE ONLY**

|     |       |  |                              |  |
|-----|-------|--|------------------------------|--|
| 936 | 55295 |  | Case Only for No. S436B Sets |  |
|-----|-------|--|------------------------------|--|




**No. S436.1 Series Sets 0-6"**
**No. S436 Series Sets 0-24"**
**0-6" range**

| Catalog No.  | EDP No. | Graduation | Description                               | Set Description  |
|--------------|---------|------------|---|--|
| S436.1CRLZ   | 68043   | .001"      | Ratchet Stop, Lock Nut                    | Each Set Includes:<br>1", 2", 3", 4", 5" and 6" Micrometers,<br>with Five Standards, in Case |
| S436.1CXRLZ  | 68044   |            | Ratchet Stop, Lock Nut, Carbide Faces     |  |
| ST436.1CXRLZ | 68045   | .0001"     | Ratchet Stop, Lock Nut, Carbide Faces     |  |
| ST436.1CXFLZ | 68046   |            | Friction Thimble, Lock Nut, Carbide Faces |  |
| S234E        | 50860   |            | Set of Five Standards Only                |  |
| S234E W/SLC  | 66878   |            |   | With Standard Letter of Certification*   |

**CASE ONLY**

|     |       |  |                              |  |
|-----|-------|--|------------------------------|--|
| 956 | 55227 |  | Case Only for No. S436C Sets |  |
|-----|-------|--|------------------------------|--|

**0-12" range**

|             |       |        |                                       |  |
|-------------|-------|--------|---------------------------------------|--|
| S436ERLZ    | 51931 | .001"  | Ratchet Stop, Lock Nut                | Each Set Includes:<br>1", 2", 3", 4", 5", 6", 7", 8", 9", 10",<br>11" and 12" Micrometers,<br>with Eleven Standards, in Case |
| S436EXRLZ   | 52012 |        | Ratchet Stop, Lock Nut, Carbide Faces |  |
| ST436EXRLZ  | 52030 | .0001" | Ratchet Stop, Lock Nut, Carbide Faces |  |
| S234G       | 51929 |        |                                       |  |
| S234G W/SLC | 66877 |        |                                       |  |

**CASE ONLY**

|     |       |  |                              |  |
|-----|-------|--|------------------------------|--|
| 938 | 55298 |  | Case Only for No. S436E Sets |  |
|-----|-------|--|------------------------------|--|

**6-12" range**

|             |       |        |                                       |  |
|-------------|-------|--------|---------------------------------------|--|
| S436DRLZ    | 51919 | .001"  | Ratchet Stop, Lock Nut                | Each Set Includes:<br>7", 8", 9", 10", 11" and 12" Micrometers,<br>with Six Standards, in Case |
| S436DXRLZ   | 64463 |        | Ratchet Stop, Lock Nut, Carbide Faces |  |
| ST436DXRLZ  | 64465 | .0001" | Ratchet Stop, Lock Nut, Carbide Faces |  |
| S234F       | 51917 |        |                                       |  |
| S234F W/SLC | 66879 |        |                                       |  |

**CASE ONLY**

|     |       |  |                              |  |
|-----|-------|--|------------------------------|--|
| 937 | 55297 |  | Case Only for No. S436D Sets |  |
|-----|-------|--|------------------------------|--|

**12-24" range**

|           |       |       |                                       |  |
|-----------|-------|-------|---------------------------------------|--|
| S436FXRLZ | 64466 | .001" | Ratchet Stop, Lock Nut, Carbide Faces | Set Includes:<br>13", 14", 15", 16", 17", 18", 19", 20",<br>21", 22", 23" and 24" Micrometers,<br>with Twelve Standards, in Case |
| S234J     | 64146 |       | Set of Twelve Standards Only          |  |

**CASE ONLY**

|         |       |  |                              |  |
|---------|-------|--|------------------------------|--|
| S436FZZ | 64339 |  | Case Only for No. S436F Sets |  |
|---------|-------|--|------------------------------|--|

\* Includes redemption card for Standard Letter of Certification (SLC).



# OUTSIDE MICROMETERS SPECIAL FUNCTION



## No. S436.1M Series Sets 0-150mm

### No. S436M Series Sets 0-600mm

#### 0-75mm range

| Catalog No.   | EDP No. | Graduation | Description                           | Set Description   |
|---------------|---------|------------|---------------------------------------|---|
| S436.1MARLZ   | 68067   | 0.01mm     | Ratchet Stop, Lock Nut                | Each Set Includes:<br>25mm, 50mm and 75mm Micrometers,<br>with Two Standards, in Case |
| S436.1MAXRLZ  | 68068   |            | Ratchet Stop, Lock Nut, Carbide Faces |   |
| SV436.1MAXRLZ | 68069   | 0.001mm    | Ratchet Stop, Lock Nut, Carbide Faces |   |
| S234MC        | 51893   |            | Set of Two Standards Only             |   |

#### CASE ONLY

|     |       |  |                               |  |
|-----|-------|--|-------------------------------|--|
| 955 | 55226 |  | Case Only for No. S436MA Sets |  |
|-----|-------|--|-------------------------------|--|

#### 0-100mm range

|               |       |         |                                       |   |
|---------------|-------|---------|---------------------------------------|---|
| S436.1MBRLZ   | 68070 | 0.01mm  | Ratchet Stop, Lock Nut                | Each Set Includes:<br>25mm, 50mm, 75mm and 100mm<br>Micrometers with Three Standards, in Case |
| S436.1MBXRLZ  | 68071 |         | Ratchet Stop, Lock Nut, Carbide Faces |   |
| SV436.1MBXRLZ | 68072 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces |   |
| S234MD        | 51901 |         | Set of Three Standards Only           |   |

#### CASE ONLY

|     |       |  |                               |  |
|-----|-------|--|-------------------------------|--|
| 936 | 55295 |  | Case Only for No. S436MB Sets |  |
|-----|-------|--|-------------------------------|--|

#### 0-150mm range

|               |       |         |                                       |  |
|---------------|-------|---------|---------------------------------------|--|
| S436.1MCRLZ   | 68073 | 0.01mm  | Ratchet Stop, Lock Nut                | Each Set Includes:<br>25mm, 50mm, 75mm, 100mm, 125mm<br>and 150mm Micrometers, with Five<br>Standards, in Case |
| S436.1MCXRLZ  | 68074 |         | Ratchet Stop, Lock Nut, Carbide Faces |  |
| SV436.1MCXRLZ | 68075 | 0.001mm | Ratchet Stop, Lock Nut, Carbide Faces |  |
| S234ME        | 51913 |         | Set of Five Standards Only            |  |

#### CASE ONLY

|     |       |  |                               |  |
|-----|-------|--|-------------------------------|--|
| 956 | 55227 |  | Case Only for No. S436MC Sets |  |
|-----|-------|--|-------------------------------|--|

#### 0-300mm range

|            |       |        |                                       |   |
|------------|-------|--------|---------------------------------------|---|
| S436MEXRLZ | 52014 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces | Set Includes:<br>25, 50, 75, 100, 125, 150, 175, 200, 225,<br>250, 275 and 300mm Micrometers,<br>with Eleven Standards, in Case |
| S234MG     | 51937 |        | Set of Eleven Standards Only          |   |

#### CASE ONLY

|     |       |  |                               |  |
|-----|-------|--|-------------------------------|--|
| 938 | 55298 |  | Case Only for No. S436ME Sets |  |
|-----|-------|--|-------------------------------|--|

#### 150-300mm range

|            |       |        |                                       |   |
|------------|-------|--------|---------------------------------------|---|
| S436MDXRLZ | 64461 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces | Set Includes:<br>175, 200, 225, 250, 275 and 300mm<br>Micrometers, with Six Standards,<br>in Case |
| S234MF     | 51925 |        | Set of Six Standards Only             |   |

#### CASE ONLY

|     |       |  |                               |  |
|-----|-------|--|-------------------------------|--|
| 937 | 55297 |  | Case Only for No. S436MD Sets |  |
|-----|-------|--|-------------------------------|--|

#### 300-600mm range

|            |       |        |                                       |  |
|------------|-------|--------|---------------------------------------|--|
| S436MFXRLZ | 64462 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces | Set Includes:<br>325, 350, 375, 400, 425, 450, 475, 500,<br>525, 550, 575 and 600mm Micrometers,<br>with Twelve Standards, in Case |
| S234MJ     | 64467 |        | Set of Twelve Standards Only          |  |

#### CASE ONLY

|         |       |  |                              |  |
|---------|-------|--|------------------------------|--|
| S436FZZ | 64339 |  | Case Only for No. S436MF Set |  |
|---------|-------|--|------------------------------|--|



### Protective Cases for 1 and 2" – 25 and 50mm Outside Micrometers

These deluxe padded cases give protection against scratches, damage, dirt and grit. Rigid, substantial construction.

Rugged leather holster also available for convenience.



**Leather Holster.**

Packed one in a box.



**No. 910 case.**

| Catalog No. | EDP No. | Description  |
|-------------|---------|--|
| <b>910</b>  | 55397   | Case for 1" (25mm) Micrometers - Nos. 204, 210, 211, 221, 230, 256, 436.1, 569, 575, 577, 1230 |
| <b>912</b>  | 55399   | Case for 2" (50mm) Micrometers - Nos. 2, 2A, 256, 585, 1212                                    |
| <b>913</b>  | 55400   | Case for 2" (50mm) Micrometers - Nos. 226, 436.1, 486 - 1"                                     |
| <b>914</b>  | 64165   | Leather holster for 1" (25mm) Micrometers  |

### Protective Cases for 3" or 75mm and larger Outside Micrometers

Cases to store and protect large size Starrett micrometers are made to the same high standard of workmanship as the tools they contain. Recesses hold not only the micrometer, but also matching standard plus an adjusting wrench. (Available with most micrometers – see individual micrometer listings and separate price book for information.) Similar attractive, protective cases are provided for micrometers purchased in sets.







## Outside Micrometer Stand

### No. 206

#### Features

- ◆ This stand converts outside micrometers to a sturdy bench gage for batch inspection of small parts
- ◆ Useful as a handy bench vise or assembly fixture
- ◆ Gripping surfaces are two nylon pads which are replaceable
- ◆ Ball joint construction allows the tilting head to be positioned as much as 45° off perpendicular in any direction
- ◆ Positive lock on the base
- ◆ Base dimension is 5-3/8" long x 3" wide x 3/4" thick (136mm long x 76mm wide x 19mm thick)
- ◆ Tilting head clamping capability is 3/8" (9.5mm) thick x 1" (25mm) throat depth
- ◆ Accommodates all Starrett 1/2" (13mm) and 1" (25mm) outside micrometers, Nos. 2 and 2A 2" outside micrometers and Nos. 210, 220, 483, 485, 569 special purpose outside micrometers



| Catalog No. | EDP No. | Description              |
|-------------|---------|--------------------------|
| 206         | 55794   | Outside Micrometer Stand |

Packed one in a box.





# OUTSIDE MICROMETERS



## Interchangeable Anvil Micrometers

**No. 224 Series 0-24"**

**No. 224M Series 0-600mm**

Unusual flexibility, plus a wide range of measurement makes the Starrett No. 224 series satin-chrome micrometers very popular in machine or automotive repair shops and for all applications requiring a versatile micrometer.

Each micrometer is equipped with a series of easily interchangeable anvils, thus providing the full range in steps of 1" or 25mm with a single micrometer. Suitable wrenches are furnished to make necessary adjustments.

These larger sizes have .300" (7.6mm) anvil and spindle diameters for ease of use on larger work.

### Readability features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Large thimble diameter with distinct figures

### Ease-of-Handling Features

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Combination ratchet and speeder for uniform pressure and quicker adjustment

### Accuracy and Long-Life Features

- ◆ Rigid and stable special cast iron frame with appropriate perforations for lightness and ribbed for strength and stability
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Interchangeable anvils
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy sleeve adjustment
- ◆ Starrett workmanship



Starrett wide range, perforated frame micrometers are available in inch and millimeter models. Shown above is the No. 224CRLZ 9-12" model with standards and interchangeable anvils.

### 0-24" range

| Range  | Graduation | With Ratchet Stop, Lock Nut, In Case |         | No. 234 Standards Furnished |
|--------|------------|--------------------------------------|---------|-----------------------------|
|        |            | Catalog No.                          | EDP No. |                             |
| 0-4"   | .001"      | 224AARLZ                             | 50770   | 1", 2", 3"                  |
| 2-6"   |            | 224ARLZ                              | 50772   | 2", 3", 4", 5"              |
| 6-9"   |            | 224BRLZ                              | 50774   | 6", 7", 8"                  |
| 6-12"  |            | 224GRLZ                              | 50776   | 6", 7", 8", 9", 10", 11"    |
| 9-12"  |            | 224CRLZ                              | 50778   | 9", 10", 11"                |
| 12-16" |            | 224DRLZ                              | 50780   | 12", 13", 14", 15"          |
| 16-20" |            | 224ERLZ                              | 50782   | 16", 17", 18", 19"          |
| 20-24" |            | 224JRLZ                              | 50784   | 20", 21", 22", 23"          |

### 0-600mm range

|           |        |           |       |                                |
|-----------|--------|-----------|-------|--------------------------------|
| 0-100mm   | 0.01mm | 224MAARLZ | 50771 | 25, 50, 75mm                   |
| 50-150mm  |        | 224MARLZ  | 50773 | 50, 75, 100, 125mm             |
| 150-300mm |        | 224MGRLZ  | 50777 | 150, 175, 200, 225, 250, 275mm |
| 300-400mm |        | 224MDRLZ  | 50781 | 300, 325, 350, 375mm           |
| 400-500mm |        | 224MERLZ  | 50783 | 400, 425, 450, 475mm           |
| 500-600mm |        | 224MJRLZ  | 50785 | 500, 525, 550, 575mm           |

Furnished with No. 234 Standards in protective case. Packed one in a box.



**Electronic  
Interchangeable Anvil  
Micrometers (with output)**

**No. 714 Series  
0-24" (0-600mm)**

This micrometer is the same as our No. 224 Series except that it has an electronic readout and the following extra features and benefits:

**Readability Features**

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Resolution – .00005" and 0.001mm
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve

**Accuracy and Long-Life Features**

- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship

**Full-Function Action Features**

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter models will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus hardware and software and to PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems



**No. 714AFLZ Micrometer with No. 234 Standards.**

**With Standard Inch Graduations on Shell and Thimble**

| Range    |             | Resolution |         | Catalog No.     | EDP No. |
|----------|-------------|------------|---------|-----------------|---------|
| Inch     | Approx. mm  | Inch       | mm      |                 |         |
| 0 - 4"   | 0 - 101mm   | .00005"    | 0.001mm | <b>714AAFLZ</b> | 64427   |
| 2 - 6"   | 51 - 152mm  |            |         | <b>714AFLZ</b>  | 64428   |
| 6 - 9"   | 152 - 228mm |            |         | <b>714BFLZ</b>  | 64429   |
| 6 - 12"  | 152 - 305mm |            |         | <b>714GFLZ</b>  | 64430   |
| 9 - 12"  | 228 - 305mm | .0001"     | 0.001mm | <b>714CFLZ</b>  | 64431   |
| 12 - 16" | 305 - 406mm |            |         | <b>714DFLZ</b>  | 64432   |
| 16 - 20" | 406 - 508mm |            |         | <b>714EFLZ</b>  | 64433   |
| 20 - 24" | 508 - 609mm |            |         | <b>714JFLZ</b>  | 64434   |

**With Standard Millimeter Graduations on Shell and Thimble**

| Range       |                  | Resolution |         | Catalog No.      | EDP No. |
|-------------|------------------|------------|---------|------------------|---------|
| mm          | Approx. Inch     | mm         | Inch    |                  |         |
| 0 - 100mm   | 0 - 3.930"       | 0.001mm    | .00005" | <b>714MEAFLZ</b> | 66108   |
| 50 - 150mm  | 1.968 - 5.900"   |            |         | <b>714MEAFZ</b>  | 66109   |
| 150 - 300mm | 5.900 - 11.810"  |            | .0001"  | <b>714MEGFLZ</b> | 66111   |
| 300 - 400mm | 11.810 - 15.740" |            |         | <b>714MEDFLZ</b> | 66112   |
| 400 - 500mm | 15.740 - 19.680" |            |         | <b>714MEEFLZ</b> | 66113   |
| 500 - 600mm | 19.680 - 23.620" |            |         | <b>714MEJFLZ</b> | 66110   |

**Cable Information**

| Part No.       | EDP No. | Description  |
|----------------|---------|--|
| <b>PT61963</b> | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| <b>PT61768</b> | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| <b>PT22938</b> | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| <b>PT61120</b> | 65446   | One 3-Volt Battery No. CR2450  |

Micrometer furnished in protective case with No. 234 Standards. Packed one in a box with instructions.



### Tubular Bow Type Micrometers with interchangeable anvils

**No. 724 Series** 12-60"

**No. 724M Series**  
300 -1500mm

These micrometers are made for better precision measurement of **LARGE** outside dimensions. They provide perfect balance, sensitive feel, ease of handling, and less measuring effort due to their advanced tubular design. Frames are built of special steel formed to exacting tubular design specifications and welded by a carefully controlled process. This produces a hollow tubular frame of the lightest weight, extreme rigidity, and standard coefficient of expansion.

Because of the interchangeable anvils, the No. 724 Series is well suited for diversified gaging and provides a wide range of measurement in steps of 1 inch or 25mm.

The micrometer head is large and well balanced with .300" (7.6mm) diameter anvil and spindle and with larger bearing surfaces on the threads.

#### Readability Features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Large thimble diameter with distinct figures

#### Ease-of-Handling Features

- ◆ Balanced frame and thimble design for easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking

#### Accuracy and Long-Life Features

- ◆ Hollow tubular frame design combining lightest possible weight with rigidity
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Interchangeable anvils for diversified gaging
- ◆ Standards with insulated grips
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy sleeve adjustment
- ◆ Starrett workmanship

Furnished with No. 234 Standards in attractive, protective case. Packed one in a box.



#### No. 724LZ-18 12-18" model with interchangeable anvils and standards.

It is recommended that these micrometers be checked with standards in the approximate position (vertical or horizontal) that they will be used.

We do not recommend .0001" or 0.001mm readings on these micrometers.

- ◆ Larger sizes, carbide faces and ratchet stop are available on special order.

| Range Inch | Graduation | With Lock Nut, In Case |         | No. 234 Standards Furnished  |
|------------|------------|------------------------|---------|------------------------------|
|            |            | Catalog No.            | EDP No. |                              |
| 12-18"     | .001"      | <b>724LZ-18</b>        | 52994   | 12", 13", 14", 15", 16", 17" |
| 18-24"     |            | <b>724LZ-24</b>        | 52995   | 18", 19", 20", 21", 22", 23" |
| 24-30"     |            | <b>724LZ-30</b>        | 52996   | 25", 27", 29"                |
| 30-36"     |            | <b>724LZ-36</b>        | 52997   | 31", 33", 35"                |
| 36-42"     |            | <b>724LZ-42</b>        | 52998   | 37", 39", 41"                |
| 42-48"     |            | <b>724LZ-48</b>        | 52999   | 43", 45", 47"                |
| 48-54"     |            | <b>724LZ-54</b>        | 53000   | 49", 51", 53"                |
| 54-60"     |            | <b>724LZ-60</b>        | 53001   | 55", 57", 59"                |

| Range mm    |        |                    |       |                                |
|-------------|--------|--------------------|-------|--------------------------------|
| 300-450mm   | 0.01mm | <b>724MLZ-450</b>  | 64318 | 300, 325, 350, 375, 400, 425mm |
| 450-600mm   |        | <b>724MLZ-600</b>  | 64319 | 450, 475, 500, 525, 550, 575mm |
| 600-750mm   |        | <b>724MLZ-750</b>  | 64320 | 625, 675, 725mm                |
| 750-900mm   |        | <b>724MLZ-900</b>  | 64321 | 775, 825, 875mm                |
| 900-1050mm  |        | <b>724MLZ-1050</b> | 64322 | 925, 975, 1025mm               |
| 1050-1200mm |        | <b>724MLZ-1200</b> | 64323 | 1075, 1125, 1175mm             |
| 1200-1350mm |        | <b>724MLZ-1350</b> | 64324 | 1225, 1275, 1325mm             |
| 1350-1500mm |        | <b>724MLZ-1500</b> | 64325 | 1375, 1425, 1475mm             |

Adjusting wrenches furnished with each tool.



## **Tubular Bow Type Micrometers with fixed anvil**

**No. 736 Series 12-30"**

**No. 736M Series**

**300-750mm**

This micrometer, available on special order, is similar to the No. 724 Series. All features are identical to the No. 724, except that it has a fixed anvil, and is furnished in one inch increments from 12-30" and 25mm increments from 300-750mm.

### **Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Large thimble diameter with distinct figures

### **Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking

### **Accuracy and Long-Life Features**

- ◆ Hollow tubular frame design combining lightest possible weight with rigidity
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy sleeve adjustment
- ◆ No. 234 Standards furnished with micrometers
- ◆ Starrett workmanship



**No. 736 Tubular Bow Fixed Anvil Micrometers are available in inch and millimeter sizes from 12-30" or 300-750mm by special order, priced on application. Shown above is a micrometer with standard.**



## **Ultralight "C" Frame Gages**

Rigid honeycomb aluminum diameter gage weighs five times less than solid frame gages. Unit shown has interchangeable anvils for 36-42" range. The gage is used as a dial indicator snap gage set to produce nominal dimension, or as an indicating micrometer. The micrometer head with .0001" graduations and the .0005" dial indicator insure quick, accurate readings.

Ultralights are available from 24-72" (600-1800mm) I.D. or O.D. and can be designed for up to 72" (1800mm) throat depth for thickness measurement.

Order by catalog number and range through our Special Order Department. Example:  
No. 736LZ-28 (this orders a micrometer with a 27-28" range with lock nut and standard, in an attractive, protective case.)





### Special Function Micrometers

Throughout its history, The L.S. Starrett Company has manufactured a multitude of special hand tools and gages for thousands of customers in many different industries. Illustrated on these first two pages are typical examples of Starrett special toolmaking. The following pages show special function tools that we make as regular items because they are commonly used in industry.

Special toolmaking activities are coordinated under the direction of special order sales engineers who oversee each order from the time it is entered until shipment is made. Complete manufacturing facilities and engineering counsel are available.

Customers are invited to submit drawings and specifications for prompt quotation. Please direct these to the attention of:

The L.S. Starrett Company  
Special Order Department  
121 Crescent Street  
Athol, MA 01331-1915



Starrett can manufacture extra large micrometers, like this special No. 724 Micrometer of tubing type construction, range 72-78" (1800-1950mm), with interchangeable anvils.



Special No. 436 Micrometer with dial indicator head. Range 3-4" (75-100mm). Other ranges also available.



### Special Tools

#### Ultralight "C" Frame Gages

Rigid honeycomb aluminum diameter gage weighs five times less than solid frame gages. Unit shown has interchangeable anvils for 36-42" range. (Also available with fixed anvils.) The gage is used as a dial indicator snap gage set to produce nominal dimension, or as an indicating micrometer. The micrometer head with .0001" graduations and the .0005" dial indicator insure quick, accurate readings.

Ultralights are available from 24-72" (600-1800mm) I.D. or O.D. and can be designed for up to 72" (1800mm) throat depth for thickness measurement.



## Micrometer Head Speeds Gaging

A specially shaped micrometer frame, to access an I.D. on an odd shaped part, is equipped with the Starrett No. 204 Quick-Adjusting Micrometer Head. This tool greatly increases the speed with which measurements can be taken.

Pressing a button on the thimble allows the spindle to slide along its axis to any position within its range. Releasing the button re-engages the spindle threads, and thimble rotation is then used for final size adjustment.

The No. 204 Micrometer Head can be mounted on frames designed to suit your particular applications. Quotations and a concept print for your application can be obtained by submitting a product drawing with the thickness dimension(s) circled to:

The L.S. Starrett Co.,  
Special Gage Division,  
121 Crescent Street,  
Athol, MA 01331-1915.

## Special No. 725 Deep Throat Tubular Micrometer

With sliding, interchangeable anvils and locking lever, 7-1/2" (185mm) depth, 0-6" (0-150mm) range.





**Mul-T-Anvil  
Micrometers**

**No. 220 Series 0-2"**

**No. 220M Series 0-50mm**

This tool was a new development in micrometer design and patent is held by Starrett. This micrometer will handle a wide variety of measurements impossible to obtain with regular micrometers, such as measuring the wall thickness of tubing, cylindrical walls from a hole or slot to an edge, many hard-to-reach locations, and the thickness of screw heads, shoulder lengths, etc.

A most interesting feature of this tool is that additional anvils of various shapes can be made up, and many of these anvils do not have to be hardened for that "special job".

This micrometer can be furnished with .0001" graduations, but we recommend .001" or 0.01mm for easier and more accurate readings. The Starrett Company, with our years of experience, recommends this because the anvils on this type of tool are not backed up by a frame as in a regular micrometer and could bend slightly.

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling, better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ A choice of smooth friction thimble for uniform pressure or the combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Interchangeable anvils are rigidly held in the vise type frame and quickly interchanged by a single lock screw adjustment
- ◆ Two hardened anvils furnished – round anvil approximately .120" diameter (3mm) and flat anvil approximately .125" (3mm) and .060" (1.5mm) thick



- ◆ "V" Anvil for measuring thickness of screw heads and shoulder lengths available separately
- ◆ Accommodates special anvils up to 5/16" (8mm) thick
- ◆ Can be used as a height gage by removing the vise jaw

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

**Accuracy and Long-Life Features**

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship
- ◆ Tool is accurate to ± .0002" or ± 0.004mm

**With Round and Flat Anvils and Carbide Faced Spindle**

| Range  | Graduation | Ratchet Stop, Lock Nut |         | Friction Thimble, Lock Nut |         |
|--------|------------|------------------------|---------|----------------------------|---------|
|        |            | Catalog No.            | EDP No. | Catalog No.                | EDP No. |
| 0-1"   | .001"      | 220XRL-1               | 66430   | 220XFL-1                   | 50746   |
| 0-25mm | 0.01mm     | 220MXRL-25             | 65050   |                            |         |

**With Round and Flat Anvils, Carbide Faced Spindle and  
With No. 234B-1" or No. 234MB-25mm End Measuring Rod or Standard**

| Range   | Graduation | Catalog No. | EDP No. | Catalog No. | EDP No. |
|---------|------------|-------------|---------|-------------|---------|
| 1-2"    | .001"      | 220XRL-2    | 66432   | 220XFL-2    | 66433   |
| 25-50mm | 0.01mm     | 220MXRL-50  | 66434   |             |         |

**V-Anvil only:** Order No. PT13017, EDP 71399

1" and 25mm models sent in fitted case. Deluxe case available by ordering No. 220ZZ-1.

2" and 50mm models packed one in a box without case. Deluxe case available by ordering No. 220ZZ-2.



**Electronic Multi-Anvil  
Micrometers  
(with output)**

**No. 790 0-1" (0-25mm)**

This micrometer is the same as our No. 220 Series except that it has an electronic readout and the following extra features and benefits:

**Readability Features**

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Resolution – .00005" and 0.001mm
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve

**Accuracy and Long-Life Features**

- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship
- ◆ Tool is accurate to  $\pm .0002''$  or  $\pm 0.004\text{mm}$

**Full-Function Action Features**

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter model will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus hardware and software and to PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems



**With Standard Inch Graduations on Shell and Thimble  
With Round and Flat Anvils**

| Catalog No. | EDP No. | Description                     |
|-------------|---------|---------------------------------|
| 790AFL-1    | 64048   | 0-1"/0-25mm Range, without Case |

**With Standard Millimeter Graduations on Shell and Thimble  
With Round and Flat Anvils**

|             |       |                                 |
|-------------|-------|---------------------------------|
| 790MEAFL-25 | 66071 | 0-25mm/0-1" Range, without Case |
|-------------|-------|---------------------------------|

**Cable Information**

| Part No. | EDP No. | Description  |
|----------|---------|--|
| PT61963  | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| PT61768  | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| PT22938  | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| PT61120  | 65446   | One 3-Volt Battery No. CR2450  |

Packed one in a box.





**Tube Micrometers**

**No. 569 Series 0-1"**

**No. 569M Series 0-25mm**

For measuring the wall thickness of tubing and other parts with cylindrical walls. Also for measuring from a hole to an edge (note minimum hole sizes in table). Rigid steel "half" frame with smooth black enamel finish. Anvil diameter = 0.185".

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Convenient decimal equivalents on inch tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability

**Accuracy and Long-Life Features**

- ◆ Rigid steel frame ribbed for strength and stability
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



**0-1" range**

| Catalog No.   | EDP No. | Graduation | Minimum Hole Size | Description                  |
|---------------|---------|------------|-------------------|------------------------------|
| <b>569AXP</b> | 66437   | .001"      | 3/16"             | Plain, Carbide Faced Spindle |
| <b>569BXP</b> | 66439   |            | 3/8"              | Plain, Carbide Faced Spindle |

**0-25mm range**

|                |       |        |       |                              |
|----------------|-------|--------|-------|------------------------------|
| <b>569MAXP</b> | 66438 | 0.01mm | 4.8mm | Plain, Carbide Faced Spindle |
| <b>569MBXP</b> | 66440 |        | 9.5mm | Plain, Carbide Faced Spindle |

Special anvils also can be furnished – prices on application. Sent in fitted case. Deluxe case available by ordering No. 910, EDP 55397.



**Electronic Tube  
Micrometers (with output)**

**No. 769 0-1" (0-25mm)**

This micrometer is the same as our No. 569 (anvil diameter=0.185") except that it has an electronic readout and the following extra features and benefits:

**Readability Features**

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Resolution – .00005" and 0.001mm
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve

**Accuracy and Long-Life Features**

- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship

**Full-Function Action Features**

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter model will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus hardware and software and to PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems



**With Standard Inch Graduations on Shell and Thimble**

| Catalog No. | EDP No. | Description  |
|-------------|---------|--|
| 769AXFL     | 66447   | 0-1"/0-25mm Range, Carbide Faced Spindle, without Case |

**With Standard Millimeter Graduations on Shell and Thimble**

|           |       |  |
|-----------|-------|--|
| 769MEAXFL | 66448 | 0-25mm/0-1" Range, Carbide Faced Spindle, without Case |
|-----------|-------|--|

**Cable Information**

| Part No. | EDP No. | Description  |
|----------|---------|--|
| PT61963  | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| PT61768  | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| PT22938  | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| PT61120  | 65446   | One 3-Volt Battery No. CR2450  |

Packed one in a box.



**Sheet Metal  
Micrometers**

**No. 222 Series 0-1"**

**No. 222M Series 0-25mm**

These micrometers reach over the edge of sheet metal and take measurements away from the edge toward the center. Also for other gaging jobs where a deep throat micrometer is needed. Rounded anvil on 1" (25mm) size gives a point contact for more accurate gaging; flat anvil is also available. The 1/2" and 13mm micrometers have satin chrome frames; 1" and 25mm micrometer frames have black wrinkle finish.

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Convenient decimal equivalents on Inch tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Ring-type knurled lock nut for quick and sure locking (on 1/2" and 13mm range models)

**Accuracy and Long-Life Features**

- ◆ Rigid one-piece frame of drop forged steel, ribbed for strength and stability
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring face
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



**2" Throat Depth; 0-1/2" range**

| Catalog No. | EDP No. | Anvil | Graduation | Description                           |
|-------------|---------|-------|------------|---------------------------------------|
| 222RL-1/2   | 50756   | Flat  | .001"      | Ratchet Stop, Lock Nut                |
| 222XRL-1/2  | 50757   | Flat  | .001"      | Ratchet Stop, Lock Nut, Carbide Faces |

**6" Throat Depth; 0-1" range**

|          |       |         |       |                             |
|----------|-------|---------|-------|-----------------------------|
| 222AXR-1 | 50762 | Rounded | .001" | Ratchet Stop, Carbide Faces |
| 222BXR-1 | 50763 | Flat    | .001" | Ratchet Stop, Carbide Faces |

**50mm Throat Depth; 0-13mm range**

|           |       |      |        |                        |
|-----------|-------|------|--------|------------------------|
| 222MRL-13 | 50758 | Flat | 0.01mm | Ratchet Stop, Lock Nut |
|-----------|-------|------|--------|------------------------|

**150mm Throat Depth; 0-25mm range**

|            |       |         |        |                             |
|------------|-------|---------|--------|-----------------------------|
| 222MAXR-25 | 66435 | Rounded | 0.01mm | Ratchet Stop, Carbide Faces |
| 222MBXR-25 | 66436 | Flat    | 0.01mm | Ratchet Stop, Carbide Faces |

**NOTE:** 0-1" range and 0-25mm range micrometers sent with rounded anvil unless otherwise ordered.

Packed one in a box without case – case available by ordering No. 222ZZ-1.



**Electronic Sheet  
Metal Micrometers  
(with output)**

**No. 764 0-1" (0-25mm)**

This micrometer is the same as our No. 222 Series, except that it has an electronic readout and is available in the 1" (25mm) and 25mm ranges. Rounded anvil gives a point contact for more accurate gaging; flat anvil also available. It has the same features as the No. 222 except as follows:

**Readability Features**

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Resolution – .00005" and 0.001mm
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve

**Accuracy and Long-Life Features**

- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship

**Full-Function Action Features**

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter model will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus hardware and software and to PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems



**6" Throat Depth  
With Standard Inch Graduations on Shell and Thimble**

| Catalog No.    | EDP No. | Description   |
|----------------|---------|---|
| <b>764AXFL</b> | 66445   | 0-1"/0-25mm Range, Round Anvil, Carbide Faces, without Case |
| <b>764BXFL</b> | 66525   | 0-1"/0-25mm Range, Flat Anvil, Carbide Faces, without Case  |

**150mm Throat Depth  
With Standard Millimeter Graduations on Shell and Thimble**

|                  |       |   |
|------------------|-------|---|
| <b>764MEAXFL</b> | 66446 | 0-25mm/0-1" Range, Round Anvil, Carbide Faces, without Case |
|------------------|-------|---|

**Cable Information**

| Part No.       | EDP No. | Description  |
|----------------|---------|--|
| <b>PT61963</b> | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| <b>PT61768</b> | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| <b>PT22938</b> | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| <b>PT61120</b> | 65446   | One 3-Volt Battery No. CR2450  |

Packed one per box.





### Automotive Crankshaft Micrometers

**No. 436-3 1/2** 1-1/2 – 3-1/2"

**No. 436M-88** 38-88mm

This Starrett micrometer is designed for automotive work and especially for crankshaft measuring. It is also well suited for all other work within its capacity. It measures the diameter of the journal bearing and main bearing of most crankshafts since the micrometer has a range from 1-1/2" (38mm) – 3-1/2" (88mm).

#### Readability Features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

#### Ease-of-Handling Features

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places
- ◆ 2" (50mm) range
- ◆ 2-5/8" (66mm) throat depth

#### Accuracy and Long-Life Features

- ◆ Rigid one-piece frame of drop forged steel, ribbed for extra strength
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy sleeve adjustment
- ◆ Starrett workmanship



T436RLS-3 1/2 with 2" standard.



The reading point is on the under side of the sleeve, plainly visible while measuring. It's a very useful feature when measuring between webs.

#### 1-1/2 – 3-1/2" range

| Catalog No.   | EDP No. | Graduation | Description                      |
|---------------|---------|------------|----------------------------------|
| T436RLS-3 1/2 | 65493   | .0001"     | Ratchet Stop, Lock Nut, Standard |

#### 38-88mm range

|             |       |         |                                  |
|-------------|-------|---------|----------------------------------|
| V436MRLS-88 | 65600 | 0.002mm | Ratchet Stop, Lock Nut, Standard |
|-------------|-------|---------|----------------------------------|

Carbide measuring faces available on special order. Specify "X" after catalog number. Packed one in a box without case – case available by ordering No. 733ZZ-4, EDP 66139.



## Automotive Disc Brake Micrometers

**No. 458 Series .300-2"**

**No. 458M Series  
7.6-50mm**

This micrometer is for measuring the depth of wear grooves in the disc of brake systems.

The micrometer has a 3" (75mm) frame with a depth of 3-1/2" (88mm) to allow additional reach. It has a flat carbide spindle and a carbide anvil with a 60° point.

### Readability Features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

### Ease-of-Handling Features

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places
- ◆ 3-1/2" (88mm) throat depth

### Accuracy and Long-Life Features

- ◆ Rigid one-piece steel frame
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Carbide measuring face on the spindle and carbide "V" anvil
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



Measuring the wear groove depth on a disc brake with the No. 458BXR.

### .300-2" range

| Range       | Graduation | Catalog No. | EDP No. | Description                    |
|-------------|------------|-------------|---------|--------------------------------|
| .300-1.300" | .001"      | 458AXR      | 67534   | Ratchet Stop,<br>Carbide Faces |
| .300-1.300" | .001"      | 458AXRS*    | 67535   |                                |
| 1-2"        | .001"      | 458BXR      | 67536   |                                |
| 1-2"        | .001"      | 458BXR*     | 67537   |                                |

### 7.6-50mm range

|          |        |            |       |                                |
|----------|--------|------------|-------|--------------------------------|
| 7.6-33mm | 0.01mm | 458MAXR    | 67538 | Ratchet Stop,<br>Carbide Faces |
| 7.6-33mm | 0.01mm | 458MAXRS** | 67539 |                                |
| 25-50mm  | 0.01mm | 458MBXR    | 67540 |                                |
| 25-50mm  | 0.01mm | 458MBXR**  | 67541 |                                |

\* Supplied with No. 2G Gage Block Standard

\*\* Supplied with No. 2MG Gage Block Standard

Packed one per box.



**Automotive Disc Brake  
Indicating Gages**

**No. 1016 .300-2"**

**No. 1016M 8-50mm**

This gage is a companion gage to the No. 458 Series micrometer. It is an indicator gage used to measure the thickness of disc brake rotors and to determine the depth of grooves worn in the rotor.

This gage consists of a 1" (25mm) range, .001" (0.01mm) indicator reverse loaded, mounted on a frame with a 60° pointed anvil and a flat indicator contact. This gage is adjustable to allow reading dimensions from .300" (8mm) to 2" (50mm) in one gage, eliminating the need for two separate gages. The frame has a 3-3/8" (85mm) depth.

**Readability Features**

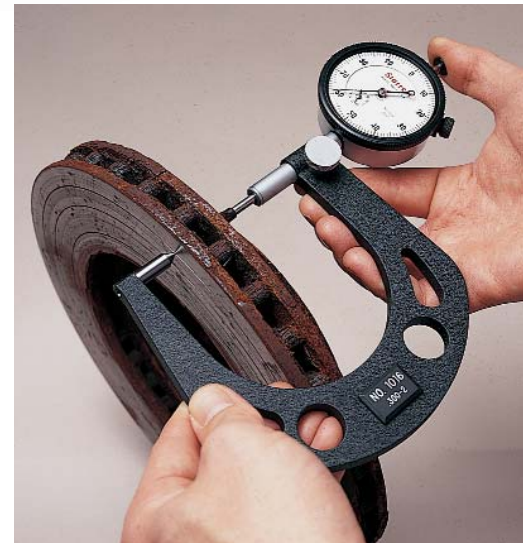
- ◆ Clear, easily read large numbers and sharp graduations on both regular and counter dials

**Ease-of-Handling Features**

- ◆ Balanced frame design for comfortable and accurate measuring
- ◆ Gracefully designed tapered frame for use in tight places
- ◆ Lightweight
- ◆ Easy plunger action to set the reading
- ◆ Adjustable to read through .300" (8mm) to 2" (50mm) range

**Accuracy and Long-Life Features**

- ◆ Stable steel frame
- ◆ Hardened indicator gear action
- ◆ Extremely hard and finely finished measuring surfaces
- ◆ Furnished with a 1" or 25mm gage block standard



Measuring the groove depth of a disc brake rotor with the No. 1016.

**.300-2" range**

| Catalog No. | EDP No. | Graduation | Description  |
|-------------|---------|------------|--|
| 1016        | 63795   | .001"      | Adjustable Dial Indicator and No. 2G Gage Block Standard |

**8-50mm range**

|       |       |        |   |
|-------|-------|--------|---|
| 1016M | 63796 | 0.01mm | Adjustable Dial Indicator and No. 2MG Gage Block Standard |
|-------|-------|--------|---|

Packed one per box.





**Blade Type  
Micrometers with  
non-rotating spindle**

**No. 486 Series 0-12"**

**No. 486M Series  
0-150mm**

Here is another special function Starrett micrometer. It is designed for fast and accurate measurements of circular form tools, diameter and depth of narrow grooves, slots, keyways, recesses, and depths between lands and fins.

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Speeder for quicker adjustment on all sizes
- ◆ Non-rotating spindle prevents blade from turning in narrow slots or rolling off shoulder
- ◆ The blades are .030" (0.8mm) thick
- ◆ Blades will measure to 5/16" (8mm) depths

**Accuracy and Long-Life Features**

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



**Ideal for measuring grooves, slots, recesses, etc.**

Packed one in a box. Sent without case unless otherwise ordered.



**0-12" range**

| Range  | Graduation | Description  | Catalog No.    | EDP No. |
|--------|------------|--------------|----------------|---------|
| 0-1"   | .001"      | With Speeder | <b>486P-1</b>  | 52499   |
| 1-2"   |            |              | <b>486P-2</b>  | 52501   |
| 2-3"   |            |              | <b>486P-3</b>  | 52503   |
| 3-4"   |            |              | <b>486P-4</b>  | 52505   |
| 4-5"   |            |              | <b>486P-5</b>  | 52507   |
| 5-6"   |            |              | <b>486P-6</b>  | 52509   |
| 6-7"   |            |              | <b>486P-7</b>  | 67094   |
| 7-8"   |            |              | <b>486P-8</b>  | 67095   |
| 8-9"   |            |              | <b>486P-9</b>  | 67096   |
| 9-10"  |            |              | <b>486P-10</b> | 67097   |
| 10-11" |            |              | <b>486P-11</b> | 67098   |
| 11-12" |            |              | <b>486P-12</b> | 67099   |

**0-150mm range**

|           |        |              |                  |       |
|-----------|--------|--------------|------------------|-------|
| 0-25mm    | 0.01mm | With Speeder | <b>486MP-25</b>  | 64257 |
| 25-50mm   |        |              | <b>486MP-50</b>  | 64258 |
| 50-75mm   |        |              | <b>486MP-75</b>  | 64259 |
| 75-100mm  |        |              | <b>486MP-100</b> | 64260 |
| 100-125mm |        |              | <b>486MP-125</b> | 64261 |
| 125-150mm |        |              | <b>486MP-150</b> | 64262 |

**Cases**

| Range     | Cat. No.   | EDP No. | Range      | Cat. No.        | EDP No. |
|-----------|------------|---------|------------|-----------------|---------|
| 1", 25mm  | <b>913</b> | 55400   | 7", 175mm  | <b>931</b>      | 55277   |
| 2", 50mm  | <b>922</b> | 55222   | 8", 200mm  | <b>932</b>      | 55278   |
| 3", 75mm  | <b>952</b> | 55223   | 9", 225mm  | <b>933</b>      | 55279   |
| 4", 100mm | <b>953</b> | 55224   | 10", 250mm | <b>934</b>      | 55280   |
| 5", 125mm | <b>954</b> | 55225   | 11", 275mm | <b>935</b>      | 55281   |
| 6", 150mm | <b>930</b> | 55276   | 12", 300mm | <b>436ZZ-13</b> | 55282   |





### Electronic Blade-Type Micrometers with non-rotating spindle (with output)

#### No. 786 Series 0-5" (0-125mm)

This micrometer is the same as our No. 486 except that it has an electronic readout and the following extra features:

#### Readability Features

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve

#### Accuracy and Long-Life Features

- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship

#### Full-Function Action Features

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter models will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus hardware and software and to PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems



#### With Standard Inch Graduations on Shell and Thimble

| Range  |             | Resolution |         | Catalog No.   | EDP No. |
|--------|-------------|------------|---------|---------------|---------|
| Inch   | Approx. mm  | Inch       | mm      |               |         |
| 0 - 1" | 0 - 25.4mm  | .00005"    | 0.001mm | <b>786P-1</b> | 65225   |
| 1 - 2" | 25.4 - 51mm |            |         | <b>786P-2</b> | 65226   |
| 2 - 3" | 51 - 76mm   |            |         | <b>786P-3</b> | 65227   |
| 3 - 4" | 76 - 101mm  |            |         | <b>786P-4</b> | 65228   |
| 4 - 5" | 101 - 127mm |            |         | <b>786P-5</b> | 65229   |

#### With Standard Millimeter Graduations on Shell and Thimble

| Range       |                | Resolution |         | Catalog No.       | EDP No. |
|-------------|----------------|------------|---------|-------------------|---------|
| mm          | Approx. Inch   | mm         | Inch    |                   |         |
| 0 - 25mm    | 0 - .984"      | 0.001mm    | .00005" | <b>786MEP-25</b>  | 66118   |
| 25 - 50mm   | .984 - 1.968"  |            |         | <b>786MEP-50</b>  | 66126   |
| 50 - 75mm   | 1.968 - 2.950" |            |         | <b>786MEP-75</b>  | 66127   |
| 75 - 100mm  | 2.950 - 3.930" |            |         | <b>786MEP-100</b> | 66128   |
| 100 - 125mm | 3.930 - 4.920" |            |         | <b>786MEP-125</b> | 66129   |

#### Cable Information

| Part No.       | EDP No. | Description  |
|----------------|---------|--|
| <b>PT61963</b> | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| <b>PT61768</b> | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| <b>PT22938</b> | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| <b>PT61120</b> | 65446   | One 3-Volt Battery No. CR2450  |

Packed one in a box. Attractive, protective case available by ordering No. 733ZZ and one size larger than the micrometer. Example: For No. 786P-2, order No. 733ZZ-3.



## Groove Micrometer

**No. 260** inch

**No. 260M** mm

This tool is designed to quickly and easily measure widths of internal or external grooves and lands.

### Readability Features

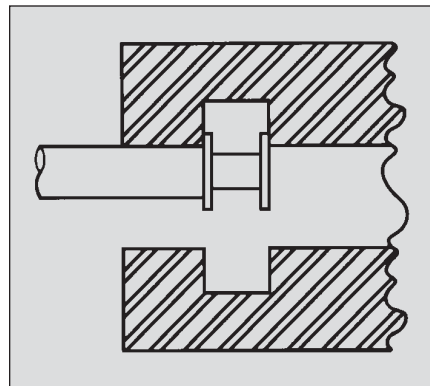
- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

### Ease-of-Handling Features

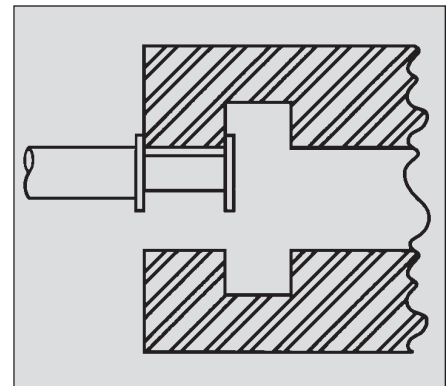
- ◆ Balanced design to insure easy handling and better readability
- ◆ Has a reach of 1-5/8" (41mm) maximum hole depth
- ◆ Each measuring disc is 9/32" (7mm) diameter and .025" (0.63mm) thick
- ◆ Will measure groove widths .050-1.050" (1.27-26.6mm)
- ◆ Will measure land widths from 0-1" and 0-25mm

### Accuracy and Long-Life Features

- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Hardened, ground, and lapped measuring discs
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship
- ◆ This tool is accurate to  $\pm 0.0004"$  or  $\pm 0.01\text{mm}$



Measures groove ranges from .050-1.050" (add .050" to reading) and ranges 1.27-26.27mm (add 1.27mm to reading).



Measures land ranges 0-1" (0-25mm).

### Inch

| Catalog No. | EDP No. | Graduation | Range          |             | Max. Hole Depth |
|-------------|---------|------------|----------------|-------------|-----------------|
|             |         |            | Groove Widths* | Land Widths |                 |
| 260Z        | 67987   | .001"      | .050"-1.050"   | 0-1.000"    | 1 5/8"          |

\* Add .050" to No. 260Z micrometer reading

### Millimeter

|       |       |        |              |        |      |
|-------|-------|--------|--------------|--------|------|
| 260MZ | 67988 | 0.01mm | 1.27-26.27mm | 0-25mm | 41mm |
|-------|-------|--------|--------------|--------|------|

\* Add 1.27mm to No. 260MZ micrometer reading

Furnished in attractive protective case.  
Packed one in a box.



**Disc-Type Micrometers  
with rotating or  
non-rotating spindles**

**No. 256 Series 0-3"**

**No. 256M Series 0-75mm**

These tools are used to measure the thickness of work sections such as ribs, lands, fins, cutting edges on form tools, and chordal thickness of gear teeth. Because of their large anvil and spindle faces, the 1" and 25mm sizes are also useful for measuring the thickness of sheet materials like paper, cardboard, rubber, and plastics.

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools
- ◆ Convenient decimal equivalents on 1" and 2" reading tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ The combination ratchet and speeder for uniform pressure and quicker adjustment on all sizes
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places
- ◆ Anvil and spindle discs are 1/2" (12.7mm) diameter tapering to .015" (0.4mm) edge thickness making it possible to enter narrow grooves and recesses
- ◆ Available in the 1" and 25mm sizes with rotating or non-rotating spindle

**Accuracy and Long-Life Features**

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship
- ◆ This tool is accurate to  $\pm .00015"$  or  $\pm 0.003\text{mm}$  measuring over the whole surface and  $\pm .0002"$  or  $\pm 0.004\text{mm}$  measuring on the edges



The No. 256 Series are available in inch and millimeter models. Shown above are the No. 256PN-1 (top) and the new No. 256MRL-50 model (bottom).

**.001" Graduation**

| Range | Description               | Catalog No.    | EDP No. |
|-------|---------------------------|----------------|---------|
| 0-1"  | Ratchet Stop, Lock Nut    | <b>256RL-1</b> | 51236   |
| 0-1"  | With Non-Rotating Spindle | <b>256PN-1</b> | 56469   |
| 1-2"  | Ratchet Stop, Lock Nut    | <b>256RL-2</b> | 55940   |
| 2-3"  | Ratchet Stop, Lock Nut    | <b>256RL-3</b> | 55941   |

**0.01mm Graduation**

|         |                           |                  |       |
|---------|---------------------------|------------------|-------|
| 0-25mm  | Ratchet Stop, Lock Nut    | <b>256MRL-25</b> | 51238 |
| 0-25mm  | With Non-Rotating Spindle | <b>256MPN-25</b> | 56470 |
| 25-50mm | Ratchet Stop, Lock Nut    | <b>256MRL-50</b> | 55942 |
| 50-75mm | Ratchet Stop, Lock Nut    | <b>256MRL-75</b> | 55943 |

1" and 25mm sent in fitted case. Deluxe case available by ordering No. 910 ,EDP 55397. 2" and 50mm and above are packed one in a box without case. Deluxe cases available by ordering No. 912, EDP 55399, for the 2" and 50mm sizes and No. 922, EDP 55222, for the 3" and 75mm sizes.



**Electronic Disc-Type  
Micrometer with  
rotating spindle (with output)**

**No. 756 0-1" (0-25mm)**

This is the same as our No. 256 except that it has an electronic readout and the following extra features and benefits:

**Readability Features**

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Resolution – .00005" and 0.001mm
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve

**Accuracy and Long-Life Features**

- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship
- ◆ Anvil and spindle discs are 1/2" (12.7mm) diameter tapering to 0.15" (0.4mm) edge thickness making it possible to enter narrow grooves and recesses
- ◆ Tool is accurate to ±.00015" or ±0.003mm measuring over the whole surface and ±.0002" or ±0.004mm measuring on the edge

**Full-Function Action Features**

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter model will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus hardware and software and to PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems



**With Standard Inch Graduations on Shell and Thimble**

| Catalog No. | EDP No. | Description                     |
|-------------|---------|---------------------------------|
| 756FL-1     | 64042   | 0-1"/0-25mm Range, without Case |

**With Standard Millimeter Graduations on Shell and Thimble**

|            |       |                                 |
|------------|-------|---------------------------------|
| 756MEFL-25 | 66134 | 0-25mm/0-1" Range, without Case |
|------------|-------|---------------------------------|

**Cable Information**

| Part No. | EDP No. | Description  |
|----------|---------|--|
| PT61963  | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| PT61768  | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| PT22938  | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| PT61120  | 65446   | One 3-Volt Battery No. CR2450  |

Packed one in a box without case – cases available by ordering No. 949, EDP 63874.





**Paper Gage  
Micrometers**

**No. 223** 0-11/32"

**No. 223M** 0-8.75mm

This micrometer is designed for use in paper mills, printing shops, paper warehouses, rubber plants, etc. for accurately, quickly measuring the thickness of paper, cardboard, chipboard, rubber, plastics, and other similar products, up to 11/32" (8.75mm).

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Convenient decimal equivalents on inch tool

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ The combination ratchet and speeder for uniform pressure and quicker adjustment on all sizes
- ◆ Anvil and spindle faces are 7/16" (11mm) diameter to prevent compressing the material being measured and to insure accurate readings
- ◆ The floating anvil automatically adjusts itself to any surface condition
- ◆ Convenient finger-holding ring is also provided

**Accuracy and Long-Life Features**

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



**0-11/32" range**

| Catalog No. | EDP No. | Graduation | Description                  |
|-------------|---------|------------|------------------------------|
| 223RL       | 50768   | .001"      | Ratchet Stop, Lock Nut, Ring |

**0-8.75mm range**

|        |       |        |                              |
|--------|-------|--------|------------------------------|
| 223MRL | 64336 | 0.01mm | Ratchet Stop, Lock Nut, Ring |
|--------|-------|--------|------------------------------|

Sent in fitted case. Attractive, protective case available by ordering No. 921, EDP 55213.



**Micrometers with rounded anvils**

- No. 576** 0-1/2"
- No. 576M** 0-13mm
- No. 577** 0-1"
- No. 577M** 0-25mm
- No. 211** 0-1"

These three micrometers are all extremely useful for measuring the wall thickness of parts such as solid and split bearings, tubing, sleeves, collars, rings, various cylinders, and also measuring from the inside of a hole to an edge. All three have a rounded anvil which contacts the inside curved surface and a flat spindle for contacting the outside of the work, thus producing single point contact. This permits accurate gaging of curved surface thickness in thousandths of an inch or hundredths of a millimeter.

**Capacity:**

- ◆ The **No. 576** can get into holes as small as 5/16 of an inch (8mm) and measure up to 1/2 inch (13mm)
- ◆ The **No. 577** can get into holes as small as 3/8 of an inch (9.5mm) and measure up to 1 inch (25mm)
- ◆ The **No. 211** can get into holes as small as 5/8 of an inch (16mm) and measure up to 1 inch (25mm)

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Convenient decimal equivalents on inch tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

**Accuracy and Long-Life Features**

- ◆ Rigid steel frames
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring face
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



Starrett outside micrometers with rounded anvils are available in different finishes. Shown (top-to-bottom) are No. 211XP with black enamel frame, No. 576XR with ratchet stop and full finish frame, and (bottom) No. 577MXP with full finish frame.

**0-1" range**

| Catalog No.  | EDP No. | Range  | Graduation | Description  |
|--------------|---------|--------|------------|--|
| <b>576XR</b> | 66441   | 0-1/2" | .001"      | Ratchet Stop, Full Finish Tapered Frame, Carbide Faced Spindle |
| <b>577XP</b> | 66443   | 0-1"   | .001"      | Full Finish Tapered Frame, Carbide Faces                       |
| <b>211XP</b> | 66428   | 0-1"   | .001"      | Black Enameled Tapered Frame, Carbide Faces                    |

**0-25mm range**

|               |       |        |        |  |
|---------------|-------|--------|--------|--|
| <b>576MXR</b> | 66442 | 0-13mm | 0.01mm | Ratchet Stop, Full Finish Tapered Frame, Carbide Faced Spindle |
| <b>577MXP</b> | 66444 | 0-25mm | 0.01mm | Full Finish Tapered Frame, Carbide Faces                       |

**NOTE:** Ball Attachment No. 247 used for rounded anvil effect is also available for other standard micrometers.

Sent in fitted case. Attractive, protective cases available by ordering No. 910, EDP 55397, for Nos. 211 and 577 micrometers. Order No. 921, EDP 55213, for No. 576.



**Electronic Micrometers  
with rounded anvil  
(with output)**

**No. 788 0-1" (0-25mm)**

This micrometer is similar to our No. 211, except that it has an electronic readout and the following extra features and benefits:

**Readability Features**

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Resolution – .00005" and 0.001mm
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve

**Accuracy and Long-Life Features**

- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship

**Full-Function Action Features**

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter model will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus hardware and software and to PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems



**With Standard Inch Graduations on Shell and Thimble**

| Catalog No. | EDP No. | Description                                    |
|-------------|---------|--|
| 788XFL      | 66449   | 0-1"/0-25mm Range, Carbide Faces, without Case |

**With Standard Millimeter Graduations on Shell and Thimble**

|          |       |  |
|----------|-------|--|
| 788MEXFL | 66450 | 0-25mm/0-1" Range, Carbide Faces, without Case |
|----------|-------|--|

**Cable Information**

| Part No. | EDP No. | Description  |
|----------|---------|--|
| PT61963  | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| PT61768  | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| PT22938  | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| PT61120  | 65446   | One 3-Volt Battery No. CR2450  |

Packed one in a box without case – case available by ordering No. 949, EDP 63874.



## Micrometer Ball Attachments

**No. 247 Series inch**

**No. 247M Series mm**

Starrett outside micrometers and micrometer heads having spindle sizes listed below can be instantly converted for measuring wall thickness of tubing, split and full bearings, sleeves and other parts with rounded surfaces by means of the No. 247 ball attachment.

### Features

- ◆ Easily applied by snapping on to end of either anvil or spindle, thus permitting two attachments to be used together
- ◆ Balls are hardened, measure .200" and 5mm in diameter, and move freely in the retainer, insuring positive contact with anvil and spindle.
- ◆ The diameters, .200" or 5mm, of each ball used must be subtracted from the micrometer reading



**Ball attachments, available in inch and millimeter models, convert standard micrometers listed below from flat anvil or spindle to round for measuring rounded surfaces.**



### .200" Diameter Balls

| Catalog No. | EDP No. | Description   |
|-------------|---------|---|
| 247A        | 51174   | For Nos. 2, 226 and 230 Series Micrometers and No. 263 Series Micrometer Heads, .235" diameter Anvil and Spindle  |
| 247B        | 51175   | For Nos. 224A, 224AA and 436 Series Micrometers, .270" diameter Anvil and Spindle                                 |
| 247C        | 51176   | For No. 232 Series Micrometers and No. 463 Series Micrometer Heads, .200" diameter Anvil and Spindle              |
| 247D        | 51177   | For Nos. 216, 231, 436.1, 733, 734, 1212 and 1230 Micrometers, .250" diameter Anvil and Spindle                   |
| 247E        | 51178   | For Nos. 224B through J, 238, 239, 436 Micrometers and No. 663 Micrometer Heads, .300" diameter Anvil and Spindle |

### 5mm Diameter Balls

|       |       |  |
|-------|-------|--|
| 247MA | 51179 | For No. 2M and No. 230M Micrometers and No. 263M Micrometer Heads, 6mm diameter Anvil and Spindle                |
| 247MB | 51180 | For No. 436M Micrometers, 6.8mm diameter Anvil and Spindle   |
| 247MD | 56691 | For Nos. 216M and 436.1M Micrometers, 6.35mm diameter Anvil and Spindle  |
| 247ME | 56692 | For Nos. 224MB through J, 238M, 436M Micrometers and No. 663M Micrometer Heads, 7.6mm diameter Anvil and Spindle |





## Steel Mill Micrometers

### No. 205 Series 0-1"

This micrometer is specially designed for gaging hot metal sheet in steel mills and has many features for safer, faster, and more accurate measurements. Micrometer has rugged construction throughout, and is attached to a convenient wooden handle, correctly shaped for a firm grip. Allows measurements to be made while the micrometer can be comfortably held at a safe distance from the hot metal.

#### Readability Features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools
- ◆ Convenient decimal equivalents on inch tools
- ◆ Extra long bevel on thimble with heavy cut graduations

#### Ease-of-Handling Features

- ◆ Both spindle and anvil are beveled to easily slide onto the work
- ◆ Large, reversible wing lock nut is easy to lock or release, even when wearing heavy gloves
- ◆ Rugged frame construction and heavy duty spindle of .270" diameter

#### Accuracy and Long-Life Features

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment by either the anvil or by a simple sleeve adjustment
- ◆ Starrett workmanship



| Catalog No. | EDP No. | Range | Graduation | Description           |
|-------------|---------|-------|------------|-----------------------|
| 205HL       | 50730   | 0-1"  | .001"      | Lock Nut, with Handle |

Also available with carbide measuring faces – specify "X" after catalog number. Packed one in a box.



## Screw Thread Micrometers for measuring pitch diameter

**No. 575 Series** 0-1"

**No. 575M Series** 0-25mm

**No. 585 Series** 1-2"

**No. 585M Series** 25-50mm

These micrometers have a pointed spindle and a double V-anvil, both shaped to contact the screw thread as shown in the drawing. The micrometer reading therefore gives the pitch diameter.\*

### Readability Features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Decimal equivalents on inch tools

### Ease-of-Handling Features

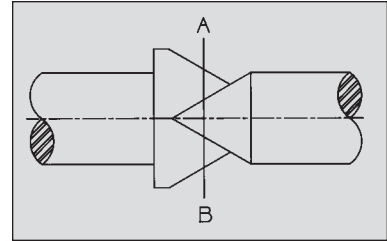
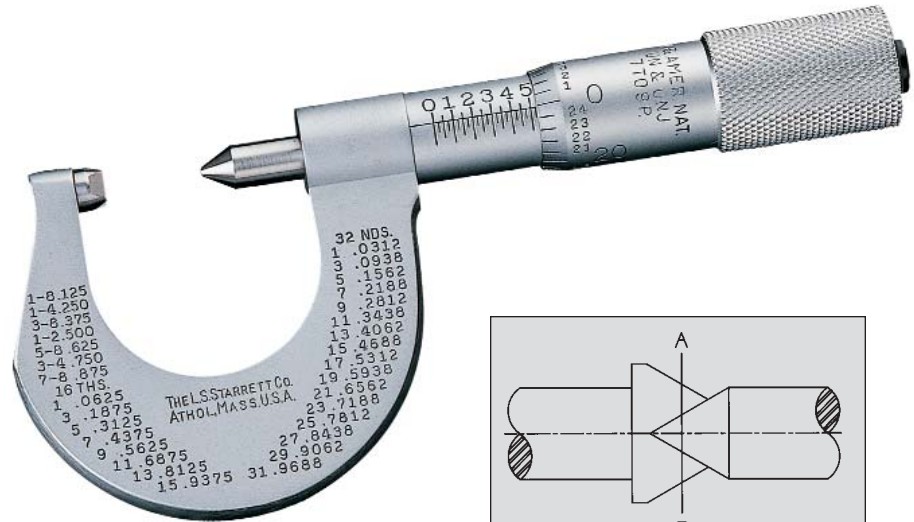
- ◆ Balanced frame and thimble design for easy handling and better readability
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places
- ◆ Furnished with fixed (non-rotating) anvil, but swivel anvils available on special order
- ◆ Available in capacity over 2" or 50mm (special order)

### Accuracy and Long-Life Features

- ◆ One-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship
- ◆ Design allows 50% to 75% contact with the thread to be measured, thereby insuring contact with the pitch diameter at all times
- ◆ Design also insures against contact with the root area of the thread
- ◆ Tools are accurate to  $\pm .0002''$  or 0.004mm

### \*Measuring tip:

These tools are accurate for general purposes, especially if set to a thread plug gage of the size to be measured. If higher accuracy is required, please refer to our No. 1130 Cone and Vee Thread Gaging System.



**No. 575AP 0-1" micrometer gages pitch diameter of a screw thread. This micrometer is read directly in inches in terms of pitch diameter, since with the anvil and spindle in the position shown in the drawing, the line AB corresponds to the 0 reading.**

## Series 575 and 585 – Inches

For measuring American Unified National series and Unified J series screw threads. Series 585 micrometers come with a one-inch standard at no extra cost.

### Graduation – .001"

| Range, Threads Per inch | Capacity, Pitch Diameter | Catalog No. | EDP No. |
|-------------------------|--------------------------|-------------|---------|
| 7-9                     | 0-1"                     | 575AP       | 56159   |
| 10-13                   |                          | 575BP       | 56160   |
| 14-18                   |                          | 575CP       | 56161   |
| 20-24                   |                          | 575DP       | 56162   |
| 28-30                   |                          | 575EP       | 56163   |
| 32-40                   |                          | 575FP       | 56164   |
| 4 1/2 - 6               | 1-2"                     | 585AP       | 56165   |
| 7-9                     |                          | 585BP       | 56166   |
| 10-13                   |                          | 585CP       | 56167   |
| 14-18                   |                          | 585DP       | 56168   |
| 20-24                   |                          | 585EP       | 56169   |
| 28-30                   |                          | 585FP       | 56170   |

## Series 575M and 585M – Metric

For measuring I.S.O. metric and MJ screw threads. Series 585M micrometers come with a 25mm standard at no extra cost.

### Graduation – 0.01mm

| Range, Pitch in mm | Capacity, Pitch Diameter | Catalog No. | EDP No. |
|--------------------|--------------------------|-------------|---------|
| 3-4                | 0-25mm                   | 575MAP      | 56321   |
| 2-2.5              |                          | 575MBP      | 56322   |
| 1.25-1.75          |                          | 575MCP      | 56323   |
| 0.75-1             |                          | 575MDP      | 56324   |
| 0.5-0.7            |                          | 575MEP      | 56325   |
| 0.35-0.45          |                          | 575MFP      | 56326   |
| 4.5-6              | 25-50mm                  | 585MAP      | 56327   |
| 3-4                |                          | 585MBP      | 56328   |
| 2-2.5              |                          | 585MCP      | 56329   |
| 1.25-1.75          |                          | 585MDP      | 56330   |

**NOTE:** Available on special order with swivel anvil – also in capacities over 2" (50mm).

**NOTE:** See reference tables, back of catalog for pitch diameters and other screw thread data.

No. 575 sent in fitted case. No. 585 packed one in a box without case – attractive, protective cases available by ordering No. 910, EDP 5539, for the No. 575 series and No. 912 EDP 55399, for the No. 585 series.



**Screw Thread  
Comparator  
Micrometers**

**No. 210 0-7/8"**

**No. 210M 0-22mm**

This micrometer is ideal for quick comparisons of thread accuracy in screw cutting operations, measuring in small grooves or recesses where regular micrometers cannot be used, and for many other applications.

**NOTE:** Does not measure pitch diameter. For such measurements, Starrett No. 575, No. 585, or No. 1130 cone and vee thread gaging system are recommended.

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Convenient decimal equivalents on inch reading tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Gracefully designed tapered frame for use in narrow slots and tight places

**Accuracy and Long-Life Features**

- ◆ Rigid steel frame
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ The No. 210 has 60° conical anvil and spindle faces with 1/64" (0.4mm) flats on the ends of the points
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



**0-7/8" range**

| Catalog No. | EDP No. | Range  | Graduation | Description                    |
|-------------|---------|--------|------------|--------------------------------|
| 210AP       | 50731   | 0-7/8" | .001"      | Plain (No Ratchet or Lock Nut) |

**0-22mm range**

|        |       |        |         |                                |
|--------|-------|--------|---------|--------------------------------|
| 210MAP | 64334 | 0-22mm | 0.01 mm | Plain (No Ratchet or Lock Nut) |
|--------|-------|--------|---------|--------------------------------|

Sent in fitted case. Attractive, protective case available by ordering No. 910, EDP 55397.



**Electronic Screw  
Thread Comparator  
Micrometer (with output)**

**No. 760 0-1" (0-25mm)**

This micrometer is the same as our No. 210 except that it has an electronic readout and the following extra features and benefits:

**NOTE:** Will not measure pitch diameter. For such measurements, Starrett Nos. 575, 585 or 1130 cone and vee thread gaging system are recommended.

**Readability Features**

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Resolution – .00005" and 0.001mm
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve

**Accuracy and Long-Life Features**

- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship

**Full-Function Action Features**

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter mode will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus hardware and software and to PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems



**With Standard Inch Graduations on Shell and Thimble**

| Catalog No. | EDP No. | Description                     |
|-------------|---------|---------------------------------|
| 760FL       | 64051   | 0-1"/0-25mm Range, without Case |

**With Standard Millimeter Graduations on Shell and Thimble**

|         |       |                                 |
|---------|-------|---------------------------------|
| 760MEFL | 66135 | 0-25mm/0-1" Range, without Case |
|---------|-------|---------------------------------|

**Cable Information**

| Part No. | EDP No. | Description  |
|----------|---------|--|
| PT61963  | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| PT61768  | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| PT22938  | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| PT61120  | 65446   | One 3-Volt Battery No. CR2450  |

Packed one in a box without case – case available by ordering No. 731ZZ-2.





### V-Anvil Micrometers

**No. 483 Series** .093-2"

**No. 483M Series** 2-25mm

**No. 485 Series** .078-1"

These micrometers are used to check out-of-roundness from centerless grinding or other machining operations. They are also used for measuring odd fluted taps, milling cutters, and reamers. When measuring odd fluted cutters, make sure that one cutting edge lines up with the micrometer spindle axis.

#### Readability Features

- ◆ Direct measuring of three and five-fluted tools
- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

#### Ease-of-Handling Features

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ The combination ratchet and speeder for uniform pressure and quicker adjustment on all sizes

#### Accuracy and Long-Life Features

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Carbide facing on spindle and anvils for extra long wear
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



No. T483XRL-1 with tapered spindle.



Checking out-of-roundness on centerless grinding work.



Measuring outside diameter of 3-fluted counterbore.

#### .093-1" range

| Catalog No. | EDP No. | Graduation | No. of Flutes It Will Measure | Description                             |
|-------------|---------|------------|-------------------------------|---|
| T483XRL-1   | 52491   | .0001"     | 3                             | Ratchet Stop, Lock Nut, Tapered Spindle |

#### 1-2" range

|           |       |        |   |                        |
|-----------|-------|--------|---|------------------------|
| T483XRL-2 | 52494 | .0001" | 3 | Ratchet Stop, Lock Nut |
|-----------|-------|--------|---|------------------------|

#### .078-1" range

|         |       |        |   |                        |
|---------|-------|--------|---|------------------------|
| T485XRL | 52497 | .0001" | 5 | Ratchet Stop, Lock Nut |
|---------|-------|--------|---|------------------------|

#### 2-25mm range

|            |       |        |   |   |
|------------|-------|--------|---|---|
| 483MXRL-25 | 56046 | 0.01mm | 3 | Ratchet Stop, Lock Nut, Tapered Spindle |
| 485MXRL    | 56047 |        | 5 |   |

Packed one in a box without case. Attractive, protective cases available by ordering No. 939, EDP 55331, for the 1" and 25mm sizes, and No. 483ZZ-2, EDP 55332, for the 2" size.



## Wire Micrometers

**No. 225** 0-.400"

**No. 225M** 0-10mm

This is another regularly offered special function Starrett micrometer designed to measure diameter of wire up to .400" (10mm).

### Readability Features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

### Ease-of-Handling Features

- ◆ Smooth friction thimble for uniform pressure
- ◆ Hex body which stops the micrometer from rolling over when placed on a flat surface
- ◆ The throat is flat to support the wire when measuring
- ◆ The anvil and spindle extend below the flat surface

### Accuracy and Long-Life Features

- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



### 0-.400" range

| Catalog No. | EDP No. | Graduation | Description      |
|-------------|---------|------------|------------------|
| T225F       | 50814   | .0001"     | Friction Thimble |

### 0-10mm range

|        |       |         |                  |
|--------|-------|---------|------------------|
| V225MF | 64255 | 0.001mm | Friction Thimble |
|--------|-------|---------|------------------|

Furnished in plastic pouch.



**Stainless Steel Can  
Seam Micrometers**

**No. 207, 207M Series  
No. 208, 208M Series**

Starrett Can Seam Micrometers are made of stainless steel and designed to measure the thickness and depth of can seams.  
**NOTE:** Depth range on 208D is .200". Depth range on 208MD is 5mm.

The No. 207 Series is used to measure the seam at the outside bottom edge of the dome on the top of an aerosol can.

The No. 208 Series is used to measure the thickness of the seam at the top and bottom of a flat-topped can.

The No. 208D Series is used to measure thickness and depth of all standard can seams.

**Readability Features**

- ◆ Satin finish stainless steel – no glare – rust and stain resistant
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

**Ease-of-Handling Features**

- ◆ The No. 207 Series has a snub nose which permits measuring aerosol type cans

**Accuracy and Long-Life Features**

- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



**No. 207Z featuring snub nose.**



**No. 208DZ with depth gage.**

**0-.375" range**

| Catalog No.  | EDP No. | Graduation | Description                   |
|--------------|---------|------------|-------------------------------|
| <b>207Z</b>  | 56173   | .001"      | Snub Nose for Aerosol Cans    |
| <b>208Z</b>  | 56175   | .001"      | Without Depth Gage            |
| <b>208DZ</b> | 56176   | .001"      | With Depth Gage (.200" Range) |

**0-9.5mm range**

|               |       |        |                             |
|---------------|-------|--------|-----------------------------|
| <b>207MZ</b>  | 64337 | 0.01mm | Snub Nose for Aerosol Cans  |
| <b>208MZ</b>  | 64338 | 0.01mm | Without Depth Gage          |
| <b>208MDZ</b> | 63191 | 0.01mm | With Depth Gage (5mm Range) |

Furnished in soft case.  
Packed one in a box.



## Can Curl Micrometers

**No. 209** 0-.500"

**No. 209M** 0-12.5mm

The Starrett No. 209 features a special rest foot and finger ring for consistent measurement of the curl thickness on aerosol cans with 1" (25mm) diameter domed tops.

### Readability Features

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools
- ◆ Convenient decimal equivalents on inch tools

### Ease-of-Handling Features

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Finger ring for ease of measuring

### Accuracy and Long-Life Features

- ◆ Special rest foot to locate the tool for good accuracy
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



### 0-.500" range

| Catalog No. | EDP No. | Graduation |
|-------------|---------|------------|
| 209RL       | 56473   | .001"      |

### 0-12.5mm range

|        |       |        |
|--------|-------|--------|
| 209MRL | 64364 | 0.01mm |
|--------|-------|--------|

Packed one in a box.





**Hub Micrometers**

**No. 228 0-1"**

**No. 228M 0-25mm**

The Starrett No. 228 micrometer is an ideal tool for precision measuring of hub thickness, for insertion through small holes to measure thickness, and for many other related uses. Micrometer has a specially designed shallow frame which makes it possible to easily pass through a 3/4" (19mm) hole.

**Readability Features**

- ◆ Starrett satin chrome finish – no glare – resists rust
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures – every thousandth numbered on inch tools

**Ease-of-Handling Features**

- ◆ Balanced frame and thimble design insure easy handling and better readability
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Combination ratchet and speeder for uniform pressure and quicker adjustment

**Accuracy and Long-Life Features**

- ◆ Rigid one-piece frame of drop forged steel
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring faces
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship



**0-1" range**

| Catalog No. | EDP No. | Graduation | Description                           |
|-------------|---------|------------|---------------------------------------|
| 228XRL      | 50921   | .001"      | Ratchet Stop, Lock Nut, Carbide Faces |

**0-25mm range**

|         |       |        |                                       |
|---------|-------|--------|---------------------------------------|
| 228MXRL | 64335 | 0.01mm | Ratchet Stop, Lock Nut, Carbide Faces |
|---------|-------|--------|---------------------------------------|

Packed one in a box. Deluxe case available by ordering No. 228ZZ, EDP 55228.



## Inspectors' Micrometer/Caliper Gage

**No. 175 0-2"**

This gage was developed in conjunction with Steel Boiler Inspectors who wanted to measure wall thickness in hard-to-reach places.

Since this gage is easily inserted through any small hole, it can be used to measure the thickness of either flat or cylindrical walls in boilers, flues, tubing, stampings, ship plates, etc., that are impossible to gage with other types of measuring equipment.

The gage consists of a micrometer head, reading in thousandths of an inch, which has an offset arm and a curved, rounded anvil giving a range of 0-2". The anvil may be turned out of gaging position by loosening a lock nut to permit inserting the anvil through small holes.

Small holes – minimum hole size range from 9/32" for 1/16" thick walls to 1-1/4" minimum hole size for 2" thick walls.



| Catalog No. | EDP No. | Range | Graduation | Description                     |
|-------------|---------|-------|------------|---------------------------------|
| 175RLZ      | 50659   | 0-2"  | .001"      | Ratchet Stop, Lock Nut, in Case |

Furnished in attractive, protective case.  
Packed one in a box.



The following pages show the full line of Starrett standard micrometer heads and bench micrometers that have been designed and developed over the years working with the needs of our customers. The micrometer heads are invaluable for use on electronic equipment, machine tools, fixtures, special gaging and other equipment where precise movement and adjustment are required.

Special features are described with each tool, but all of these tools have these features that benefit the user.

- ◆ Starrett satin chrome finish – no glare – resists rust on all reading surfaces
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick-reading figures on all inch reading tools
- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy and long life)
- ◆ Micro-lapped measuring face for flatness and squareness
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship

### Special Heads

In addition to standard micrometer heads, Starrett has also designed and manufactured many special types of micrometer heads for widely diversified applications requiring micrometer accuracy in settings and adjustments. These special heads are designed to exact specifications for specialized usage with wavemeters and other equipment in the electronics industry, machine tools, fixtures, special gages, tools, and all special mountings. They can be furnished to suit your particular requirements in a wide choice of sizes, range and graduations.

We design and build to your special need, so if you don't see what you want, please ask for it.

For quotations or recommendations, write The L.S. Starrett Co. Special Order Department 121 Crescent Street Athol, MA 01331



Standard heads and bench model.



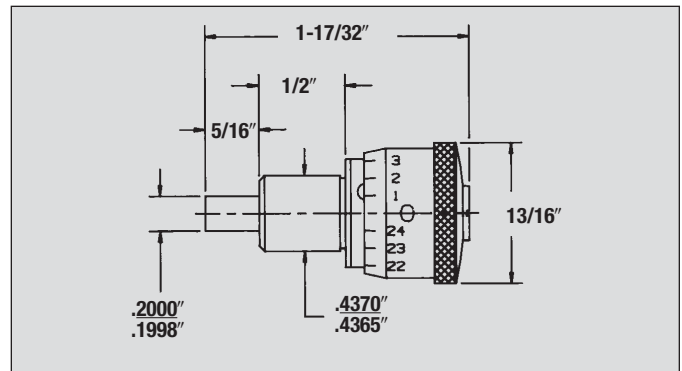
Examples of our special heads.



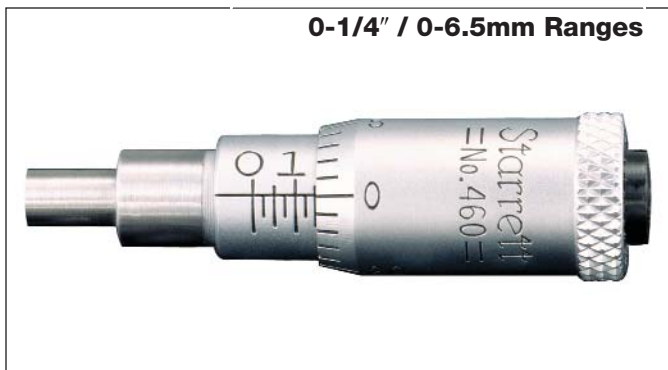
# MICROMETER HEADS



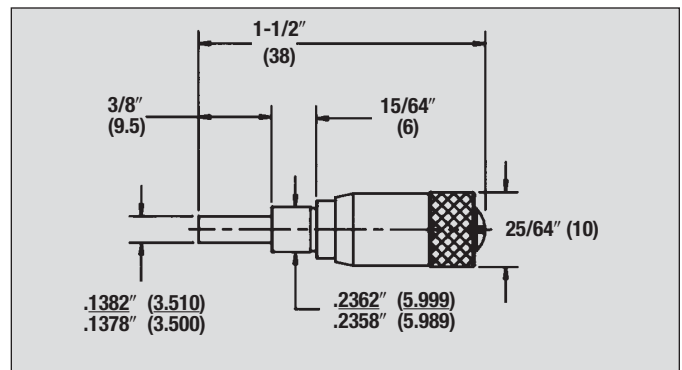
No. 464P.



No. 464P, 0-1/4" dimensions.



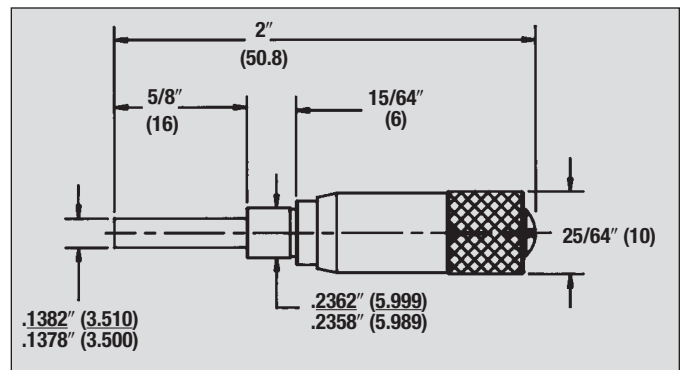
No. 460A (Inch model).



No. 460A, 0-1/4" and No. 460MA (0-6.5mm) dimensions.



No. 460B (Inch model).



No. 460B, 0-1/2" and No. 460MB (0-13mm) dimensions.

**No. 464P** 0-1/4"

**No. 460A** 0-1/4"

**No. 460MA** 0-6.5mm

**No. 460B** 0-1/2"

**No. 460MB** 0-13mm

These are plain micrometer heads with no lock nut or ratchet.

| Range   | Graduation | Catalog No. | EDP No. | Description |
|---------|------------|-------------|---------|-------------|
| 0-1/4"  | .001"      | 464P        | 56657   | Plain       |
| 0-1/4"  | .001"      | 460A        | 64444   | Plain       |
| 0-6.5mm | 0.01mm     | 460MA       | 64445   | Plain       |
| 0-1/2"  | .001"      | 460B        | 64446   | Plain       |
| 0-13mm  | 0.01mm     | 460MB       | 64447   | Plain       |

All tools are packed one in a box.





### No. 463 Series 0-1/2"/0-13mm

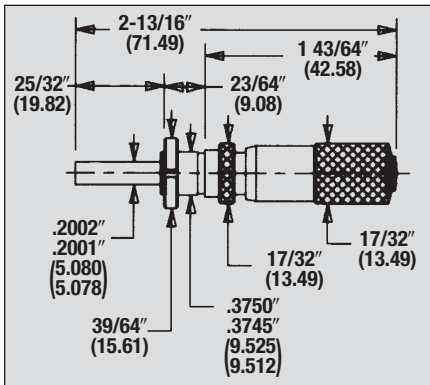
#### No. 1463 Stainless Steel Series 0-1/2"/0-13mm

The No. 463 and No. 1463 Series are exactly the same, except that the 1463 Series is made from rust-resistant stainless steel. The reading surfaces are satin finished stainless steel for easy readability. Heads are available with the features below:

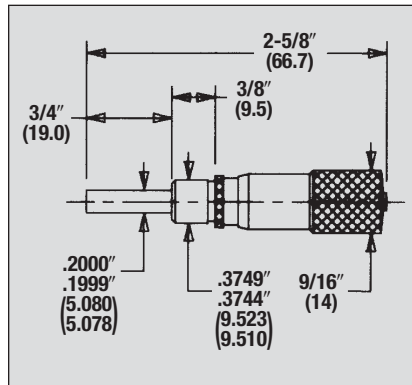


0-1/2" / 0-13mm Ranges

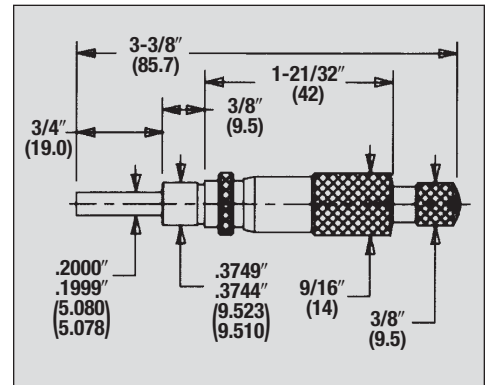
No. 463RL (Inch model).



No. 463L-38TN, 0-1/2" dimensions.



Nos. 463P, 0-1/2" and 463MP (0-13mm) dimensions.



Nos. 463RL, 0-1/2" and 463MRL (0-13mm) dimensions.

- ◆ Either combination ratchet and speeder for uniform pressure and quicker adjustment, or plain micrometer heads that depend on your own feel
- ◆ Ring-type lock nut for quick and sure locking at any setting
- ◆ Reverse reading, if needed
- ◆ Plain or carbide spindle faces

| Range   | Graduation | Catalog No. | EDP No. | Description   |         |                                    |
|---------|------------|-------------|---------|---|---------|------------------------------------|
| 0-1/2"  | .001"      | 463P        | 52440   | Plain   |         |                                    |
|         |            | 463P-38TN   | 67112   | Plain, 3/8" Threaded Hub and Check Nut                |         |                                    |
|         |            | 463L        | 52442   | Lock Nut  |         |                                    |
|         |            | 463XL       | 52451   | Lock Nut, Carbide Face                                |         |                                    |
|         |            | 463L-38TN   | 67113   | Lock Nut, 3/8" Threaded Hub and Check Nut             |         |                                    |
|         |            | 463RL       | 52443   | Ratchet Stop, Lock Nut                                |         |                                    |
|         |            | 463XRL      | 64687   | Ratchet Stop, Lock Nut, Carbide Face                  |         |                                    |
|         |            | RV463RL     | 57073   | Reverse Reading, Ratchet Stop, Lock Nut               |         |                                    |
|         |            | RV463XRL    | 64688   | Reverse Reading, Ratchet Stop, Lock Nut, Carbide Face |         |                                    |
|         |            | 0-13mm      | .0001"  | T463P   | 52446   | Plain                              |
| T463L   | 52448      |             |         | Lock Nut  |         |                                    |
| T463XL  | 64689      |             |         | Lock Nut, Carbide Face                                |         |                                    |
| T463RL  | 52449      |             |         | Ratchet Stop, Lock Nut                                |         |                                    |
| T463XRL | 65052      |             |         | Ratchet Stop, Lock Nut, Carbide Face                  |         |                                    |
| 0-13mm  | 0.01mm     |             |         | 463MP   | 52444   | Plain                              |
|         |            | 463MRL      | 52452   | Ratchet Stop, Lock Nut                                |         |                                    |
|         |            | 463MXRL     | 64691   | Ratchet Stop, Lock Nut, Carbide Face                  |         |                                    |
|         |            | V463MRL     | 65053   | Ratchet Stop, Lock Nut                                |         |                                    |
| 0-13mm  | 0.002mm    | RV463MRL    | 60845   | Reverse Reading, Ratchet Stop, Lock Nut               |         |                                    |
|         |            | 0-1/2"      | .001"   | 1463RL  | 53207   | Ratchet Stop, Lock Nut (Stainless) |
|         |            | 0-1/2"      |         | .0001"  | T1463RL | 53209                              |
|         |            | 0-13mm      | 0.002mm | V1463MRL  | 64344   | Ratchet Stop, Lock Nut (Stainless) |

Packed one in a box.



## Micrometer Heads with non-rotating spindles

**No. 261L** 0-1/2"

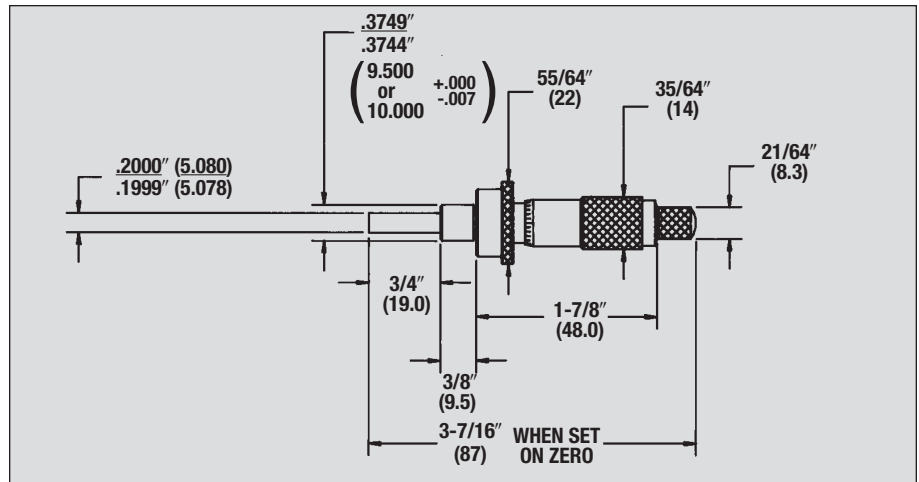
**No. 261ML** 0-13mm

Because the spindle does not rotate, these tools are useful in driving positioning tables directly without an intermediate connecting device. They are also useful in gaging jobs where scratches on the work surface cannot be tolerated or where there is risk of distortion when spindle meets work – as in measuring soft or elastic materials. Spindle wear is also reduced since there is no rotational friction as its face contacts the work.

- ◆ Ring-type lock nut for quick and sure locking at any setting
- ◆ A speeder for quicker adjustment – this is not a ratchet stop. The tool is dependent on your own “feel”



**No. 261L (Inch model).**



**No. 261L, 0-1/2" and No. 261ML (0-13mm) dimensions.**

### 0-1/2" range

| Catalog No. | EDP No. | Graduation | Description       |
|-------------|---------|------------|-------------------|
| 261L        | 55944   | .001"      | Speeder, Lock Nut |

### 0-13mm range

|        |       |        |  |
|--------|-------|--------|--|
| 261ML* | 64346 | 0.01mm | Speeder, Lock Nut, Specify Clamping Diameter (9.5mm or 10mm) |
|--------|-------|--------|--|

\*9.5mm clamping diameter sent unless otherwise specified.

Packed one in a box.



### Electronic Micrometer Heads with rotating or non-rotating spindles (with output)

#### No. 762 Series 0-2" (0-50mm)

##### Readability Features

- ◆ Large, right-sized, digital readout is easy to read, reducing error
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive black wrinkle finish on frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve

##### Ease-of-Handling Features

- ◆ Ring-type knurled lock nut
- ◆ Smooth friction thimble for uniform pressure on regular heads and the combination ratchet and speeder on the non-rotating heads

##### Accuracy and Long-Life Features

- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped steel or carbide face
- ◆ Starrett designed microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Auto OFF after 30 minutes of nonuse

##### Full-Function Action Features

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter models will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Output data to Starrett SPC Plus® hardware, software and PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems



0-1" / 25mm Range

0-2" / 50mm Range

#### With Standard Inch Graduations on Shell and Thimble

| Range       | Description*   | Catalog No. | EDP No. |
|-------------|--|-------------|---------|
| 0-1"/0-25mm | Friction Thimble, Lock Nut, Carbide Face                   | 762XFL      | 65058   |
|             | Ratchet Stop, Lock Nut, Carbide Face, Non-rotating Spindle | 762NXRL     | 65060   |
| 0-2"/0-50mm | Friction Thimble, Lock Nut, Carbide Face                   | 762XFL-2    | 65062   |

#### With Standard Millimeter Graduations on Shell and Thimble

|             |  |             |       |
|-------------|--|-------------|-------|
| 0-25mm/0-1" | Friction Thimble, Lock Nut, Carbide Face | 762MEXFL-25 | 66077 |
| 0-50mm/0-2" | Friction Thimble, Lock Nut, Carbide Face | 762MEXFL-50 | 66137 |

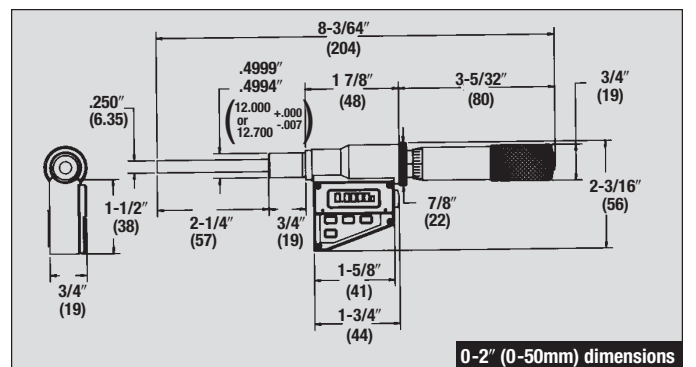
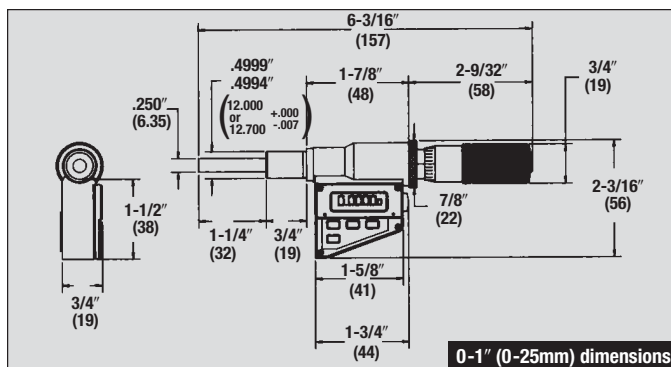
\*1/2" (12.7mm) clamping diameter sent unless otherwise specified.

|  |         |       |
|--|---------|-------|
| Computer Interface Cable Complete to PC (RS232C)                               | PT61963 | 66636 |
| Adaptor from No. PT22938 Cable to PC (RS232C)                                  | PT61768 | 66454 |
| Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor | PT22938 | 64059 |
| One 3-Volt Battery No. CR2450  | PT61120 | 65446 |

|                   | Inch             | Millimeter        |
|-------------------|------------------|-------------------|
| <b>Resolution</b> | .00005"          | 0.001mm           |
| <b>Accuracy</b>   | ±.0001" per Inch | ±0.003mm per 25mm |

Packed one per box with instructions.

NOTE: Catalog numbered products made in the U.S.A. except where noted as Global.





## Digital Micrometer Heads

0-1" / 0-25mm Ranges

No. 363 Series 0-1"

No. 363M Series 0-25mm

### Readability Features

- ◆ Clear, easily read numbers reduce errors
- ◆ No-glare black finish on the frame
- ◆ Starrett no-glare satin chrome finish on thimble and sleeve
- ◆ .001" or 0.01mm is read directly from the counter
- ◆ Reverse reading if needed

### Ease-of-Handling Features

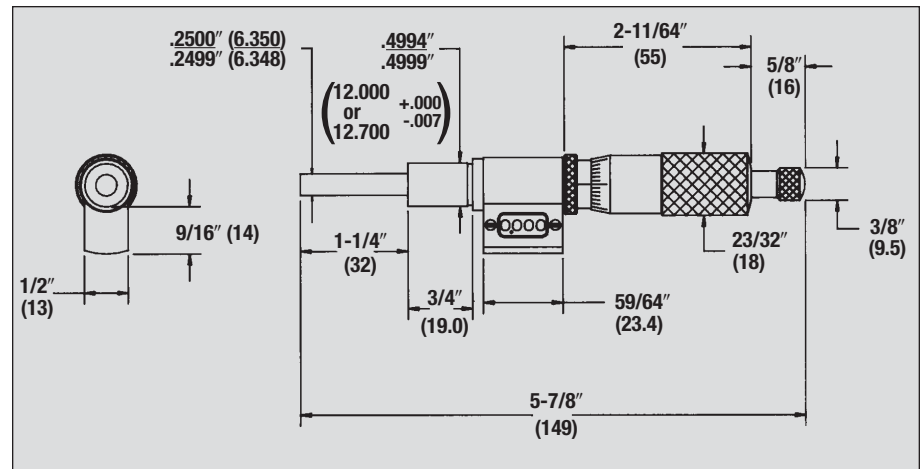
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ A choice of smooth friction thimble for uniform pressure or the combination ratchet and speeder for uniform pressure and quicker adjustment

### Accuracy and Long-Life Features

- ◆ Extremely hard and stable one-piece spindle (the heart of our accuracy)
- ◆ Micro-lapped measuring face
- ◆ Starrett workmanship



No. 363RL (Inch model).



No. 363RL, 0-1" and No. 363MRL (0-25mm) dimensions.

### 0-1" range

| Catalog No. | EDP No. | Graduation | Description                             |
|-------------|---------|------------|---|
| 363L        | 56297   | .001"      | Lock Nut                                |
| 363RL       | 56298   |            | Ratchet Stop, Lock Nut                  |
| 363FL       | 56299   |            | Friction Thimble, Lock Nut              |
| RV363RL     | 57072   |            | Reverse Reading, Ratchet Stop, Lock Nut |

### 0-25mm range

| Catalog No. | EDP No. | Graduation | Description                |
|-------------|---------|------------|----------------------------|
| 363ML*      | 56302   | 0.01mm     | Lock Nut                   |
| 363MRL*     | 56303   |            | Ratchet Stop, Lock Nut     |
| 363MFL*     | 56304   |            | Friction Thimble, Lock Nut |

\* Specify clamping diameter (12 or 12.7mm). 12.7mm sent unless otherwise ordered.

Packed one in a box.





### No. 263 Series 0-1"/0-25mm

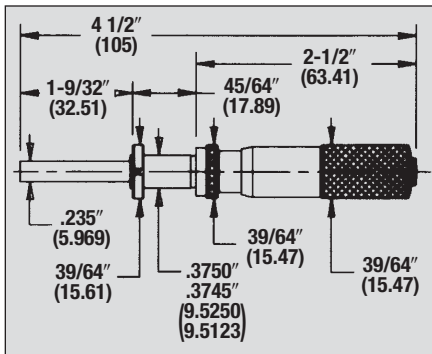
0-1" / 0-25mm Ranges

### No. 1263 Stainless Steel Series 0-1"/0-25mm

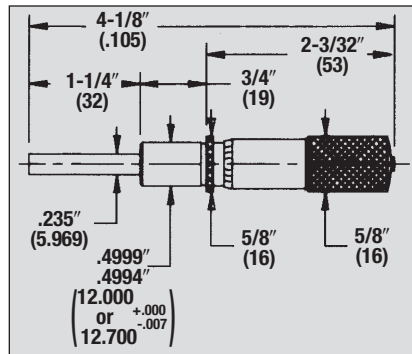
The No. 263 and No. 1263 Series are exactly the same except that the No. 1263 Series is made from rust-resistant stainless steel. The reading surfaces are satin-finished stainless steel for easy readability. These heads have features listed below:



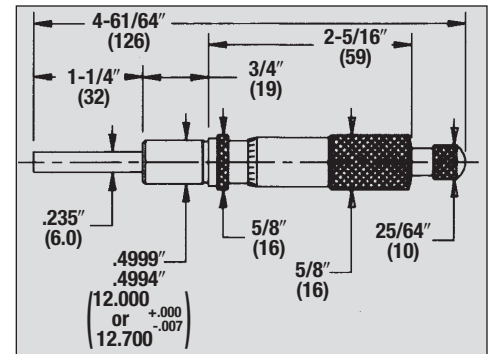
No. 263RL (Inch model).



No. 263L-38TN, 0-1" dimensions.



Nos. 263P, 0-1" and 263MP (0-25mm) dimensions.



Nos. 263RL, 0-1" and 263MRL (0-25mm) dimensions.

- ◆ No-glare, satin chrome finish on No. 263 Series, rust-resistant, stainless steel on No. 1263 Series
- ◆ Available with reverse reading, if needed
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Choice of smooth friction thimble for uniform pressure, combination ratchet and speeder for uniform pressure and quicker adjustment, or a plain micrometer head that depends on your own "feel"
- ◆ Spindle face available plain or with carbide
- ◆ Furnished with 1/2" (12.7mm) diameter clamping surface, but also available with 3/8" (9.5mm) clamping diameter on special order

| Range  | Graduation | Catalog No. | EDP No. | Description                               |
|--------|------------|-------------|---------|---|
| 0-1"   | .001"      | 263P        | 51251   | Plain                                     |
|        |            | 263P-38     | 67108   | Plain, 3/8" Diameter Hub                  |
|        |            | 263P-38TN   | 67110   | Plain, 3/8" Threaded Hub and Check Nut    |
|        |            | 263L        | 51253   | Lock Nut                                  |
|        |            | 263XL       | 51265   | Lock Nut, Carbide Face                    |
|        |            | 263L-38     | 67109   | Lock Nut, 3/8" Diameter Hub               |
|        |            | 263L-38TN   | 67111   | Lock Nut, 3/8" Threaded Hub and Check Nut |
|        |            | 263RL       | 51254   | Ratchet Stop, Lock Nut                    |
|        |            | 263FL       | 51256   | Friction Thimble, Lock Nut                |
|        |            | RV263RL     | 57071   | Reverse Reading, Ratchet Stop, Lock Nut   |
| 0-1"   | .0001"     | T263P       | 51258   | Plain                                     |
|        |            | T263L       | 51260   | Lock Nut                                  |
|        |            | T263XL      | 65054   | Lock Nut, Carbide Face                    |
|        |            | T263RL      | 51261   | Ratchet Stop, Lock Nut                    |
|        |            | 263MP*      | 51275   | Plain                                     |
|        |            | 263ML*      | 51276   | Lock Nut                                  |
| 0-25mm | 0.01mm     | 263MRL*     | 51257   | Ratchet Stop, Lock Nut                    |
|        |            | 263MXL*     | 65055   | Lock Nut, Carbide Face                    |
|        |            | V263MRL*    | 55962   | Ratchet Stop, Lock Nut                    |
|        | 0.001mm    | RV263MRL*   | 64948   | Reverse Reading, Ratchet Stop, Lock Nut   |
|        |            | V263MXRL*   | 65056   | Ratchet Stop, Lock Nut, Carbide Face      |

#### Stainless Steel Models

|        |         |           |       |                        |
|--------|---------|-----------|-------|------------------------|
| 0-1"   | .001"   | 1263L     | 53200 | Lock Nut               |
|        |         | 1263RL    | 53201 | Ratchet Stop, Lock Nut |
|        | .0001"  | T1263RL   | 53203 | Ratchet Stop, Lock Nut |
| 0-25mm | 0.001mm | V1263MRL* | 64345 | Ratchet Stop, Lock Nut |

**NOTE:**\* 0-25mm models specify clamping diameter 12 or 12.7mm. 12.7mm sent unless otherwise ordered.

Packed one in a box.



**Heavy Duty  
Micrometer Heads**

**0-1" / 0-25mm Ranges**

**No. 663 Series 0-1"**

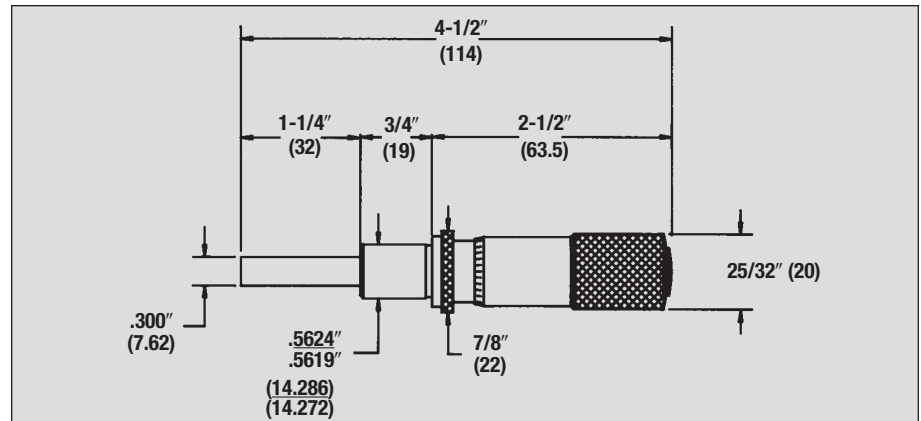
**No. 663M Series 0-25mm**

The No. 663 is similar to the No. 263 but features heavy duty construction with a larger diameter spindle, clamping surface and thimble.

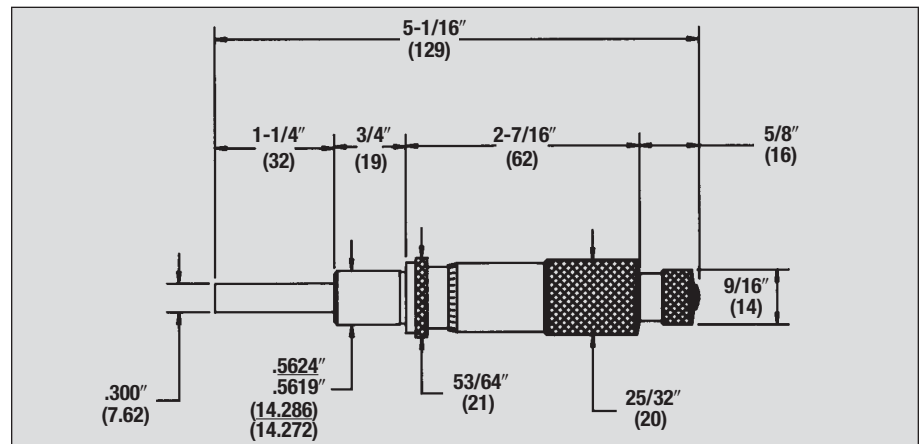
- ◆ Available with lock nut and the combination ratchet and speeder for uniform pressure and quicker adjustment, or a plain micrometer head with lock nut only
- ◆ Ring-type lock nut for quick and sure locking



**No. 663RL (Inch model).**



**No. 663L, 0-1" and No. 663ML (0-25mm) dimensions.**



**No. 663RL, 0-1" and No. 663MRL (0-25mm) dimensions.**

**0-1" range**

| Catalog No. | EDP No. | Graduation | Description            |
|-------------|---------|------------|------------------------|
| 663L        | 52772   | .001"      | Lock Nut               |
| 663RL       | 52773   |            | Ratchet Stop, Lock Nut |
| T663L       | 52777   | .0001"     | Lock Nut               |
| T663RL      | 52778   |            | Ratchet Stop, Lock Nut |

**0-25mm range**

|         |       |         |                        |
|---------|-------|---------|------------------------|
| 663MRL  | 52774 | 0.01mm  | Ratchet Stop, Lock Nut |
| V663MRL | 64342 | 0.001mm | Ratchet Stop, Lock Nut |

Packed one in a box.



### Micrometer Heads with non-rotating spindles

**No. 262 Series 0-1"**

**No. 262M Series 0-25mm**

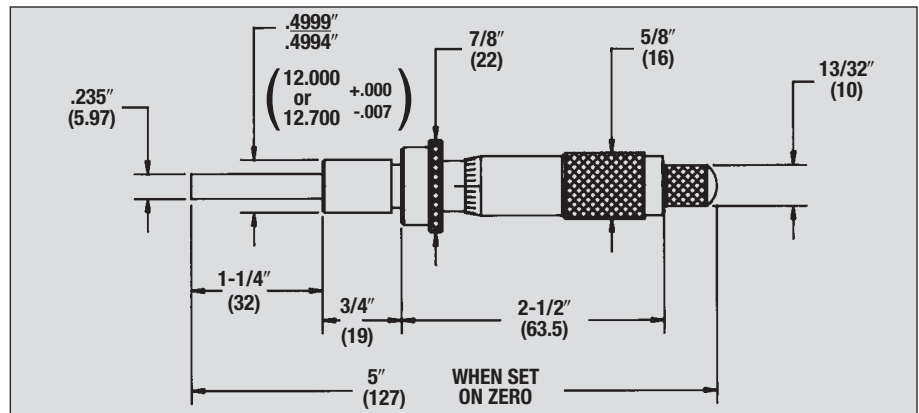
Because the spindle does not rotate, this tool is useful in driving positioning tables directly without an intermediate connecting device. It is also useful in gaging jobs where scratches on the work surface cannot be tolerated, or where there is risk of distortion when spindle meets work – as in measuring soft or elastic materials. Spindle wear is also reduced, since there is no rotational friction when its face contacts the work.

- ◆ Ring-type lock nut for quick and sure locking at any setting
- ◆ Available with or without the combination ratchet and speeder for uniform pressure and quicker adjustment

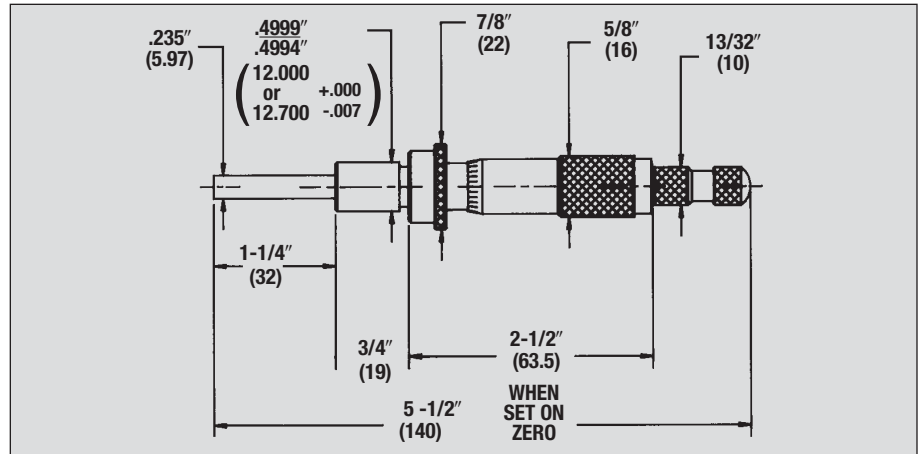
0-1" / 0-25mm Ranges



**No. 262L (Inch model).**



**No. 262L, 0-1" and No. 262ML (0-25mm) dimensions.**



**No. 262RL, 0-1" and No. 262MRL (0-25mm) dimensions.**

#### 0-1" range

| Catalog No. | EDP No. | Graduation | Description            |
|-------------|---------|------------|------------------------|
| 262L        | 55945   | .001"      | Lock Nut               |
| 262RL       | 55946   | .001"      | Ratchet Stop, Lock Nut |

#### 0-25mm range

|         |       |        |                        |
|---------|-------|--------|------------------------|
| 262ML*  | 64347 | 0.01mm | Lock Nut               |
| 262MRL* | 65051 | 0.01mm | Ratchet Stop, Lock Nut |

**NOTE:**\* 0-25mm models specify clamping diameter 12mm or 12.7mm. 12.7mm sent unless otherwise ordered.

Packed one in a box.







### Direct-Reading, Large Micrometer Heads

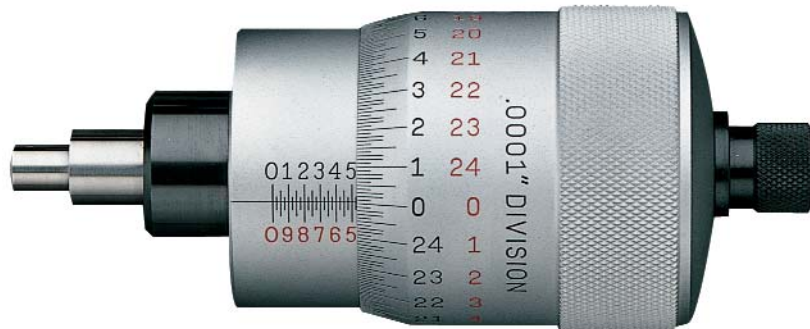
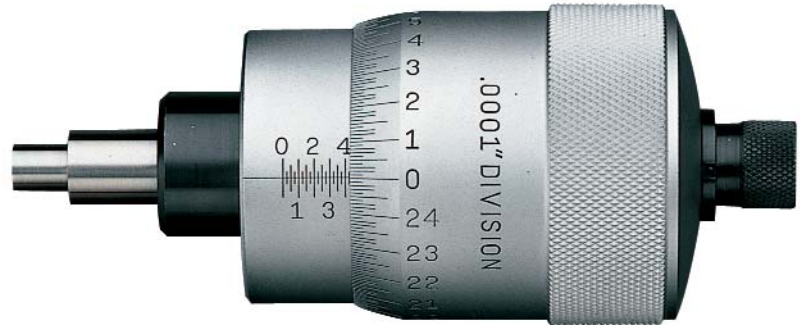
0-1" / 25mm Ranges

0-2" / 50mm Ranges

These large micrometer heads are designed for use with electronic equipment requiring ultra-fine adjustment for machine tools, fixtures, special gages and tools, special mountings, or wherever micrometer accuracy in setting and adjustment is required.

The micrometer heads with 2-1/16" (52mm) thimble diameter have widely spaced .0001" or 0.002mm graduations. The micrometer heads with 4-1/16" (103mm) thimble diameter have graduations up to .000050" or 0.001mm.

Another highly useful feature is the spindle adjustment, which permits adjusting the spindle length approximately  $\pm 1/16"$  (1.5mm). If the spindle is to be located against a definite stop and a different zero position is required, first loosen the cap screw in the end of the thimble, position the spindle to the desired location, then holding the spindle in position, rotate the thimble to zero and retighten the cap screw. In achieving this adjustable feature, we have still retained our positive taper-lock large thimble bearing.



(Top) No. T465XSP-1 (inch model) and (bottom) No. T468XSP-1 (inch model) with double figures in red and black on sleeve and thimble for reading both ways.

#### Readability, Accuracy and Long-Life Features:

- ◆ All graduations are direct reading – no vernier lines to match
- ◆ All reading surfaces have Starrett satin chrome finish as the no-glare background for the sharp lines and figures
- ◆ All graduations on sleeves and thimbles have advanced styling with staggered graduations for easy reading
- ◆ The spindle is carbide faced for long life
- ◆ Thimble and sleeve are made of aluminum to reduce weight
- ◆ Furnished with a speeder (not a ratchet) for quicker adjustment
- ◆ Extremely hard and stable one-piece spindle for accuracy and long-life
- ◆ Micro-lapped measuring face for flatness and squareness
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship

**No. 465 Series 0-2"**

**No. 465M Series 0-50mm**

**No. 468 Series 0-2"**

**No. 468M Series 0-50mm**

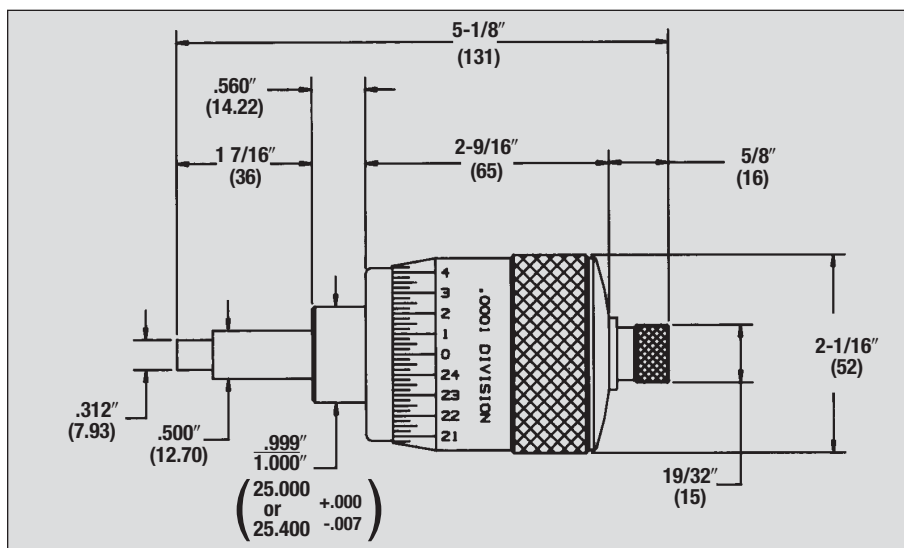
The No. 468 Series micrometer heads are exactly the same as the No. 465 Series, except that they have double figures in red and black on the sleeve and thimble, permitting reading both ways with the spindle moving in either direction. This feature is invaluable on many instruments and microwave applications.

These heads have 2-1/16" (52mm) thimble diameter with widely spaced .0001" or 0.002mm graduations for direct reading.

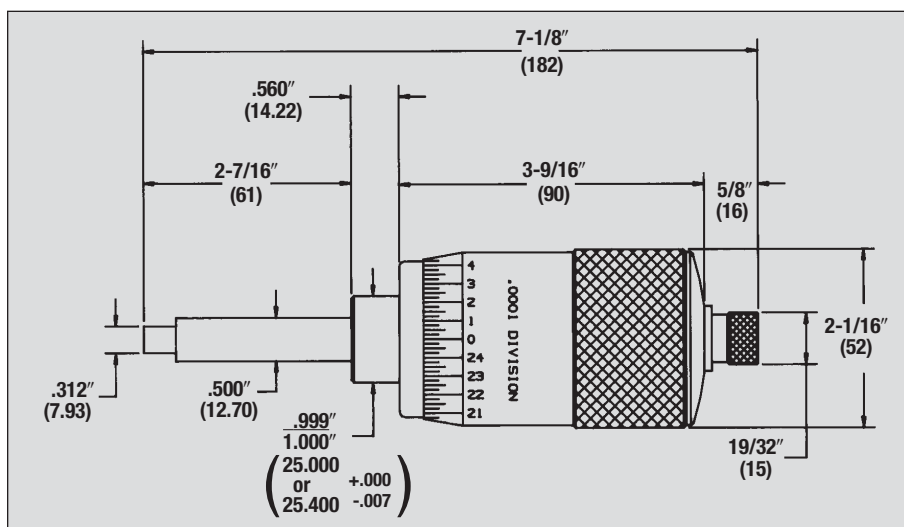
**SPECIFICATIONS / NEXT PAGE**



## Specifications No. 465 Series No. 468 Series



Nos. 465, 468 Series 0-1" (0-25mm) dimensions.



Nos. 465, 468 Series 0-2" (0-50mm) dimensions.

### 465 Series

| Catalog No. | EDP No. | Range  | Graduation | Description |
|-------------|---------|--------|------------|-------------|
| T465XSP-1   | 67121   | 0-1"   | .0001"     | Speeder     |
| T465XSP-2   | 67122   | 0-2"   |            |             |
| 465MXSP-25* | 67123   | 0-25mm | 0.002mm    | Speeder     |
| 465MXSP-50* | 67124   | 0-50mm |            |             |

### 468 Series

|             |       |        |         |         |
|-------------|-------|--------|---------|---------|
| T468XSP-1   | 67125 | 0-1"   | .0001"  | Speeder |
| T468XSP-2   | 67126 | 0-2"   |         |         |
| 468MXSP-25* | 67127 | 0-25mm | 0.002mm | Speeder |
| 468MXSP-50* | 67128 | 0-50m  |         |         |

**NOTE:**\* 0-25mm and 0-50mm models specify clamping diameter 25 or 25.4mm. 25.4mm sent unless otherwise ordered.

Packed one in a box.



### Large, Super-Precision Micrometer Heads

**No. 469 Series** 0-1"

**No. 469M Series** 0-25mm

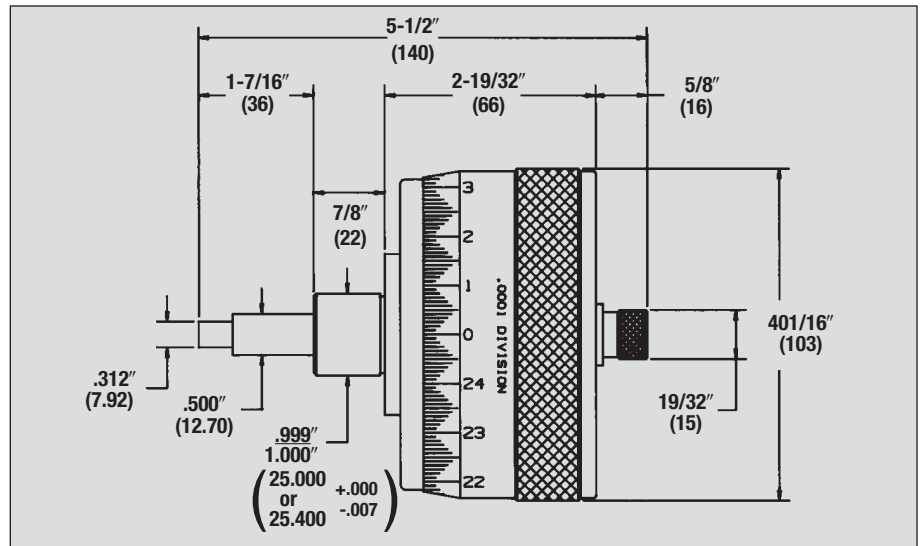
These are our most accurate micrometer heads. They are also available on special order with double graduations in red and black on the sleeve and thimble, permitting readings both ways with the spindle moving in either direction.

These micrometer heads have a 4-1/16" (103mm) thimble diameter and are graduated to .0001", .000050", 0.001mm, or 0.002mm for direct reading. They also have staggered graduations for easy counting and reading of lines. Spindle is carbide faced for long life.

0-1" / 0-25mm Ranges



No. T469HXSP (Inch model).



No. 469, 0-1" and No. 469M (0-25mm) dimensions.

#### 0-1" range

| Catalog No. | EDP No. | Graduation | Description |
|-------------|---------|------------|-------------|
| T469HXSP    | 67129   | .000050"   | Speeder     |
| T469XSP     | 67130   | .0001"     |             |

#### 0-25mm range

|           |       |         |         |
|-----------|-------|---------|---------|
| 469MHXSP* | 67131 | 0.001mm | Speeder |
| 469MXSP*  | 67132 | 0.002mm |         |

**NOTE:** Also available on special order with double graduations for reading both ways with spindle moving in either direction.

Packed one in a box.

\*Specify clamping diameter 25 or 25.4mm. 25.4mm sent unless otherwise ordered.



## Electronic Bench Micrometers

(with output)

0-1" / 0-25mm Range

### No. 777 0-1" (0-25mm)

The No. 777 electronic bench micrometer is especially suited for precision measurements where the work must be brought to the gage.

Work is staged between the anvil and spindle on an adjustable table, which can be raised to a selected height and locked in position by turning a knurled thumb screw on back of the base. Made of cast iron with black wrinkle finish, the base is heavily proportioned to sustain gage accuracy and assure stability in use. It stands on three machined pads.

#### Readability Features

- ◆ Large, right-sized, high-contrast LCD digital readout is easy to read and reduces errors
- ◆ Conventional inch or millimeter graduations standard
- ◆ Attractive no-glare black wrinkle finish on the frame

#### Ease-of-Handling Features

- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Smooth friction thimble for uniform pressure

#### Accuracy and Long-Life Features

- ◆ Extremely hard and stable one-piece spindle
- ◆ The spindle and anvil are carbide faced for long life
- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished for dependable power and over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship

#### Full-Function Action Features

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter model will turn on in the millimeter mode after installation of a new battery



#### With Standard Inch Graduations on Shell and Thimble

| Catalog No. | EDP No. | Description                                 |
|-------------|---------|---|
| 777XFLZ     | 67135   | 0-1"/0-25mm Range, Carbide Faces, with Case |

#### With Standard Millimeter Graduations on Shell and Thimble

|           |       |   |
|-----------|-------|---|
| 777MEXFLZ | 67136 | 0-25mm/0-1" Range, Carbide Faces, with Case |
|-----------|-------|---|

#### Cable Information

| Part No. | EDP No. | Description  |
|----------|---------|--|
| PT61963  | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| PT61768  | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| PT22938  | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| PT61120  | 65446   | One 3-Volt Battery No. CR2450  |

- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus<sup>®</sup> hardware and software and to PCs
- ◆ Works well with Starrett DataSure<sup>®</sup> Wireless Data Collection Systems

Furnished in a protective case. Packed one per box with instructions.





### Direct-Reading Bench Micrometers

0-2" / 0-50mm Ranges

**No. 673** 0-2"

**No. 673M** 0-50mm

The Starrett No. 673 bench micrometer is a high precision instrument, ideal for bench use either in a shop environment or inspection laboratory. It can be used as a comparator measuring to fifty-millionths of an inch (.000050") or two-thousandths of a mm (0.002mm) or for direct measuring to .0001" or 0.002mm. Work lengths up to 2" or 50mm can be measured.

- ◆ The base is a heavy, rigid casting, incorporating at the left end a movable anvil which actuates a linear, friction-free motion transfer mechanism between the anvil and the indicator. This assures high accuracy
- ◆ The large thimble diameter, approximately 3" (77mm), makes possible widely spaced graduations that are easy to read without a vernier scale reference
- ◆ Advanced, staggered design and quick reading graduations in combination with Starrett no-glare satin chrome finish on both thimble and sleeve also contribute to easier, faster readings
- ◆ The head is furnished with a speeder and has a special ring-type lock nut which firmly holds the spindle at any setting without distortion
- ◆ Another useful feature is the adjustable work table centered beneath the anvil and spindle. Work can be accurately aligned between the anvil and spindle by adjusting the table to the proper height and locking it in position
- ◆ The spindle and anvil are carbide faced for long life
- ◆ This bench micrometer can also be used with the No. 718 Analog Amplifier or the No. 776 Electronic Gage Amplifier by using the No. 673A Adaptor for the No. 715-2 Cartridge-Type Electronic Gaging Head to read to ten-millionths of an inch (.000010") or 0.0001mm



**Starrett No. 673XZ Bench Micrometer (Inch model). Shown here is the No. 673 with the Starrett No. 718 Amplifier.**



#### How to Use for Direct Measure and as a Comparator

For direct measuring, the micrometer head is set to zero and the dial indicator is set to zero by the bezel adjustment. Any workpiece within the 2" (50mm) range can then be measured by the micrometer head in ten-thousandths of an inch (.0001" or 0.002mm). The indicator must read zero for each measurement.

If used as a comparator, first set the head and the indicator to zero as previously explained. Then adjust the micrometer head to the desired dimension to be checked. After retracting the anvil, work is placed on the table between anvil and spindle and the anvil is then released so anvil and spindle contact the work. Plus or minus deviation from the nominal work size is then read from the dial indicator in fifty-millionths of an inch (.000050") or 0.002mm.

| Catalog No.   | EDP No. | Range   |                   | Graduation      |                | Work Table                               |  |
|---------------|---------|---|-------------------|-----------------|----------------|--|--|
|               |         | Micrometer Head   | Dial Indicator    | Micrometer Head | Dial Indicator |  |  |
| <b>673XZ</b>  | 67191   | 0-2"  | .006"<br>(0-3-0)  | .0001"          | .000050"       | 2-1/4" dia. and 7/8" Vertical Adjustment |  |
| <b>673MXZ</b> | 67192   | 0-50mm  | 0.2mm<br>(0-10-0) | 0.002mm         | 0.002mm        | 57mm dia. and 22mm Vertical Adjustment   |  |
| <b>673A</b>   | 52891   | Adaptor for No. 715-2 Cartridge Type Electronic Gaging Head for Use with No. 776 Electronic Gage Amplifier or No. 718 Analog Amplifier. |                   |                 |                |  |  |

**NOTE:** Anvil Pressure Adjustment – 8 oz. to 3 lbs. (0.23 to 1.36kg)

Furnished in a case. Packed one in a box.





The following pages show our varied line of precision end measuring rods and inside micrometers. The variations are fixed-range or adjustable-range micrometers and solid or tubular measuring rods.

Unless otherwise noted under the individual tools, all have these features:

- ◆ Balanced design for better feel and accurate measurement
- ◆ All contact points are hardened and ground for better accuracy and long life
- ◆ Satin chrome finish on all micrometer heads and reading surfaces that resist rust and also make for easy reading by providing a no-glare background for the sharp lines and figures
- ◆ Hardened and stabilized spindle for accuracy and long life
- ◆ Advanced sleeve design with staggered lines and distinct figures for precise and easy readability
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship
- ◆ Inside Micrometers Nos. 121, 124, 823 and 824 by design have a firmer rotation than regular micrometers. This is to limit the tendency of the micrometer head to rotate when withdrawn from the workpiece.



### Measuring Tips for Inside Measurements

Whether to use a two-point or three-point contact measuring tool is usually a matter of preference, but there are some differences.

A two-point contact rod-type inside micrometer shown in this section is usually lighter, easier to handle, and more versatile over long ranges from approximately 6-107" (150-2700mm). Any two-point contact micrometer, regardless of range, can probe a hole better to find the geometry of that hole than a three-point contact.

Most three-point contact tools have setting rings to insure accuracy. If you desire very close tolerance work with

two-point contact inside micrometers, it is recommended that they be set to a ring gage or to an outside micrometer.

A three-point contact micrometer shown in the Bore Gages section has an advantage in that it can be seated in position more quickly than a two-point contact tool. Usually these tools can also be read to a finer accuracy. The three-point tool will tell the maximum true diameter that can enter the hole a little faster than a two-point contact tool.

Micrometer heads used in these tools are accurate to  $\pm 0.0001$ " or 0.002mm, but overall accuracy on tools that add rods is dependent on good practice and technique.

To insure accuracy, these practices should be followed:

- ◆ Always make sure that there are no specks of dirt between the clamping surfaces of the rods and micrometer heads
- ◆ Tighten all rods uniformly, not too tight, not too loose, but a fairly firm assembly
- ◆ Assemble long sections vertically or, with support, horizontally
- ◆ Because temperature can affect long rods used in these tools, they should be assembled in the same environment in which they will be used

**(For additional information, refer to the Bore Gage Section)**



**End Measuring Rods  
with spherical ends**

**1-24" / 25-600mm Lengths**

**No. 234 Series 1-24"**

**No. 234M Series  
25-600mm**

These rods or "standards" are for checking and setting micrometers of 2" capacity and larger, and are also used on machine tools for comparing gages, checking precision measuring tools, for measuring parallel surfaces, and many other types of work.

They are made of special tool steel in rod form with ends hardened and accurately lapped to a spherical radius.

Available plain or with insulated handles to minimize expansion by heat when held in the hand. 1-6" (25-150mm) sizes are 1/4" (6.3mm) diameter; 7-11" (175-275mm) sizes, 3/8" (9.5mm) diameter; 12-24" (300-600mm) sizes are 7/16" (11mm) diameter.



**No. 234 Rods shown with or without insulated handles.**

**NOTE:** These standards are the ones used for all micrometers that are furnished with standards. Larger sizes are available on special order.

| Length | With Insulating Handle |         | Without Insulating Handle |         |
|--------|------------------------|---------|---------------------------|---------|
|        | Catalog No.            | EDP No. | Catalog No.               | EDP No. |
| 1"     | 234A-1                 | 50969   | 234B-1                    | 51017   |
| 2"     | 234A-2                 | 50971   | 234B-2                    | 51019   |
| 3"     | 234A-3                 | 50973   | 234B-3                    | 51021   |
| 4"     | 234A-4                 | 50975   | 234B-4                    | 51023   |
| 5"     | 234A-5                 | 50977   | 234B-5                    | 51025   |
| 6"     | 234A-6                 | 50979   | 234B-6                    | 51027   |
| 7"     | 234A-7                 | 50981   | 234B-7                    | 51029   |
| 8"     | 234A-8                 | 50983   | 234B-8                    | 51031   |
| 9"     | 234A-9                 | 50985   | 234B-9                    | 51033   |
| 10"    | 234A-10                | 50987   | 234B-10                   | 51035   |
| 11"    | 234A-11                | 50989   | 234B-11                   | 51037   |
| 12"    | 234A-12                | 50991   | 234B-12                   | 51039   |
| 13"    | 234A-13                | 50993   |                           |         |
| 14"    | 234A-14                | 50995   |                           |         |
| 15"    | 234A-15                | 50997   |                           |         |
| 16"    | 234A-16                | 50999   |                           |         |
| 17"    | 234A-17                | 51001   |                           |         |
| 18"    | 234A-18                | 51003   |                           |         |
| 19"    | 234A-19                | 51005   |                           |         |
| 20"    | 234A-20                | 51007   |                           |         |
| 21"    | 234A-21                | 51009   |                           |         |
| 22"    | 234A-22                | 51011   |                           |         |
| 23"    | 234A-23                | 51013   |                           |         |
| 24"    | 234A-24                | 51015   |                           |         |

| Length | With Insulating Handle |         | Without Insulating Handle |         |
|--------|------------------------|---------|---------------------------|---------|
|        | Catalog No.            | EDP No. | Catalog No.               | EDP No. |
| 25mm   | 234MA-25               | 50970   | 234MB-25                  | 51018   |
| 50mm   | 234MA-50               | 50972   | 234MB-50                  | 51020   |
| 75mm   | 234MA-75               | 50974   | 234MB-75                  | 51022   |
| 100mm  | 234MA-100              | 50976   | 234MB-100                 | 51024   |
| 125mm  | 234MA-125              | 50978   | 234MB-125                 | 51026   |
| 150mm  | 234MA-150              | 50980   | 234MB-150                 | 51028   |
| 175mm  | 234MA-175              | 50982   | 234MB-175                 | 51030   |
| 200mm  | 234MA-200              | 50984   | 234MB-200                 | 51032   |
| 225mm  | 234MA-225              | 50986   | 234MB-225                 | 51034   |
| 250mm  | 234MA-250              | 50988   | 234MB-250                 | 51036   |
| 275mm  | 234MA-275              | 50990   | 234MB-275                 | 51038   |
| 300mm  | 234MA-300              | 50992   | 234MB-300                 | 51040   |
| 325mm  | 234MA-325              | 50994   |                           |         |
| 350mm  | 234MA-350              | 50996   |                           |         |
| 375mm  | 234MA-375              | 50998   |                           |         |
| 400mm  | 234MA-400              | 51000   |                           |         |
| 425mm  | 234MA-425              | 51002   |                           |         |
| 450mm  | 234MA-450              | 51004   |                           |         |
| 475mm  | 234MA-475              | 51006   |                           |         |
| 500mm  | 234MA-500              | 51008   |                           |         |
| 525mm  | 234MA-525              | 51010   |                           |         |
| 550mm  | 234MA-550              | 51012   |                           |         |
| 575mm  | 234MA-575              | 51014   |                           |         |
| 600mm  | 234MA-600              | 51016   |                           |         |

Sizes 1-23" packed one in a box.  
Size 24" packed one in a package.





### No. 128 Series Sets 6-294"

### No. 128M Series Sets 150-7350mm

These sets of inside micrometers are ideal for a wide range of precision inside measurements in aircraft, metalworking and other industries.

Each set consists of a satin-chrome micrometer head which can be used in combination with any one or more of a series of rigid, tubular steel measuring rods to obtain the required length.

The micrometer head is a modification of our No. 63, which has a 2" (50mm) range. The head has a basic length of 4" (100mm) which can be lengthened to 6" (150mm) by means of its measuring range. Besides those listed on the lead page of this section, the No. 128 Series have these additional features:

- ◆ For inside measurements from 6-294" (150-7350mm) (longer sizes are also available on special order)
- ◆ Interchangeable tubular steel measuring rods and extension rods are lightweight with extreme rigidity. Rods screw into each other and seat against hardened ground and lapped surfaces necessary for high accuracy. Rod diameter 5/8" (16mm)
- ◆ Rods are provided with insulated handles to minimize expansion from hand heat. All rods marked with length
- ◆ All rod anvil contacts are hardened and ground
- ◆ All measuring rod anvil contacts are adjustable (plain extension rods are not adjustable)
- ◆ Adjustable, ground steel supporting collars (placed in "V" grooves when used in the horizontal position)

6-294" / 150-7350mm Ranges



#### 6-294" range

| Range with Micrometer Head | Move-ment of Screw | Grad-uation | Description   | Range with Combination Head* | Catalog No.  | EDP No. |
|----------------------------|--------------------|-------------|---|------------------------------|--------------|---------|
| 6-78"                      | 2"                 | .001"       | With (1) 4-6" Head, (1) each 2", 4", 6", 8", 10", 12" Rods, (1) 12" Ext., (2) 24" Ext.  | 11-83"                       | <b>128AZ</b> | 64375   |
| 6-150"                     | 2"                 | .001"       | With (1) 4-6" Head, (1) each 2", 4", 6", 8", 10", 12" Rods, (1) 12" Ext., (5) 24" Ext.  | 11-155"                      | <b>128BZ</b> | 64376   |
| 6-294"                     | 2"                 | .001"       | With (1) 4-6" Head, (1) each 2", 4", 6", 8", 10", 12" Rods, (1) 12" Ext., (11) 24" Ext. | 11-299"                      | <b>128CZ</b> | 64377   |

#### 150-7350mm range

|             |      |         |  |             |               |       |
|-------------|------|---------|--|-------------|---------------|-------|
| 150-1950 mm | 50mm | 0.01 mm | With (1) 100-150mm Head, (1) ea. 50, 100, 150, 200, 250, 300mm Rods, (1) 300mm Ext., (2) 600mm Ext.  | 300-2100 mm | <b>128MAZ</b> | 64378 |
| 150-3750 mm | 50mm | 0.01 mm | With (1) 100-150mm Head, (1) ea. 50, 100, 150, 200, 250, 300mm Rods, (1) 300mm Ext., (5) 600mm Ext.  | 300-3900 mm | <b>128MBZ</b> | 64379 |
| 150-7350 mm | 50mm | 0.01 mm | With (1) 100-150mm Head, (1) ea. 50, 100, 150, 200, 250, 300mm Rods, (1) 300mm Ext., (11) 600mm Ext. | 300-7500 mm | <b>128MCZ</b> | 64380 |

All sets furnished in nicely finished cases. Packed one in a box.

\* See following page for information on the optional No. 128 Combination Head.



## Combination Head with Inside Micrometer

No. 128

No. 128M

The Starrett combination head for inside micrometers combines the precision of a dial indicator sensor and the linear accuracy of a micrometer. This combination of indicator and micrometer reduces the need for operator “feel” and provides faster readings with increased reliability.

This head is interchangeable with the Starrett No. 128 Series end rods and extension combinations.

**For direct measurements,** the dial indicator hand and the telltale hand must both register zero before reading the micrometer. As a comparator, the micrometer is first set to the nominal dimension and  $\pm$  deviation from zero is read from the dial indicator. The gage should be rocked to obtain a minimum reading on the indicator. Out-of-roundness can also be checked – any variation being shown by the indicator.

**For inch-reading tools,** the head can be adjusted within a range of 2". It extends the overall range by an additional 5". The special No. 81-138J jeweled non-shock Indicator is graduated .0005", range  $\pm .040$ " and reads 0-40 on both the plus and minus dials.

**For millimeter-reading tools,** the head can be adjusted within a range of 50mm. This extends the overall range an additional 125mm. The special No. 81-181J jeweled non-shock Indicator is graduated 0.01mm, range  $\pm 1$ mm and reads 0-100mm on both the plus and minus dials.

The 10" (250mm) master should be used vertically with the shoulder on the indicator end of the head, seated squarely, as shown in photo.



Combination Head in master.

| Catalog No. | EDP No. | Description   |
|-------------|---------|---|
| 128         | 64381   | Inch-reading Combination Head with Setting Master       |
| 128M        | 68117   | Millimeter-reading Combination Head with Setting Master |



### Solid-Rod Inside Micrometers

**No. 124 Series Sets 2-32"**

**No. 124M Series Sets 50-800mm**

These are the most popular inside micrometers because of their lightness, ease of use, and range. They are very useful for measuring inside diameters of cylinders and rings, measuring parallel surfaces, etc.

The desired range is obtained by assembling rods and spacing collars to the micrometer head. Measuring rods are provided with a shoulder that is set accurately in the micrometer head and locked in position. When assembling rods to the A and B heads, the reading line on the micrometer head should be lined up with the marking on each rod (except for the 2-3" and the 50-75mm rods).

Rod diameters are approximately 1/4" (6mm) on the A and B sizes, and approximately 11/32" (8.5mm) on the C size. Each rod has individual length adjustment for the anvil by means of special wrenches furnished.

- ◆ Measuring rods are solid and assembled on one side of the micrometer head
- ◆ Rods are insulated
- ◆ Each rod marked with length
- ◆ Hardened and ground anvils on rods, adjustable for length. Head anvil is hardened and ground
- ◆ Quick-reading figures – every thousandth numbered on inch reading tools
- ◆ A 6-1/2" (165mm) long convenient handle is available to provide reach for use in deep holes. Handle screws into the micrometer head in place of the dummy screw, which is opposite a rod lock screw



Measuring I.D. with micrometer and rod.



No. 124AZ (2-8" set) with tool, rods and wrenches.

#### Graduation – .001"

| Range | Movement of Screw       | No. Measuring Rods              | No. Spacing Collars | Catalog No.                    | EDP No.        |
|-------|-------------------------|---------------------------------|---------------------|--------------------------------|----------------|
| 2-8"  | 1/2"                    | 6                               | One 1/2"            | <b>124A**</b><br><b>124AZ*</b> | 50540<br>50542 |
| 2-12" | 1/2"                    | 10                              | One 1/2"            | <b>124B**</b><br><b>124BZ*</b> | 50544<br>50546 |
| 8-32" | 1"                      | 4                               | One 1"<br>Two 2"    | <b>124C**</b><br><b>124CZ*</b> | 50548<br>50550 |
| 2-32" | 1/2 and 1"<br>(2 Heads) | Comprised of Sets 124A and 124C |                     | <b>124D**</b><br><b>124DZ*</b> | 50552<br>50554 |

#### Graduation – 0.01mm

|           |                        |                                   |                      |                                  |                |
|-----------|------------------------|-----------------------------------|----------------------|----------------------------------|----------------|
| 50-200mm  | 13mm                   | 6                                 | One 12mm             | <b>124MA**</b><br><b>124MAZ*</b> | 50541<br>56141 |
| 50-300mm  | 13mm                   | 10                                | One 12mm             | <b>124MB**</b><br><b>124MBZ*</b> | 50545<br>56142 |
| 200-800mm | 25mm                   | 4                                 | One 25mm<br>Two 50mm | <b>124MC**</b><br><b>124MCZ*</b> | 50549<br>56143 |
| 50-800mm  | 13 & 25mm<br>(2 Heads) | Comprised of Sets 124MA and 124MC |                      | <b>124MD**</b><br><b>124MDZ*</b> | 50553<br>56144 |

#### Accessory

|                   |             |       |
|-------------------|-------------|-------|
| 6" (150mm) Handle | <b>124H</b> | 50556 |
|-------------------|-------------|-------|

\* With Case    \*\* Without Case

Available with case. Sent without case unless otherwise ordered. Packed one in a box.





**Tubular Inside Micrometers**

**1-1/2-40" / 40-1000mm Ranges**

**No. 823 Series Sets  
1 1/2-40"**

**No. 823M Series Sets  
40-1000mm**

The Starrett 823 Series micrometers are highly useful tools for internal linear measurements such as measuring cylinders, rings, setting calipers, comparing gages and measuring parallel surfaces.

The extension rods are made of steel tubing, light in weight, yet extremely rigid. Rods are approximately 3/8" (9.5mm) diameter to meet the requirements of mechanics who prefer this larger diameter. By removing the hardened and ground anvil ends (end caps) of the micrometer head, the rods may be attached to either or both ends of the micrometer as preferred. Each rod may be individually adjusted for wear by the hardened and ground anvil at the end.

- ◆ **Rods attachable as shown to either one or both ends of the head ensures the best balance, feel, and ease of reading**



- ◆ Tubular measuring rods are lightweight, yet extremely rigid. Rods are insulated, with the exception of 1/2" (13mm) and 1" (25mm) sizes
- ◆ Each rod is marked with length
- ◆ Hardened and ground anvils on rods are adjustable for length. Head anvil is hardened and ground
- ◆ Interchangeable anvils on both 1/2" (13mm) and 1" (25mm) heads
- ◆ Quick reading figures – every thousandth numbered on inch reading tools
- ◆ Lock nut furnished on 1" (25mm) heads
- ◆ 5-1/2" (140mm) long, convenient handle furnished on A, B, F micrometers may be clamped where it will provide correct balance and reach

Each set furnished in attractive, protective case with assembly instructions for various measurements. Packed one in a box.



(Above) No. 823AZ 1-1/2-8" set with tool, rods, handle and wrenches. (Right) Measuring inside diameter using convenient handle attached to the micrometer.



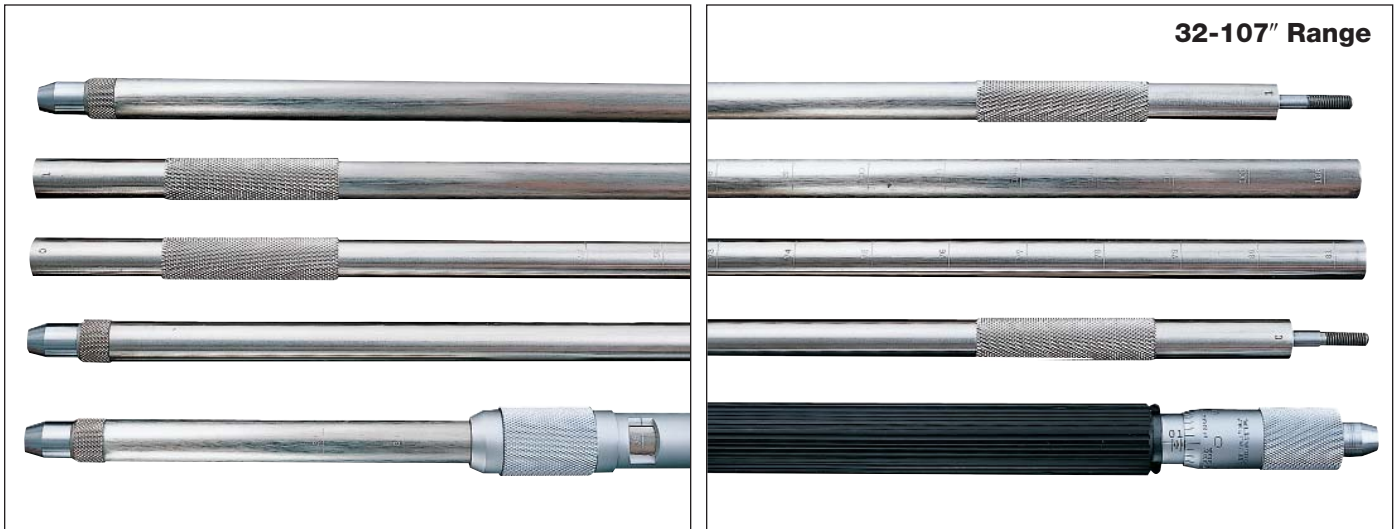
**Graduation – .001"**

| Range     | Movement of Screw    | Description             | Catalog No.  | EDP No. |
|-----------|----------------------|-------------------------|--------------|---------|
| 1-1/2-8"  | 1/2"                 | With 5 Rods and Handle  | <b>823AZ</b> | 53050   |
| 1-1/2-12" |                      | With 8 Rods and Handle  | <b>823BZ</b> | 53052   |
| 4-24"     | 1"                   | With 7 Rods             | <b>823CZ</b> | 53054   |
| 4-32"     |                      | With 8 Rods             | <b>823DZ</b> | 53055   |
| 4-40"     |                      | With 10 Rods            | <b>823EZ</b> | 53056   |
| 1-1/2-32" | 1/2 and 1" (2 heads) | With 10 Rods and Handle | <b>823FZ</b> | 53058   |

**Graduation – 0.01mm**

|            |      |                        |               |       |
|------------|------|------------------------|---------------|-------|
| 40-200mm   | 13mm | With 6 Rods and Handle | <b>823MAZ</b> | 53051 |
| 40-300mm   |      | With 8 Rods and Handle | <b>823MBZ</b> | 53053 |
| 100-1000mm | 25mm | With 10 Rods           | <b>823MEZ</b> | 53057 |





The No. 121CZ Set covers a wide range, from 32-107". Furnished in case (not shown).

## Long Range Tubular Inside Micrometers

### No. 121 Series Sets 32-107"

Starrett No. 121 tubular inside micrometers are designed for large internal measurements beyond the capacity of most other micrometers. Each set consists of a micrometer head mounted at the end of a tubular holder in which measuring rods can be inserted and adjusted to the desired size. Final size reading in thousandths of an inch (.001") is obtained using the micrometer head.

Rods and holder are made of steel tubing, light in weight, yet very rigid. Each rod is accurately graduated with inch divisions, which are set to the size desired by a line on the holder, and firmly held by a large, knurled clamping nut. The collet has a design, insuring an extremely tight grip on the rods at any setting.

#### Features

- ◆ Insulated rod holder to eliminate expansion by heat when hand held
- ◆ Attractive nickel-plated finish; satin-chrome finish on micrometer head reading surfaces
- ◆ Rods are accurately graduated in inches – micrometer head in thousandths of an inch
- ◆ Hardened and ground anvils. All rod anvils are adjustable
- ◆ Quick, easy adjustment for micrometer screw

#### Graduation – .001"

| Range   | Movement of Screw | Description  | Catalog No.  | EDP No. |
|---------|-------------------|--|--------------|---------|
| 32-57"  | 1"                | With 1 Graduated Measuring Rod                       | <b>121AZ</b> | 50492   |
| 32-82"  |                   | With 2 Graduated Measuring Rods and 1 Extension Rod  | <b>121BZ</b> | 50493   |
| 32-107" |                   | With 3 Graduated Measuring Rods and 2 Extension Rods | <b>121CZ</b> | 50494   |

Each set furnished in attractive, protective case. Packed one in a box.



## Fixed Range Inside Micrometers

2-12" Range

**No. 824 Series** 2-12"

**No. 824M Series**  
50-150mm

**No. S824 Series Sets** 2-12"

**No. S824M Series Set**  
50-150mm

For those who prefer inside micrometers without interchangeable rods, Starrett offers this series of fixed range inside micrometers. The Nos. 824 and 824M Series can be ordered individually or in sets. All Nos. 824 and 824M Series micrometers feature:

- ◆ Insulating handles on all sizes minimize possible expansion by heat when hand held
- ◆ Lock nuts (except Nos. 824AA and 824MAA)
- ◆ Adjustable contacts on thimble end
- ◆ Adjustable sleeve for head accuracy



Top-to-bottom: Nos. 824B 4-5", 824C 5-6", 824K 6-8".

### Graduation – .001"

| Range  | Movement of Screw | Catalog No.  | EDP No. |
|--------|-------------------|--------------|---------|
| 2-3"   | 1"                | <b>824AA</b> | 56665   |
| 3-4"   |                   | <b>824A</b>  | 56666   |
| 4-5"   |                   | <b>824B</b>  | 56667   |
| 5-6"   |                   | <b>824C</b>  | 56668   |
| 6-7"   |                   | <b>824D</b>  | 56669   |
| 7-8"   |                   | <b>824E</b>  | 56670   |
| 8-9"   |                   | <b>824F</b>  | 56671   |
| 9-10"  |                   | <b>824G</b>  | 56672   |
| 10-11" |                   | <b>824H</b>  | 56673   |
| 11-12" |                   | <b>824J</b>  | 56674   |
| 6-8"   | 2"                | <b>824K</b>  | 56675   |
| 8-10"  |                   | <b>824L</b>  | 56676   |
| 10-12" |                   | <b>824N</b>  | 56677   |

### Graduation – 0.01mm

|           |      |               |       |
|-----------|------|---------------|-------|
| 50-75mm   | 25mm | <b>824MAA</b> | 64192 |
| 75-100mm  |      | <b>824MA</b>  | 64193 |
| 100-125mm |      | <b>824MB</b>  | 64194 |
| 125-150mm |      | <b>824MC</b>  | 64195 |

Packed one in a box.

### No. 824 Series Sets – Inch

| Total Range | Description  | Catalog No.   | EDP No. |
|-------------|--|---------------|---------|
| 2-6"        | 4 Micrometers, 1" Range:<br>2-3", 3-4", 4-5",<br>5-6", with case   | <b>S824AZ</b> | 56678   |
| 2-12"       | 10 Micrometers, 1" Range:<br>2-3", 3-4", 4-5",<br>5-6", 6-7", 7-8",<br>8-9", 9-10",<br>10-11", 11-12", with case | <b>S824BZ</b> | 56679   |
| 6-12"       | 3 Micrometers, 2" Range:<br>6-8", 8-10", 10-12",<br>with case  | <b>S824CZ</b> | 56680   |
| 2-12"       | 7 Micrometers, (4) 1" Range,<br>(3) 2" Range:<br>2-3", 3-4", 4-5",<br>5-6", 6-8", 8-10",<br>10-12", with case    | <b>S824DZ</b> | 56681   |

### No. 824M Series Set – Millimeter

|          |   |                |       |
|----------|---|----------------|-------|
| 50-150mm | 4 Micrometers,<br>25mm Range:<br>50-75mm, 75-100mm,<br>100-125mm,<br>125-150mm, with case | <b>S824MAZ</b> | 64196 |
|----------|---|----------------|-------|

Each set furnished in attractive, protective case.



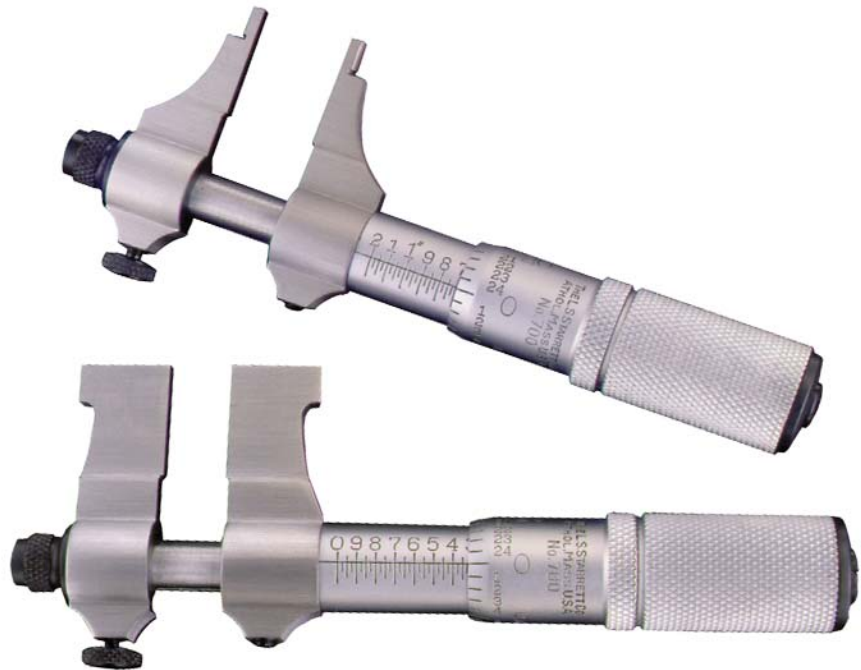
**Inside Micrometer Calipers**

**No. 700 Series .200-2"**

**No. 700M Series 5-50mm**

Caliper-type jaws permit quick inside measurements accurate to  $\pm .0002''$  or  $\pm 0.003\text{mm}$ . Jaws are hardened and ground on a radius for accurate feel without cramping.

- ◆ Satin chrome reading surface is glare free and resists rust
- ◆ Smooth friction thimble for consistent readings
- ◆ Lock screw



Top-to-bottom: Nos. 700A and 700B.

**Graduation – .001"**

| Range       | Description                  | Catalog No. | EDP No. |
|-------------|------------------------------|-------------|---------|
| .200-1.200" | Friction Thimble, Lock Screw | <b>700A</b> | 52909   |
| 1-2"        | Friction Thimble, Lock Screw | <b>700B</b> | 52911   |

**Graduation – 0.01mm**

|         |                              |              |       |
|---------|------------------------------|--------------|-------|
| 5-30mm  | Friction Thimble, Lock Screw | <b>700MA</b> | 56063 |
| 25-50mm | Friction Thimble, Lock Screw | <b>700MB</b> | 56064 |

Packed one in a box; sent without case – case is available by ordering No. 940, EDP 55359.



## Internal Groove Micrometers

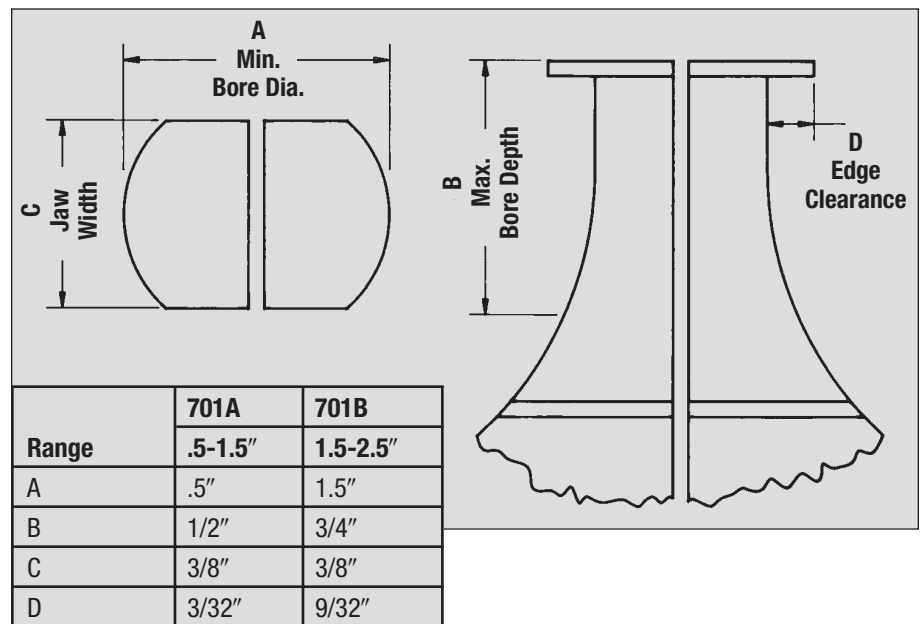
### No. 701 Series .500-2.500"

Measures grooves for retaining rings and "O" rings, oil grooves, washer grooves, as well as bores and recesses. Depth of grooves up to 5/64" can be measured with No. 701A; and 7/32" with No. 701B. Tool is accurate to  $\pm .0002$ ".

- ◆ Hardened and ground gaging contacts are .030" thick
- ◆ Contacts have flush ends to gage grooves at the bottom of blind holes
- ◆ Satin chrome reading surface is glare free and resists rust
- ◆ Smooth friction thimble for consistent readings
- ◆ Lock screw



Gaging contacts are only .030" thick.



### Graduation – .001"

| Range        | Minimum Bore | Max. Depth Bore | Thickness Jaws | Description                  | Catalog No. | EDP No. |
|--------------|--------------|-----------------|----------------|------------------------------|-------------|---------|
| .500-1.500"  | .500"        | 1/2"            | .030"          | Friction Thimble, Lock Screw | <b>701A</b> | 52913   |
| 1.500-2.500" | 1.500"       | 7/8"            |                | Friction Thimble, Lock Screw | <b>701B</b> | 52915   |

Packed one in a box; sent without case – case is available by ordering No. 940, EDP 55359.





The following pages show our varied line of depth micrometers. These are available with base lengths from 2-1/2-6" (63.5-150mm) and can measure depths up to 9" (225mm). They are available in electronic, mechanical digital and regular readouts.

They are also available with rotating or non-rotating blades.

The purpose of these tools is to measure the depth of holes, slots, shoulders and projections quickly and easily to .001" or 0.01mm. All heads used in our depth micrometers are accurate to  $\pm 0.0001$ " or  $\pm 0.002$ mm.

Unless otherwise noted under the individual tools, they all have these features:

- ◆ A base shape design that will automatically position the fingers so that the base is easily held in place for measuring stability
- ◆ All precision screws are ground and lapped
- ◆ All bases and rods are hardened, ground, and lapped for permanent accuracy
- ◆ All reading surfaces have a satin chrome finish that resists rust and provides a no-glare background for the sharp lines and figures
- ◆ All measuring rods are adjustable
- ◆ Quick and easy adjustment
- ◆ Starrett workmanship





## Electronic Micrometer Depth Gage (with output)

**No. 749 0-12" (0-300mm)**

The Starrett No. 749 electronic depth micrometer has a wide 0-6" (0-150mm) range for measuring the depth of most holes, slots, shoulders and projections. The 4" (100mm) base is hardened, ground, and lapped for long-lasting precision.

### Readability Features

- ◆ Large, right-sized, high-contrast LCD digital readout
- ◆ Resolution – .0001" (0.001mm)
- ◆ Inch or millimeter graduations standard
- ◆ No-glare black wrinkle finish frame
- ◆ No-glare satin chrome finish on thimble and sleeve

### Ease-of-Handling Features

- ◆ Ring-type knurled lock nut
- ◆ Combination ratchet and speeder

### Accuracy and Long-Life Features

- ◆ Ground and lapped one-piece spindle
- ◆ Base length 4" (100mm); rod diameter 5/32" (4mm); all measuring rods are adjustable
- ◆ Starrett designed electronic microprocessor
- ◆ One 3-volt battery furnished with over one year's normal usage
- ◆ Automatic OFF after 30 minutes of nonuse
- ◆ Starrett workmanship

### Full-Function Action Features

- ◆ Instant inch/millimeter conversion
- ◆ "ME" millimeter model will turn on in the millimeter mode after installation of a new battery
- ◆ Measurement HOLD button
- ◆ Ability to zero tool at any position
- ◆ Ability to retain and return to the true zero reading of the micrometer
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output data to Starrett SPC Plus® hardware and software and to PCs
- ◆ Works well with Starrett DataSure® Wireless Data Collection Systems

Furnished in a protective case. Packed one per box with instructions.



### With Standard Inch Graduations on Shell and Thimble

| Catalog No. | EDP No. | Description                    |
|-------------|---------|--------------------------------|
| 749BZ-6RL   | 65063   | 0-6"/0-150mm Range, with Case  |
| 749BZ-12RL  | 68854   | 0-12"/0-300mm Range, with Case |

### With Standard Millimeter Graduations on Shell and Thimble

|             |       |                                |
|-------------|-------|--------------------------------|
| 749MEBZ-150 | 66124 | 0-150mm/0-6" Range, with Case  |
| 749MEBZ-300 | 68855 | 0-300mm/0-12" Range, with Case |

### Rods Only

| Inch   | Part No. | EDP No. | Millimeter | Part No. | EDP No. |
|--------|----------|---------|------------|----------|---------|
| 0-1"   | PT99486  | 72493   | 0-25mm     | PT99143  | 66331   |
| 1-2"   | PT99487  | 72494   | 25-50mm    | PT99183  | 66332   |
| 2-3"   | PT99488  | 72495   | 50-75mm    | PT99190  | 66333   |
| 3-4"   | PT99489  | 72496   | 75-100mm   | PT99266  | 66334   |
| 4-5"   | PT99490  | 72497   | 100-125mm  | PT99267  | 66335   |
| 5-6"   | PT99491  | 72498   | 125-150mm  | PT99268  | 66336   |
| 6-7"   | PT99457  | 11626   | 150-175mm  | PT99531  | 11632   |
| 7-8"   | PT99458  | 11627   | 175-200mm  | PT99532  | 11633   |
| 8-9"   | PT99459  | 11628   | 200-225mm  | PT99533  | 11634   |
| 9-10"  | PT99460  | 11629   | 225-250mm  | PT99534  | 11635   |
| 10-11" | PT99461  | 11630   | 250-275mm  | PT99535  | 11636   |
| 11-12" | PT99462  | 11631   | 275-300mm  | PT99536  | 11637   |

### Cable Information

| Part No. | EDP No. | Description  |
|----------|---------|--|
| PT61963  | 66636   | Computer Interface Cable Complete to PC (RS232C)                               |
| PT61768  | 66454   | Adaptor from No. PT22938 Cable to PC (RS232C)                                  |
| PT22938  | 64059   | Shielded Cable to Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor |
| PT61120  | 65446   | One 3-Volt Battery No. CR2450  |



### Digital Micrometer Depth Gages

**No. 446 Series 0-6"**

**No. 446M Series  
0-150mm**

These are the Starrett mechanical digital depth micrometers – simple to use even by the inexperienced. Besides those listed on the lead page of this section, this tool has these additional features:

- ◆ Clear, easily read white numbers on black background reduce errors
- ◆ No-glare black finish on the frame
- ◆ .001" or 0.01mm is read directly from the counter
- ◆ Ring-type knurled lock nut for quick and sure locking
- ◆ Combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Hardened, ground, and lapped base is 3" (75mm) long
- ◆ Measuring rods are 5/32" (4mm) diameter and are adjustable



Micrometer, rods and wrenches in case.

#### Graduation – .001"

| Range | No. Rods | Description                     | Catalog No.      | EDP No. |
|-------|----------|---------------------------------|------------------|---------|
| 0-3"  | 3        | Ratchet Stop, Lock Nut, in Case | <b>446AZ-3RL</b> | 56288   |
| 0-6"  | 6        | Ratchet Stop, Lock Nut, in Case | <b>446AZ-6RL</b> | 56289   |

#### Graduation – 0.01mm

|         |   |                                 |                     |       |
|---------|---|---------------------------------|---------------------|-------|
| 0-75mm  | 3 | Ratchet Stop, Lock Nut, in Case | <b>446MAZ-75RL</b>  | 56294 |
| 0-150mm | 6 | Ratchet Stop, Lock Nut, in Case | <b>446MAZ-150RL</b> | 56295 |

#### Rods Only

| For 446 Series (Inch) |                |         | For 446M Series (Millimeter) |                |         |
|-----------------------|----------------|---------|------------------------------|----------------|---------|
| Size                  | Part No.       | EDP No. | Size                         | Part No.       | EDP No. |
| 0-1"                  | <b>PT99381</b> | 72211   | 0-25mm                       | <b>PT99391</b> | 72217   |
| 1-2"                  | <b>PT99382</b> | 72212   | 25-50mm                      | <b>PT99392</b> | 72218   |
| 2-3"                  | <b>PT99383</b> | 72213   | 50-75mm                      | <b>PT99393</b> | 72219   |
| 3-4"                  | <b>PT99384</b> | 72214   | 75-100mm                     | <b>PT99394</b> | 72220   |
| 4-5"                  | <b>PT99385</b> | 72215   | 100-125mm                    | <b>PT99395</b> | 72221   |
| 5-6"                  | <b>PT99386</b> | 72216   | 125-150mm                    | <b>PT99396</b> | 72222   |

Furnished in an attractive, protective case.



**Micrometer Depth  
Gages with  
non-rotating blades**

**No. 449 Series 0-6"**

**No. 449M Series 0-150mm**

The 449 Series features non-rotating, blade-type rods approximately .045" thick x 1/8" wide (1.2 x 3.2mm).

By holding the base in one hand, the blade can be turned with the fingers and positioned at any angle relative to the base. In operation, the blade does not turn, but moves perpendicularly only, permitting depth measurement of narrow shoulders without the blade rolling off. This is also ideal for slots and recesses as narrow as .045" (1.2mm). Furnished with a 2-1/2" (63mm) or a 4" (100mm) base.

Also available with 3 rods for measuring 0-3" (0-75mm), or 6 rods for measuring 0-6" (0-150mm) in thousandths of an inch or 0.01mm.

This tool comes with the combination ratchet and speeder for uniform pressure and quicker adjustment.



**Graduation – .001"**

| Range | Base Length | No. Rods | Rod Size    | Catalog No.     | EDP No. |
|-------|-------------|----------|-------------|-----------------|---------|
| 0-3"  | 2-1/2"      | 3        | .045 x 1/8" | <b>449AZ-3R</b> | 52318   |
| 0-6"  | 2-1/2"      | 6        |             | <b>449AZ-6R</b> | 52320   |
| 0-3"  | 4"          | 3        |             | <b>449BZ-3R</b> | 52322   |
| 0-6"  | 4"          | 6        |             | <b>449BZ-6R</b> | 52324   |

**Graduation – 0.01mm**

| Range   | Base Length | No. Rods | Rod Size    | Catalog No.        | EDP No. |
|---------|-------------|----------|-------------|--------------------|---------|
| 0-75mm  | 63.5mm      | 3        | 1.2 x 3.2mm | <b>449MAZ-75R</b>  | 56636   |
| 0-150mm | 63.5mm      | 6        |             | <b>449MAZ-150R</b> | 56637   |
| 0-75mm  | 100mm       | 3        |             | <b>449MBZ-75R</b>  | 56638   |
| 0-150mm | 100mm       | 6        |             | <b>449MBZ-150R</b> | 56639   |

**Rods Only**

| For 449 Series (Inch) |                |         | For 449M Series (Millimeter) |                |         |
|-----------------------|----------------|---------|------------------------------|----------------|---------|
| Size                  | Part No.       | EDP No. | Size                         | Part No.       | EDP No. |
| 0-1"                  | <b>PT99115</b> | 71838   | 0-25mm                       | <b>PT99306</b> | 72476   |
| 1-2"                  | <b>PT99116</b> | 71839   | 25-50mm                      | <b>PT99307</b> | 72477   |
| 2-3"                  | <b>PT99117</b> | 71840   | 50-75mm                      | <b>PT99308</b> | 72478   |
| 3-4"                  | <b>PT99118</b> | 71841   | 75-100mm                     | <b>PT99309</b> | 72479   |
| 4-5"                  | <b>PT99119</b> | 71842   | 100-125mm                    | <b>PT99310</b> | 72480   |
| 5-6"                  | <b>PT99120</b> | 71843   | 125-150mm                    | <b>PT99311</b> | 72481   |

Longer rods are available by special order.



Measuring depth of narrow slot with the No. 449A-3R.

Furnished in an attractive, protective case.





**No. 440 Series** 0-9"  
**No. 440M Series**  
0-225mm

**No. 445 Series** 0-12"  
**No. 445M Series**  
0-225mm

The depths of holes, slots, shoulders and projections can be measured to .001" or 0.01mm with these fine tools.

The No. 440 gages are furnished with a 2-1/2" (63.5mm) base and 1/8" (3.2mm) diameter measuring rods.\*

The No. 445 gages are furnished with choices of 3" (75mm), 4" (100mm), and 6" (150mm) bases and have 5/32" (4mm) diameter measuring rods.\*

Besides the features listed on the lead page of this section, there are these additional features:

- ◆ The combination ratchet and speeder for uniform pressure and quicker adjustment
- ◆ Ring-type lock nut for quick and sure locking



Measuring the depth of a shoulder with the No. 445AZ-3RL.

### Graduation – .001"

| Range | Base   | No. Rods* | Rod Dia. | Description                          | Catalog No.       | EDP No. |
|-------|--------|-----------|----------|--------------------------------------|-------------------|---------|
| 0-3"  | 2-1/2" | 3         | 1/8"     | With Lock Nut, in Case               | <b>440Z-3L</b>    | 52113   |
| 0-6"  |        | 6         |          |                                      | <b>440Z-6L</b>    | 52117   |
| 0-9"  |        | 9         |          |                                      | <b>440Z-9L</b>    | 52121   |
| 0-3"  | 2-1/2" | 3         | 1/8"     | With Ratchet Stop, Lock Nut, in Case | <b>440Z-3RL</b>   | 52115   |
| 0-6"  |        | 6         |          |                                      | <b>440Z-6RL</b>   | 52119   |
| 0-9"  |        | 9         |          |                                      | <b>440Z-9RL</b>   | 52123   |
| 0-3"  | 3"     | 3         | 5/32"    |                                      | <b>445AZ-3RL</b>  | 52208   |
| 0-6"  |        | 6         |          |                                      | <b>445AZ-6RL</b>  | 52212   |
| 0-9"  |        | 9         |          |                                      | <b>445AZ-9RL</b>  | 52216   |
| 0-12" |        | 12        |          |                                      | <b>445AZ-12RL</b> | 67117   |
| 0-3"  | 4"     | 3         | 5/32"    | With Ratchet Stop, Lock Nut, in Case | <b>445BZ-3RL</b>  | 52220   |
| 0-6"  |        | 6         |          |                                      | <b>445BZ-6RL</b>  | 52224   |
| 0-9"  |        | 9         |          |                                      | <b>445BZ-9RL</b>  | 52228   |
| 0-12" |        | 12        |          |                                      | <b>445BZ-12RL</b> | 67118   |
| 0-3"  | 6"     | 3         | 5/32"    |                                      | <b>445DZ-3RL</b>  | 52244   |
| 0-6"  |        | 6         |          |                                      | <b>445DZ-6RL</b>  | 52248   |
| 0-9"  |        | 9         |          |                                      | <b>445DZ-9RL</b>  | 52252   |
| 0-12" |        | 12        |          |                                      | <b>445DZ-12RL</b> | 67119   |

### Graduation – 0.01mm

|         |        |   |       |                                      |                     |       |
|---------|--------|---|-------|--------------------------------------|---------------------|-------|
| 0-75mm  | 63.5mm | 3 | 3.2mm | With Ratchet Stop, Lock Nut, in Case | <b>440MZ-75RL</b>   | 52116 |
| 0-150mm |        | 6 |       |                                      | <b>440MZ-150RL</b>  | 52120 |
| 0-225mm |        | 9 |       |                                      | <b>440MZ-225RL</b>  | 52124 |
| 0-75mm  | 75mm   | 3 | 4mm   |                                      | <b>445MAZ-75RL</b>  | 52209 |
| 0-150mm |        | 6 |       |                                      | <b>445MAZ-150RL</b> | 52213 |
| 0-225mm |        | 9 |       |                                      | <b>445MAZ-225RL</b> | 52217 |
| 0-75mm  | 100mm  | 3 | 4mm   | With Ratchet Stop, Lock Nut, in Case | <b>445MBZ-75RL</b>  | 52221 |
| 0-150mm |        | 6 |       |                                      | <b>445MBZ-150RL</b> | 52225 |
| 0-225mm |        | 9 |       |                                      | <b>445MBZ-225RL</b> | 52229 |
| 0-75mm  | 150mm  | 3 | 4mm   |                                      | <b>445MDZ-75RL</b>  | 52245 |
| 0-150mm |        | 6 |       |                                      | <b>445MDZ-150RL</b> | 52249 |
| 0-225mm |        | 9 |       |                                      | <b>445MDZ-225RL</b> | 52253 |

Furnished in an attractive, protective case.

\* For information on rods only, see next page.



## Micrometer Depth Gages with half base

### No. 443 Series 0-9"

This tool is exactly like the No. 445 Series except that it has a half base. The 2" (50mm) half base permits measuring depths of holes and slots close to shoulders and between obstructions. Rods have individual length adjustment and are 5/32" (4mm) in diameter.



| Range | No. of Rods | Graduation | Description                           | Catalog No.     | EDP No. |
|-------|-------------|------------|---------------------------------------|-----------------|---------|
| 0-3"  | 3           | .001"      | Ratchet Stop,<br>Lock Nut,<br>in Case | <b>443Z-3RL</b> | 52171   |
| 0-6"  | 6           |            |                                       | <b>443Z-6RL</b> | 52173   |
| 0-9"  | 9           |            |                                       | <b>443Z-9RL</b> | 52175   |

Furnished in an attractive, protective case.

### Rods Only for Nos. 440, 443 and 445 Series Micrometer Depth Gages

#### Inch Reading

| Size   | 440 Series     |         | 443, 445 Series |         |
|--------|----------------|---------|-----------------|---------|
|        | Part No.       | EDP No. | Part No.        | EDP No. |
| 0-1"   | <b>PT99331</b> | 71973   | <b>PT99341</b>  | 71982   |
| 1-2"   | <b>PT99332</b> | 71974   | <b>PT99342</b>  | 71983   |
| 2-3"   | <b>PT99333</b> | 71975   | <b>PT99343</b>  | 71984   |
| 3-4"   | <b>PT99334</b> | 71976   | <b>PT99344</b>  | 71985   |
| 4-5"   | <b>PT99335</b> | 71977   | <b>PT99345</b>  | 71986   |
| 5-6"   | <b>PT99336</b> | 71978   | <b>PT99346</b>  | 71987   |
| 6-7"   | <b>PT99337</b> | 71979   | <b>PT99347</b>  | 71988   |
| 7-8"   | <b>PT99338</b> | 71980   | <b>PT99348</b>  | 71989   |
| 8-9"   | <b>PT99339</b> | 71981   | <b>PT99349</b>  | 71990   |
| 9-10"  |                |         | <b>PT99358</b>  | 66673   |
| 10-11" |                |         | <b>PT99359</b>  | 66674   |
| 11-12" |                |         | <b>PT99360</b>  | 66675   |

#### Millimeter Reading

| Size      | 440M Series    |       | 445M Series    |         |
|-----------|----------------|-------|----------------|---------|
|           | Part No.       | EDP   | Part No.       | EDP No. |
| 0-25mm    | <b>PT99361</b> | 72193 | <b>PT99371</b> | 72202   |
| 25-50mm   | <b>PT99362</b> | 72194 | <b>PT99372</b> | 72203   |
| 50-75mm   | <b>PT99363</b> | 72195 | <b>PT99373</b> | 72204   |
| 75-100mm  | <b>PT99364</b> | 72196 | <b>PT99374</b> | 72205   |
| 100-125mm | <b>PT99365</b> | 72197 | <b>PT99375</b> | 72206   |
| 125-150mm | <b>PT99366</b> | 72198 | <b>PT99376</b> | 72207   |
| 150-175mm | <b>PT99367</b> | 72199 | <b>PT99377</b> | 72208   |
| 175-200mm | <b>PT99368</b> | 72200 | <b>PT99378</b> | 72209   |
| 200-225mm | <b>PT99369</b> | 72201 | <b>PT99379</b> | 72210   |

Longer rods are available by special order.



- ◆ Slide calipers are very versatile measuring tools. While they do not provide the same degree of precision as a micrometer, they are very accurate and each tool offers much more range than a single micrometer.
- ◆ The best digital and dial slide calipers, regardless of resolution, are accurate to within .001" or 0.03mm, every 6" or 150mm. The best vernier calipers are accurate to .0005" or 0.013mm per foot or 300mm.
- ◆ Slide calipers come in different styles – electronic calipers, mechanical dial calipers, vernier calipers and plain slide calipers.
- ◆ Because slide caliper measuring surfaces are not in line with the beam of the caliper, some care should be taken not to use too much measuring pressure. This will lessen the possibility of springing the jaws. We use approximately one-half pound (.2kg) of pressure to set up the tools. However, a specific pressure is not necessary – just use good judgment for a minimum measuring pressure.
- ◆ To check or set the separate I.D. nibs on a caliper, a micrometer or a ring gage can be used. Individual "feel" is important when measuring an I.D. This is because the measuring surfaces are so thin that small pressure changes that are normal from person to person can affect the reading as much as .001" (0.03mm) or so.
- ◆ It is important to keep the sliding surfaces clean and lightly oiled.







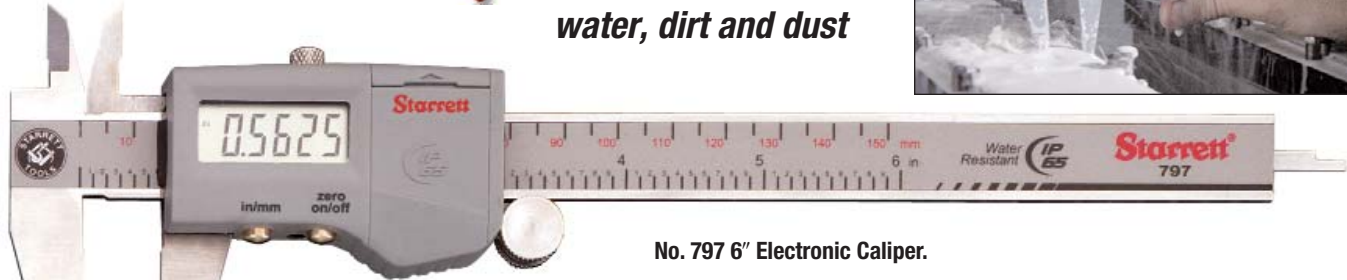
# SLIDE CALIPERS



## Electronic Calipers No. 797 Series 0-12" (0-300 mm)



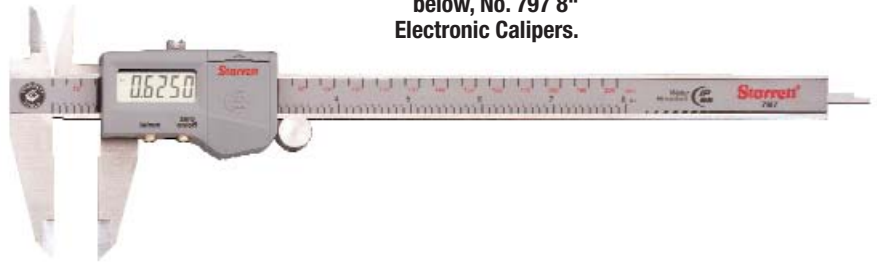
**IP65 protection  
against coolant,  
water, dirt and dust**



No. 797 6" Electronic Caliper.



Above, No. 797 12",  
below, No. 797 8"  
Electronic Calipers.



Starrett 797 Electronic Calipers provide an IP65\* level of protection against foreign matter in hostile shop environments.

They are coolant and water resistant and offer excellent protection against chips, dirt, dust and other contaminants.

The extra large LCD (character height .310") makes the 797 exceptionally easy to read. All 797 models also include an output port for RS232 equipped devices.

While there are other IP65 electronic calipers available, only the 797 is a Starrett – the tool of choice for the most experienced toolmakers and machinists when the measurements are most critical.

### Features

- ◆ Large, easy-to-read LCD display
- ◆ IP65\* level of protection against coolant, water, dirt and dust
- ◆ Induction type linear encoder system
- ◆ Hardened stainless steel measuring surface for long life
- ◆ Depth rod attachment available for all sizes to more accurately seat the tool
- ◆ Fine adjustment
- ◆ Lock to hold the slide in position
- ◆ Linear accuracy meets DIN862
- ◆ Resolution is .0005" (0.01 mm)



**IP65 protection against coolant, water, dirt and dust.**

- ◆ Long life CR2032 3V battery (>3500 continuous hours of battery life)
- ◆ Inch/mm conversion
- ◆ Zero at any position
- ◆ Manual on/off, plus an automatic off after four hours of nonuse
- ◆ Output data to Starrett SPC Plus hardware and software and to PCs
- ◆ Works well with Starrett DataSure®

\* According to IEC529, IP65 stands for:  
 – The first number "6" identifies protection against ingress of dust  
 – The second number "5" identifies protection against water jets projected by a nozzle from any direction for a duration of three minutes

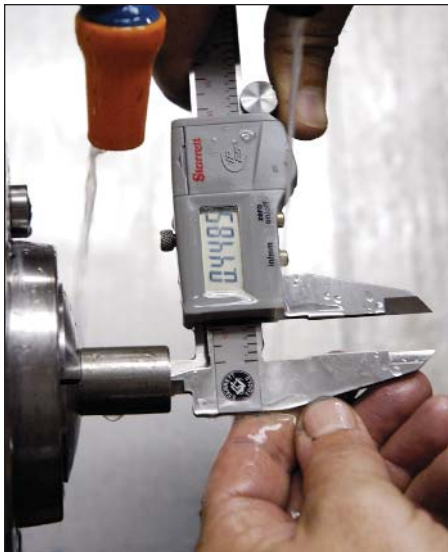
Packed one in a box.





### No. 797 Series Specifications

Right: All 797 models include a port for output to a variety of peripherals, either through a traditional wire, or by connecting to a Starrett DataSure® Wireless Data Collection System End Node .



| Range         | Description  | Catalog No.              | EDP No. |
|---------------|--|--------------------------|---------|
| 0-6" (150mm)  | Caliper with Output in Fitted Plastic Case                                     | <b>797B-6/150</b>        | 68659   |
|               | Caliper with Output, Standard Letter of Certification†, in Fitted Plastic Case | <b>797B-6/150 W/SLC</b>  | 68823   |
| 0-8" (200mm)  | Caliper with Output in Fitted Plastic Case                                     | <b>797B-8/200</b>        | 68660   |
|               | Caliper with Output, Standard Letter of Certification†, in Fitted Plastic Case | <b>797B-8/200 W/SLC</b>  | 68824   |
| 0-12" (300mm) | Caliper with Output in Fitted Plastic Case                                     | <b>797B-12/300</b>       | 68661   |
|               | Caliper with Output, Standard Letter of Certification†, in Fitted Plastic Case | <b>797B-12/300 W/SLC</b> | 68825   |

### Accessories, Cables and Case Information

| Description                                       | Catalog No.    | EDP No. |
|---|----------------|---------|
| Center Distance Attachment                        | <b>PT26151</b> | 64440   |
| Depth Attachment                                  | <b>PT22431</b> | 64640   |
| Computer Interface Cable to PC (RS232)            | <b>PT62606</b> | 68822   |
| Shielded Cable to 761/772 Series Starrett Modules | <b>PT61340</b> | 65648   |
| Two 3-Volt Batteries, No. CR2032                  | <b>PT99492</b> | 65650   |
| Deluxe Padded Case for 0-6" (150mm) Calipers      | <b>723ZZ-6</b> | 57070   |
| Finished Wood Case for 0-8" (200mm) Calipers      | <b>950</b>     | 63878   |
| Finished Wood Case for 0-12" (300mm) Calipers     | <b>946</b>     | 56695   |

### Approximate Jaw Depths

|                | 6" (150mm)    | 8" (200mm)      | 12" (300mm)     |
|----------------|---------------|-----------------|-----------------|
| <b>Outside</b> | 1-1/2" (38mm) | 1-7/8" (47.6mm) | 2-1/2" (63.5mm) |
| <b>Inside</b>  | 5/8" (16mm)   | 3/4" (19mm)     | 3/4" (19mm)     |

Packed one in a box.

**NOTE:** † Includes redemption card for Standard Letter of Certification (SLC).



## Electronic Calipers No. 799 Series 0-40" (0-1000mm)



Starrett's 799 Series Electronic Calipers are light, comfortable, easy-to-use, and constructed with features that have made Starrett slide calipers the machinist's first choice for many years.

The 799 offers a slim, streamlined profile, a large, clear, easy-to-read LCD display, long battery life, and function buttons for zero and inch/mm.

799 calipers are available in 0-6", 0-8", and 0-12" sizes and the newly available Extended Range 24" and 40". All sizes furnished in a fitted, protective case.

### Features (all sizes)

- ◆ Lightweight, ergonomic design
- ◆ Inch/millimeter conversion reads .0005" or 0.01mm
- ◆ Easy access to the single, long-life battery
- ◆ Last measuring position retained when shut off
- ◆ Hardened stainless steel body for long life
- ◆ Fine adjustment thumb wheel
- ◆ Lock screw to hold the slide in position
- ◆ Resolution is .0005" (0.01mm)
- ◆ Zero at any position



### 6", 8" & 12" Calipers Only

- ◆ Large easy-to-read LCD, .32" high characters
- ◆ Automatic shut-off after 5 minutes of nonuse
- ◆ Linear accuracy meets DIN862
- ◆ Integrated depth rod

### Extended Range 24" & 40" Calipers

- ◆ Preset and hold feature
- ◆ Minimum and maximum limits set
- ◆ I.D. jaw dimension is 0.800"/20.32mm
- ◆ LCD characters are .50" high
- ◆ Auto shut-off after 30 minutes of nonuse

Packed one in a box.



### No. 799 Series specifications

Right:  
0-40"/1000mm

Below:  
0-24"/600mm



| Range          | Description  | Catalog No.             | EDP No. |
|----------------|--|-------------------------|---------|
| 0-6" (150mm)   | Caliper in Fitted Plastic Case   | <b>799A-6/150</b>       | 67410   |
|                | Caliper with Standard Letter of Certification†, in Fitted Plastic Case | <b>799A-6/150 W/SLC</b> | 67620   |
| 0-8" (200mm)   | Caliper in Fitted Plastic Case   | <b>799A-8/200</b>       | 67412   |
|                | Caliper with Standard Letter of Certification†, in Fitted Plastic Case | <b>799A-8/200 W/SLC</b> | 67413   |
| 0-12" (300mm)  | Caliper in Fitted Plastic Case   | <b>799A-12/300</b>      | 67621   |
| 0-24" (600mm)  | Caliper in Fitted Plastic Case   | <b>799AZ-24/600</b>     | 11978   |
| 0-40" (1000mm) | Caliper in Fitted Plastic Case   | <b>799AZ-40/1000</b>    | 11979   |

### Accessories and Case Information

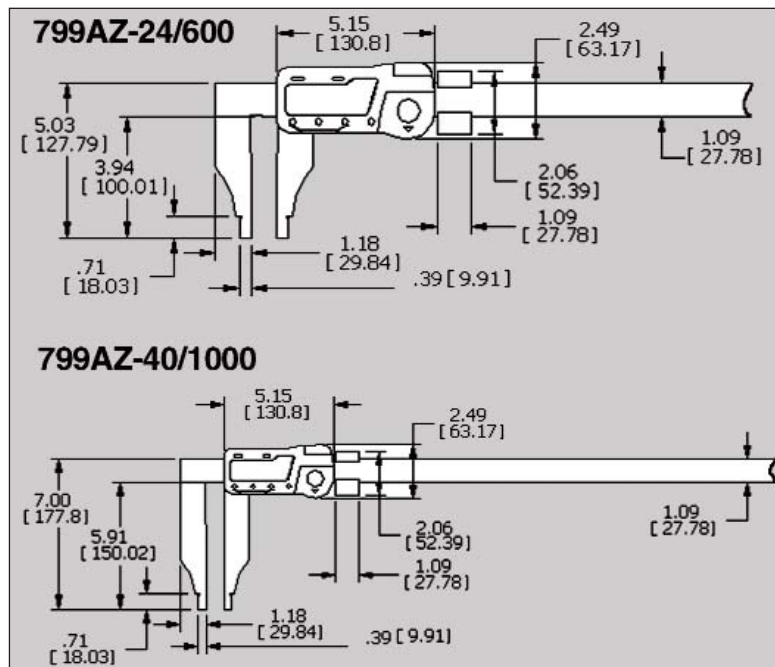
| Description                                   | Catalog No.                    | EDP No.        |       |
|---|--------------------------------|----------------|-------|
| 6", 8" & 12"<br>Calipers Only                 | Center Distance Attachment for | <b>PT26151</b> | 64440 |
|   | Depth Attachment               | <b>PT22431</b> | 64640 |
| 1-1/2 Volt Battery, No. CR2032                | <b>PT99492</b>                 | 65650          |       |
| Deluxe Padded Case for 0-6" (150mm) Calipers  | <b>723ZZ-6</b>                 | 57070          |       |
| Finished Wood Case for 0-8" (200mm) Calipers  | <b>950</b>                     | 63878          |       |
| Finished Wood Case for 0-12" (300mm) Calipers | <b>946</b>                     | 56695          |       |

NOTE: † Includes redemption card for Standard Letter of Certification (SLC).

### Approximate Jaw Depths

|         | 6" (150mm)    | 8" (200mm)  | 12" (300mm)     | 24" 600mm        | 40" (1000mm)     |
|---------|---------------|-------------|-----------------|------------------|------------------|
| Outside | 1-1/2" (38mm) | 2" (50.8mm) | 2-1/2" (63.5mm) | 4" (100mm)       | 4" (100mm)       |
| Inside  | 5/8" (16mm)   | 3/4" (19mm) | 23/32" (18.3mm) | 11/16" (17.46mm) | 11/16" (17.46mm) |

### 24" & 40" Dimension Detail







## No. 120 Series and 120M Series Dial Calipers



120 Series 6" Dial Calipers are available with White, Black, or Red dials.



150mm Metric Dial Caliper with yellow dial.

**No. 120 Series** 0-12"  
**No. 120M** 0-300mm

**The Only American Made Dial Caliper ...**  
This is one of the handiest measuring tools available, used by mechanics and toolmakers everywhere. It is direct reading, reliable and accurate.

### Readability Features

- ◆ Sharp, clear dial graduations of .001" or 0.02mm – .100" or 2mm in one revolution
- ◆ Sharp, black graduations on the satin finished bar, every .100" or 1mm
- ◆ Choice of black, red, or white inch dials; millimeter dials are yellow

### Ease-of-Handling Features

- ◆ Knife-edge contacts for both inside and outside measurements
- ◆ One hand use with the thumb-operated, fine adjustment roll

- ◆ Lock screw for dial bezel
- ◆ Lock screw for holding the sliding jaw in position
- ◆ 6" (150mm) and 9" (225mm) models have a covered rack depth rod. A detachable depth rod is available for the 12" model
- ◆ Parallel lines can be scribed on a workpiece by setting the caliper jaw to the required dimensions, locking the movable jaw with the lock screw and then using the front edge of the fixed jaw as the scribing surface

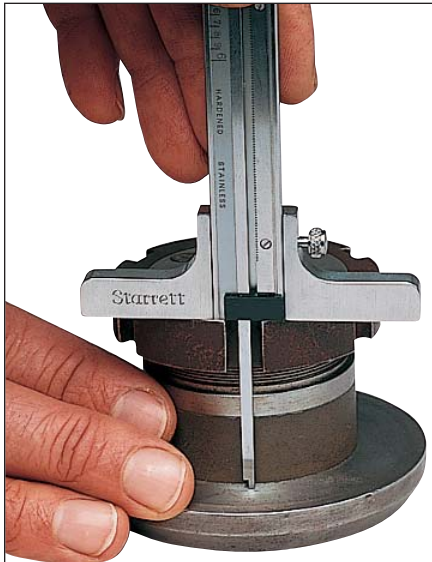
### Accuracy and Long-Life Features

- ◆ Long-wearing carbide faces on outside contacts on models Nos. 120AX-6 and 120MX-150 only
- ◆ Hardened stainless steel bar, measuring surfaces, rack, gears and depth rod
- ◆ Positive, split-gear anti-backlash control
- ◆ Rack teeth point down to make it easy to shed foreign matter and thereby keep the area clean





### No. 120 Series Dial Calipers (continued)



Above: Making depth measurement with caliper and depth attachment.

Below: 6" Caliper with convenient holster.



#### Approximate Jaw Depths for 120 Series

|         | 120 6" & 9"<br>(150mm & 225mm) | 120 12"<br>(300mm) |
|---------|--------------------------------|--------------------|
| Outside | 1-1/2" (38mm)                  | 2-1/2" (63mm)      |
| Inside  | 5/8" (16mm)                    | 3/4" (19mm)        |

All items packed one per box.

#### Graduation – .001"

| Range | Dial Color | Description   | Catalog No.          | EDP No. |
|-------|------------|---|----------------------|---------|
| 0-6"  | White      | Caliper in Case*  | <b>120A-6</b>        | 64514   |
|       |            | Caliper, Standard Letter of Certification†, in Case*              | <b>120A-6 W/SLC</b>  | 66568   |
|       |            | Caliper with Carbide Faces in Case*                               | <b>120X-6</b>        | 65909   |
| 0-9"  | Black      | Caliper in Case*  | <b>B120A-6</b>       | 64515   |
|       |            | Caliper, Standard Letter of Certification†, in Case*              | <b>B120A-6 W/SLC</b> | 66917   |
|       |            | Caliper in Case*  | <b>R120A-6</b>       | 64516   |
| 0-9"  | Red        | Caliper, Standard Letter of Certification†, in Case*              | <b>R120A-6 W/SLC</b> | 66918   |
|       |            | Caliper in Finished Wood Case                                     | <b>120AZ-9</b>       | 64520   |
|       |            | Caliper without Case  | <b>120A-9</b>        | 64517   |
| 0-12" | White      | Caliper in Finished Wood Case                                     | <b>120Z-12</b>       | 56693   |
|       |            | Caliper, Standard Letter of Certification†, in Finished Wood Case | <b>120Z-12 W/SLC</b> | 66569   |
|       |            | Caliper without Case  | <b>120-12</b>        | 56694   |
|       |            | Caliper, Standard Letter of Certification†, without Case          | <b>120-12 W/SLC</b>  | 66919   |

#### Graduation – 0.02mm

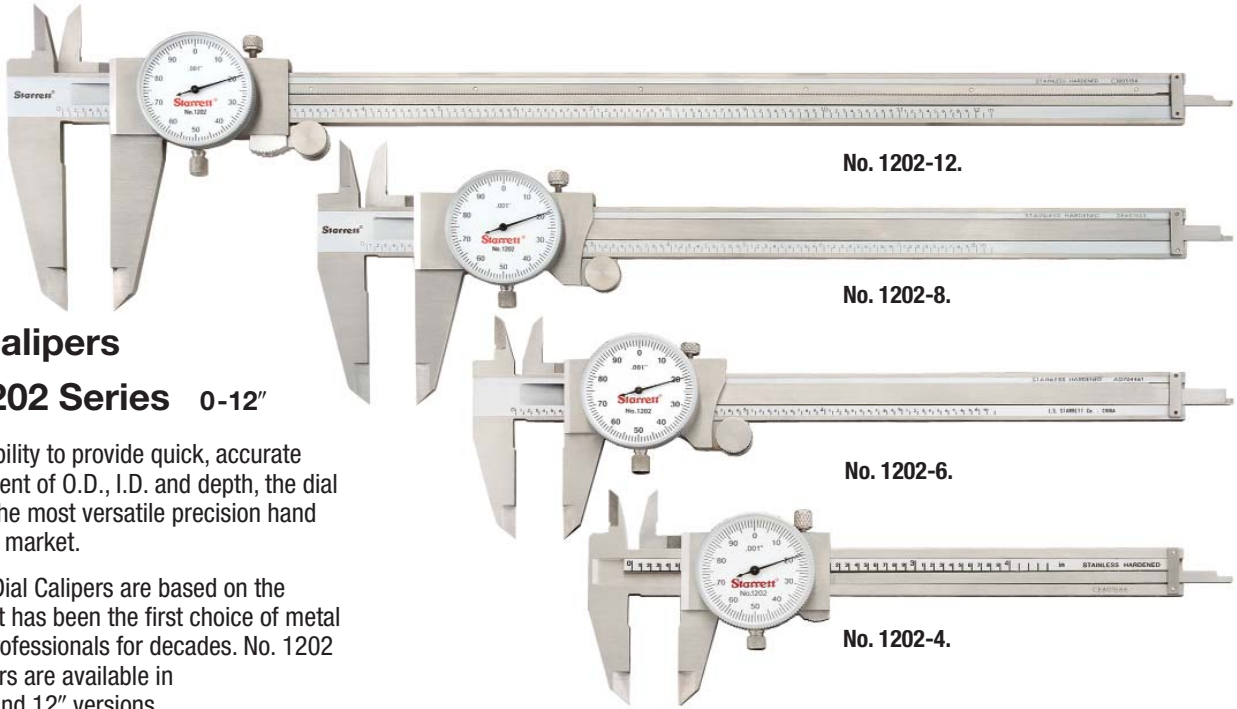
|         |        |   |                        |       |
|---------|--------|---|------------------------|-------|
| 0-150mm |        | mm Caliper in Case*   | <b>120AM-150</b>       | 66295 |
|         |        | mm Caliper, Standard Letter of Certification†, without Case | <b>120AM-150 W/SLC</b> | 66920 |
|         |        | mm Caliper with Carbide Faces in Case*                      | <b>120MX-150</b>       | 65910 |
| 0-225mm | Yellow | mm Caliper in Wood Case                                     | <b>120MZ-225</b>       | 64508 |
|         |        | mm Caliper without Case                                     | <b>120M-225</b>        | 64509 |
|         |        | mm Caliper in Wood Case                                     | <b>120MZ-300</b>       | 64510 |
| 0-300mm |        | mm Caliper, Standard Letter of Certification†, in Wood Case | <b>120MZ-300 W/SLC</b> | 66922 |
|         |        | mm Caliper without Case                                     | <b>120M-300</b>        | 64511 |
|         |        | mm Caliper, Standard Letter of Certification†, without Case | <b>120M-300 W/SLC</b>  | 66921 |

#### Accessories and Cases Only

|   |                |       |
|---|----------------|-------|
| Center Distance Attachment**                        | <b>PT26151</b> | 64440 |
| Depth Attachment for 6", 9" and 150mm Dial Calipers | <b>PT22431</b> | 64640 |
| Detachable Depth Rod for 12" Dial Calipers          | <b>PT26091</b> | 65100 |
| Deluxe Padded Case for 6" (150mm) Dial Calipers     | <b>943</b>     | 55971 |
| Finished Wood Case for 9" (225mm) Dial Calipers     | <b>950</b>     | 63878 |
| Finished Wood Case for 12" (300mm) Dial Calipers    | <b>946</b>     | 56695 |
| Leather Holster for 6" (150mm) Dial Calipers        | <b>915</b>     | 64166 |

NOTES: † Includes redemption card for Standard Letter of Certification (SLC).

\*Fitted plastic case. \*\*See details in this section.



No. 1202-12.

No. 1202-8.

No. 1202-6.

No. 1202-4.

**Dial Calipers**

**No. 1202 Series 0-12"**

With the ability to provide quick, accurate measurement of O.D., I.D. and depth, the dial caliper is the most versatile precision hand tool on the market.

No. 1202 Dial Calipers are based on the caliper that has been the first choice of metal working professionals for decades. No. 1202 Dial Calipers are available in 4", 6", 8" and 12" versions.

**Readability Features**

- ◆ Sharp, clear dial graduations of .001" with .100" per revolution (except for the 1202F Model – see below)
- ◆ Sharp, black graduations on the satin finished bar, every .100"

**Ease-of-Handling Features**

- ◆ Knife-edge contacts
- ◆ Thumb-operated fine adjustment roll
- ◆ Adjustable bezel
- ◆ Lock screws for sliding jaw and dial bezel
- ◆ Covered rack depth rod (4", 6" and 8" models)

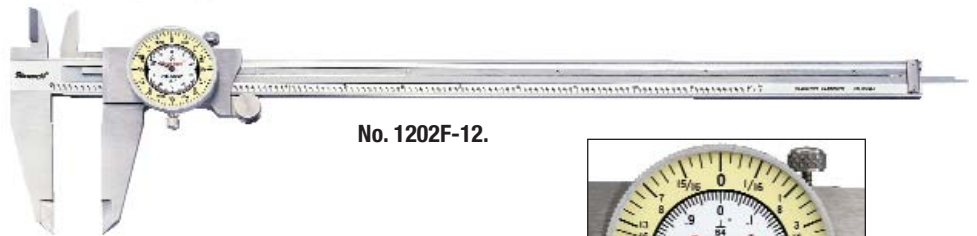
**Accuracy and Long-Life Features**

- ◆ Hardened stainless steel bar, measuring surfaces, rack, gears and depth rod
- ◆ Positive, spring-loaded double pinion anti-backlash control

| Range            | Description            | Catalog No. | EDP No. |
|------------------|------------------------|-------------|---------|
| 0-4"             | Caliper in Fitted Case | 1202-4      | 68814   |
| 0-6"             |                        | 1202-6      | 66964   |
| 0-8"             |                        | 1202-8      | 66979   |
| 0-12"            |                        | 1202-12     | 66980   |
| 0-6" Fractional  |                        | 1202F-6     | 68931   |
| 0-8" Fractional  |                        | 1202F-8     | 69757   |
| 0-12" Fractional |                        | 1202F-12    | 69758   |



No. 1202F-6.



No. 1202F-12.



Fractional Dial on the 1202F

**Features**

- ◆ 1/64" graduations on the yellow outer scale, and .01" on the white inner scale.
- ◆ Except for dial graduation and color, 1202F calipers have the same features as other 1202 Series dial calipers

**Fractional Dial Calipers**

**No. 1202F Series 0-12"**

For many applications, the dimension being checked is specified as a fraction. Since dial calipers display measurements as decimals, the person doing the measurement must convert the decimal readout from the dial into a fraction – inconvenient at best, and sometimes leading to errors. The Starrett 1202F solves this problem.

The 1202F shows measurements as fractions on the yellow outer scale with 1/64th inch graduations, and decimal measurements on the white inner scale with 1/100th inch graduations.

**NEW**



### Offset Dial Caliper

#### No. 120J 0-6"

This tool has an adjustable jaw for versatility when measuring different planes that can't be reached with a regular caliper. The reference jaw is adjustable in height to be either longer or shorter than the sliding jaw. All other features are the same as our No. 120 dial caliper.

- ◆ Adjustable jaw – 3-1/2" (88mm) long
- ◆ Extends up to 5/8" (16mm) longer than the sliding jaws
- ◆ Caliper in deluxe padded case

Packed one in a box.



#### 0-6" range

| Catalog No. | EDP No. | Description                   |
|-------------|---------|-------------------------------|
| 120JZ-6     | 65866   | Caliper in Deluxe Padded Case |
| PT26341     | 65867   | Adjustable Jaw Only           |

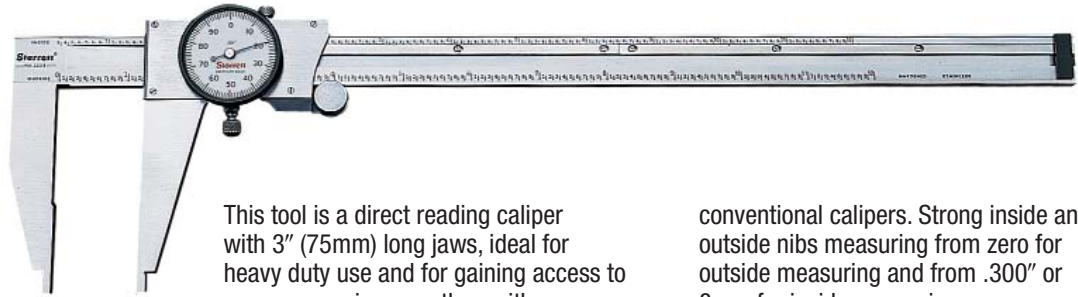
### Dial Calipers with Long Nib Jaws

#### No. 120B

0-12"

#### No. 120MB

0-300mm



This tool is a direct reading caliper with 3" (75mm) long jaws, ideal for heavy duty use and for gaining access to more measuring area than with

conventional calipers. Strong inside and outside nibs measuring from zero for outside measuring and from .300" or 8mm for inside measuring.

\* Includes redemption card for Standard Letter of Certification (SLC).

Packed one in a box.

| Range   | Dial Color | Catalog No.      | EDP No. |
|---------|------------|------------------|---------|
| 0-12"   | White      | 120B-12          | 65067   |
| 0-300mm | Yellow     | 120MB-300        | 65154   |
|         |            | 120MB-300 W/SLC* | 66923   |

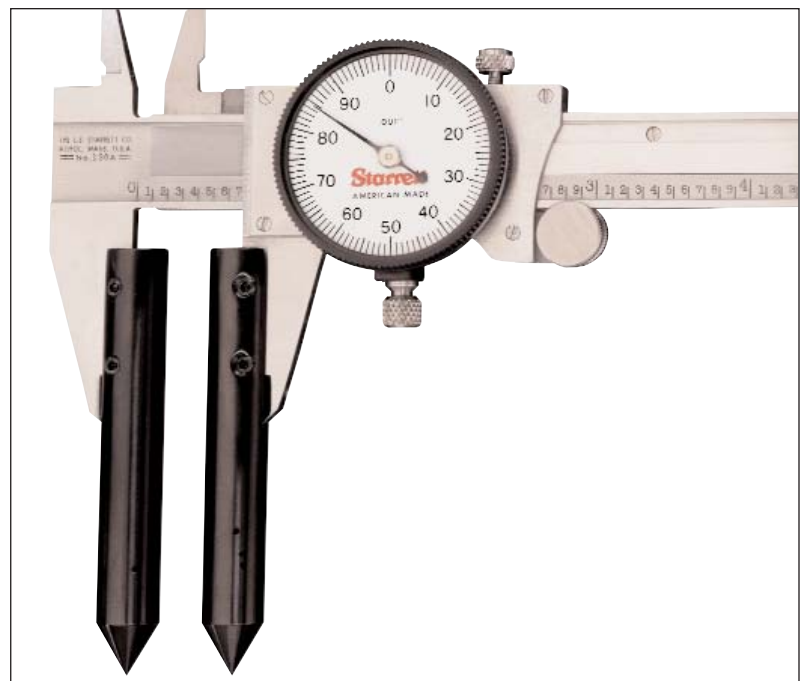
### Center Distance Attachment

#### PT26151 / EDP 64440

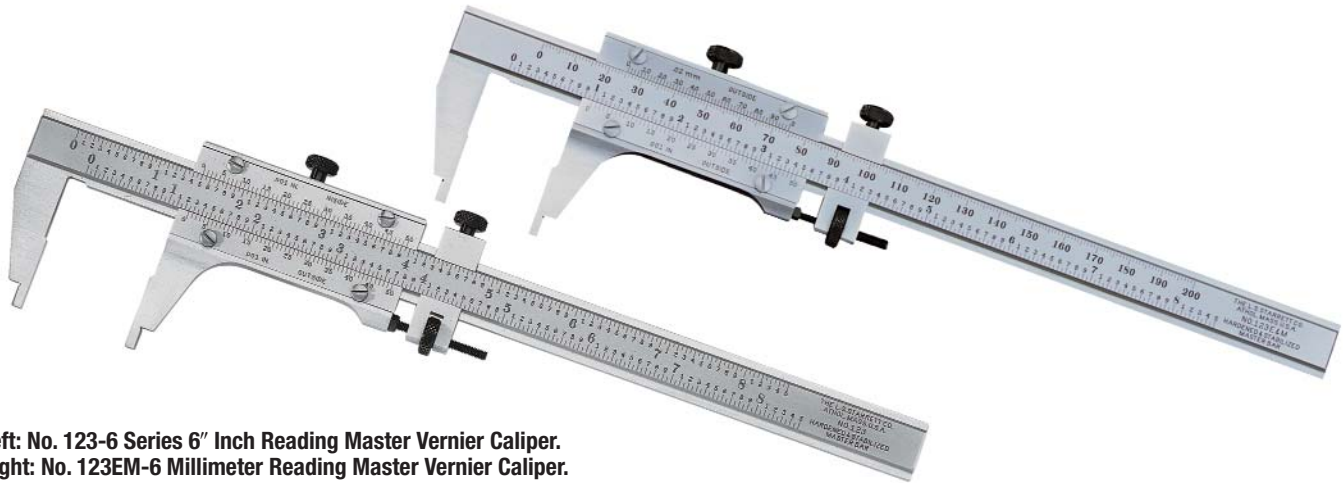
A set of two jaws with body sizes of .400" and conical points, enabling the user to measure the center distance between holes or center-punched locations that are at least .400" apart and less than .400" in diameter.

- ◆ Can be used with metric calipers by setting the caliper to 10.16mm
- ◆ Will fit Starrett Nos. 797 and 120, 6" through 12", No. 123, 6" through 24", and No. 1202, 4" through 12" sizes

Packed one in a box.







Left: No. 123-6 Series 6" Inch Reading Master Vernier Caliper.  
Right: No. 123EM-6 Millimeter Reading Master Vernier Caliper.

## Master Vernier Calipers

**No. 123 Series** 0-72"

**No. 123M Series** 0-600mm

**No. 123EM Series**  
0-24" / 0-600mm

This vernier caliper is the ultimate example of slide caliper design. It is more accurate, has the easiest reading vernier style, is stronger and is offered in much longer lengths than other slide calipers.

### Readability Features

- ◆ Long 50-division vernier scales, made popular by Starrett. This feature permits just half as many bar graduations as conventional single-vernier tools. These widely-spaced graduations make possible easy reading to .001" or 0.02mm without requiring a magnifying glass
- ◆ Flush fitting of the vernier scales to the main scale means that these are in the same plane, which eliminates parallax. Vernier scales are adjustable
- ◆ The open-face design of the slide allows both the inside and outside vernier scale on the same side, thus allowing both verniers to be read without turning the tool over
- ◆ Black lines and figures against the Starrett satin chrome finish make reading a pleasure, not an effort
- ◆ Screw-type adjusting nut allows for fine measuring adjustments
- ◆ Lock nut to hold measurements

### Long-Life and Accuracy Features

- ◆ These tools are made of the finest tool steel. This makes the jaws harder and longer-wearing than stainless tools. All tools through 24" (600mm) also have hardened and stabilized bars
- ◆ Measuring surfaces are hardened, ground and lapped to close limits
- ◆ All graduations are machine divided for accuracy, not photo-engraved. They are also deeper and sharper
- ◆ The combination straight and angular ways on the master bar allow for positive alignment of graduations and easy adjustment of the flush-fitting verniers
- ◆ Sizes through 24" have divider points on the back side to accurately set dividers and trammels as needed
- ◆ Tools with inch and millimeter graduations on the same bar have outside readings only. (Inside readings must be compensated for by adding the nib width to the indicated reading.)
- ◆ The longer length of the adjusting jaw slide provides a longer bearing surface on the master bar, ensuring squareness with the solid jaw and extra resistance to springing
- ◆ Tight, smoothly fitted slides for maximum accuracy and easy adjustment
- ◆ Made to rigid Starrett standards





## No. 123 Series Specifications

### Inch Reading / Graduation – .001"

| Range | Bar Width | Approx. Jaw Depth | Max. Nib Width Closed | Description                               | Catalog No.          | EDP No. |
|-------|-----------|-------------------|-----------------------|---|----------------------|---------|
| 0-6"  | 11/16"    | 1-9/16"           | .250"                 | Caliper in Finished Wood Case             | <b>123Z-6</b>        | 50524   |
|       |           |                   |                       | Caliper, SLC*, in Finished Wood Case      | <b>123Z-6 W/SLC</b>  | 66925   |
|       |           |                   |                       | Caliper without Case                      | <b>123-6</b>         | 50525   |
|       |           |                   |                       | Caliper, SLC*, without Case               | <b>123-6 W/SLC</b>   | 66926   |
| 0-12" | 15/16"    | 2-5/16"           | .300"                 | Caliper In Finished Wood Case             | <b>123Z-12</b>       | 50526   |
|       |           |                   |                       | Caliper, SLC*, in Finished Wood Case      | <b>123Z-12 W/SLC</b> | 66927   |
|       |           |                   |                       | Caliper without Case                      | <b>123-12</b>        | 50527   |
|       |           |                   |                       | Caliper, SLC*, without Case               | <b>123-12 W/SLC</b>  | 66928   |
| 0-24" | 15/16"    | 2-5/16"           | .300"                 | Caliper in Finished Wood Case             | <b>123Z-24</b>       | 50528   |
| 0-36" | 1-3/8"    | 3"                | .500"                 | Caliper in Finished Wood Case             | <b>123Z-36</b>       | 50530   |
| 0-48" | 1-3/8"    | 3"                | .500"                 | Caliper in Finished Wood Case             | <b>123Z-48</b>       | 50532   |
| 0-60" | 2-1/2"    | 4-1/2"            | .750"                 | Caliper in Finished Wood Case             | <b>123Z-60</b>       | 64383   |
|       | 1-3/8"    | 3"                | .500"                 | Lightweight Caliper in Finished Wood Case | <b>‡L123Z-60</b>     | 63189   |
| 0-72" | 2-1/2"    | 4-1/2"            | .750"                 | Caliper in Finished Wood Case             | <b>123Z-72</b>       | 64374   |
|       | 1-3/8"    | 3"                | .500"                 | Lightweight Caliper in Finished Wood Case | <b>‡L123Z-72</b>     | 63190   |

### Millimeter Reading / Graduation – 0.02mm

|         |         |      |       |                               |                  |       |
|---------|---------|------|-------|-------------------------------|------------------|-------|
| 0-150mm | 17.46mm | 40mm | 6.4mm | Caliper in Finished Wood Case | <b>123MZ-150</b> | 56100 |
|         |         |      |       | Caliper Without Case          | <b>123M-150</b>  | 56099 |
| 0-300mm | 23.81mm | 58mm | 7.6mm | Caliper in Finished Wood Case | <b>123MZ-300</b> | 56102 |
|         |         |      |       | Caliper without Case          | <b>123M-300</b>  | 56101 |
| 0-600mm | 23.81mm | 58mm | 7.6mm | Caliper in Finished Wood Case | <b>123MZ-600</b> | 56104 |

### Inch and Millimeter Reading / Graduation – .001" and 0.02mm

|                  |                     |                   |                   |                               |                  |       |
|------------------|---------------------|-------------------|-------------------|-------------------------------|------------------|-------|
| 0-6"<br>(150mm)  | 11/16"<br>(17.46mm) | 1-9/16"<br>(40mm) | .250"<br>(6.35mm) | Caliper in Finished Wood Case | <b>123EMZ-6</b>  | 50534 |
|                  |                     |                   |                   | Caliper without Case          | <b>123EM-6</b>   | 50535 |
| 0-12"<br>(300mm) | 15/16"<br>(23.81mm) | 2-5/16"<br>(58mm) | .300"<br>(7.62mm) | Caliper in Finished Wood Case | <b>123EMZ-12</b> | 50536 |
|                  |                     |                   |                   | Caliper without Case          | <b>123EM-12</b>  | 50537 |
| 0-24"<br>(600mm) | 15/16"<br>(23.81mm) | 2-5/16"<br>(58mm) | .300"<br>(7.62mm) | Caliper in Finished Wood Case | <b>123EMZ-24</b> | 50538 |

**NOTE: For inside measurements, the thickness of the nibs must be added to the caliper reading as follows:**

| Catalog No.              | Range          | Add Nib Thickness Below to Caliper Reading |
|--------------------------|----------------|--|
| <b>No. 123 E &amp; M</b> | 0-6" or 150mm  | .250" (Inch) or 6.35mm (Metric)            |
| <b>No. 123 E &amp; M</b> | 0-12" or 300mm | .300" (Inch) or 7.62mm (Metric)            |
| <b>No. 123 E &amp; M</b> | 0-24" or 600mm | .300" (Inch) or 7.62mm (Metric)            |

**NOTES:** \* Includes redemption card for Standard Letter of Certification (SLC).

‡ Lightweight versions weigh approximately 10 lbs. for the 60" model and 12 lbs. for the 72" model. Regular 60" model weighs approximately 32 lbs. and the regular 72" weighs approximately 36 lbs.

Other sizes available on special order – priced on application. Special jaws priced on application.

HARDENED BARS on 6", 12" and 24" models: these models are also furnished with center points for dividers.

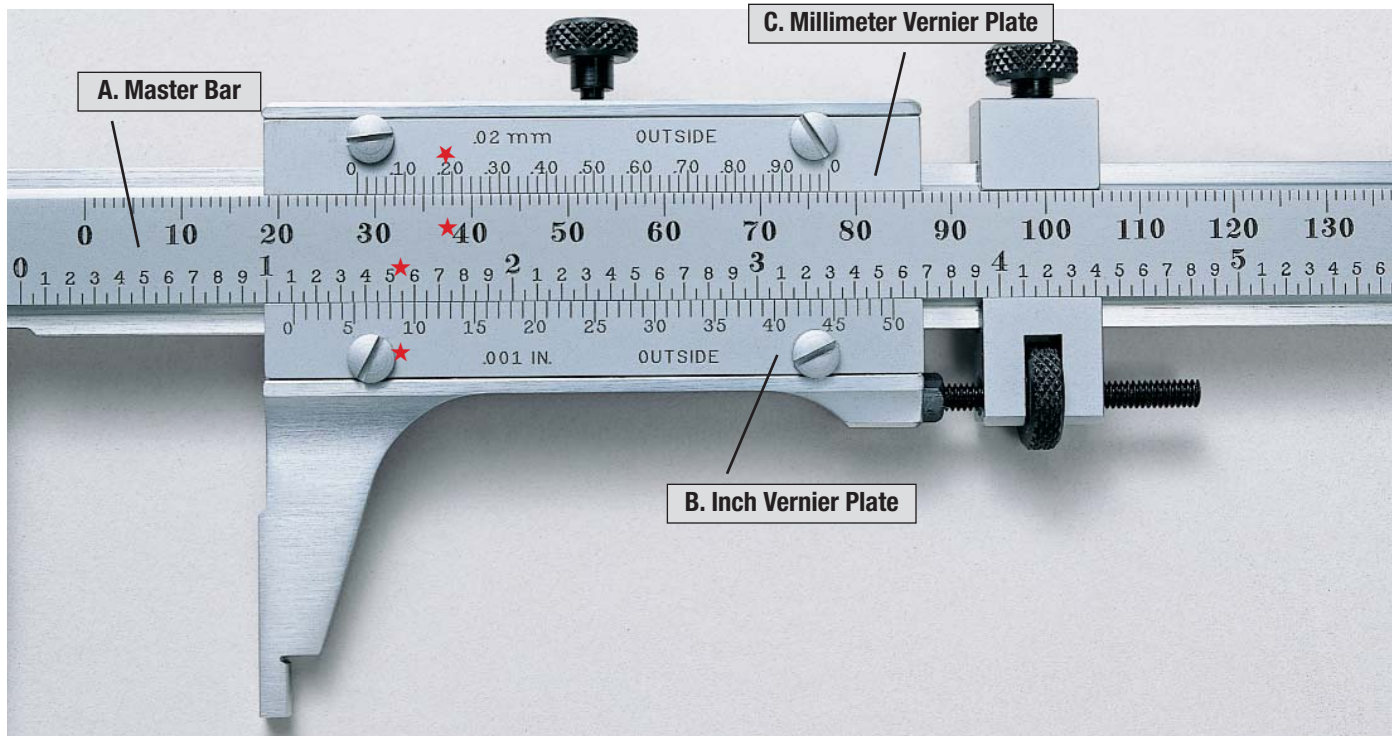
Packed one in a box.

## Center Distance Attachment

**PT26151 / EDP 64440**

A set of two jaws with body sizes of .400" and conical points, enabling the user to measure the center distance between holes or center-punched locations that are at least .400" apart and less than .400" in diameter.

- ◆ Can be used with metric calipers by setting the caliper to 10.16mm
- ◆ Will fit Starrett Nos. 797 and 120, 6" through 12", No. 123, 6" through 24", and No. 1202, 4" through 12" sizes



## How to Read a Starrett 50-Division Vernier Caliper Gage Graduated in Inches and Millimeters (Direct Reading)

### Inch Reading

- ◆ Refer to the lower bar graduations and the inch vernier plate. Inches are numbered in sequence over the full range of the bar. Every second graduation between the inch lines is numbered and equals .100". Each bar graduation is .050"
- ◆ The vernier plate is divided into 50 parts, each representing .001". Every fifth line is numbered – 5, 10, 15, 20 ... 45, 50 – for easy counting
- ◆ To read the gage, first count how many inches and how many .050" lines lie between the zero line on the bar and the zero line on the vernier plate and add them
- ◆ Then count the number of graduations on the vernier plate from its zero line to the line that coincides with a line on the bar. Multiply the number of vernier plate graduations you counted by .001" and add this figure to the number of inches and .050" lines you counted on the bar. This is your total reading

### Example

- ★ In the photo, the vernier plate zero line is one inch (1.000") plus .100" beyond the zero line on the bar, or 1.100". The 9th graduation on the vernier plate coincides with a line on the bar (as indicated by stars).  $9 \times .001$  (.009") is therefore added to the 1.100" bar reading, and the total reading is 1.109"

### Millimeter Reading

- ◆ Refer to the upper bar graduations and millimeter vernier plate. Each bar graduation is 1.00mm. Every tenth graduation is numbered in sequence – 10mm, 20mm, 30mm, 40mm, etc. – over the full range of the bar. This provides for direct reading in millimeters
- ◆ The vernier plate is divided into 50 parts, each representing 0.02mm. Every fifth line is numbered in sequence – 0.10mm, 0.20mm, 0.30mm ... 0.80mm, 0.90mm – providing for direct reading in hundredths of a millimeter
- ◆ To read the gage, first count how many millimeters lie between the zero line on the bar and the zero line on the vernier plate
- ◆ Then find the graduation on the vernier plate that coincides with a line on the bar and note its value in hundredths of a millimeter. Add the vernier plate reading in hundredths of a millimeter to the number of millimeters you counted on the bar. This is your total reading

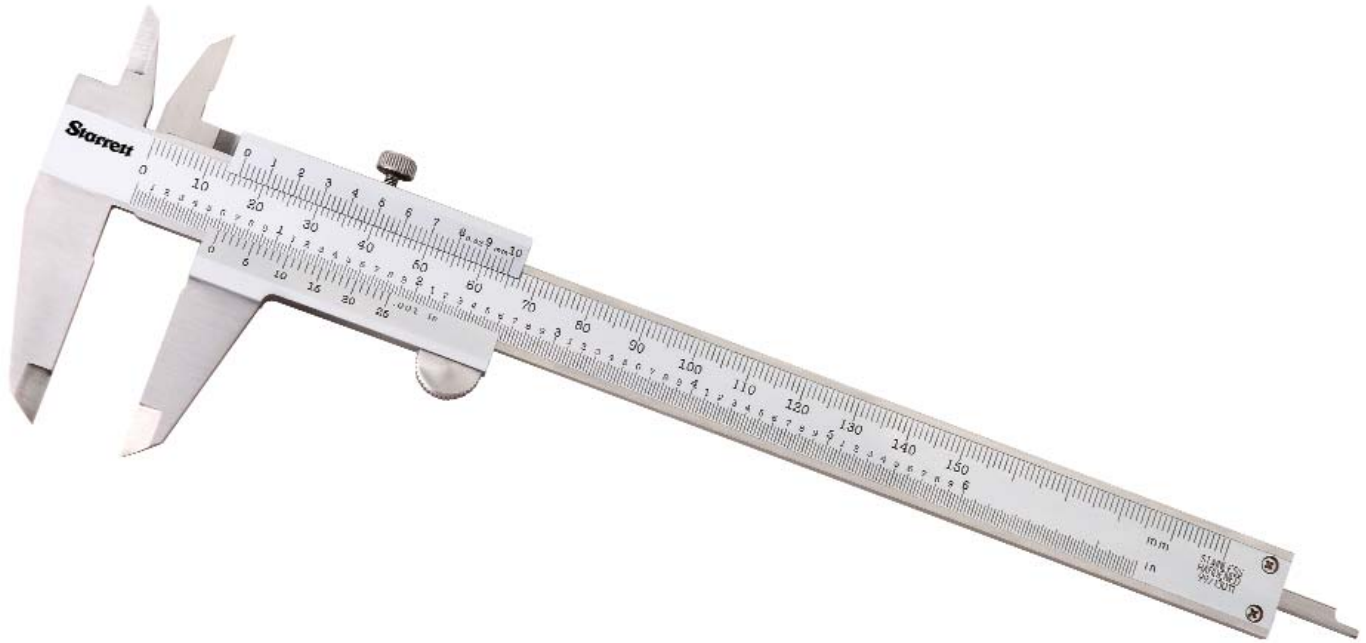
### Example

- ★ In the photo, the vernier plate zero line is 28 millimeters beyond the zero line on the bar, and the 0.18mm graduation on the vernier plate coincides with a line on the bar (as indicated by stars). 0.18 millimeters is therefore added to the 28mm bar reading, and the total reading is 28.18 millimeters



### Vernier Calipers

No. 125 Series 0-12" 0-300mm



The 125 Series is a high quality, basic vernier caliper that offers both inch and metric measurement.

- ◆ High quality basic vernier caliper
- ◆ Lock screw for sliding jaw
- ◆ Hardened stainless steel depth rod
- ◆ Graduations: .001" inch, 0.020mm metric
- ◆ Sharp, black graduations on the satin finished bar
- ◆ Starrett Global Series

| Range          | Description                                      | Catalog No.          | EDP No. |
|----------------|--|----------------------|---------|
| 0-6", 0-150mm  | Metric/Inch, 0-6"/150mm Caliper                  | <b>125MEA-6/150</b>  | 61660   |
| 0-8", 0-200mm  | Metric/Inch, 0-8"/200mm Caliper                  | <b>125MEA-8/200</b>  | 61882   |
| 0-12", 0-300mm | Metric/Inch, 0-12"/300mm Caliper in Plastic Case | <b>125MEA-12/300</b> | 61886   |

Packed one in a box.



## Gear Tooth Vernier Calipers

**No. 456 Series**  
20-2 Diametral Pitch

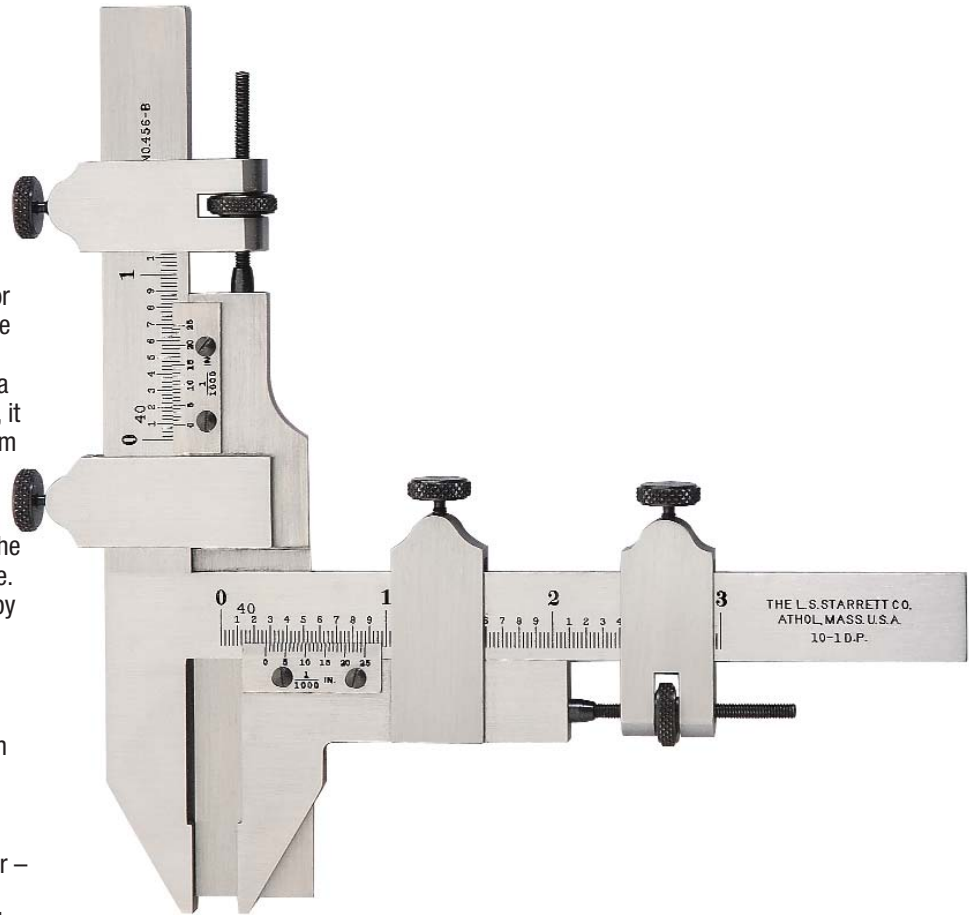
**No. 456M Series**  
1 1/4-25mm Module

The Starrett No. 456 Gear Tooth Vernier Caliper is designed to measure in .001" or 0.02mm the thickness of gear teeth at the pitch line (the chordal thickness of the teeth) using the distance from the top of a tooth to the chord. For the same purpose, it can also be used for measuring hobs, form and thread tools, etc.

The thickness of a tooth at the pitch line is measured by an adjustable jaw after the addendum is set by the adjustable tongue. Each of these is adjusted independently by screws on the graduated bars.

### For Tool Operation:

- a. Find on the chart, furnished with the tool, the number of teeth of the gear in question, and find the corrected addendum (s"). This figure is for one diametral pitch for inch measure, so divide it by the diametral pitch number – this figure is also for a one millimeter module for metric measure, so multiply it by the required module number. This gives a corrected addendum for this particular number of teeth.
- b. Next, measure the actual outside diameter of the gear and add or subtract one-half the difference between the theoretical gear diameter and actual measured gear diameter from the corrected addendum (s") found in the first step.



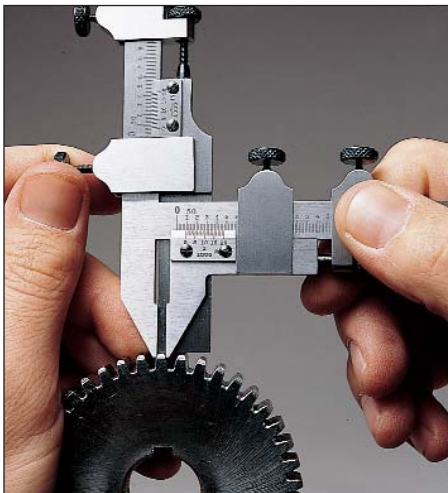
- c. Set the new calculated addendum figure on the adjustable tongue of the tool.
- d. Now, with the tongue on the top of the tooth, measure the chordal thickness with the horizontal vernier jaw and compare with the figure in the "t" column in the chart.
- e. All inch graduations are read to .001". However the No. 456A is graduated by .020" increments and the No. 456B is graduated by .025" increments. Nos. 456MA and 456MB are read to 0.02mm and graduated by 0.5mm increments.

### Graduation – .001"

| Range                | Description          | Catalog No.  | EDP No. |
|----------------------|----------------------|--------------|---------|
| 20-2 Diametral Pitch | Caliper in Case      | <b>456AZ</b> | 52420   |
|                      | Caliper without Case | <b>456A</b>  | 52422   |
| 10-1 Diametral Pitch | Caliper in Case      | <b>456BZ</b> | 52424   |
|                      | Caliper without Case | <b>456B</b>  | 52426   |

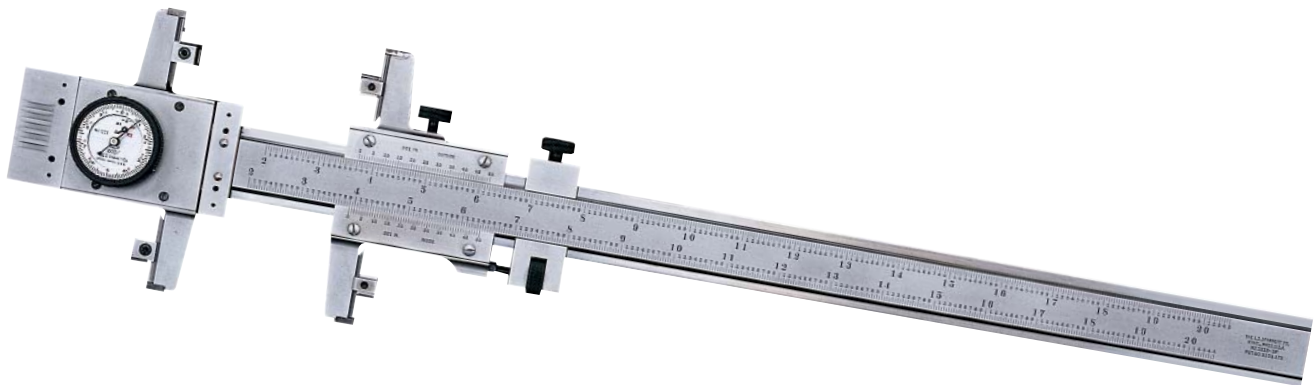
### Graduation – 0.02mm

|                   |                      |               |       |
|-------------------|----------------------|---------------|-------|
| 1-1/4-12mm Module | Caliper in Case      | <b>456MAZ</b> | 52421 |
|                   | Caliper without Case | <b>456MA</b>  | 52423 |
| 2-1/2-25mm Module | Caliper in Case      | <b>456MBZ</b> | 52425 |
|                   | Caliper without Case | <b>456MB</b>  | 52427 |



Available with carbide measuring surfaces on special order. Available with attractive, protective case – sent with case unless otherwise ordered. Packed one in a box.





### Special Master Dial Indicator Vernier Calipers

**No. 1223 Series 2-48"**

**No. 1223M Series  
50-900mm**

The No. 1223 Series are so versatile that we make some models available as standard. However, special vernier tools like these can be built to your specifications by application through our Special Gage Department. The tool eliminates the need for skilled operator "feel" because it automatically sets in the correct gaging pressure.

- ◆ Tool has the basic Starrett No. 123 Master Bar with all of its advantages
- ◆ The slide and the dial gage sensing unit have inside and outside measuring jaws
- ◆ Direct outside and inside measurements in .001" (or 0.02mm) are read from the vernier after the indicator is zeroed. Out-of-roundness can be checked within .0001" (or 0.01mm) using the dial gage
- ◆ To use the caliper as a comparator, the vernier slide is set to the desired dimension and clamped. Plus or minus variations, outside or inside, are then read directly from the dial indicator
- ◆ All jaws have carbide measuring faces
- ◆ Adjustable work rests attached to the jaws permit the caliper to be placed on the work with the jaws at the correct measuring depth. The work rests have an adjustment range from 1/8-1" (3-25mm) and are locked in the desired position by a locking screw. Work rests are carbide-faced for long wear
- ◆ The dial gage head or sensing unit has a slide mounted on preloaded ball bearings at the end of the caliper bar. Movement of the jaws on the sensing unit actuates a dial indicator graduated in .0001" (or 0.01mm) with one complete revolution reading .010" (or 1mm). The indicator has a total range of  $\pm .020"$  (or  $\pm 1\text{mm}$ ), each .010" indicated by a telltale hand. Plus graduations are shown in black and minus graduations are shown in red. The indicator can be set to zero by a fine adjustment screw or by the bezel.
- ◆ A preload reversing switch on the back of the sensing unit permits instant changeover of the dial indicator for outside or inside readings
- ◆ A calibration master accurate to  $\pm .000050"$  (or 0.001mm) is also available at extra charge for checking the relation between the vernier and the dial indicator zero. To check, set the vernier to the exact size of the master, place the master between either the "inside" or "outside" jaws, and adjust the dial indicator so that both the small and large hands read zero

#### Inch Reading

| Range | Vernier Graduation | Dial Gage Head |             | Work Rest Adjustment | Catalog No.    | EDP No. |
|-------|--------------------|----------------|-------------|----------------------|----------------|---------|
|       |                    | Grad.          | Range       |                      |                |         |
| 2-18" | .001"              | .0001"         | $\pm .020"$ | 1/8-1"               | <b>1223-18</b> | 56137   |
| 2-24" |                    |                |             |                      | <b>1223-24</b> | 56138   |
| 2-36" |                    |                |             |                      | <b>1223-36</b> | 56139   |
| 2-48" |                    |                |             |                      | <b>1223-48</b> | 56140   |

#### Millimeter Reading

|          |        |        |                  |        |                  |       |
|----------|--------|--------|------------------|--------|------------------|-------|
| 50-450mm | 0.02mm | 0.01mm | $\pm 1\text{mm}$ | 3-25mm | <b>1223M-450</b> | 64366 |
| 50-600mm |        |        |                  |        | <b>1223M-600</b> | 64382 |
| 50-900mm |        |        |                  |        | <b>1223M-900</b> | 64373 |

Available with finished wood case – sent without case unless otherwise ordered. Calibration master available at extra charge. Packed one in a box.



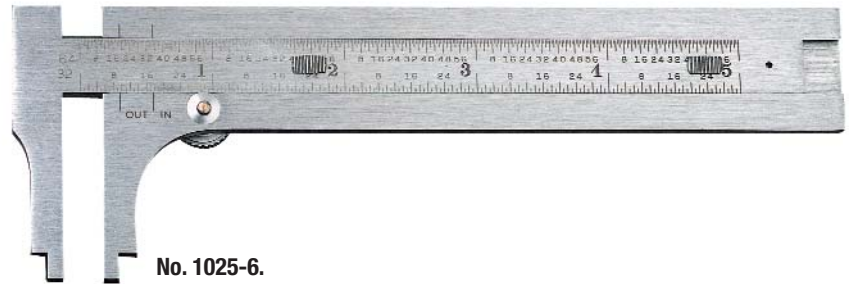
**Stainless Steel Pocket Slide Calipers**

**No. 1025 Series**  
Inch Reading 5", 6"

**No. 1025ME**  
Inch and Millimeter Reading  
5"/130mm

These are very handy tools that permit quick and accurate outside and inside measurements. Their compact size fits easily in shop coat pockets and since there are no knife edges on the tools, they won't tear up pockets. Calipers are made of fine quality stainless steel.

- ◆ Accurate readings for both inside and outside measurements are made directly from the two lines marked "in" and "out" on one side of the stock
- ◆ Handy inch or millimeter scale on the back of the stock



**No. 1025-6.**

- ◆ Knurled thumb pieces to activate the slide
- ◆ Knurled clamp screw with a left hand thread for easy one-hand operation
- ◆ A slide stop prevents tool from being disassembled
- ◆ Straight measuring surface for outside measuring and rounded nibs for inside or hole measurements

**Inch Reading**

| Size | Range    |        | Depth of Jaws | Width of Nibs Closed | Graduations   |       | Catalog No.   | EDP No. |
|------|----------|--------|---------------|----------------------|---------------|-------|---------------|---------|
|      | Outside  | Inside |               |                      | Slide         | Stock |               |         |
| 5"   | 0-3-3/4" | 1/4-4" | 1-3/8"        | 1/4"                 | 32nds & 64ths | 32nds | <b>1025-5</b> | 53123   |
| 6"   | 0-4-3/4" | 1/4-5" | 1-3/8"        | 1/4"                 | 32nds & 64ths | 32nds | <b>1025-6</b> | 53124   |

**Inch and Millimeter Reading**

|            |                    |                   |                |              |               |             |                   |       |
|------------|--------------------|-------------------|----------------|--------------|---------------|-------------|-------------------|-------|
| 5" (130mm) | 0-3-3/4" or 0-96mm | 1/4-4" or 6-100mm | 1-3/8" or 36mm | .236" or 6mm | 64ths & 1/2mm | millimeters | <b>1025ME-130</b> | 65860 |
|------------|--------------------|-------------------|----------------|--------------|---------------|-------------|-------------------|-------|

**CASES**

| Description             | Catalog No.     | EDP No. |
|-------------------------|-----------------|---------|
| 5" and 130mm Vinyl Case | <b>1025ZZ-5</b> | 55269   |
| 6" Vinyl Case           | <b>1025ZZ-6</b> | 55270   |

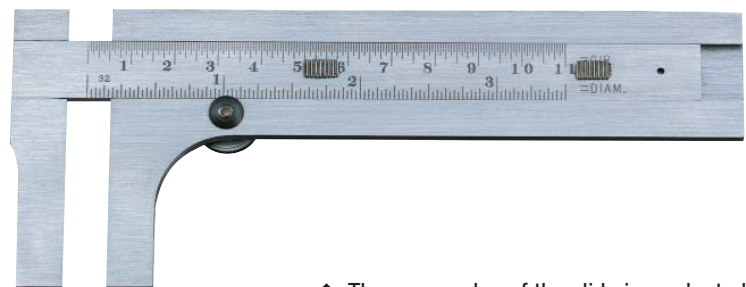
Available with protective vinyl case – sent without case unless otherwise ordered. Packed one in a box.

**Stainless Steel Pocket Slide Caliper and Circumference Gage**

**No. 424 3-1/2"**

This extremely handy caliper gives direct readings of both circumference and diameter in a single setting.

- ◆ Especially useful for obtaining instant circumference and diameter measurements of rope, cordage, metal rods, pipe, tubing, etc.
- ◆ Also for checking cutting speeds on lathe work. (Rule: Cutting Speed in Feet per Minute = Circumference divided by 12 x Revolutions per Minute.)



- ◆ The jaws are 1-3/8" deep and therefore will caliper a cylinder up to 2-3/4" diameter

- ◆ The upper edge of the slide is graduated from 0 to 11 circumference inches in 16ths and the lower edge from 0 to 3-1/2" standard measurement in 32nds

| Size   | Range    |               | Graduations |               | Depth of Jaws | Catalog No. | EDP No. |
|--------|----------|---------------|-------------|---------------|---------------|-------------|---------|
|        | Dia.     | Circumference | Dia.        | Circumference |               |             |         |
| 3-1/2" | 0-3-1/2" | 0-11"         | 32nds       | 16ths         | 1-3/8"        | <b>424</b>  | 51527   |

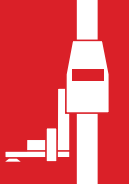
Packed one in a box.



- ◆ Starrett Height Gages come in a variety of styles, sizes, readouts and accuracies to suit individual needs.
- ◆ Accuracies range from .000050" and 0.001mm on our Digi-Chek® Series to .001" and 0.03mm on our dial and vernier height gages.
- ◆ Standard height measurements are available to 85" or 2150mm. Higher measuring tools are available through the Special Order Department.
- ◆ Height Gages are normally used on a known flat surface such as our Granite Surface Plates (see Granite Surface Plate Section), where the work to be measured is brought to the plate.
- ◆ Some applications require the use of a height gage on a vertical plane. We offer practical lightweight tools such as our Nos. 751, 250, and 255 Series for these situations.
- ◆ All of our bases are hardened, ground, and lapped except the No. 252 base, which is not hardened. If these bases are moved rapidly on an extremely flat plate, there may be a tendency to "hum", since the two surfaces try to "wring" together. When the gage is brought to the work, it is a good practice to be sure the two surfaces are clean and to move the gage slowly.







## Altissimo® Electronic Height Gages No. 2000 & No. 2001 “Platinum” 0-24” / 600mm

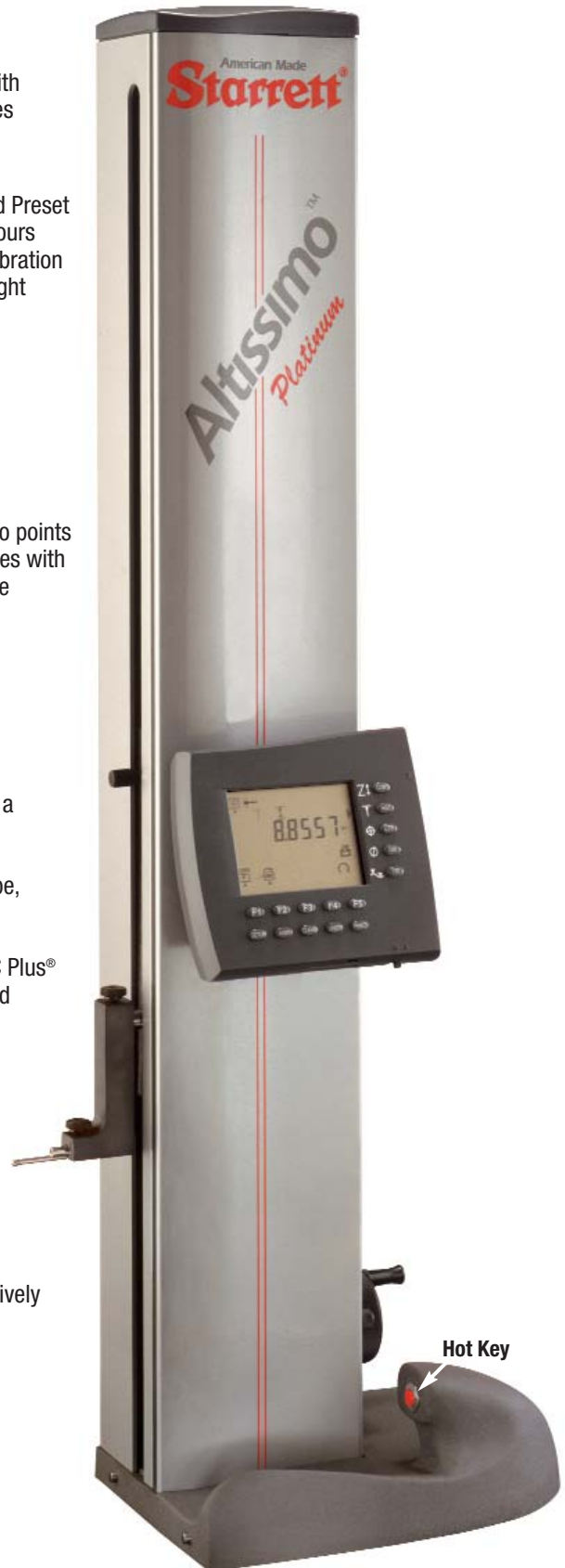
Altissimo® Electronic Height Gages are innovative, easy-to-use, and loaded with Starrett-exclusive functions that allow you to easily program measuring routines that run smoothly and reliably.

### Features

- ◆ A unique, ergonomically shaped base, hardened and ground, that fits your grip just right to easily move the gage and press the ...
- ◆ Hot key that lets you select measuring results on the fly
- ◆ Two selectable Datums and Preset
- ◆ Auto Power Off after two hours with retention of probe calibration
- ◆ Automatic calculation of eight measurement routines:
  - Center
  - Diameter
  - Height
  - Max
  - Min
  - TIR
  - Distance to last feature
  - Distance between last two points
- ◆ Rechargeable NiMH batteries with 100 hours of continuous life
- ◆ Seven setup functions:
  - Probe Calibration (2)
  - Beeper Volume
  - Display Resolution
  - Probe Force Adjustment
  - Printer On/Off
  - Force Calibration
- ◆ Optional probe kit features a variety of probes for many applications
- ◆ Gages include carbide probe, probe holder and probe calibration block
- ◆ Output data to Starrett SPC Plus® hardware and software, and RS232 output for data transmission to Starrett DataSure® Wireless Data Collection Systems and other RS232 devices
- ◆ Starrett capacitive measurement system ensures the accuracy and reliability you expect
- ◆ Excellent value – loaded with features and competitively priced
- ◆ 20-24” Measuring Range
- ◆ Smart probe that can measure I.D. or O.D. without attachments
- ◆ Electronically adjusted probe force
- ◆ Large, easy-to-read interactive LCD with unique scanning meter for monitoring probe position
- ◆ Electronically adjustable beeper volume
- ◆ Bold screen icons indicate the current routine
- ◆ Three electronically adjustable resolutions
- ◆ Retains the last calibrated diameter of the measuring probe, even after the gage is shut down
- ◆ Dynamic bi-directional probing with point and scan modes
- ◆ Easy operation with speed wheel, which also has fine-adjust feature
- ◆ Locking mechanism for scribing
- ◆ Five measurement modes: (ID/OD, Center, TIR, Max/Min, Continuous Display)
- ◆ Instant inch/millimeter conversion



**Quickly change between measuring routines by pressing the “hot key,” ergonomically integrated with the base**



Hot Key

(Continued on next page.)





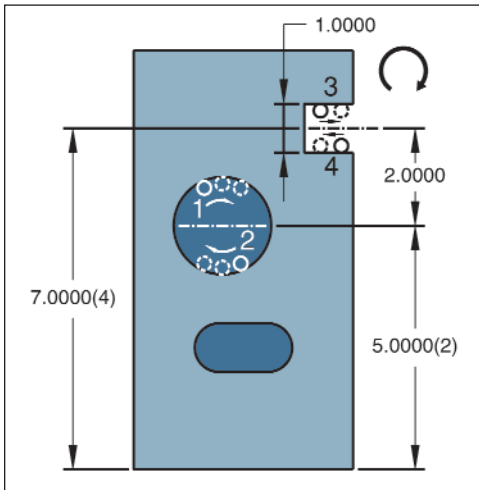
Large, easy-to-view / understand display shows the diameter of a hole or boss.



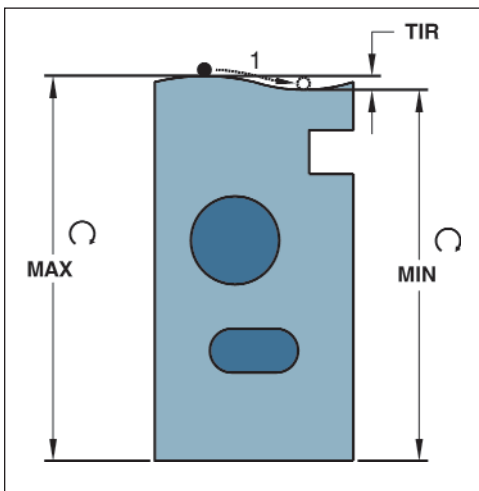
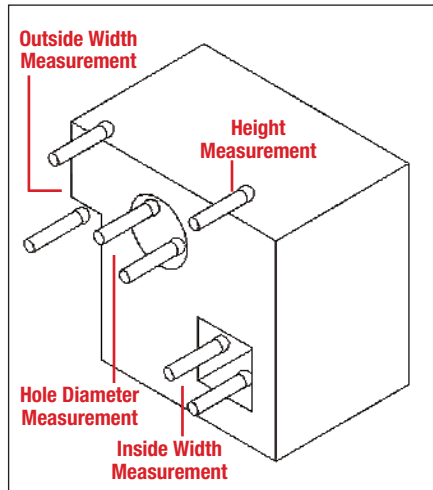
Display showing TIR.



Interactive LCD with unique scanning meter for easy probe position viewing.



Altissimo includes many routines including diameter of a bore (1 & 2), width of a slot or a rib (3 & 4), distance from datum to center of a hole or slot and distance between features.



TIR mode can measure the high or low point of a diameter or other surface. The datum can then be set to the max or min value.

### Specifications:

|                         |  |
|-------------------------|--|
| <b>Measuring Range</b>  | 24"/600mm (Extendible to 30"/750mm by rotating the probe holder 180°)  |
| <b>Resolution</b>       | .0001"/.0005"/.001" (.002mm/.01mm/.02mm)   |
| <b>Accuracy</b>         |  |
| No. 2000-24             | ±.0006" (.015mm)   |
| No. 2001-24             | ±.0003" (.008mm)   |
| <b>Repeatability</b>    | ±.0001" (±.002mm)  |
| <b>Power Source</b>     | NiMH Rechargeable Batteries (120V AC/60Hz Charger/Adaptor included). Operation time: 100+ hours, Recharging time: 10 hours |
| <b>Included</b>         | .1875"/4.8mm Dia. Carbide Probe, Probe Holder  |
| <b>Accessories</b>      | AC Charger/Adaptor, Probe Calibration Block  |
| <b>Dimensions</b>       | Length 11" (279mm), Width 7-3/4" (197mm), Height 36-1/2" (927mm)   |
| <b>Weight</b>           | 40 lbs. (18 kg)  |
| <b>Perpendicularity</b> | .0004" (0.010mm)   |

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## Altissimo® Electronic Height Gages (continued)

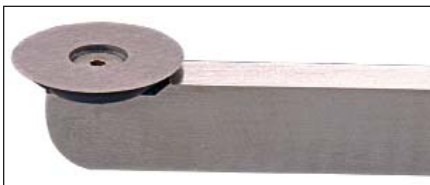


### Height Gages with Standard Components:

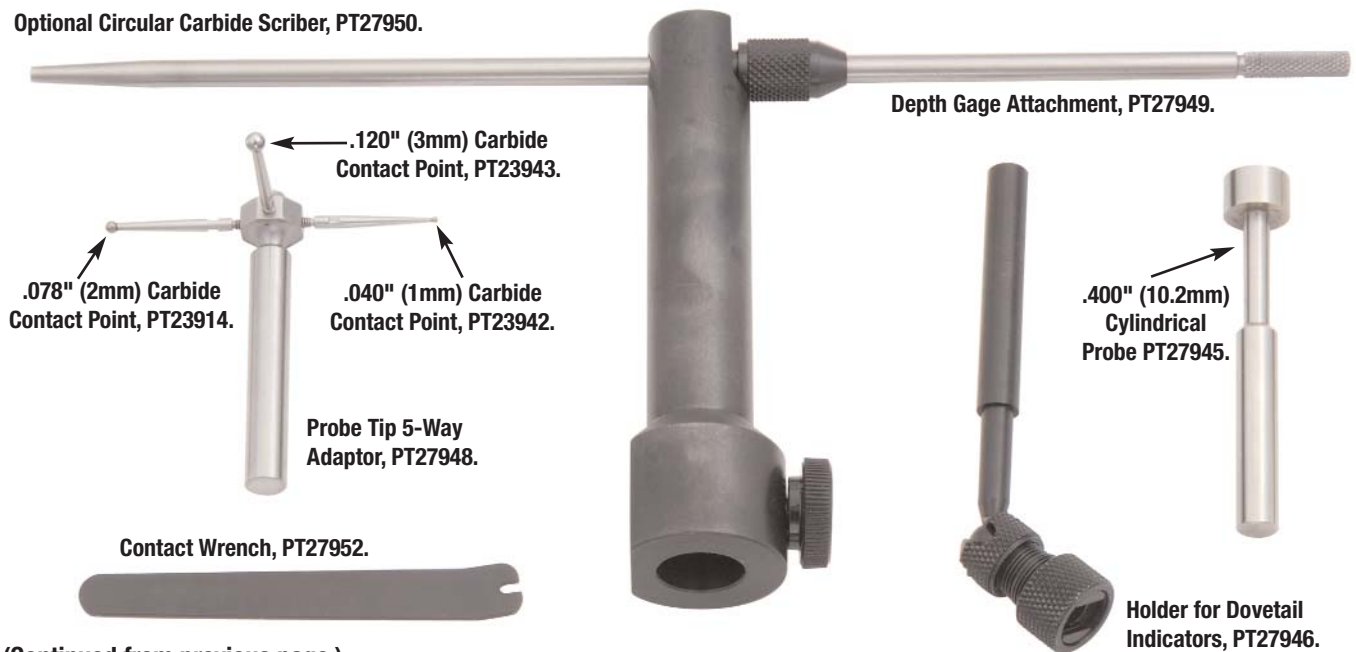
| Description                                  | Catalog No. | EDP No. |
|--|-------------|---------|
| Height Gage                                  | 2000-24     | 67008   |
| Height Gage, "Platinum"                      | 2001-24     | 67453   |
| Carbide Probe .1875" (4.8mm) Dia. (Standard) | PT27937     | 67009   |
| Probe Holder (Standard)                      | PT27940     | 67010   |
| Probe Calibration Block (Standard)           | PT27944     | 67011   |

### Accessories:

| Accessory Set Includes:   | S2000AZ | 66997 |
|---|---------|-------|
| Probe Tip, 5-Way Adaptor  | PT27948 | 67012 |
| .040" (1mm) Carbide Contact Point   | PT23942 | 65255 |
| .078" (2mm) Carbide Contact Point   | PT23914 | 64222 |
| .120" (3mm) Carbide Contact Point   | PT23943 | 65256 |
| Contact Wrench  | PT27952 | 67013 |
| .400" (10.2mm) Cylindrical Probe  | PT27945 | 67014 |
| Circular Carbide Scriber  | PT27950 | 67015 |
| Depth Gage Attachment   | PT27949 | 67016 |
| Holder for Dovetail Indicators  | PT27946 | 67017 |
| Replacement Battery Pack, NiMH 6V   | PT62011 | 67018 |
| Power Supply Charger for USA and Canadian Configuration                                 | PT62015 | 67002 |
| Power Supply Charger for United Kingdom Configuration                                   | PT62130 | 67003 |
| Power Supply Charger for European Configuration   | PT62131 | 67004 |
| Interface Adaptor for Starrett Tools to PC  | PT61768 | 66454 |
| Shielded Cable to Starrett Nos. 761/772 Series Starrett Modules and No. PT61768 Adaptor | PT62103 | 67019 |
| Computer Interface Cable to PC  | PT62425 | 67658 |



Optional Circular Carbide Scriber, PT27950.



Depth Gage Attachment, PT27949.

.120" (3mm) Carbide Contact Point, PT23943.

.078" (2mm) Carbide Contact Point, PT23914.

.040" (1mm) Carbide Contact Point, PT23942.

Probe Tip 5-Way Adaptor, PT27948.

Contact Wrench, PT27952.

.400" (10.2mm) Cylindrical Probe PT27945.

Holder for Dovetail Indicators, PT27946.

(Continued from previous page.)



### Electronic Height Gages No. 3752 Series

The 3752 Electronic Height Gage is a full featured, versatile and economic solution for most height measurement applications.

All measuring information from these tools can be entered directly into Starrett Data Collection Systems for analysis, data collection and hard copy documentation. They are available in 0-12" and 0-24" ranges.

#### Readability and Control Features

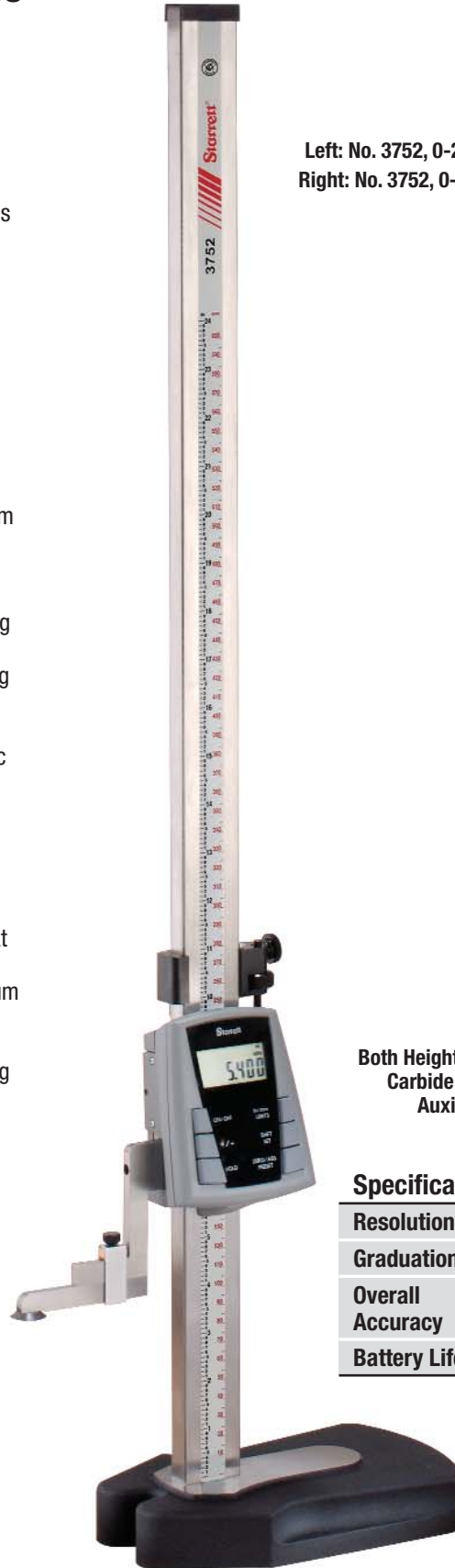
- ◆ Clear bar graduations in .100" and 5mm increments
- ◆ Large (.380"/9.65mm), easy-to-read LCD display reads to .0005" or 0.01mm
- ◆ Instant inch-millimeter conversion
- ◆ Carrier and scriber designed to read from zero
- ◆ "Hold" control feature retains a reading at any position
- ◆ Plus or minus indication allows reading in proper direction
- ◆ Ability to set ZERO at any position
- ◆ Manual on/off plus a built-in automatic off after 30 minutes of nonuse

#### Full Function Action Features

- ◆ Large positive action keypad
- ◆ Ability to retain and return to the true zero reading of the height gage
- ◆ PRESET button to install any reading at any position
- ◆ Ability to install minimum and maximum limits
- ◆ Output jack allows data transmission, either through a cable or by connecting to a Starrett DataSure® Wireless Data Collection System end node and other devices that support RS232

#### Battery Life

- ◆ 1-1/2+ years battery life. Two 3-volt batteries furnished (CR2450)



Left: No. 3752, 0-24" Height Gage.  
Right: No. 3752, 0-12" Height Gage.

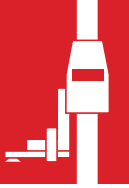


Both Height Gages shown with optional Auxilliary Circular Carbide Scriber, PT28131. Gages are furnished with Auxilliary Straight Carbide Scriber, PT22357.

#### Specifications

|                         |  |
|-------------------------|--|
| <b>Resolution</b>       | .0005" (0.01mm)  |
| <b>Graduations</b>      | .100" (5mm)  |
| <b>Overall Accuracy</b> | ±.0015" (.04mm) 0-18" (0-450mm)<br>±.002" (.05mm) 18-24" (450-600mm) |
| <b>Battery Life</b>     | Over 1-1/2 Years Average Use   |

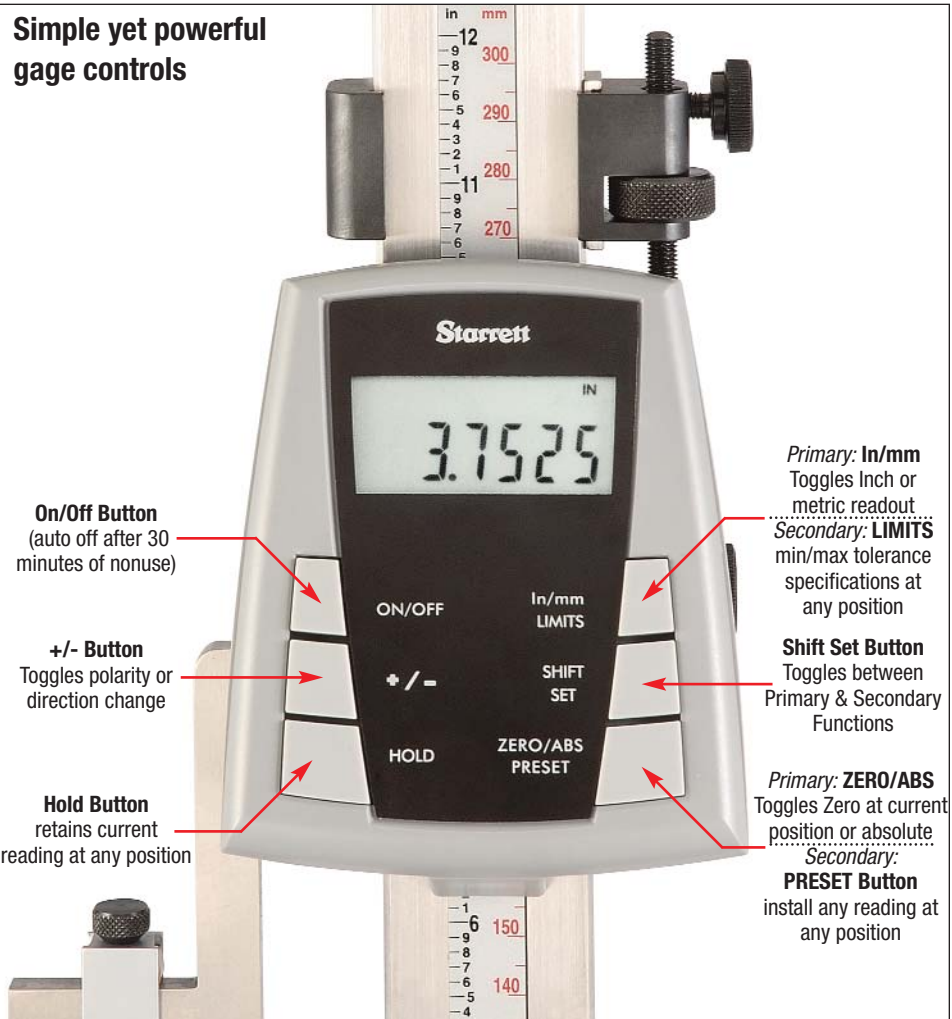
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**No. 3752 Series Electronic Height Gages**



**Simple yet powerful gage controls**



| Range         | Description              | Catalog No.        | EDP No. |
|---------------|--------------------------|--------------------|---------|
| 0-12" (300mm) | Height Gage without Case | <b>3752-12/300</b> | 68815   |
| 0-24" (600mm) |                          | <b>3752-24/600</b> | 68816   |

**Cables, Accessories, Cases**

| Description   | Catalog No.    | EDP No. |
|---|----------------|---------|
| Shielded Cable to Starrett Nos. 761/772 Series Modules, No. PT61768 Adaptor | <b>PT62103</b> | 67019   |
| Interface Adaptor for Starrett Tools to PC                                  | <b>PT61768</b> | 66454   |
| 3-Volt Battery, No. CR2450 (2) Required                                     | <b>PT61120</b> | 65446   |
| Wood Case Only for 12" Gage   | <b>928</b>     | 55249   |
| Wood Case Only for 24" Gage   | <b>945</b>     | 56684   |

Furnished without case unless otherwise ordered.

(Continued from previous page.)





### Electronic Height Gage (without output)

**No. 3751** 0-6" / 150mm

This height gage is light, portable and easy to use for vertical measurements within its range.

#### Readability Features

- ◆ Easy-to-read LCD .32" high characters

#### Accuracy and Long Life Design Features

- ◆ Hardened, stainless steel bar for long life
- ◆ Depth attachment No. PT08680A available for measuring depth of holes, slots, and recesses
- ◆ Fine adjustment thumb roll for precision measurements
- ◆ Rounded nose scriber cuts clean, sharp lines with smoothness and less pressure
- ◆ Lock to hold the slide in position
- ◆ Hardened, ground, and lapped base with finger grooves provides ease of movement
- ◆ Easy access to single long-life battery, 3-volt CR2032
- ◆ Vertical bar is back from the edge of the nose for better stability
- ◆ Scribe can reference zero from the bottom of the base to get the full 6" (150mm) usable range
- ◆ Linear Accuracy:  $\pm .001"$  ( $\pm 0.03\text{mm}$ )
- ◆ Resolution:  $.0005"$  (0.01mm)

#### Action Features with Three Control Buttons

- ◆ Inch-millimeter conversion
- ◆ Zero at any position
- ◆ Manual ON/OFF plus a built in automatic OFF after 5 minutes of nonuse



**NEW**

#### 0-6"/150mm range

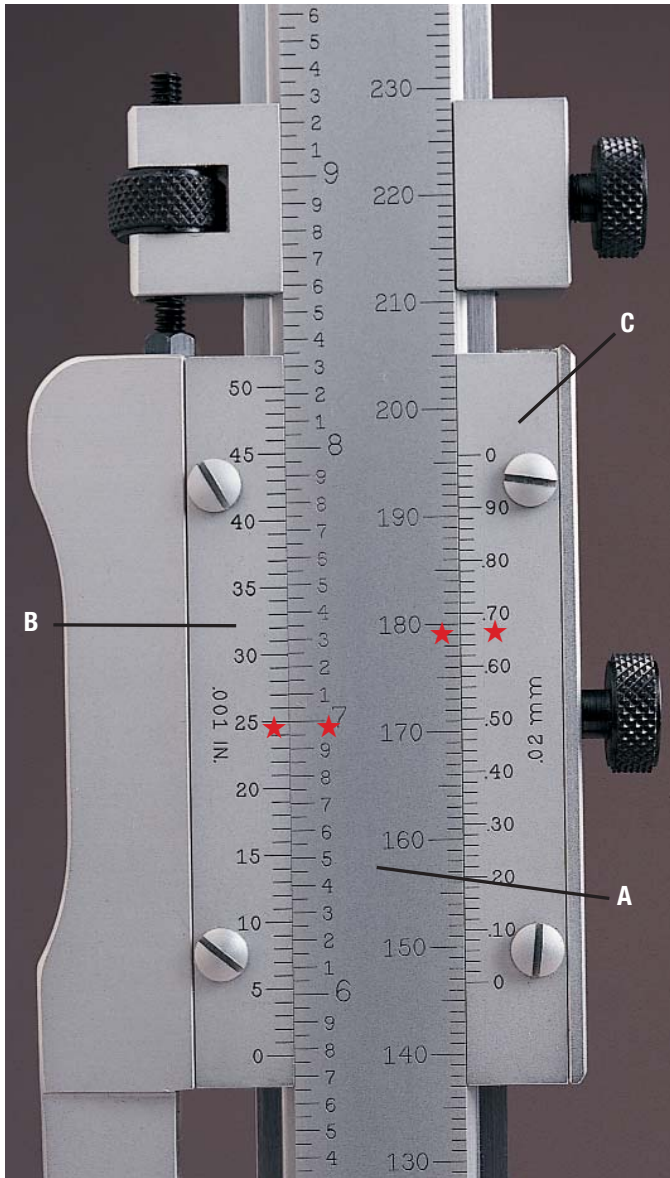
| Catalog No.  | EDP No. | Description          |
|--------------|---------|----------------------|
| 3751AZ-6/150 | 12221   | Height Gage, in Case |

#### Accessories and Cables

|         |       |                                  |
|---------|-------|----------------------------------|
| PT99492 | 65650 | One 3-Volt Batteries, No. CR2032 |
| 947     | 56756 | Wood Case Only                   |



## How to Read a Starrett 50-Division Vernier Height Gage Graduated in Inches and Millimeters (Direct Reading)



Open-face long Vernier with 50 widely spaced graduations for easy reading. Flush-fitting Vernier and master bar eliminates parallax.

A. Master Bar  
B. Inch Vernier Plate  
C. Millimeter Vernier Plate

### Inch Reading

- ◆ Refer to the left side bar graduations and the inch vernier plate. Inches are numbered in sequence over the full range of the bar. Every second graduation between the inch lines is numbered and equals .100". Each bar graduation is .050"
- ◆ The vernier plate is divided into 50 parts, each representing .001". Every fifth line is numbered – 5, 10, 15 ... 45, 50 – for easy counting
- ◆ To read the gage, first count how many inches and how many .050" lines lie between the zero line on the bar and the zero line on the vernier plate and add them
- ◆ Then count the number of graduations on the vernier plate from its zero line to the line that coincides with a line on the bar. Multiply the number of vernier plate graduations you counted by .001" and add this figure to the number of inches and .050" lines you counted on the bar. This is your total reading

### Example

- ★ In the photo, the vernier plate zero line is five inches (5.000") plus .750" beyond the zero line on the bar, or 5.750". The 25th graduation on the vernier plate coincides with a line on the bar (as indicated by stars).  $25 \times .001$  (.025") is therefore added to the 5.750" bar reading, and the total reading is 5.775"

### Millimeter Reading

- ◆ Refer to the right side bar graduations and millimeter vernier plate. Each bar graduation is 1.00mm. Every tenth graduation is numbered in sequence – 10mm, 20mm, 30mm, etc. – over the full range of the bar. This provides for direct reading in millimeters
- ◆ The vernier plate is divided into 50 parts, each representing 0.02mm. Every fifth line is numbered in sequence – 0.10mm, 0.20mm, 0.30mm ... 0.80mm, 0.90mm – providing for direct reading in hundredths of a millimeter
- ◆ To read the gage, first count how many millimeters lie between the zero line on the bar and the zero line on the vernier plate
- ◆ Then find the graduation on the vernier plate that coincides with a line on the bar and note its value in hundredths of a millimeter. Add the vernier plate reading in hundredths of a millimeter to the number of millimeters you counted on the bar. This is your total reading

### Example

- ★ In the photo, the vernier plate zero line is 146 millimeters beyond the zero line on the bar, and the 0.68mm graduation on the vernier plate coincides with a line on the bar (as indicated by stars). 0.68 millimeters is therefore added to the 146 millimeter bar reading, and the total reading is 146.68 millimeters



### Master Vernier Height Gages

**Nos. 254 Series 0-72", 254M Series 0-900mm, 254EM Series 0-24" / 0-600mm**

This Master Vernier Height Gage is an accurate, rugged and reliable tool that gives precise and dependable measurements over long ranges. It has an easy-to-read vernier, is stronger, and is offered in greater ranges than other height gages.

#### Readability Features

- ◆ Long, 50-division vernier scales permits half as many bar graduations as single vernier tools. These widely spaced graduations provide easy reading to .001" or 0.02mm
- ◆ Flush fitting of the vernier scales to the main scale eliminates parallax. Vernier scales are adjustable
- ◆ Black lines and figures against Starrett satin chrome finish make reading easy
- ◆ Scriber and base are designed for direct reading from zero (bottom of base)

#### Ease-of-Handling Features

- ◆ Quick-adjust release on the slide allows for fast positioning
- ◆ Extremely fine adjustments by a knob on the base isolating the column and slide from external pressures

- ◆ Additional remote fine adjustment located on top of the bar for sizes 36" (900mm) and larger
- ◆ Special master bar design and the balanced design and weight of the base eliminates vibration
- ◆ Master bars on models up to 24" and 600mm are hardened and stabilized
- ◆ Base is hardened, ground, and lapped square with the bar and has finger grooves to provide ease of movement
- ◆ Vertical bar is positioned near the center of the base for balance and stability
- ◆ Versatile tool will scribe lines, mount dial indicators or electronic probes, and accept depth attachments
- ◆ Tool can also be used with our No. 359 Protractor for checking angles



Quick-adjusting screw release allows rapid slide movement to desired area, then precisely positioned with the fine adjustment knob.



Precise positioning with fine-adjustment knob on the base isolates column and slide from external pressures.

#### Inch Reading – Graduation – .001"

| Range | Approximate Base Dimensions | Catalog No.    | EDP No. |
|-------|-----------------------------|----------------|---------|
| 0-12" | 5-7/8" x 3-7/8"             | <b>254Z-12</b> | 51219   |
| 0-18" | 7-1/2" x 4-1/2"             | <b>254Z-18</b> | 51220   |
| 0-24" |                             | <b>254Z-24</b> | 51221   |
| 0-36" | 10" x 6-1/2"                | <b>254Z-36</b> | 51222   |
| 0-48" |                             | <b>254Z-48</b> | 51223   |
| 0-60" |                             | <b>254Z-60</b> | 56183   |
| 0-72" |                             | <b>254Z-72</b> | 56184   |

#### Millimeter Reading – Graduation – 0.02mm

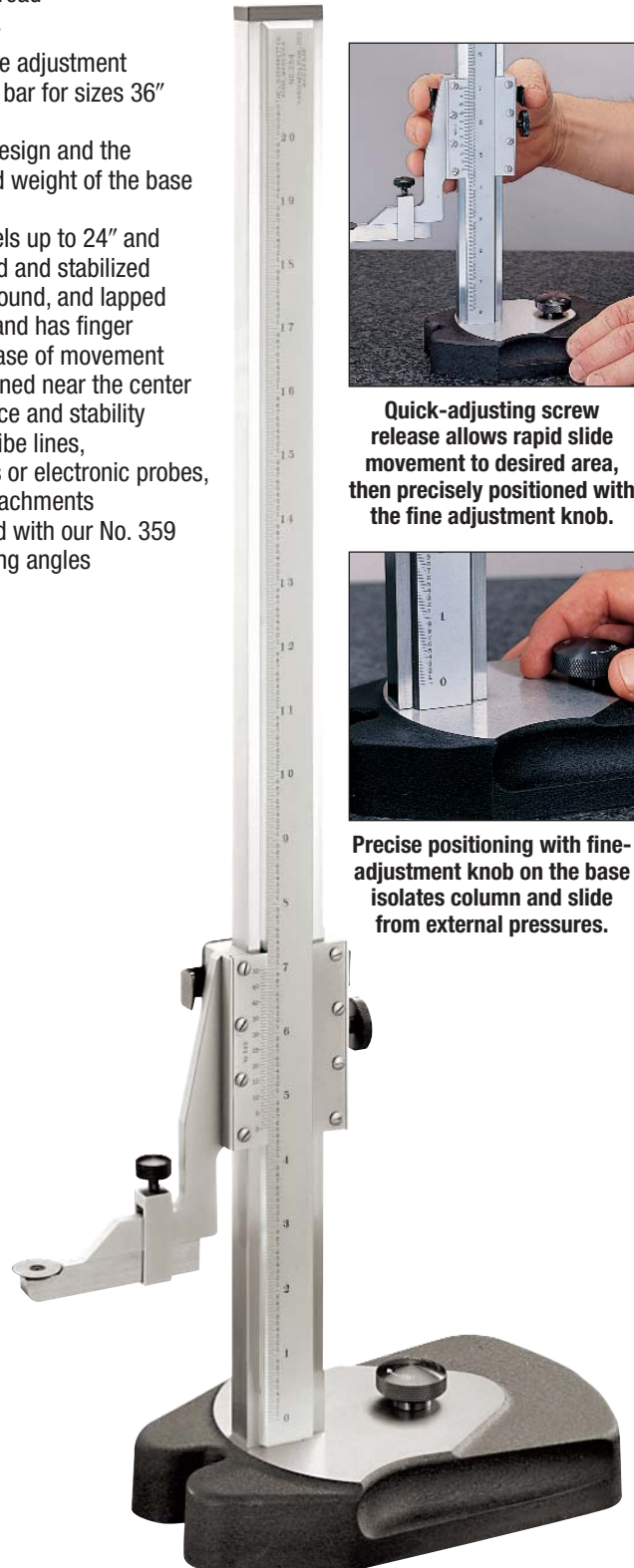
|         |               |                  |       |
|---------|---------------|------------------|-------|
| 0-300mm | 150mm x 95mm  | <b>254MZ-300</b> | 56214 |
| 0-450mm | 190mm x 115mm | <b>254MZ-450</b> | 56215 |
| 0-600mm |               | <b>254MZ-600</b> | 56216 |
| 0-900mm | 250mm x 165mm | <b>254MZ-900</b> | 56217 |

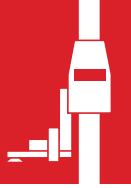
#### Inch and Millimeter Reading – Graduation – .001" / 0.02mm

|             |             |                  |       |
|-------------|-------------|------------------|-------|
| 0-12"/300mm | (See Above) | <b>254EMZ-12</b> | 51224 |
| 0-18"/450mm |             | <b>254EMZ-18</b> | 51225 |
| 0-24"/600mm |             | <b>254EMZ-24</b> | 51226 |

#### NOTES:

- ◆ Hardened bars on all sizes through 24" and 600mm
- ◆ Height gages shown with optional Auxilliary Circular Carbide Scriber, PT28131. Gages are furnished with Auxilliary Straight Carbide Scriber, PT22357.
- ◆ Depth Gage Attachment PT05409A, EDP 51227, available for all sizes through 24" and 600mm





## Vernier Height Gages

**No. 255 Series** 0-18"

**No. 255M** 0-300mm

**No. 255EM** 0-18" / 0-450mm

This tool is the “baby brother” of the No. 254 Master Vernier Height Gage. It is essentially the same tool, but a much lighter version for normal use where heavy duty applications are not practical. The 18" and 450mm models weigh 3-1/4 lbs. (1.5kg). No other height gage features this favorable combination of design, weight and accuracy.

### Readability Features

- ◆ Long, 50-division vernier scales that can be read to .001" or 0.02mm without a magnifying glass
- ◆ Flush-fitting of the vernier scales to the main scale eliminates parallax
- ◆ Easy-reading sharp black lines and figures against Starrett satin chrome finish background
- ◆ The scribe and the base are designed so that the gage will read directly from zero

### Ease-of-Handling Features

- ◆ Slides easily for quick adjustment and has a screw type adjusting nut on the bar for precise positioning
- ◆ The design of the hardened and stabilized bar plus the balanced design and weight of the base eliminate vibration
- ◆ The base is hardened, ground, and lapped and is hand shaped for sure grip and easy movement
- ◆ The vertical bar is positioned near the center of the base for balance and stability
- ◆ Ability to scribe lines, measure with dial indicators or electronic probes and accept depth attachments
- ◆ The auxiliary scribe is a circular carbide scribe – cuts sharp, clean lines smoothly – rotatable for wear – a Starrett original

### Inch Reading – Graduation .001"

| Range | Bar Approximate (W x Thick) | Base Approximate (L x W) | Description  | Catalog No.    | EDP No. |
|-------|-----------------------------|--------------------------|--------------|----------------|---------|
| 0-12" | 15/16" x 7/32"              | 4-7/16" x 2-9/32"        | In Case      | <b>255Z-12</b> | 51229   |
|       |                             |                          | Without Case | <b>255-12</b>  | 51230   |
| 0-18" |                             |                          | In Case      | <b>255Z-18</b> | 51231   |
|       |                             |                          | Without Case | <b>255-18</b>  | 51232   |

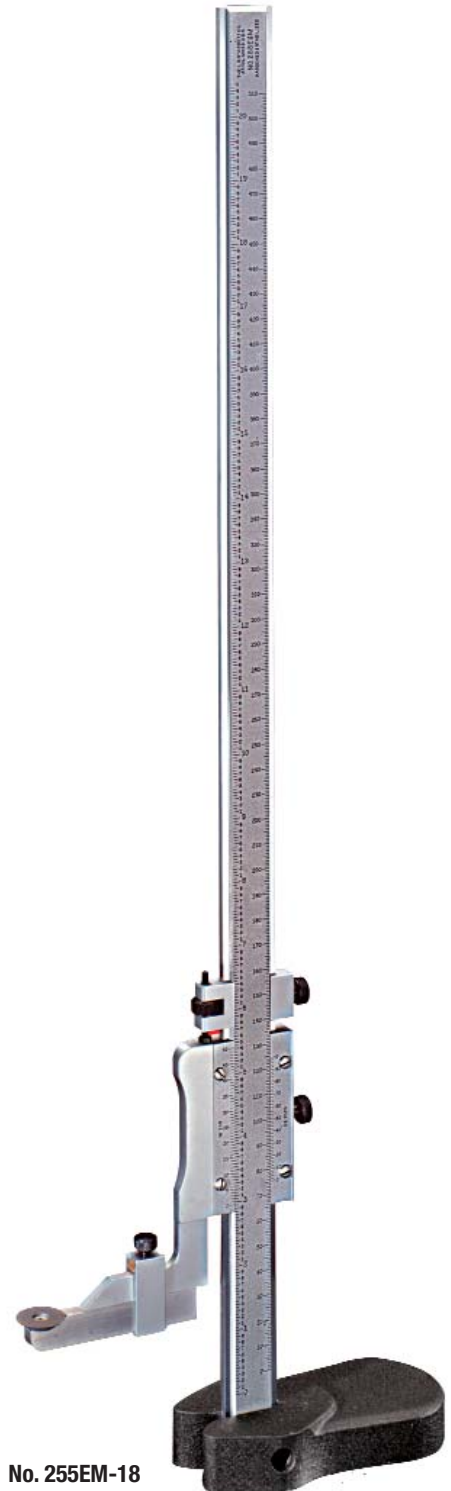
### Millimeter Reading – Graduation 0.02mm

|         |              |              |              |                  |       |
|---------|--------------|--------------|--------------|------------------|-------|
| 0-300mm | 24mm x 5.5mm | 113mm x 58mm | In Case      | <b>255MZ-300</b> | 56218 |
|         |              |              | Without Case | <b>255M-300</b>  | 56219 |

### Inch and Millimeter Reading – Graduation .001"/0.02mm

|             |                               |                                  |              |                  |       |
|-------------|-------------------------------|----------------------------------|--------------|------------------|-------|
| 0-18"/450mm | 15/16" x 7/32" (24mm x 5.5mm) | 4-7/16" x 2-9/32" (113mm x 58mm) | In Case      | <b>255EMZ-18</b> | 65160 |
|             |                               |                                  | Without Case | <b>255EM-18</b>  | 65161 |

**NOTES:** Shown with Carbide Scribe PT27710 (EDP 67187) 3/16" x 25/64" x 2-3/4" (4.8mm x 10mm x 70mm). Furnished with Straight Scribe, PT13791  
Depth Gage Attachment PT08962A (EDP 51233) available



No. 255EM-18

Furnished with Auxiliary Scribe, packed one in a box.





### Dial Height Gages

**No. 250** 0-6"

**No. 250M** 0-150mm

This compact height gage has universal appeal for virtually all machinists and inspectors. It is simple to use, reliable, accurate, and fits into most toolboxes.

#### Readability Features

- ◆ Sharp, clear dial graduations of .001" or 0.02mm – .100" or 2mm in one revolution
- ◆ Sharp, black graduations on the satin chrome finished bar every .100" or 1mm

#### Ease-of-Handling Features

- ◆ Fine adjustment thumb roll for precision measurements
- ◆ Vertical bar is back from the edge of the nose for better stability
- ◆ Hardened, ground, and lapped base with finger grooves for control and ease of movement
- ◆ Base is designed so the gage can read from the zero position up to the full 6" (150mm) range
- ◆ Tool scribes lines, measures with test indicators, and can also be used with a depth attachment
- ◆ Lock screw for dial
- ◆ Lock to hold the slide in position
- ◆ The auxiliary scriber has a rounded nose for cutting clean, sharp lines with smoothness and less pressure. This is an original Starrett feature

#### Accuracy and Long-Life Features

- ◆ Hardened, stainless steel bar, rack, gears, scriber, and scriber carrier
- ◆ Positive split gear anti-backlash control



#### 0-6" range

| Catalog No. | EDP No. | Graduation | Description              |
|-------------|---------|------------|--------------------------|
| 250-6       | 56699   | .001"      | Height Gage Without Case |
| 250Z-6      | 56703   | .001"      | Height Gage In Case      |

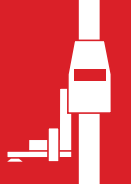
#### 0-150mm range

|           |       |        |                          |
|-----------|-------|--------|--------------------------|
| 250M-150  | 64274 | 0.02mm | Height Gage Without Case |
| 250MZ-150 | 64277 | 0.02mm | Height Gage In Case      |

#### Accessories

|          |       |  |                  |
|----------|-------|--|------------------|
| PT08680A | 51383 |  | Depth Attachment |
| 947      | 56756 |  | Wood Case Only   |

Furnished with Auxiliary Scriber and Scriber Carrier. Packed one in a box.



## DIGI-CHEK™ II Height Master

### No. DHG Series

Ranges up to 85" and 2150mm

These are the world's fastest and most precise height masters, ideal for those who need the highest degree of accuracy over an extremely long vertical range.

- ◆ Can be used in the laboratory or on the shop floor
- ◆ Lower inspection cost by saving time – within 10 seconds the tool can be set into position
- ◆ The gage block stack is free-standing, so it will adapt to temperature differences in a reasonable time period
- ◆ 1" or 25mm range of adjustment
- ◆ Reverse reading block allows readings from the underside of the master gage blocks
- ◆ The large, remote digital readout can be placed in the most convenient location and adjusted for best readability
- ◆ The housing is heavy and extremely stable. It has hardened and lapped three-point bearings



Simple, two step operation in less than 10 seconds. 1. Set rapid positioner (A) to within .005" (0.15mm) (3 seconds). 2. Final setting (5 seconds).

### 1-85" range

| Capacity | Catalog No.     | EDP No. |
|----------|-----------------|---------|
| 1-25"    | <b>DHG 25.</b>  | 93265   |
| 1-37"    | <b>DHG 37.</b>  | 93266   |
| 1-49"    | <b>DHG 49.</b>  | 93267   |
| 1-61"    | <b>DHG 61.</b>  | 93268   |
| 1-73"    | <b>DHG 73.*</b> | 93269   |
| 1-85"    | <b>DHG 85.*</b> | 93270   |

### 25-2150mm range

|           |                   |       |
|-----------|-------------------|-------|
| 25-625mm  | <b>DHG 625.</b>   | 93271 |
| 25-1025mm | <b>DHG 1025.</b>  | 93272 |
| 25-1225mm | <b>DHG 1225.</b>  | 93273 |
| 25-1550mm | <b>DHG 1550.</b>  | 93274 |
| 25-1800mm | <b>DHG 1800.*</b> | 93640 |
| 25-2150mm | <b>DHG 2150.*</b> | 93275 |

\*Setup charge extra depending on location.

Standard equipment: pedestal stand for readout unit, DIGI-CHEK II plastic dust cover and wood shipping/storage case.

**Note:** The accuracy of the surface that supports the gage must be taken into account when determining the accuracy of any measurements.

### Optional Equipment

| Catalog No.                   | EDP No. | Description   |
|-------------------------------|---------|---|
| <b>HG 525.60</b> (Inch)       | 92579   | Reverse Reading Blocks  |
| <b>HG 501.3M</b> (Millimeter) | 91486   |   |
| <b>HG 525.61</b> (Inch)       | 92577   | One inch or 25mm base blocks for use with reverse reading blocks to set dial bore gages |
| <b>HG 501.4M</b> (Millimeter) | 91487   |   |
| <b>CS 9133.</b>               | 92320   | Finished wood case for reverse reading and base block                                   |

### Specifications

| Description                                       | Inch System                                     | Metric System                                |
|---|---|--|
| Tolerance (Stack)<br>Maximum:<br>Minimum:         | expressed in $\mu$ in.<br>2.5L + 10 L in inches | expressed in $\mu$ m<br>.0025L + .25 L in mm |
|   | - 10  | - .25  |
| Parallelism: Gage Surfaces to Base and Each Other | 15 $\mu$ in.                                    | 0.4 $\mu$ m                                  |
| Resolution  | 10 $\mu$ in. or 20 $\mu$ in.                    | 0.5 $\mu$ m or 1.0 $\mu$ m                   |
| Repeatability of Readout                          | $\pm$ 20 $\mu$ in.                              | 0.5 $\mu$ m or 1.0 $\mu$ m                   |
| Digital Readout                                   | 1/2" high figures                               | 12.5mm                                       |
| Readout Pedestal Height                           | 38"   | 970mm  |
| Power Supply                                      | Switchable: 115 V 60 Cycle or 220 V 50 Cycle    |  |
| Certificate of Calibration (Extra Cost)           | expressed in $\mu$ in.                          | expressed in $\mu$ m                         |
| Uncertainty of Calibration of Stack               | 10 + 2.0L L in inches                           | .25 + .002L L in mm                          |
| Uncertainty of Calibration of Readout             | $\pm$ 30 $\mu$ in.                              | $\pm$ 0.75 $\mu$ m                           |

$\mu$  = .00001 x unit of measure



### DIGI-CHEK™ Height Gages

**No. 258 Series**  
.100"-24.100"

**No. 258M Series**  
2-602mm

These gages combine the accuracy of Starrett-Webber Gage Blocks with a precision micrometer head and digital readout.

#### Readability Features

- ◆ Satin chrome scales mounted beside the gage block column for quick reference to the nearest 1" or 25mm reading
- ◆ Digital readout reads in .001" or 0.01mm and has a range of 1" or 25mm
- ◆ Reads directly from the micrometer head to .0001" or 0.002mm. The micrometer head (our No. 469) has black figures on the satin chrome thimble. The graduations are staggered for easy counting
- ◆ Both the micrometer head and digital readout are mounted on top of the gage, directly in line with the operator's vision

#### Ease-of-Handling Features

- ◆ The micrometer head has a speeder knob for rapid positioning
- ◆ Both over and under heights can be checked directly from the gage blocks in a single setting. Because reference surfaces are provided on the top and bottom of each block, adjacent blocks are in the exact same plane. This eliminates the need to add or subtract block thickness.
- ◆ Readings can also be taken from either left, center, or right of the gage block column
- ◆ Parts can be checked from .100" or 2mm in height
- ◆ The gage block column design permits wringing a 1" block between two blocks in the column. This is convenient for setting and checking other gages such as inside micrometers, end measuring rods, dial bore gages, etc.

#### Accuracy and Long-Life Features

- ◆ Gage is housed in a heavily flanged frame for stability and the base has three-point hardened, ground, and lapped bearing pads, making it virtually tip-proof

- ◆ Gage blocks are assembled in a free-standing system that allows the blocks to conform to temperature variations independently of the frame, thereby reading the same as the workpiece
- ◆ The highly accurate micrometer spindle is one piece, with the measuring threads ground from the solid, hardened and stabilized
- ◆ A 10" riser block is available for increased height capacity

**NOTE:** The accuracy of the surface that supports the gage must be taken into account when determining the accuracy of any measurements.



#### .100"-24.100" range

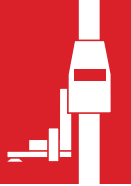
| Range         | Graduation |                 |                 | Gage Accuracy | Catalog No.      | EDP No. |
|---------------|------------|-----------------|-----------------|---------------|------------------|---------|
|               | Scales     | Digital Readout | Micrometer Head |               |                  |         |
| .100"-12.100" | Inches     | .001"           | .0001"          | ±.0002"       | <b>DHG12-258</b> | 93005   |
| .100"-18.100" |            | .001"           | .0001"          | ±.0002"       | <b>DHG18-258</b> | 93006   |
| .100"-24.100" |            | .001"           | .0001"          | ±.0002"       | <b>DHG24-258</b> | 93357   |

#### 2-602mm range

|           |             |        |         |         |                   |       |
|-----------|-------------|--------|---------|---------|-------------------|-------|
| 2mm-302mm | Millimeters | 0.01mm | 0.002mm | ±.005mm | <b>DHG300-258</b> | 93007 |
| 2mm-452mm |             | 0.01mm | 0.002mm | ±.005mm | <b>DHG450-258</b> | 93008 |
| 2mm-602mm |             | 0.01mm | 0.002mm | ±.005mm | <b>DHG600-258</b> | 93358 |

**NOTES:** Finished wood case for 12" (300mm) and 18" (450mm) also available, at extra cost. These finished wood cases are NOT suitable for shipping. Use suggested shipping materials. Certificate of Calibration available at extra cost. See page 127 for Riser Blocks and Reverse Reading Blocks. Questions and repair regarding Digi-Chek gages should be referred to the Starrett-Webber Division, Tel.: 440-835-0001.





## Height Transfer Gages

### No. 252 Series 0-48" / 0-1200mm

The Starrett No. 252 Height Transfer Gage is ideal for use with test indicators or electronic amplifiers to accurately transfer height settings from gage blocks, height gages and other standards.

#### Accuracy and Long-Life Features

- ◆ Extreme rigidity provides the vibration-proof stability necessary to permit precise, repeat readings with indicators of the highest amplification
- ◆ Extremely rigid, rectangular box-type hollow column mounted integrally on a heavy base
- ◆ Adjusting mechanism is located in the base so the column and indicator are isolated and not affected by external factors, i.e. heat or hand pressure

#### Ease-of-Operation Features

- ◆ Hand-fitting base design for sure-grip handling and easy movement
- ◆ Bottom of the base has three ground and lapped pads for stability and smooth movement on the surface plate
- ◆ Adjustable slide, incorporating a snug for holding test indicators or electronic gage heads, has rapid vertical manual adjustment
- ◆ Thumb screw allows slide to be locked
- ◆ Knob on base allows fine vertical adjustment of the slide unit relative to the fixed column. This permits the slide with its test indicator to be quickly and precisely adjusted to the desired setting

#### Tool and Gaging Holders

- ◆ A snug on the slide provides two holes (.375" [9.5mm] and .156" [4mm]) for holding gage rods or scribers. A 9" (225mm) rod furnished with the gage is especially useful for reaching confined areas or reaching heights greater than the range of the gage
- ◆ The rod has a major diameter of .375" (9.5mm) and stepped diameters of 1/4" (3.2mm) and 7/32" (5.5mm) at one end and 5/16" (8mm) at the opposite end. Starrett No. 708 and 709 Test Indicators can be mounted on this rod using Starrett No. PT22428 swivel clamp. Starrett No. 196 Universal Back-Plunger Indicators can be mounted using Starrett snugs, Part Nos. PT18718 or PT18724 (snugs not furnished)
- ◆ No. PT06784-A Gage Holding Rod is



- ◆ included to accommodate the Starrett No. 715-1 Gaging Head when the Transfer Gage is used with the No. 717 Electronic Gage. A wire retaining clip keeps electronic gage head cables from deflecting the gage-holding rod
- ◆ Starrett No. 25, No. 81, No. 655 and No. 656 Series Dial Indicators also can

be used on the height gage by means of a No. PT06784-A Gage Rod (furnished). Other useful attachments (extra) are Starrett surface gage spindles (No. 57C or No. 57D, 12" [300mm] and 18" [450mm]) – which are extremely useful for scribing and layout

| Range          | Fine Adjustment (Approximate) | Base Size (Approximate)             | Gage Rod Dimension                           | Catalog No. | EDP No. |
|----------------|-------------------------------|-------------------------------------|--|-------------|---------|
| 0-14" (350mm)  | 3/8" (9.5mm)                  | 5-3/4" L x 3-1/2" W (145mm x 90mm)  | 9" L x .375" Dia. (225mm x 9.5mm) with steps | 252Z-14     | 55890   |
| 0-24" (600mm)  |                               | 7-1/2" L x 4-1/2" W (190mm x 115mm) |  | 252Z-24     | 51216   |
| 0-48" (1200mm) |                               | 9" L x 6" W (225mm x 150mm)         |  | 252Z-48     | 51217   |

#### NOTE: Larger sizes available on special order.

Starrett Nos. 708, 709, 711, 650 Test Indicators; Nos. 25, 81, 196, 655, 656 Dial Indicators and supplementary attachments also available.

Gage furnished with 9" (225mm) Rod and No. PT06784-A Gage Holding Rod in wood case. Packed one in a box.





### Depth Gage Attachments for Height Gages



Right: No. PT08680A.  
Middle, No. PT08962A.  
Left, No. PT05409A.

These attachments replace standard scribes and measure the depths of holes and slots, recesses; inside of jigs, fixtures; and over high projections.

They have adjustable rods which are held in the desired position by a knurled binding nut. The ends have a slight radius for point contact on the work.

| Rod Length | Fits Starrett Height Gage No./Size   | Part No. | EDP No. |
|------------|--|----------|---------|
| 6" (150mm) | No. 255 8", 12", 18", 300mm, 450mm   | PT08962A | 51233   |
| 8" (200mm) | No. 254 12", 18", 24", 300mm, 450mm, 600mm and all Metric & English Series<br>No. 259 18" and 24", No. 3752 12" (300mm) and 24" (600mm), No. 755 24" (600mm) | PT05409A | 51227   |
| 6" (150mm) | Nos. 250, 751  | PT08680A | 51383   |

### DIGI-CHEK Height Gage Accessories for No. 258 Series

#### Reverse Reading Blocks

No. 258RRB (Inch)

No. 258RRBM (Millimeter)

Used on No. 258 Digi-Chek™ Height Gages for the precise calibration of working gages and for setting dial bore gages. The block fits in alternate inch positions, its tongue entering the odd numbers and its groove entering the even numbers of the gage block stack.

Packed one in a box.



| Catalog No. | EDP No. | Description                       |
|-------------|---------|-----------------------------------|
| HG 258.RRB  | 92433   | Fits 12", 18" and 24" Gages       |
| HG 258.RRBM | 92434   | Fits 300mm, 450mm and 600mm Gages |

### Riser Blocks

No. 258R Series (Inch)

No. 258MR (Millimeter)

Increases the range of Inch reading No. 258 Digi-Chek™ Height Gages by 10" and metric reading No. 258 Digi-Cheks by 250mm. Heavily flanged for rigidity and stability. Both top and base have three ground and lapped pads to match the pads on the Digi-Chek base. Retaining plate prevents the Digi-Chek from being pushed or sliding off the pads. Attractive black wrinkle finish. If desired, riser blocks can be stacked one on top of another.

Packed one in a box.

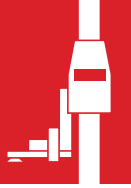
#### 10" Blocks

| Cat. No.  | EDP No. | Accuracy  | For:     |
|-----------|---------|-----------|----------|
| HG 258.R  | 99865   | ±.000040" | 12" gage |
| HG 258.RA | 99866   |           | 18" gage |

#### 250mm Blocks

| Cat. No.   | EDP No. | Accuracy | For:       |
|------------|---------|----------|------------|
| HG 258.MR  | 99867   | ±0.001mm | 300mm gage |
| HG 258.MRA | 99868   |          | 450mm gage |





## Straight Scribers for Starrett Height Gages

All steel scribers are hardened to approximately HRC 62 and have a rounded tip (a Starrett original) which cuts sharp, clear lines smoothly, with less pressure, on any material.



| Part No. | EDP No. | Point               | Size   | Fits Starrett Height Gage No./Size   |
|----------|---------|---------------------|--|--|
| PT22090  | 64507   | Hardened Tool Steel | 5/16" x 1/8" x 1-3/4"<br>(8 x 3.2 x 45mm)      | Nos. 250 and 3751  |
| PT14343  | 71511   | Hardened Tool Steel | 1/4" x 1/2" x 3"<br>(6.4 x 12.7 x 75mm)        | No. 254 12", 18", 24", 300mm, 450mm, 600mm<br>No. 254 Metric & English Series<br>No. 259 18" and 24" |
| PT13816  | 52367   |                     | 1/4" x 1/2" x 6"<br>(6.4 x 12.7 x 150mm)       |  |
| PT13817  | 52368   |                     | 1/4" x 1/2" x 10"<br>(6.4 x 12.7 x 250mm)      |  |
| PT16566  | 72288   | Hardened Tool Steel | 5/8" x 3/8" x 3-5/8"                           | No. 254 36", 48", 60", 72", 900mm  |
| PT13791  | 71460   | Hardened Tool Steel | 3/16" x 25/64" x 2-3/4"<br>(4.8 x 10 x 69.9mm) | No. 255 8", 12", 18", 300mm, 450mm   |
| PT22357  | 12295   | Carbide             | 1/4" x 7/16" x 3"<br>(6.4 x 11.1 x 75mm)       | No. 3752   |

## Circular Carbide Scribers

- ◆ Cuts a sharper and cleaner line with less pressure than any other scriber
- ◆ Resists breakage and chipping but can be rotated for wear
- ◆ Another Starrett original



| Part No. | EDP No. | Point            | Size   | Fits Starrett Height Gage No./Size  |
|----------|---------|------------------|--|---|
| PT27724  | 67185   | Circular Carbide | 1/4" x 1/2" x 3"<br>(6.4 x 12.7 x 75mm)        | No. 254 12", 18", 24", 300mm, 450mm, 600mm<br>No. 254 Metric & English Series<br>No. 259 18", 24" |
| PT27708  | 67186   |                  | 1/4" x 1/2" x 6"<br>(6.4 x 12.7 x 150mm)       |   |
| PT27710  | 67187   |                  | 3/16" x 25/64" x 2-3/4"<br>(4.8 x 10 x 69.9mm) | No. 255 8", 12", 18", 300mm, 450mm  |
| PT27950  | 67015   |                  | 1/4" (6.4mm) Diameter Shank                    | Nos. 2000, 2001 Altissimo   |
| PT28131  | 67007   |                  | 1/4" x 7/16" x 3"<br>(6.4 x 11.1 x 75mm)       | Nos. 3752, 752  |

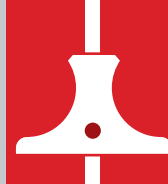
## Stem-Mount Indicator Attachment for Height Gages



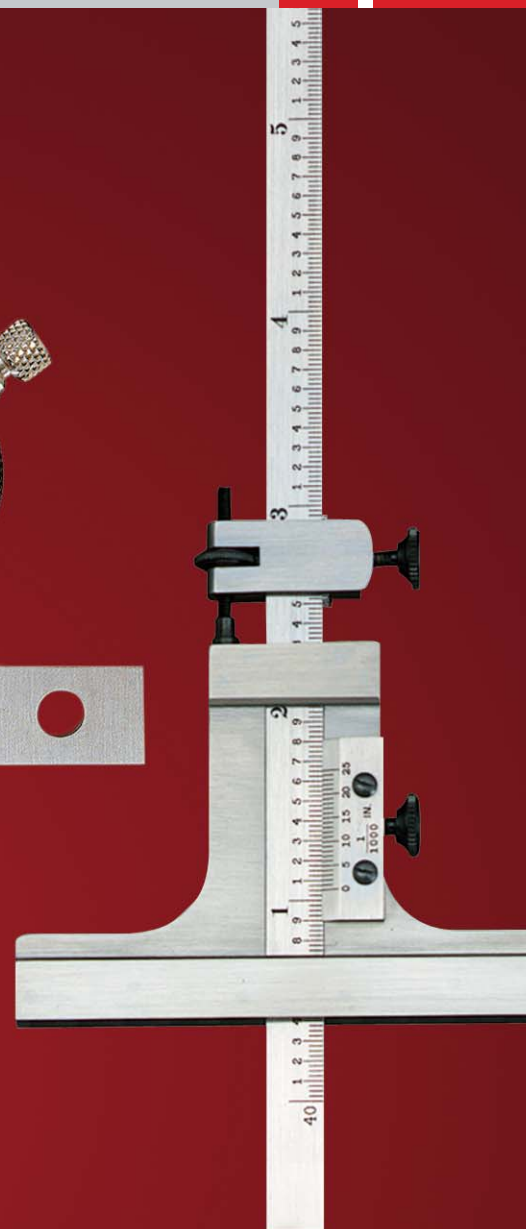
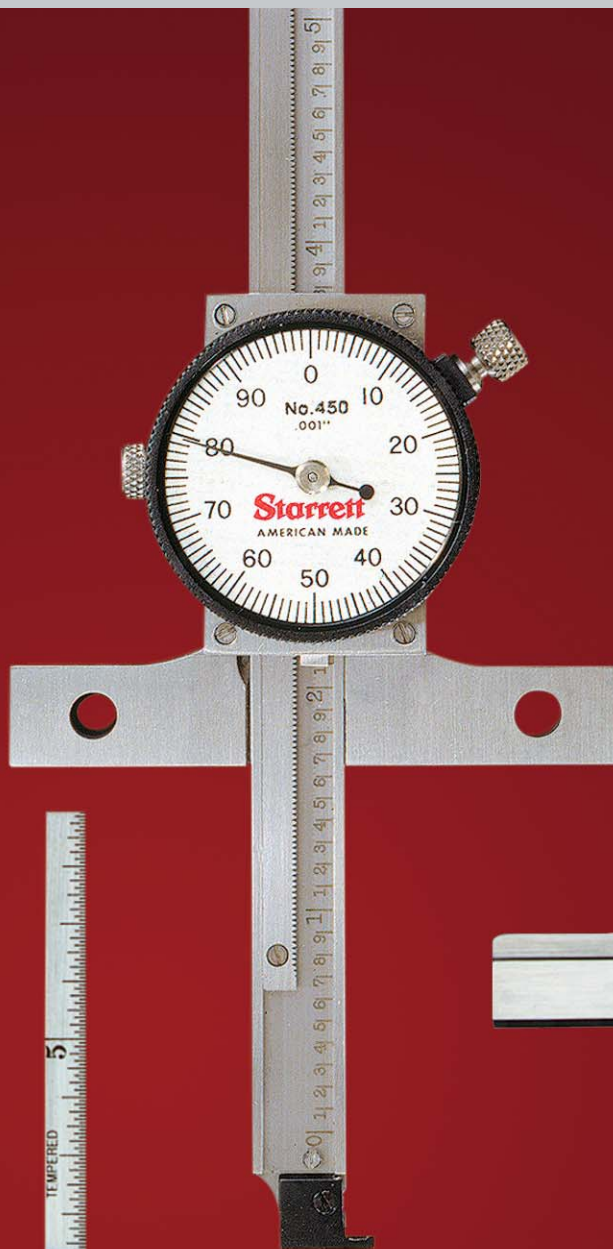
This attachment replaces the standard scriber and provides a way to mount dial indicators or LVTD style probes having 3/8" diameter shafts onto your height gage. By using the lower stem of the indicator as an attachment point, the indicator can be used to guarantee the amount of down pressure on the part is the same as the original set zero position.

| Description                     | Part No. | EDP No. |
|---------------------------------|----------|---------|
| Stem-Mount Indicator Attachment | PT99441  | 52991   |





- ◆ Starrett Depth Gages are available in many variations
- ◆ We manufacture these tools with electronic, dial, vernier, or precision rule readouts which range from .001" (0.03mm) on dial depth gages (depending upon the indicator used) to a 64th and 1/2mm on our precision steel rule depth gages
- ◆ Standard depths range up to 12" (300mm), but special lengths are also available





## Electronic Depth Gages

### No. 753 Series

0-12" (0-300mm)

The Starrett 753 Series is the only American-made electronic depth gage. It is light and easy to use for depth measurements within its range.

The 753 provides the ability to output measurements to a wide variety of peripherals and data collection devices, either through a traditional wire or by connecting to a Starrett DataSure® Wireless Data Collection System end node.

#### Readability Features

- ◆ Clear, easily-read numbers, properly sized for the tool

#### Design Features for Accuracy and Long Life

- ◆ Linear accuracy:  $\pm .001"$  ( $\pm 0.03\text{mm}$ )
- ◆ Resolution:  $.0005"$  (0.01mm)
- ◆ Exclusive Starrett designed microprocessor chip
- ◆ Hardened stainless steel body and slide for long life
- ◆ Fine adjustment thumb roll for precision measurements
- ◆ Lock to hold the slide in position
- ◆ Hardened base is standard 2-3/4" (70mm) long, but optional base extensions of 7" and 12" (175 and 300mm) are available
- ◆ A hook attachment is furnished with the gage, making it possible to take readings from the edge of a workpiece to edges of slots, grooves, shoulders, and other I.D. length dimensioning. The removable hook has the screw permanently attached to prevent loss
- ◆ One-year minimum battery life with two furnished 3-volt batteries, No. CR2032

#### Action Features with Five Control Buttons

- ◆ Inch/millimeter conversion
- ◆ Zero at any position
- ◆ Hold readout at any position
- ◆ Manual ON/OFF plus a built in automatic OFF after 15 minutes of nonuse
- ◆ LIMITS button allows high and low limits to be set. Out-of-limits readings will show a flashing display



- ◆ Output jack allows data transmission, either through a cable or by connecting to a Starrett DataSure® Wireless Data Collection System end node
- ◆ The output jack allows data transmission to the following peripherals for analysis, data collection and hard copy documentation
  - Starrett No. 772 Data Collection Systems
  - Starrett No. 761 Data Multiplexers
  - Other devices that support RS232

#### 0-6"/150mm range (without output)

| Catalog No. | EDP No. | Description                          |
|-------------|---------|--------------------------------------|
| 753AZ-6/150 | 66582   | 0-6"/150mm Range, Depth Gage in Case |

#### 0-12"/300mm range (with output)

|             |       |   |
|-------------|-------|---|
| 753Z-6/150  | 65662 | 0-6"/150mm Range, Depth Gage in Case      |
| 753-6/150   | 65666 | 0-6"/150mm Range, Depth Gage without Case |
| 753Z-9/225  | 66584 | 0-9"/225mm Range, Depth Gage in Case      |
| 753Z-12/300 | 66587 | 0-12"/300mm Range, Depth Gage in Case     |

#### Accessories and Cable Information

|         |       |  |
|---------|-------|--|
| PT22287 | 65861 | 7" Base Extension  |
| PT22288 | 65862 | 12" Base Extension   |
| PT61963 | 66636 | Computer Interface Cable Complete to PC (RS232C)   |
| PT61768 | 66454 | Adaptor from PT22938 Cable to PC (RS232C)  |
| PT22938 | 64059 | Shielded Cable from No. 753 Series to Nos. 761/772 Series Starrett Modules and No. PT61768 Interface Adaptor |
| PT99492 | 65650 | Two 3-Volt Batteries, No. CR2032   |





### Dial Depth Gages

**No. 450 Series 0-12"**

**No. 450M 0-300mm**

These depth gages are ideal for the individual mechanic. They are light, reliable and accurate for measurements to .001" or 0.02mm and will fit into most toolboxes.

#### Readability Features

- ◆ Sharp, easy-to-read dial graduations of .001-.100" or 0.02-2mm in one revolution
- ◆ Sharp, black graduations on the satin chrome finished bar, every .100" or 1mm

#### Ease-of-Handling and Versatility Features

- ◆ Lock screw for dial bezel
- ◆ Lock screw for holding the measuring rod in position
- ◆ Optional base extensions of 7" and 12" (175 and 300mm) are available to increase the base span on both models
- ◆ Removable hook attachment permits readings from the edge of a workpiece to edges of slots, shoulders, etc.

#### Accuracy and Long-Life Features

- ◆ Hardened, stainless steel base, measuring bar, rack and gears
- ◆ Positive split gear anti-backlash control



Right: 6" model; bottom.

Below: 12"/300mm base extension.



#### Graduation – .001"

| Range | Description           | Catalog No.   | EDP No. |
|-------|-----------------------|---------------|---------|
| 0-6"  | 6" Gage without Case  | <b>450-6</b>  | 56766   |
| 0-12" | 12" Gage without Case | <b>450-12</b> | 56768   |

#### Graduation – 0.02mm

|         |                         |                 |       |
|---------|-------------------------|-----------------|-------|
| 0-150mm | 150mm Gage without Case | <b>450M-150</b> | 64275 |
| 0-300mm | 300mm Gage without Case | <b>450M-300</b> | 64276 |

#### Accessories

| Description              | Catalog No.     | EDP No. |
|--------------------------|-----------------|---------|
| 7"/175mm Base Extension  | <b>PT22287</b>  | 65861   |
| 12"/300mm Base Extension | <b>PT22288</b>  | 65862   |
| 6" Case Only             | <b>450ZZ-6</b>  | 56776   |
| 12" Case Only            | <b>450ZZ-12</b> | 56777   |

Packed one in a box.



## Vernier Depth Gages

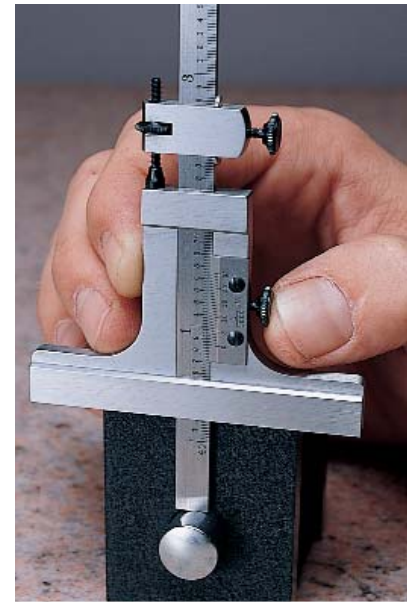
**No. 448 Series 0-12"**

**No. 448ME Series**

**0-12" / 0-300mm**

These are easy-to-use, very accurate depth gages. They are designed for measuring the depths of holes, slots, and recesses and for inspecting jig, fixtures and die work. They are also ideal for measuring from a plane surface to toolmakers' buttons for locating center distances. Readings are in .001" and 0.02mm.

- ◆ Heads are hardened, ground and lapped
- ◆ Measuring blades are hardened and ground and have accurate and sharp machine divided graduations
- ◆ All English graduations read to .001", with the bar being graduated in .025" increments
- ◆ All metric graduations read to 0.02mm, with the bar being graduated in 0.5mm increments
- ◆ Screw type adjusting nut allows for fine measuring adjustment
- ◆ Slide lock nut to hold measurement position
- ◆ Vernier plates are adjustable



Left, 6" model; right, measuring distance and depth.

### Inch Reading / Graduation – .001"

| Range | Blades Furnished | Base Length x Width | Catalog No.     | EDP No. |
|-------|------------------|---------------------|-----------------|---------|
| 0-6"  | One (6")         | 2-3/4" x 1/4"       | <b>448Z-6</b>   | 52306   |
| 0-12" | One (12")        |                     | <b>448Z-12</b>  | 52308   |
| 0-12" | Two (6" and 12") |                     | <b>448Z-612</b> | 52310   |

### Inch and Millimeter Reading / Graduation – .001" and 0.02mm – Both Edges

|             |                              |                                |                   |       |
|-------------|------------------------------|--------------------------------|-------------------|-------|
| 0-6"/150mm  | One (6"/150mm)               | 2-3/4" x 1/4"<br>(70 x 6.35mm) | <b>448MEZ-6</b>   | 52312 |
| 0-12"/300mm | One (12"/300mm)              |                                | <b>448MEZ-12</b>  | 52314 |
| 0-12"/300mm | Two (6"/150mm and 12"/300mm) |                                | <b>448MEZ-612</b> | 52316 |

Furnished in attractive, protective case. Packed one in a box.



**Steel Rule Depth Gages**

**No. 237 0-6"**

**No. 237M 0-150mm**

These very handy depth gages can be used to quickly obtain measurements in 64th of an inch or 1/2mm by simply adjusting the rule to the required depth.

- ◆ The gage consists of a nicely finished, hardened steel head and an accurate, machine divided, tempered steel rule. These rules are either our No. 610N (6 inch) or our No. 635N (150mm) models
- ◆ Gage can be smoothly adjusted to the required measurement and then locked into position by a knurled nut
- ◆ Base is cut out on one side, adjacent to the rule, permitting easier readings and more accurate measurements
- ◆ 6" hook rule (No. 236HC, EDP 51077) also available, permitting easier readings from the edge of a workpiece to the edges of slots, shoulders, etc. Graduated in 32nds, 64ths



Above: 6" model.

Right: Measuring depth of blind hole.



**0-6" range**

| Catalog No. | EDP No. | Graduation   | Head Length x Width |
|-------------|---------|--------------|---------------------|
| 237         | 51080   | 32nds, 64ths | 2-5/8" x 1/8"       |

**0-150mm range**

|      |       |           |          |
|------|-------|-----------|----------|
| 237M | 51081 | mm, 1/2mm | 66 x 3mm |
|------|-------|-----------|----------|

**NOTE:** Also available on request with No. C610N-6 satin chrome rule or with No. 611N-6 with 64ths-100ths graduations.

Packed one in a box.



## Combination Steel Rule Depth and Angle Gages

### No. 236 Series 0-6"

#### No. 236

This depth gage has an added feature permitting its use as a protractor for measuring angles. It is a simple, handy tool that is a welcome addition to any machinist's toolbox.

- ◆ The head is graduated both left and right to 30, 45, and 60 degrees. The rule can be set to any of these angles by swinging the rule until the line on the turret coincides with the desired angle
- ◆ Head is made of hardened steel, ground, and nicely polished – 2-5/8" (66mm) long and 1/8" (3mm) wide
- ◆ One side of the base is cut out to permit easier and more accurate readings
- ◆ The center of the head is recessed so that the tool will lay flat to permit more accurate measurements
- ◆ A tempered rule that has been accurately machined divided, is smoothly fitted to the head and can be locked in position by a knurled nut

#### No. 236H Series

These versatile gages can be used for calipering, as a depth gage by simply reversing the rule, as a protractor, and as a hook rule when removed from the tool.

- ◆ Features are the same as the No. 236 except that a hook rule and an extra 6" (150mm) long rod are furnished with this gage. The rod has a 5/64" (2mm) diameter so it can measure the depth of small holes, slots, and recesses that the rule will not enter



Left, No. 236.

Right, No. 236HB (with hook rule and rod).

### 0-6" range

| Graduation   | Angle Degrees | Description                                | Catalog No.  | EDP No. |
|--------------|---------------|--|--------------|---------|
| 32nds, 64ths | 30, 45, 60    | 6" Combination Gage                        | <b>236</b>   | 51074   |
|              |               | 6" Combination Gage with Hook Rule         | <b>236HA</b> | 51075   |
|              |               | 6" Combination Gage with Hook Rule and Rod | <b>236HB</b> | 51076   |
| None         | None          | 6" Hook Rule Only*                         | <b>236HC</b> | 51077   |
|              |               | 6" Rod Only                                | <b>236HD</b> | 51078   |

**NOTE:** Also available on request with No. C610N-6 satin chrome rule.

\*Hook rule only for Nos. 236, 236H, 237, 493 and 493B.

Packed one in a box.





### Dial Depth Gages

**No. 640 Series** 0-1/2"

**No. 640M Series** 0-10mm

**No. 643** 0-.125"

**No. 644** 0-3"

**No. 644M** 0-75mm

These depth gages are direct reading tools, referencing from their hardened and ground bases. All bases are 2-1/2" (64mm) long. They are quicker and more convenient to use than any other type of depth gage within their ranges and accuracy. Electronic Indicators can be furnished by special order.



Left-to-right: Nos. 640JZ, 643JZ, 644JZ.

### No. 640 Dial Depth Gages

The contact is slightly up into the base at rest. In action, the inspector sets the contact at zero, which is usually at the bottom of the base. Then the top button is pushed down to contact the work and the measurement is taken.

### No. 640R Dial Depth Gages

These gages are the same as the No. 640 except they have reverse movement (no push button) and can easily be used with one hand. Simply set on zero and apply the contact to the work and read the measurement.

### No. 643 Dial Depth Gage

This gage has a knife-edge base and a needle point contact which has been hardened and ground. The knife-edge base has a cutout so that the conical point can be precisely positioned for close work. Point is 1/2" (12.7mm) long with a 40° included angle.

In action, the inspector gently pushes the point down to read zero with the base and then pushes down to make the needle point contact the workpiece to take the measurement.

### No. 644 Dial Depth Gages\*

These gages are for longer ranges, and are accurate and simple to use. Put the contact on the work to be measured and push the gage head down until the base stops at the reference point and take your reading.

Furnished with three rounded-end contact points to cover the range. Flat end contact points are also available on special order.

The zero setting can be checked with the (shortest) contact in place by pushing down on a flat surface.

### No. 640 Series

| Range  | Graduation | Dial Reading | In Case  |         |
|--------|------------|--------------|----------|---------|
|        |            |              | Cat. No. | EDP No. |
| 0-1/2" | .0005"     | 0-50         | 640JZ    | 52705   |
|        |            |              | 640RJZ   | 52709   |
| 0-10mm | 0.01mm     | 0-100        | 640MJZ   | 55997   |
|        |            |              | 640MRJZ  | 56001   |

### No. 643

| Range   | Graduation | Dial Reading | In Case  |         | Without Case |         |
|---------|------------|--------------|----------|---------|--------------|---------|
|         |            |              | Cat. No. | EDP No. | Cat. No.     | EDP No. |
| 0-.125" | .0005"     | 0-25-0       | 643JZ    | 52714   | 643J         | 52715   |

### No. 644 Series

|        |        |       |        |       |       |       |
|--------|--------|-------|--------|-------|-------|-------|
| 0-3"   | .001"  | 0-100 | 644JZ  | 52718 | 644J  | 52719 |
| 0-75mm | 0.01mm | 0-100 | 644MJZ | 56027 | 644MJ | 56028 |

Packed one in a box.

\*No. 648 Depth Gage Bases will also accommodate the No. 644 Series. See specifications on the following page.





**Top Reading  
Dial Depth Gages**

**No. 642 Series 0-8.6"**

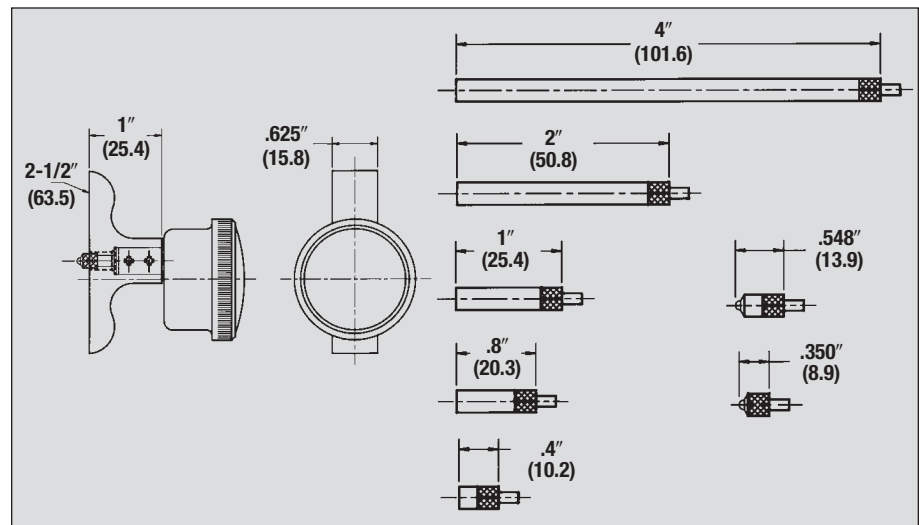
**No. 642M Series 0-215mm**

This dial depth gage uses the back-plunger indicator to provide an upward-facing dial for easier readout. The operator selects the extension and contact point required, zeros the tool on a master and then reads any deviation of the work directly on the dial.

- ◆ Indicator does not have to be repositioned to get the full range available
- ◆ Choice of 2-1/2" (60mm) or 4" (100mm) base
- ◆ Two contacts and five extensions extend the range to 8.6" or 215mm
- ◆ Charts are supplied showing combinations of contacts and extensions required to achieve certain lengths



Left, No. 642AZ side view; right, top view.



**0-8.6" range**

| Graduation | Dial Indicator Range | Approx. Base Length | Catalog No.  | EDP No. |
|------------|----------------------|---------------------|--------------|---------|
| .001"      | .200"                | 2-1/2"              | <b>642Z</b>  | 65103   |
|            |                      | 4"                  | <b>642AZ</b> | 65104   |

**0-215 mm range**

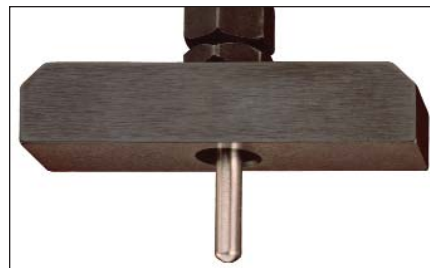
| Graduation | Dial Indicator Range | Approx. Base Length | Catalog No.   | EDP No. |
|------------|----------------------|---------------------|---------------|---------|
| 0.01mm     | 5mm                  | 60mm                | <b>642MZ</b>  | 65105   |
|            |                      | 100mm               | <b>642MAZ</b> | 65106   |

All gages furnished with extensions and contact points in case. Packed one in a box.

**Depth Gage Bases**

**No. 648 Series**

These different bases are for mounting indicators with a 3/8" (9.5mm) stem (No. 25SC38 Stem Collet included) or an 8mm stem with optional No. 25MSB Split Bushing.



| Base Size  | Catalog No.  | EDP No. |
|------------|--------------|---------|
| 4" (100mm) | <b>648-4</b> | 65850   |
| 6" (150mm) | <b>648-6</b> | 65851   |
| 8" (200mm) | <b>648-8</b> | 65852   |



This section includes the following:

- ◆ Test and Back-Plunger Indicators and Holders .....140-158
- ◆ Electronic and Mechanical AGD Indicators and Holders .....159-202
- ◆ Special Function Dial Gages .....203-224







## Test Indicators and Holders

Test indicators are primarily used for the testing or checking of parts and for machine setups, but they are also frequently used for general production purposes, either singly or “ganged” in multiples. They are an indispensable part of a toolmaker’s kit of tools.

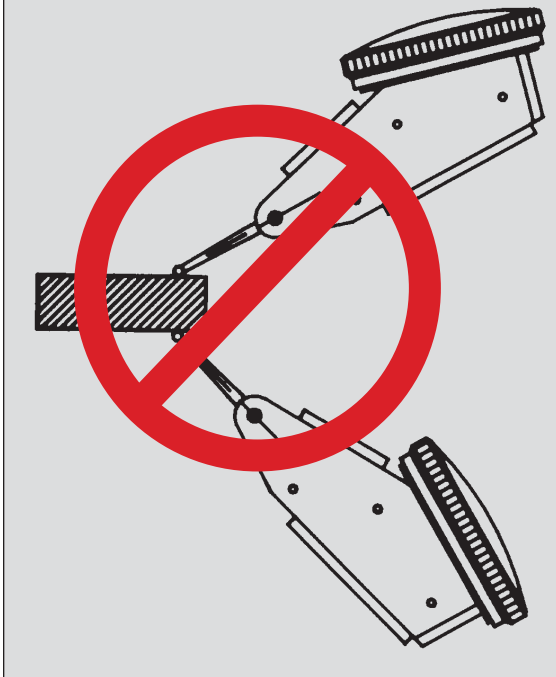
Test indicators come in two types – the plunger style and the lever style. The lever style is more adaptable to smaller, confined working areas, but both types are amazingly versatile.

The lever style differs in measuring because the lever contact moves in an arc rather than in a straight line, as in the plunger style. This can cause a slight inaccuracy called a “cosine error” if reasonable care is not used in setting the angle of the lever to the workpiece. If, for example, a lever was set off 20° more at the start of a reading than it should have been, there could be an error of .0006” in a .010” range (0.012 mm in a 0.2mm range). This is not important when zeroing-out, but only when looking for a measurement.

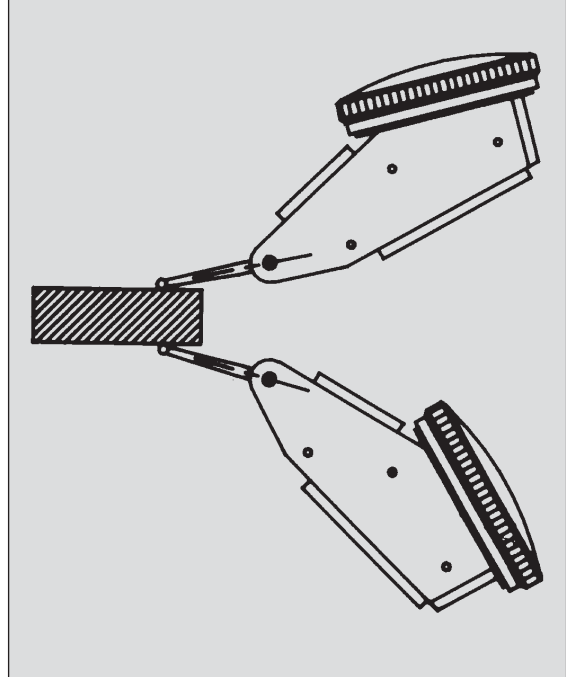
There are other test indicators on the market that have pear-shaped contacts to try to compensate for this error. We do not think this is effective. We think it is best to keep your contact at or near 90° to the direction of movement unless the manufacturer specifies another angle. (See Illustration.) Test indicators should always be “loaded” 1/10 to 1/4 of a turn before measuring.

Test indicators are not hand-held absolute measuring tools. They are comparative instruments that check and compare to known standards or that are used to zero-out setups. We have a broad selection of holders shown in this section that allows you to use these indicators to the fullest. We’ve never seen a job that one of these holders combined with one of our test indicators could not handle.

### Incorrect



### Correct







### Dial Test Indicators with dovetail mounts

**No. 708 Series** .020"

**No. 708M Series** 0.2mm

**No. 709 Series** .060"

**No. 709M Series** 0.8mm

These precision test indicators were designed to be positioned for easy and accurate readability. The versatility of the angled head, combined with the three dovetail mounts eliminates the need for having both vertical and horizontal style test indicators. These are the features that make this series of test indicators superior to ordinary types:

#### Readability Features

- ◆ Angled head for better reading position
- ◆ Large 1-3/8" (35mm) dial diameter
- ◆ Revolution count hand on Nos. 708B and 709B models for easy reading

#### Accuracy Features

- ◆ Precision gear-driven design with smooth, jeweled movement
- ◆ Meet or exceed ISO accuracy specification
- ◆ For extreme accuracy we recommend positioning the lever contact so that it is approximately 15° from being horizontal with the workpiece



Left-to-right: Nos. 708BZ, 708AZ, 709AZ.

#### Versatility Features

- ◆ Three dovetail positioning mounts work with existing test indicator accessories
- ◆ Inch reading indicators are available with easy-to-read, shaded white, solid red, or solid black dials – millimeter reading indicators with solid yellow dials
- ◆ Contact point reverses automatically, always maintaining clockwise hand rotation
- ◆ Narrow body for inreach ability
- ◆ Satin chrome finish for durability
- ◆ Models with twice the range of ordinary types
- ◆ Long carbide contacts 13/16" (20mm) are furnished as standard on most indicators. Exceptions are the contacts for the Nos. 709ALZ and 709ALCZ which are 1-23/64" (34mm) long; and Nos. 709MALZ and 709MALCZ which are 1-5/64" (28mm)
- ◆ Contact points with other ball diameters also available individually, as listed
- ◆ Contacts are frictionally adjustable and replaceable



Angled head for easy reading.

Specifications on next page.



**Dial Test Indicators with dovetail mounts (continued)  
Nos. 708, 708M and Nos. 709, 709M Series**

**Inch Reading**

| Graduation | Range  | Dial Reading         | Carbide Contact Point |                    | Description         | Dial Color     | Catalog No.    | EDP No. | With Standard Letter of Certification** |         |
|------------|--------|----------------------|-----------------------|--------------------|---------------------|----------------|----------------|---------|---|---------|
|            |        |                      | Length In. (mm)       | Ball Dia. In. (mm) |                     |                |                |         | Catalog No.                             | EDP No. |
| .0001"     | .010"  | 0-5-0                | 13/16"<br>(20mm)      | .078"<br>(2mm)     | Without Attachments | White          | <b>708AZ</b>   | 64212   | <b>708AZ W/SLC</b>                      | 66866   |
|            |        |                      |                       |                    |                     | Red            | <b>R708AZ</b>  | 64603   | <b>R708AZ W/SLC</b>                     | 66867   |
|            |        |                      |                       |                    |                     | Black          | <b>B708AZ</b>  | 64607   | <b>B708AZ W/SLC</b>                     | 66868   |
|            | .020"  |                      |                       |                    | With Attachments*   | White          | <b>708ACZ</b>  | 64217   | <b>708ACZ W/SLC</b>                     | 66869   |
|            |        |                      |                       |                    |                     | Red            | <b>R708ACZ</b> | 64604   | <b>R708ACZ W/SLC</b>                    | 66870   |
|            |        |                      |                       |                    |                     | Black          | <b>B708ACZ</b> | 64608   | <b>B708ACZ W/SLC</b>                    | 66871   |
| .0005"     | .030"  | 0-15-0               | 13/16"<br>(20mm)      | .078"<br>(2mm)     | Without Attachments | White          | <b>709AZ</b>   | 64214   |   |         |
|            |        |                      |                       |                    |                     | Red            | <b>R709AZ</b>  | 64605   |   |         |
|            |        |                      |                       |                    |                     | Black          | <b>B709AZ</b>  | 64609   |   |         |
|            | .050"  |                      |                       |                    | With Attachments*   | White          | <b>709ACZ</b>  | 64219   |   |         |
|            |        |                      |                       |                    |                     | Red            | <b>R709ACZ</b> | 64606   |   |         |
|            |        |                      |                       |                    |                     | Black          | <b>B709ACZ</b> | 64610   |   |         |
| .060"      | 0-25-0 | 1-23/64"<br>(34.4mm) | Without Attachments   | With Attachments*  | White               | <b>709ALZ</b>  | 65857          |         |   |         |
|            |        |                      |                       |                    | White               | <b>709ALCZ</b> | 65858          |         |   |         |
|            |        |                      |                       |                    | White               | <b>709BZ</b>   | 64215          |         |   |         |
| .060"      | 0-15-0 | 13/16"<br>(20mm)     | Without Attachments   | With Attachments*  | White               | <b>709BCZ</b>  | 64220          |         |   |         |
|            |        |                      |                       |                    | White               | <b>709BCZ</b>  | 64220          |         |   |         |

**Millimeter Reading**

|         |       |         |                     |                |                     |        |                 |       |                      |       |
|---------|-------|---------|---------------------|----------------|---------------------|--------|-----------------|-------|----------------------|-------|
| 0.002mm | 0.2mm | 0-100-0 | 5/8"<br>(16mm)      | .078"<br>(2mm) | Without Attachments | Yellow | <b>708MAZ</b>   | 65864 | <b>708MAZ W/SLC</b>  | 66872 |
|         |       |         |                     |                | With Attachments*   |        | <b>708MACZ</b>  | 65865 | <b>708MACZ W/SLC</b> | 66873 |
| 0.01mm  | 0.8mm | 0-40-0  | 13/16"<br>(20mm)    | .078"<br>(2mm) | Without Attachments | Yellow | <b>709MAZ</b>   | 64216 |                      |       |
|         |       |         |                     |                | With Attachments*   |        | <b>709MACZ</b>  | 64221 |                      |       |
|         | 1.0mm | 0-50-0  | 1-5/64"<br>(28.4mm) |                | Without Attachments |        | <b>709MALZ</b>  | 67092 |                      |       |
|         |       |         |                     |                | With Attachments*   |        | <b>709MALCZ</b> | 67093 |                      |       |

**Individual Carbide Contact Points†**

| Fits Series                                 | Length  |        | Ball Diameter |        | Part No.        | EDP No. |
|---|---------|--------|---------------|--------|-----------------|---------|
|   | Inch    | mm     | Inch          | mm     |                 |         |
| .0001", .0005",<br>0.01mm<br>Reading Models | 13/16"  | 20mm   | .040"         | 1mm    | <b>PT23942</b>  | 65255   |
|   |         |        | .078"         | 2mm    | <b>PT23914†</b> | 64222   |
|   |         |        | .120"         | 3mm    | <b>PT23943</b>  | 65256   |
|   |         |        | 1-23/64"      | 34.4mm | .078"           | 2mm     |
|   | 1-5/64" | 28.4mm | .078"         | 2mm    | <b>PT25577†</b> | 67294   |
| 0.002mm<br>Reading Models Only              | 5/8"    | 16mm   | .078"         | 2mm    | <b>PT23953†</b> | 65868   |

\*Attachments include **dovetail body clamp** (PT22429/EDP 72441), **tool post holder** (PT11770A/EDP 71361), **swivel post snug with dovetail indicator clamp** (PT22428/EDP 72440), and **snug and rod unit** (Inch: PT22430/EDP 72442 or Millimeter: PT27171/EDP 66457) (see detailed description on page 145 for complete information and/or individual ordering).

\*\* Includes redemption card for Standard Letter of Certification (SLC).

†PT23914, PT27024, PT25577 and PT23953 furnished as standard.

‡Length of carbide contacts must be the same as contacts normally furnished.

Indicators furnished in fitted case.



### Dial Test Indicators with swivel head

**No. 811 Series** .060"

**No. 811M Series** 0.8mm

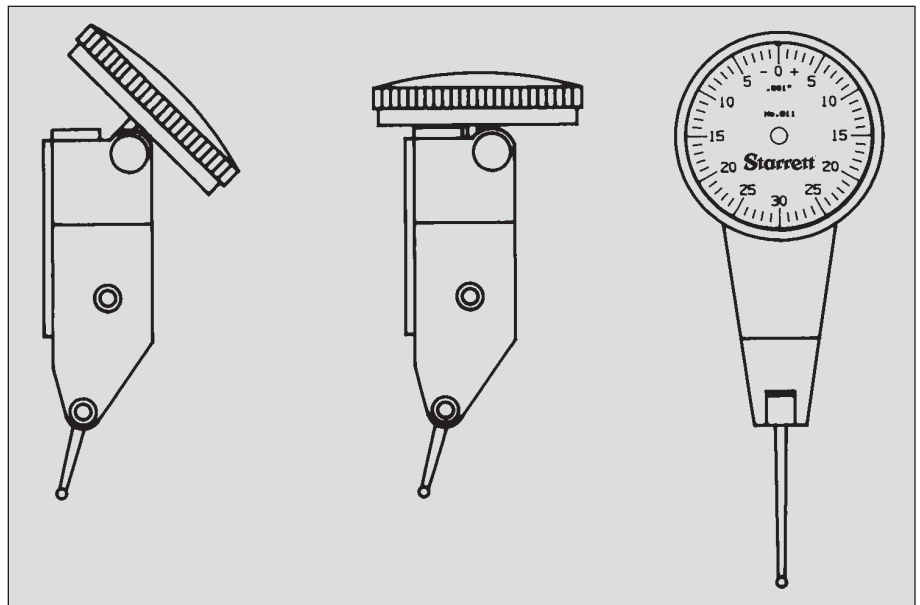
These are some of the most versatile and unique indicators available because the handy swivel head feature allows positioning to suit your line of sight from horizontal to vertical and at any angle in between 90°.

Additional features and benefits include:

- ◆ Two positioning mounts work with existing dovetail test indicator accessories
- ◆ Contacts are frictionally adjustable and replaceable
- ◆ Contact point reverses, always maintaining clockwise hand rotation
- ◆ Contacts also available individually in steel, carbide and different sizes as listed
- ◆ Smooth, jeweled movement
- ◆ Large, 1-3/8" (35mm) dial diameter for increased readability
- ◆ Inch reading indicators are available with white, red, or black dials – metric indicators with yellow dials



Left-to-right: Nos. 811-5CZ, R811-1CZ, B811-5CZ.



Head swivels at any angle from horizontal to vertical, up to 90°.



**Dial Test Indicators with swivel head (continued)  
Nos. 811 and 811M Series**

**Inch Reading**

| Graduation | Range | Dial Reading | Steel Contact Points |                        | Description                 | Dial Color | Catalog No.     | EDP No. |
|------------|-------|--------------|----------------------|------------------------|-----------------------------|------------|-----------------|---------|
|            |       |              | Length<br>Inch (mm)  | Ball Dia.<br>Inch (mm) |                             |            |                 |         |
| .0005"     | .030" | 0-15-0       | 5/8"<br>(16mm)       | .078"<br>(2mm)         | In Case without Attachments | White      | <b>811-5PZ</b>  | 57080   |
|            |       |              |                      |                        |                             | Black      | <b>B811-5PZ</b> | 63262   |
|            |       |              |                      |                        |                             | Red        | <b>R811-5PZ</b> | 63266   |
|            |       |              |                      |                        | In Case with Attachments*   | White      | <b>811-5CZ</b>  | 57079   |
|            |       |              |                      |                        |                             | Black      | <b>B811-5CZ</b> | 63261   |
|            |       |              |                      |                        |                             | Red        | <b>R811-5CZ</b> | 63265   |
| .001"      | .060" | 0-30-0       | 1-5/16"<br>(33mm)    | .078"<br>(2mm)         | In Case without Attachments | White      | <b>811-1PZ</b>  | 57082   |
|            |       |              |                      |                        |                             | Black      | <b>B811-1PZ</b> | 63264   |
|            |       |              |                      |                        |                             | Red        | <b>R811-1PZ</b> | 63268   |
|            |       |              |                      |                        | In Case with Attachments*   | White      | <b>811-1CZ</b>  | 57081   |
|            |       |              |                      |                        |                             | Black      | <b>B811-1CZ</b> | 63263   |
|            |       |              |                      |                        |                             | Red        | <b>R811-1CZ</b> | 63267   |

**Millimeter Reading**

|        |       |        |                |                |                             |        |                |       |
|--------|-------|--------|----------------|----------------|-----------------------------|--------|----------------|-------|
| 0.01mm | 0.8mm | 0-40-0 | 5/8"<br>(16mm) | .078"<br>(2mm) | In Case without Attachments | Yellow | <b>811-MPZ</b> | 57084 |
|        |       |        |                |                | In Case with Attachments*   |        | <b>811-MCZ</b> | 57083 |

\*Attachments include **dovetail body clamp** (PT22429/EDP 72441), **tool post holder** (PT11770A/EDP 71361), **swivel post snug with dovetail indicator clamp** (PT22428/EDP 72440), and **snug and rod unit** (Inch: PT22430/EDP 72442 or Millimeter: PT27171/EDP 66457) (see detailed description on previous pages for complete information and/or individual ordering). All attachments are the same as for Nos. 708 and 709. Details and complete listings are shown on those pages.

**Individual Contact Points**

| Fits No. 811<br>Models               | Length  |      | Ball Diameter |       | Material | Part No.        | EDP No. |
|--------------------------------------|---------|------|---------------|-------|----------|-----------------|---------|
|                                      | Inch    | mm   | Inch          | mm    |          |                 |         |
| .0005" and<br>0.01mm<br>Reading Only | 5/8"    | 16mm | .032"         | 0.8mm | Steel    | <b>PT23062</b>  | 72451   |
|                                      |         |      |               |       | Carbide  | <b>PT23062X</b> | 72452   |
|                                      |         |      | .078"         | 2mm   | Steel    | <b>PT22315</b>  | 72443   |
|                                      |         |      |               |       | Carbide  | <b>PT22315X</b> | 72453   |
| .001"<br>Reading Only                | 1-5/16" | 33mm | .032"         | 0.8mm | Steel    | <b>PT23064</b>  | 72454   |
|                                      |         |      |               |       | Carbide  | <b>PT23064X</b> | 72455   |
|                                      |         |      | .078"         | 2mm   | Steel    | <b>PT23011</b>  | 72444   |
|                                      |         |      |               |       | Carbide  | <b>PT23011X</b> | 72456   |

Indicators furnished in fitted case.





### Attachments for Starrett Nos. 708, 709, and 811 Series Test Indicators

**A. \*Dovetail Body Clamp** – No. PT22429  
3/16" (4.8mm) diameter rod. For use in chucks, collets or surface gage snugs.



**B. \*Tool Post Holder** – No. PT11770A  
1/4" x 1 5/16" (6.3 x 33mm) post and 1/4" x 1/2" (6.3 x 12.7mm) shank. For use in tool posts or in height gages.



**C. \*Swivel Post Snug with Dovetail Indicator Clamp** – No. PT22428  
Will fit over spindles and posts 3/32-1/4" (2.4-6.3mm). Can be used directly on our No. 252 Height Transfer Gage and our No. 657 Series Magnetic Base Holders. It is frequently used on the 1/4" (6.3mm) rod of the Snug and Rod Unit No. PT22430.



**D. \*Snug and Rod Unit** – No. PT22430  
This unit consists of a snug (No. PT18724) with two 4" (100mm) long rods, one a 1/4" (6.3mm) diameter, the other a 3/8" (9.5mm) diameter. It is generally used with an indicator attached to No. PT22428 Swivel Post Snug which slides onto the 1/4" (6.3mm) diameter rod.

The 3/8" (9.5mm) rod will fit into the Nos. 252 and 657H Gage Holders. It also has the ability to be held in chucks and adjusted to a wide range of heights and diameters.

**DM. Metric Snug and Rod Unit** – No. PT27171. This unit consists of a snug with two 100mm (4") long rods, one having a 6mm (.236") diameter, the other an 8mm (.315") diameter.



**E. Indicator Axial Support** – No. PT26007  
This triple-hinged indicator holder is designed to mount dovetail indicators (such as our Nos. 708, 709, and 811 Series). By using a rod through the 3/16" (4.7mm) mounting hole, it will also accommodate test indicators such as our No. 711 Series. Overall length is approximately 5 1/4" (133mm), shank size is 3/8" (9.5mm).



**F. Height Gage Attachment** – No. 711-49  
1/8" x 5/16" (3 x 8mm) shank. This is used for Starrett Nos. 250, 454 10", 750, 751 Height Gages and No. 995 Planer and Shaper Gage.



**G. Height Gage Attachment** – No. 711-35  
3/16" x 3/8" (4.8 x 9.5mm) shank. This is used for Starrett Nos. 255 and No. 454 12" and 24" Height Gages.



**H. Indicator Attachment, dovetail clamping style** – No. PT99454. Replaces standard scriber. Provides means to attach dovetail equipped test indicators or electronic probes to height gages. Allows indicator to be used to ensure that the down pressure on the part is the same as the original set zero position.



**I. & J. Collet Adaptors** – No. PT28315  
To be used with a 3/16" (4.7mm) diameter attachment for indicators such as PT22429 dovetail body clamp and PT0710F long and short arm attachments.  
No. PT28316 – Swivel Post Collet Adaptor, for use on any dovetail test indicator.



\* Attachments marked with an asterisk (\*) are furnished with all sets having "C" in the catalog number.

| Photo Key | Description                          | Part No. | EDP No. |
|-----------|--------------------------------------|----------|---------|
| A*        | Dovetail Body Clamp                  | PT22429  | 72441   |
| B*        | Tool Post Holder                     | PT11770A | 71361   |
| C*        | Swivel Post Snug with Clamp          | PT22428  | 72440   |
| D*        | Snug and Rod Unit                    | PT22430  | 72442   |
| DM        | Metric Snug and Rod Unit             | PT27171  | 66457   |
| E         | Indicator Axial Support              | PT26007  | 65101   |
| F         | Height Gage Attachment               | 711-49   | 52941   |
| G         | Height Gage Attachment               | 711-35   | 52942   |
| H         | Indicator Attachment, dovetail style | PT99454  | 68713   |
| I         | Collet Adaptor                       | PT28315  | 68847   |
| J         | Collet Adaptor                       | PT28316  | 68848   |



## Last Word® Dial Test Indicators

**No. 711 Series .030"**

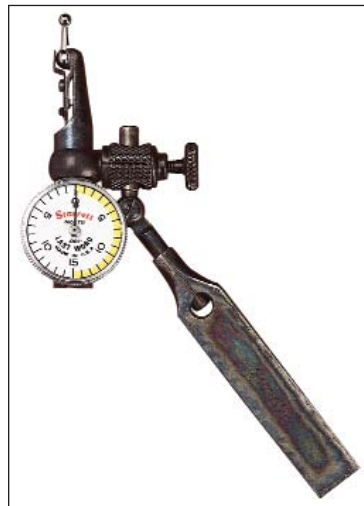
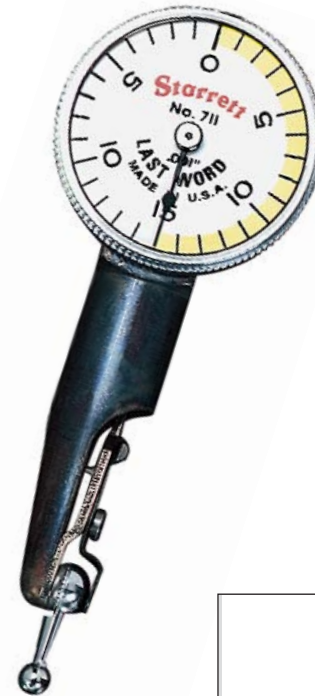
**No. 711M Series 0.07mm**

The venerable Last Word® Dial Test Indicator is among the most versatile available. Their small size and variety of attachments will handle all jobs with ease and accuracy. A very useful feature is the shaded dial – when used with a mirror, such as in a jig bore application, the operator will always know what the correct reading is.

Other features include:

- ◆ Ideal for precise measurements in all machining, layout, and inspection work
- ◆ Smooth, jeweled lever action
- ◆ Positive reversing switch
- ◆ Hard chrome-plated ratchet contact point
- ◆ Swiveling tubular body
- ◆ Easy reading dials, half-shaded yellow for clarity
- ◆ Variety of attachments available to suit the application, such as: universal or gooseneck shanks and universal friction holder with shank
- ◆ Indicators having "C" in the catalog number are furnished with 3 interchangeable steel contact points. All other indicators are furnished with one interchangeable steel contact point, No. PT07087. Carbide points available as listed

No. 711F Indicator only.



Right: No. 711LPSZ Indicator with Universal Friction Holder and shank.

Left: No. 711FSAZ Indicator with universal shank and body clamp attachment.




**Last Word® Compact Dial Test Indicators Nos. 711 and 711M Series (continued)**
**Inch Reading**

| Graduation | Range | Dial Reading | Steel Contact Points |                            | Description   | Catalog No.    | EDP No. |
|------------|-------|--------------|----------------------|----------------------------|---|----------------|---------|
|            |       |              | Length<br>Inch (mm)  | Ball Diameter<br>Inch (mm) |   |                |         |
| .001"      | .030" | 0-15-0       | 5/32"<br>(4mm)       | One:<br>.120" (3mm)        | Indicator with Universal Shank Complete with Long and Short Arm, Body Clamp | <b>711FSAZ</b> | 52925   |
|            |       |              |                      |                            | Indicator with Gooseneck Shank  | <b>711FSBZ</b> | 52927   |
|            |       |              |                      |                            | Indicator with Body Clamp Only  | <b>711FSZ</b>  | 52929   |
|            |       |              |                      |                            | Indicator with Universal Friction Holder with Shank                         | <b>711GPSZ</b> | 52944   |
|            |       |              |                      |                            | Indicator Complete with All Attachments*                                    | <b>711GCSZ</b> | 52943   |
| .0005"     | .030" | 0-15-0       | 5/32"<br>(4mm)       | One:<br>.120" (3mm)        | Indicator with Universal Shank Complete with Long and Short Arm, Body Clamp | <b>711HSAZ</b> | 52951   |
|            |       |              |                      |                            | Indicator with Body Clamp Only  | <b>711HSZ</b>  | 52953   |
|            |       |              |                      |                            | Indicator with Universal Friction Holder with Shank                         | <b>711LPSZ</b> | 52958   |
|            |       |              |                      |                            | Indicator Complete with All Attachments*                                    | <b>711LCSZ</b> | 52957   |
|            |       |              |                      |                            | Indicator Complete with All Attachments*                                    | <b>711LCSZ</b> | 52957   |

**Millimeter Reading**

|        |       |        |                |                     |   |                 |       |
|--------|-------|--------|----------------|---------------------|---|-----------------|-------|
| 0.01mm | 0.7mm | 0-35-0 | 5/32"<br>(4mm) | One:<br>.120" (3mm) | Indicator with Universal Shank Complete with Long and Short Arm, Body Clamp | <b>711MFAZ</b>  | 52926 |
|        |       |        |                |                     | Indicator with Body Clamp Only  | <b>711MFSZ</b>  | 52930 |
|        |       |        |                |                     | Indicator with Universal Friction Holder with Shank                         | <b>711MGPSZ</b> | 52946 |
|        |       |        |                |                     | Indicator Complete with All Attachments*                                    | <b>711MGCSZ</b> | 52945 |
|        |       |        |                |                     | Indicator Complete with All Attachments*                                    | <b>711MGCSZ</b> | 52945 |

\*Attachments include 3 contact points – body clamp – universal friction holder with shank – universal shank complete with long and short arm – double-jointed attachment – height gage attachment – surface gage attachment – coupling with 3/16" (4.8 mm) hole.

**Individual Contact Points (Fit All No. 711 Series)**

| Length |     | Ball Diameter |       | Material | Part No.        | EDP No. |
|--------|-----|---------------|-------|----------|-----------------|---------|
| Inch   | mm  | Inch          | mm    |          |                 |         |
| 5/32"  | 4mm | .035"         | 0.9mm | Steel    | <b>PT07137</b>  | 70945   |
|        |     | .062"         | 1.6mm |          | <b>PT07136</b>  | 70944   |
|        |     | .120"         | 3mm   |          | <b>PT07087</b>  | 70912   |
|        |     | .035"         | 0.9mm | Carbide  | <b>PT07137X</b> | 52964   |
|        |     | .062"         | 1.6mm |          | <b>PT07136X</b> | 52965   |
|        |     | .120"         | 3mm   |          | <b>PT07087X</b> | 52966   |



## Attachments for Starrett No. 711 Series Last Word® Dial Test Indicators

**A. \*Body Clamp** – No. PT07101F  
Permits the indicator to be held by its body and clamped to any diameter rod from 1/8-1/4" (3-6mm). It will attach directly to the rod on the Starrett No. 252 Height Transfer Gage, Nos. 57 and 257 Surface Gage Scribes and No. 657A and AA Holder. It also attaches the universal shank to the indicator with the addition of No. PT07104F Long and Short Arm.



**B. \*Universal Friction Holder with shank** – No. 711EA – This inserts in place of the end plug at the top of the indicator body. The shank has a 3/16" (4.8mm) diameter which will fit into chucks and also into the snugs of our Nos. 57 and 257 Surface Gages.



**C. \*Universal Shank** – No. PT07103A  
This shank includes No. PT07104F (the long and short arm) to go into the body clamp. With its shank size of 1/4" x 1/2" (6.4 x 12.7mm) this can be used in a lathe tool post or for Starrett Height Gage Nos. 254 and 259.



**D. Gooseneck Shank** – No. PT07107A  
1/4" x 1/2" (6.4 x 12.7mm) shank can be used on tool posts and on the same height gages as the No. PT07103A Universal Shank. It is attached by unscrewing the body clamp and replacing it with the gooseneck shank.



**E. \*Double-Jointed Attachment** – No. PT13301 – This attachment has a 3/8" (9.5mm) diameter at one end and a 1/4" (6.3mm) diameter at the other end and will fit into chucks and collets, (such as in a jig borer) and hold the indicator by the body clamp, giving it greater depth and diameter range.



**F. \*Long and Short Arm** – No. PT07104F  
This is used with the universal shank to attach it to the body clamp. It has a 3/16" (4.8mm) diameter and arms with 13/16" and 1-3/16" (20mm and 30mm) lengths.



**G. \*Coupling with 3/16" (4.8mm) hole** – No. PT05116 – Coupling slips over the long and short arm No. PT07104F and the shank of No. PT13175 Universal Friction Holder to permit offset.



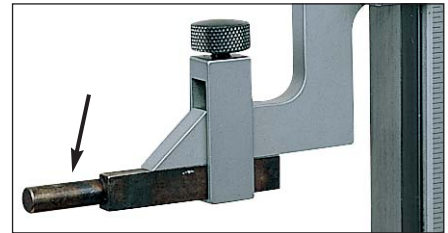
**H. \*Height Gage Attachment** – No. PT24706 – This inserts in place of the end plug at the top of the indicator body. The 3/16" x 11/32" (4.8 x 8.7mm) shank fits Starrett No. 255 12", 18" and 24" Height Gages.



**I. Height Gage Attachment** – No. 711-49 – 1/8" x 5/16" (3 x 8mm). This goes into the body clamp and allows the indicator to be used on Starrett Nos. 250, 354, 454-10", 750, 751 Height Gages.



**J. Height Gage Attachment** – No. 711-35 – 3/16" x 3/8" (4.8 x 9.5mm). This goes into the body clamp and is used for Starrett No. 255 12", 18" and 24" Height Gages.



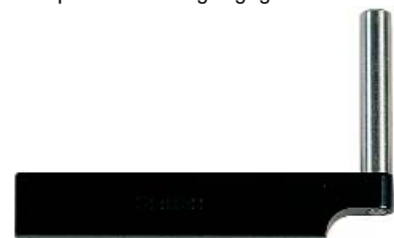
**K. Indicator Axial Support** – No. PT26007  
This triple-hinged indicator holder will hold our No. 711 Series Indicators by putting a shank or rod through the 3/16" (4.7mm) mounting hole. Also designed to mount dovetail indicators. Overall length is approximately 5-1/4" (133mm) – shank size is 3/8" (9.5mm).



**L. \*Surface Gage Attachment** – No. PT05119 – Fits in place of the ball shank of the No. 711EA Attachment. Allows Nos. 711G and L Indicators to be used on holders with smaller clamp holes.



**M. Tool Post Holder** – No. PT11770A  
1/4" x 1-5/16" (6.3 x 33mm) post and 1/4" x 1/2" (6.3 x 12.7mm) shank. For use in tool posts or in height gages.



\* Attachments marked with an asterisk (\*) are furnished with all sets having "C" in the catalog number.





**Attachments for Starrett No. 711 Series Last Word® Dial Test Indicators (continued)**

**N. Rubber Dust Guard** – No. PT09764  
Protects the indicators' working parts by sealing out dust, powder, and other foreign matter under adverse gaging conditions.



**O. Collet Adaptor** – No. PT28315  
To be used with a 3/16" (4.7mm) diameter attachment for indicators such as PT22429 dovetail body clamp and PT0710F long and short arm attachments.



| Photo Key | Description                                      | Part No.        | EDP No. |
|-----------|--|-----------------|---------|
| <b>A*</b> | Body Clamp                                       | <b>PT07101F</b> | 70924   |
| <b>B*</b> | Universal Friction Holder with Shank             | <b>711EA</b>    | 52924   |
| <b>C*</b> | Universal Shank Complete with Long and Short Arm | <b>PT07103A</b> | 52939   |
| <b>D</b>  | Gooseneck Shank                                  | <b>PT07107A</b> | 52937   |
| <b>E*</b> | Double-Jointed Attachment                        | <b>PT13301</b>  | 71441   |
| <b>F*</b> | Long and Short Arm                               | <b>PT07104F</b> | 70929   |
| <b>G*</b> | Coupling with 3/16" (4.8mm) Hole                 | <b>PT05116</b>  | 70556   |
| <b>H*</b> | Height Gage Attachment                           | <b>PT24706</b>  | 65064   |
| <b>I</b>  |  | <b>711-49</b>   | 52941   |
| <b>J</b>  |  | <b>711-35</b>   | 52942   |
| <b>K</b>  | Indicator Axial Support                          | <b>PT26007</b>  | 65101   |
| <b>L*</b> | Surface Gage Attachment                          | <b>PT05119</b>  | 70557   |
| <b>M</b>  | Tool Post Holder                                 | <b>PT11770A</b> | 71361   |
| <b>N</b>  | Rubber Dust Guard                                | <b>PT09764</b>  | 71290   |
| <b>O</b>  | Collet Adaptor                                   | <b>PT28315</b>  | 68847   |

\*Attachments marked with an asterisk (\*) are furnished with all sets having "C" in the catalog number.



## Back-Plunger Dial Indicators

**No. 650 Series with deep hole attachment .200"**

**No. 651 Series without deep hole attachment**

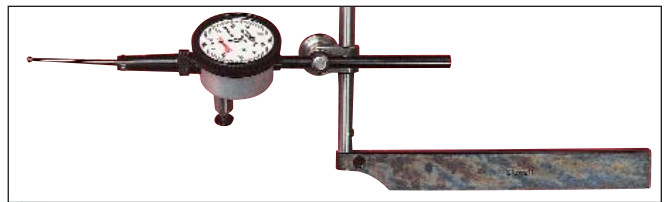
These workhorse back-plunger indicators feature AGD (American Gage Design) stem holding fixtures and the great variety of AGD contact points. This very versatile indicator series has the following features:

- ◆ Smooth and accurate operation due to their sturdy, basic design
- ◆ Hardened, stainless steel AGD stem .375" (9.5mm) diameter
- ◆ Shank dimension 1/4" (6.3mm) diameter, 3-3/16" (80mm) long
- ◆ No. 650 Indicators have a 3" (75mm) deep hole attachment that connects directly with the main spindle for positive action. Attachment is convenient to use when checking internal dimensions of a workpiece while in fixtures or machines. When not needed, the attachment can be easily removed and the hole capped
- ◆ No. 651 Indicators are identical to the No. 650 Series except they cannot accept the deep hole attachment



Left-to-right:  
Nos. 650 and 651.

- ◆ Both models have large 1-11/16" (43mm) diameter bezels with easy-to-read dial numbers and graduations



### Individual Contact Points Only

| Photo | Part No.  | EDP No. |
|-------|-----------|---------|
|       | PT07215   | 70965   |
|       | PT06632-5 | 70793   |
|       | PT06632-6 | 70794   |

- ◆ With their .375" (9.5mm) AGD stem diameter, the 650 and 651 can be used with our No. 670 Hole Attachment and our No. 671 Universal Attachment the .375" (9.5mm) AGD stem diameter
- ◆ Adjustable dials to set zero at any point opposite the hand
- ◆ Inch reading dials have white faces and millimeter reading dials are yellow
- ◆ Three different styles of contact points are furnished with each indicator

### Inch Reading

| Range | Graduation | Dial Reading | Description  | No. 650 Series            |                              | No. 651 Series |         |
|-------|------------|--------------|--|---------------------------|------------------------------|----------------|---------|
|       |            |              |  | With Deep Hole Attachment | Without Deep Hole Attachment | Catalog No.    | EDP No. |
| .200" | .001"      | 0-100        | Indicator with 3 Contact Points, 3 Attachments*, in Case | 650A1Z                    | 64475                        | 651A1Z         | 64483   |
|       |            |              | Indicator with 3 Contact Points Only                     | 650B1                     | 64477                        | 651B1          | 64485   |
|       |            | 0-50-0       | Indicator with 3 Contact Points, 3 Attachments*, in Case | 650A5Z                    | 64474                        | 651A5Z         | 64484   |
|       |            |              | Indicator with 3 Contact Points Only                     | 650B5                     | 64476                        | 651B5          | 64486   |

### Millimeter Reading

| Range | Graduation | Dial Reading           | Description  | No. 650M Series |         | No. 651M Series |         |
|-------|------------|------------------------|--|-----------------|---------|-----------------|---------|
|       |            |                        |  | Catalog No.     | EDP No. | Catalog No.     | EDP No. |
| 5 mm  | 0.01mm     | 0-100 Yellow Dial Face | Indicator with 3 Contact Points, 3 Attachments*, in Case | 650MA1Z         | 65261   | 651MA1Z         | 65263   |
|       |            |                        | Indicator with 3 Contact Points Only                     | 650MB1          | 65262   | 651MB1          | 65264   |

\*Attachments include clamp, tool post holder and snug (PT18718). For detailed information, see below and next page.

## Attachments for Starrett No. 650 & No. 651 Series Back-Plunger Dial Indicators

**A. \*Clamp** – No. PT99437  
With a 1-5/16" (33mm) flat or round capacity – 5/16" (8mm) post used with No. PT18718 Snug. (See right)



**B. \*Tool Post Holder** – No. PT99438  
3/8" x 3/4" x 6" (9.5 x 19 x 150mm) with upright spindle 5/16" dia. x 4-1/2" length (8 x 114mm).



(Continued on the next page.)



### Back-Plunger Dial Indicators

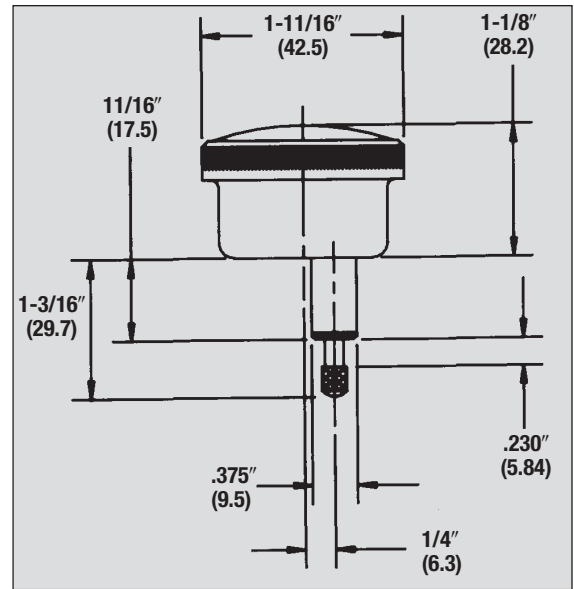
**No. 641** .200"

**No. 641M** 5mm

These indicators have the same design as the 650 Series, but without the shank and deep hole attachments. They are useful for positioning in unconventional fixtures and mountings. The spindle is perpendicular to the dial face for optimum dial readability.



Above: No. 641;  
Below: No. 641M.



- ◆ Continuous reading dials with revolution counters
- ◆ Uses standard AGD contacts

### Attachments for Starrett No. 650 and No. 651 Series Back-Plunger Dial Indicators (continued)

**C. \*Snug Complete** – No. PT18718  
Post hole has a 5/16" diameter† and 3/32-1/4" holding capacity. Can be used on our No. 252 Height Transfer Gage, Nos. 57 and 257A and B Surface Gages, on No. 657A Magnetic Base and Swivel Post Assembly.



**D. Snug Complete** – No. PT18724  
Post hole has a 3/8" diameter (9.5mm) and 3/32-1/4" (2.4-6.3mm) holding capacity. Can be used with our Nos. 57 and 257C and D Surface Gages or No. 657AA Magnetic Base with upright post.



\* Attachments marked with an asterisk (\*) are furnished with all sets having "A" in the catalog number.

† For snug with 8mm post hole diameter and 2.4-6.3mm holding capacity, order PT27171, EDP 66457.

#### Inch Reading

| Range | Graduation | Dial Reading | Catalog No. | EDP No. |
|-------|------------|--------------|-------------|---------|
| .200" | .001"      | 0-100        | 641         | 65107   |

#### Millimeter Reading

|     |        |       |      |       |
|-----|--------|-------|------|-------|
| 5mm | 0.01mm | 0-100 | 641M | 65108 |
|-----|--------|-------|------|-------|

#### E. Universal Snug – No. 57S

With spindle hole diameters 5/16", 3/8" (8, 9.5mm) and gripping hole diameters 9/64", 5/32", 3/16", 1/4" (3.5, 4, 4.8, 6.3mm).



#### F. Universal Snug – No. 58S

With spindle hole diameters 1/4", 5/16", 3/8" (6.3, 8, 9.5mm). Gripping hole diameters range from 3/32-1/4"



| Photo Key | Description                          | Catalog/Part No. | EDP No. |
|-----------|--------------------------------------|------------------|---------|
| A*        | Clamp (see previous page)            | PT99437          | 64492   |
| B*        | Tool Post Holder (see previous page) | PT99438          | 64493   |
| C*        | Snug Complete                        | PT18718          | 50709   |
| D         | Snug Complete – 1/4" and 3/8" Holes  | PT18724          | 50710   |
| E         | Universal Snug                       | 57S              | 50296   |
| F         | Universal Snug                       | 58S              | 56613   |

**NOTE:** For AGD attachments and contact points that can be used with No. 650 and No. 651 Indicators, see the attachments and accessories pages with the AGD Indicators, further on in the section.



## Universal Back-Plunger Dial Indicators

**No. 196 Series .200"**

**No. 196M Series 5mm**

Our No. 196 Indicator is one of the most versatile indicators available ... and it is the "granddaddy" of them all. Over the years this tool has been improved by methods and materials but the basic design is unchanged. The design is older than most of you and has withstood the test of time and beaten all challengers because it is:

- ◆ Accurate and reliable
- ◆ Simple to operate
- ◆ Rugged, with few moving parts
- ◆ Smooth in operation
- ◆ Inexpensive – the best indicator value you can buy

While there is a need for indicators with finer graduations, such as our No.708 Series, this indicator with graduations to .001" and 0.02mm will handle by far the majority of jobs. Shank diameter is 1/4" (6.3mm). Antimagnetic models are also available – (inch reading) Nos. 196A6Z and 196B6.



Left, No. 196B1;  
right, No. 196MB1.

For full use, the operator first chooses the proper contact from the three hardened contact points that come with each model. Then the contact should be brought against the work with enough pressure to give the hand

one full turn. Set the hand at zero by rotating the dial with the knurled bezel. This provides one full rotation of the hand both to the right and left of zero, showing a rise or drop in the work and the amount of that variation.

### Inch Reading – Shank Diameter 1/4"

| Graduation | Range | Dial Reading | Description   | Catalog No.        | EDP No. |
|------------|-------|--------------|---|--------------------|---------|
| .001"      | .200" | 0-100        | Indicator with 3 Contact Points, Adaptor, 4 Attachments* in Case                | <b>196A1Z</b>      | 50697   |
|            |       |              | Indicator with 3 Contact Points and Adaptor Only                                | <b>196B1</b>       | 50699   |
|            |       |              | Indicator with 3 Contact Points, Adaptor, and Standard Letter of Certification† | <b>196B1 W/SLC</b> | 66865   |
|            |       | 0-50-0       | <b>Antimagnetic</b> Indicator with 3 Contact Points, 4 Attachments* in Case     | <b>196A6Z</b>      | 50701   |
|            |       |              | <b>Antimagnetic</b> Indicator with 3 Contact Points Only                        | <b>196B6</b>       | 50702   |
|            |       |              | Indicator with 3 Contact Points, Adaptor, 4 Attachments* in Case                | <b>196A5Z</b>      | 50714   |
|            |       |              | Indicator with 3 Contact Points and Adaptor Only                                | <b>196B5</b>       | 50717   |

### Millimeter Reading – Shank Diameter 6.3mm

|        |     |                  |   |                |       |
|--------|-----|------------------|---|----------------|-------|
| 0.02mm | 5mm | 0-100            | Indicator with 3 Contact Points, Adaptor, 4 Attachments* in Case      | <b>196MA1Z</b> | 65251 |
|        |     | Yellow Dial Face | Indicator with 3 Contact Points and Adaptor Only                      | <b>196MB1</b>  | 65252 |
|        |     | 0-50-0           | Indicator with 3 Contact Points, Adaptor 196R, 4 Attachments* in Case | <b>196MA5Z</b> | 65253 |
|        |     | Yellow Dial Face | Indicator with 3 Contact Points and Adaptor Only                      | <b>196MB5</b>  | 65254 |

\*Attachments include **clamp, tool post holder, snug and hole attachment**. For detailed information, see next page.

†Includes redemption card for Standard Letter of Certification (SLC).

### Contact Points and Adaptors Only

| Description              | Catalog/Part No. | EDP No. |
|--------------------------|------------------|---------|
| Adaptor**                | <b>196R</b>      | 50711   |
| Adaptor (Metric Threads) | <b>196MR</b>     | 67457   |
| Hardened Steel           | <b>PT05471</b>   | 70617   |
|                          | <b>PT05472</b>   | 70618   |
| Contact Point            | <b>PT05473</b>   | 70619   |



196R, 196MR



PT05472



PT05471



PT05473

\*\*For Contact Points with #4-48 Thread, see AGD Contact Listings.





### Attachments for Starrett Nos. 196, 196M Series Universal Dial Indicators

**A. \*Clamp** – No. PT99437  
With a 1-5/16" (33mm) flat or round capacity, 5/16" (8mm) post used with No. PT18718 Snug.



**B. \*Tool Post Holder** – No. PT99438  
3/8" x 3/4" x 6" (9.5 x 19 x 150mm) with upright spindle 5/16" dia. x 4-1/2" length (8 x 114mm). Use with No. PT18718 Snug.



**C. \*Snug Complete** – No. PT18718  
Post hole has a 5/16" diameter† and 3/32-1/4" holding capacity. Can be used on our No. 252 Height Transfer Gage, Nos. 57 and 257A and B Surface Gages, on No. 657A Magnetic Base and Swivel Post Assembly.

**D. Snug Complete** – No. PT18724  
Post has a 3/8" diameter (9.5mm) and 3/32-1/4" (2.4-6.3mm) holding capacity. Can be used with our Nos. 57 and 257C and D Surface Gages and No. 657AA Magnetic Base with upright post.



**E. \*Hole Attachment** – No. 196F  
Lets indicator be used over obstructions and inside holes to a depth of approximately 1-5/8" (40mm).



**F. Shock Absorbing Anvil** – No. PT08726A



**G. Universal Snug** – No. 57S  
With spindle hole diameters 5/16", 3/8" (8, 9.5mm) and gripping hole diameters 9/64", 5/32", 3/16", 1/4" (3.5, 4, 4.8, 6.3mm).



**H. Universal Snug** – No. 58S  
With spindle hole diameters 1/4", 5/16", 3/8" (6.3, 8, 9.5mm). Gripping hole diameters range from 3/32-1/4" (2.4-6.3mm).



**I. Split Bushing** – No. PT00764  
Allows attachment of No. 196 Indicator to No. 660 Magnetic Base.



\* Attachments marked with an asterisk (\*) are furnished with all sets having "A" in the catalog number.

† For snug with 8mm post hole diameter and 2.4-6.3 mm holding capacity, order PT27171, EDP 66457.

| Photo Key | Description                         | Catalog/Part No. | EDP No. |
|-----------|-------------------------------------|------------------|---------|
| A*        | Clamp                               | PT99437          | 64492   |
| B*        | Tool Post Holder                    | PT99438          | 64493   |
| C*        | Snug Complete                       | PT18718          | 50709   |
| D         | Snug Complete – 1/4" and 3/8" Holes | PT18724          | 50710   |
| E*        | Hole Attachment                     | 196F             | 50706   |
| F         | Shock Absorbing Anvil               | PT08726A         | 66052   |
| G         | Universal Snug                      | 57S              | 50296   |
| H         | Universal Snug                      | 58S              | 56613   |
| I         | Split Bushing                       | PT00764          | 68850   |

**NOTE:** For AGD attachments and contact points that can be used with No. 196 Indicators, see the attachments and accessories pages with the AGD Indicators, further on in the section.



## Test and Back-Plunger Indicator Holders

Test and back-plunger indicators cannot be used without proper holders. The following pages show the variety of Starrett holders available. This selection should handle virtually any job that needs to be done.

### Magnetic Base Indicator Holder

#### No. 657AA

For use with all Starrett Test, Back-Plunger, AGD, Dial and Miniature-Dial Indicators. Also accommodates similar indicators of other manufacturers.

**A. No. 657P Magnetic Base.** 1-15/16 x 1-5/8 x 1-7/8" (50 x 40 x 48mm). Push-button on/off switch for one-hand operation. Base has three precision ground magnetic contact points. Grips horizontally, vertically, and upside down. V-step holds base to arbors, shafts, etc. Base has extra 1/4-20 tapped hole on one side for mounting post. Black wrinkle finish on non-working surfaces.

**B. No. 657G Upright Base Post.** 3/8" (9.5mm) diameter x 7-7/16" (190mm) length overall. Starrett No. 57S and No. 58S Universal Snugs may also be used.

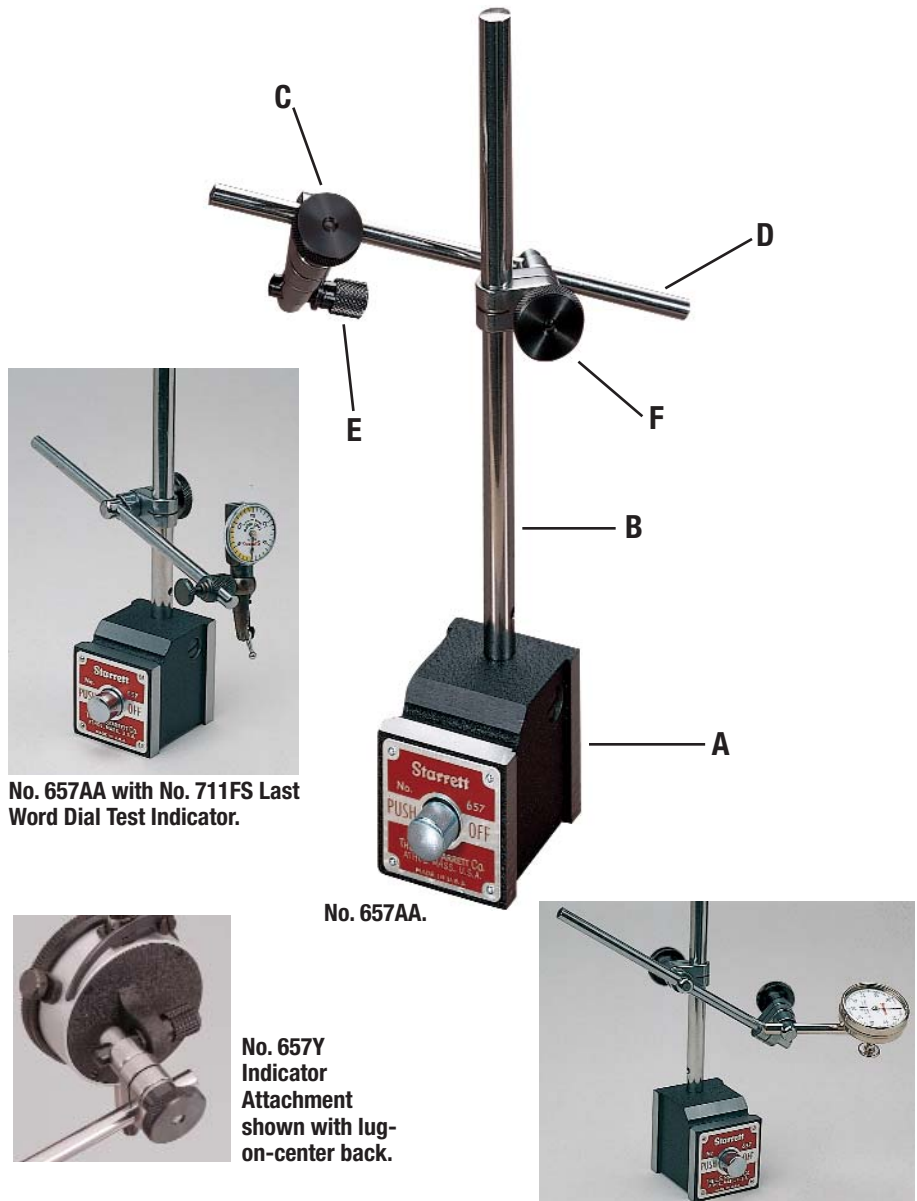
**C. No. 657S Snug.** Two 1/4" (6.3mm) diameter holes. Adapts Nos. 196, 650, and 651 Series Dial Indicators and No. 657Y Indicator Attachment to No. 657X Rod.

**D. No. 657X Rod.** 1/4" (6.3mm) diameter x 6" (150mm) long. Accommodates Starrett Nos. 708, 709, 811 and 711F Series Dial Test Indicators and No. 657S Sleeve.

**E. No. 657Y Indicator Attachment.** 1/4" (6.3mm) O.D. one end, other end threaded and fits lug backs of all AGD indicators (Starrett Series Nos. 81, 25, 655, 656) and Series No. 80 Miniature Indicators.

**F. No. PT18724 Snug** 3/8" (9.5mm) diameter post hole. 1/4" (6.3mm) diameter gripping hole accommodates No. 657X Rod.

Packed one in a box.



No. 657AA with No. 711FS Last Word Dial Test Indicator.

No. 657AA.

No. 657Y Indicator Attachment shown with lug-on-center back.

Shown with No. 196B1 Universal Dial Indicator.

### Complete Set

| Photo Key | Description  | Catalog No.     | EDP No. |
|-----------|--|-----------------|---------|
|           | Magnetic Base with All Attachments – A, B, C, D, E, F                                | <b>657AA</b>    | 52743   |
|           | Base and Post Assembly with No. 650B1 Indicator, No. 657S Snug, and 3 Contact Points | <b>657-650Z</b> | 65259   |

### Individual Components

|          |                                     |                |       |
|----------|-------------------------------------|----------------|-------|
| <b>A</b> | Magnetic Base Only                  | <b>657P</b>    | 52757 |
| <b>B</b> | 7-7/16" Upright Base Post Only      | <b>657G</b>    | 52753 |
| <b>C</b> | Snug with Two 1/4" (6.3 mm) Holes   | <b>657S</b>    | 52759 |
| <b>D</b> | Rod                                 | <b>657X</b>    | 52764 |
| <b>E</b> | Indicator Attachment                | <b>657Y</b>    | 52765 |
| <b>F</b> | Snug Complete – 1/4" and 3/8" Holes | <b>PT18724</b> | 50710 |



### Magnetic Base Indicator Holder with swivel post assembly

#### No. 657A

The swivel post assembly on these holders provides universal adjustment in both horizontal and vertical planes. Available with inch or millimeter Starrett Dial Test or Back-Plunger Indicators, they save time in shop set-up and other inspection jobs.

For use with all Starrett Test, Back-Plunger, AGD, Dial and Miniature-Dial Indicators. Also accommodates similar indicators of other manufacturers.

Powerful, permanent magnetic base holds firmly to steel or iron surfaces – horizontally, vertically, upside-down. Push-button turns magnetic force on or off for quick, one-hand set-up and take-down. V-step adapts base to horizontal or vertical arbors and chucks. There is an extra 1/4-20 NC tapped hole in side of base for indicator mounting post. Three precision ground magnetic contact surfaces (plus V-step). Black wrinkle finish on non-working surfaces.

#### Magnetic Base Assembly Features:

**A. No. 657P Magnetic Base** is 1-15/16" x 1-5/8" x 1-7/8" (50 x 40 x 48mm) deep.

**B. Swivel Cap** Slot permits 90° post travel to horizontal position.

Packed one in a box.



Left, No. 657A shown with No. 196B1 Universal Dial Indicator setting up workpiece on milling machine. Center, No. 657A with No. 711LS Last Word Dial Test Indicator setting up workpiece on surface grinder. Right, No. 657A.

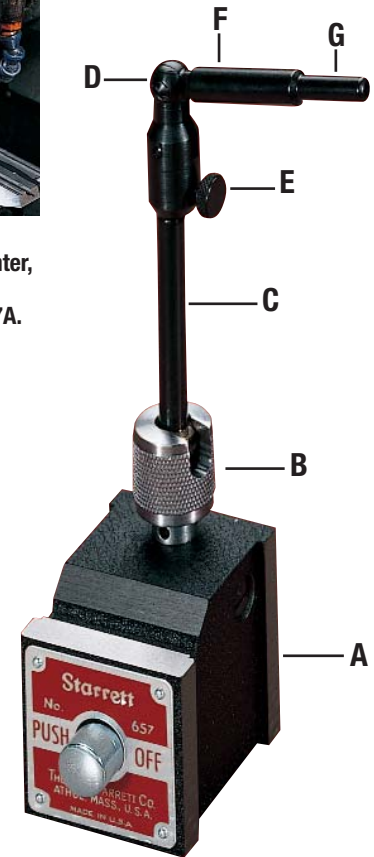
**C. Post** rotates 360°.

**D. No. 657F Indicator Swivel Post Assembly** is 6-1/2" (165mm) high (less threaded end). Assembly consists of items B, C, E, F, G.

**E. Fine-Adjusting Screw.** Turn to zero set indicator.

**F. Upper arm** is 2" (50mm) long with a 5/16" (8 mm) dia. and swings more than 180°; friction joint holds it in position.

**G. 7/32" (5.5mm) dia. step, 1/2" (13 mm) long.**



#### Individual Components

| Description                             | Catalog No. | EDP No. |
|---|-------------|---------|
| Magnetic Base with Swivel Post Assembly | <b>657A</b> | 52744   |
| Magnetic Base Only                      | <b>657P</b> | 52757   |
| Swivel Post Assembly Only               | <b>657F</b> | 52752   |

### No. 657 Series Sets

These sets have been put together for your ordering convenience, but you can mix and match other Starrett test or back-plunger indicators and attachments with the No. 657A Magnetic Base and Swivel Post Assembly to suit your needs.

With No. 709A.



With No. 711FS.



With No. 196B1.



#### Inch Reading Sets

| Description*   | W/Finished Wood Case |         | Without Case |         |
|--|----------------------|---------|--------------|---------|
|  | Cat. No.             | EDP No. | Cat. No.     | EDP No. |
| Base and Post Assembly with 711FSAZ Last Word® Indicator and PT07101F Body Clamp                       | <b>657BZ</b>         | 52746   | <b>657B</b>  | 52745   |
| Base and Post Assembly with 196B1 Indicator, PT18718 Snug, 3 Contact Points, and Contact Point Adaptor | <b>657CZ</b>         | 52748   | <b>657C</b>  | 52747   |
| Base and Post Assembly with 709AZ Indicator and PT22428 Swivel Post Snug                               | <b>657-709Z</b>      | 65257   |              |         |
| Base and Post Assembly with No. 811-1Z Indicator and PT22428 Swivel Post Snug                          | <b>657-811Z</b>      | 65258   |              |         |

#### Millimeter Reading Sets

|  |               |       |              |       |
|--|---------------|-------|--------------|-------|
| Base and Post Assembly with 711MFSZ Indicator with PT07101F Body Clamp                             | <b>657MBZ</b> | 56354 | <b>657MB</b> | 56353 |
| Base and Post Assembly with 196B1 Indicator, PT18718 Snug, 3 Contact Points, Contact Point Adaptor | <b>657MCZ</b> | 56356 | <b>657MC</b> | 56355 |

\* See previous pages for detailed indicator and attachment specifications.





## Flex-O-Post Indicator Holders with magnetic base

### No. 657T Series

For use with all Starrett Test, Back-Plunger, AGD, Dial, and Miniature Dial Indicators. Also accommodates similar indicators of other manufacturers. The flexible post is an assembly of short tubular steel sections and precision ball joints, linked by an internal steel cable. It can be adjusted to any position and locked by turning a lever near the magnetic base. This makes it possible to use indicators in awkward places that are hard to reach with conventional holding devices.

Assembled to the magnetic base, the post has a vertical reach of approximately 15" (380mm) and a horizontal reach of approximately 10" (250mm). The indicator snug on the end of the post can be rotated through 360° and locked in any position.

The base has three precision ground magnetic contact surfaces. Grips horizontally, vertically or upside down. V-step holds base to arbors, shafts, chucks.

The No. 657W Attachment allows fine adjustments to be made, operated by turning the fine-adjusting thumb screw (with post locked in rigid position) to zero, then set the indicator.

**A. Gage Rod** 3/8" x 3" (9.5mm x 75mm) has 5/16, 1/4 and 7/32" (8, 6.3, and 5.5mm) steps. Holds Nos. 708, 709, 711 and 811 Dial Test Indicators by body clamp. See attachment specifications for the appropriate indicator body clamp on previous pages.

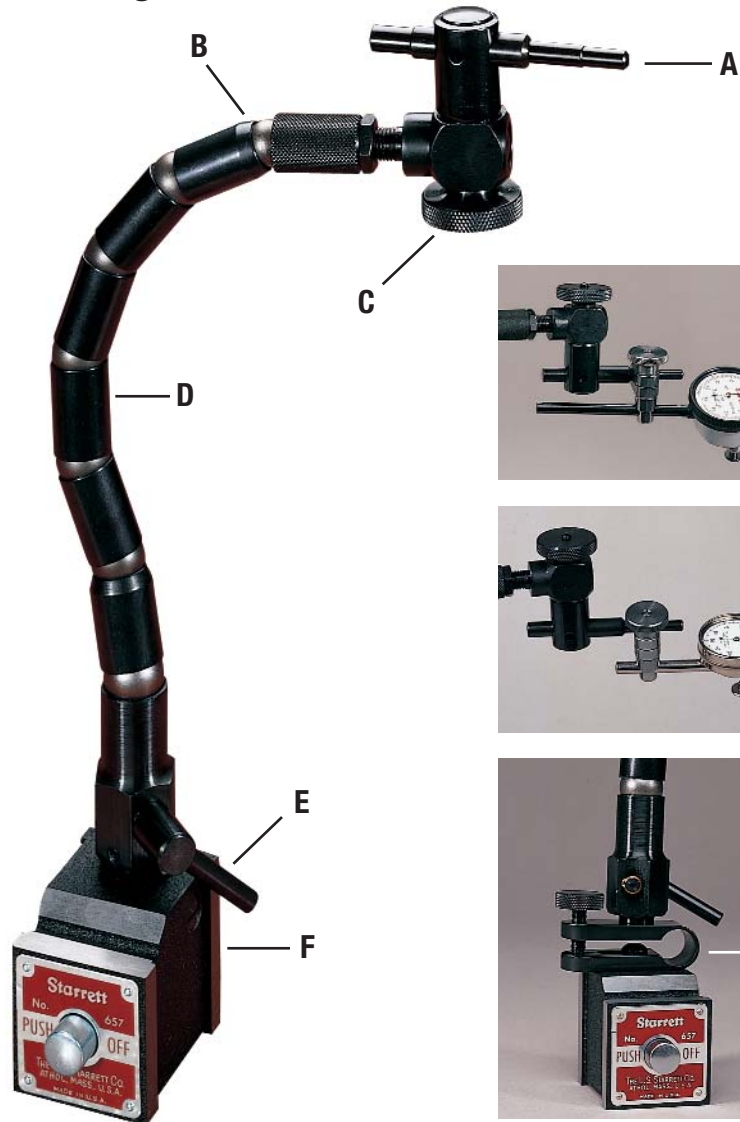
**B. Adjusting Take-up Sleeve** with locking nut for maintaining proper degree of post rigidity.

**C. Post Snug** has 3/8" (9.5mm) hole (which will also grip AGD dial indicators by the stem).

**D. Flex-O-Post** No. 657U.

**E. Locking Lever** tightens internal steel cable to make post rigid and lock it in position.

**F. Magnetic Base** No. 657P has push-button on/off switch.



Top inset, No. 651B1 Indicator gripped directly to its stem via the post snug; middle, holding a No. 196B1 Indicator via a No. 657S Snug attached to the indicator's 1/4" (6.3 mm) diameter rod; bottom, No. 657W Fine-Adjustment Attachment.

### Complete Assemblies

| Description  | Catalog No. | EDP No. |
|--|-------------|---------|
| Magnetic Base with Flex-O-Post Assembly                                | 657T        | 52760   |
| Magnetic Base with Flex-O-Post Assembly and Fine-Adjustment Attachment | 657TW       | 52761   |

### Individual Components

| Photo Key       | Description                                  | Catalog No. | EDP No. |
|-----------------|--|-------------|---------|
| F               | Magnetic Base Only                           | 657P        | 52757   |
| (A, B, C, D, E) | Flex-O-Post with Locking Lever and Snug Only | 657U        | 52762   |
| G               | Fine-Adjustment Attachment                   | 657W        | 52763   |
| A               | Indicator Holding Rod                        | PT17850     | 72400   |

Packed one in a box.





### Magnetic Base Universal Indicator Holder with triple-jointed arm and fine-adjustment

#### Nos. 657-1 and -2 Series

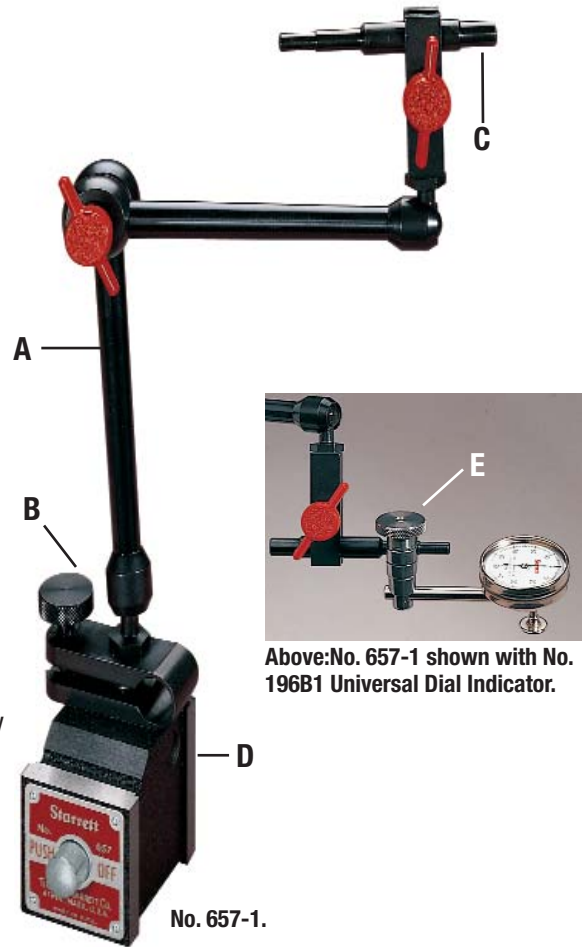
This versatile indicator holder has three pivots available for positioning the indicator where needed. All pivots are controlled by one tightening knob. It will hold:

- ◆ Any indicator with a 3/8" (9.5mm) stem (such as our No. 25 and Nos. 650 and 651 Series)
- ◆ Any indicator with a standard dovetail mount (such as our Nos. 708, 709, and 811 Series)
- ◆ Any indicator with a 1/4" (6.3mm) shank (such as our No. 196 Series)
- ◆ Any indicator with a 3/16" (4.7mm) shank (such as our Nos. 708, 709, 811 and 711 Series)
- ◆ Any indicator with a body clamp (such as our No. 711 Series)
- ◆ The working area is within a hemisphere having a radius of approximately 12" (300mm)



Above: No. 709A Dial Test Indicator with dovetail mount.

- ◆ The very sensitive fine-adjustment is located on the magnetic base to eliminate indicator deflection when it is being adjusted
- ◆ The No. 657-3 Universal Indicator Holder Arm Assembly can also be used on the No. 659P Base using the No. 659 Thread Adaptor, No. PT18318



Above: No. 657-1 shown with No. 196B1 Universal Dial Indicator.

Packed one in a box.

### References for Other Test Indicator Holding Methods

In addition to the magnetic base indicator holders on the preceding pages, we also offer the following:

- A. For very precise measurements such as comparing a part to a gage block set, we have our No. 252 Height Transfer Gage with our Digi-Chek® Series of Height Gages

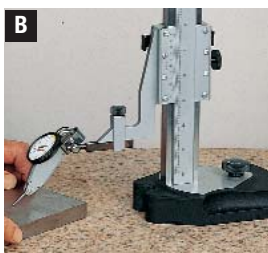


### Complete Assemblies

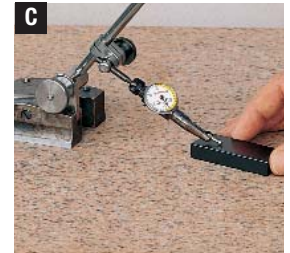
| Description  | Catalog No.  | EDP No. |
|--|--------------|---------|
| Universal Indicator Holder, No. 657W Fine-Adjustment, No. 657P Magnetic Base, No. PT17850 Indicator Holding Rod, and No. 657S Snug | <b>657-1</b> | 64436   |
| Universal Indicator Holder with No. 657 Magnetic Base  | <b>657-2</b> | 64437   |

### Individual Components

| Photo Key | Description                                  | Catalog No.    | EDP No. |
|-----------|--|----------------|---------|
| <b>A</b>  | Universal Indicator Holder Arm Assembly Only | <b>657-3</b>   | 64438   |
| <b>B</b>  | Fine-Adjustment Attachment                   | <b>657W</b>    | 52763   |
| <b>C</b>  | Indicator Holding Rod                        | <b>PT17850</b> | 72400   |
| <b>D</b>  | Magnetic Base Only                           | <b>657P</b>    | 52757   |
| <b>E</b>  | Snug with Two 1/4" (6.3 mm) Holes            | <b>657S</b>    | 52759   |



- B. Any of our great variety of height gages. Series Nos. 250, 254, 255, 259, and 3752. These can be used for comparing and for actual vertical measurements



- C. Our No. 57 or No. 257 Surface Gages. These are for comparison and the truing-up of surfaces



## Magnetic Base Indicator Holder with Triple-Jointed Arm

### No. 660

The compact and versatile 660 magnetic base indicator holder has three adjustable pivots controlled by a single knob for fast, easy indicator positioning.

- ◆ Small but powerful magnetic base, with 70 lbs. (320 N) holding force
- ◆ Positive On/Off switch
- ◆ Base Dimensions: 1-3/16" x 1-9/16" x 1-3/8" (30mm x 40mm x 35mm)
- ◆ Horizontal and vertical mounting positions
- ◆ Will hold any indicator with a 3/8" (9.5mm) stem or standard dovetail mount
- ◆ Articulating arm with powerful central locking knob, provides full 360° horizontal positioning and over 180° vertical positioning
- ◆ Maximum Horizontal Reach: 4.750" (120mm); Maximum Vertical Reach: 7.500" (190mm)
- ◆ Very sensitive fine-adjustment thumb screw



Left, No. 660. Inset, No. 660 shown with 81-131J Dial Indicator.

| Description           | Catalog No. | EDP No. |
|-----------------------|-------------|---------|
| Base Indicator Holder | 660         | 68621   |

## Common Test and Back-Plunger Indicator Applications

- A. Models with tool post holders, generally used for lathe work.
- B. Indicators may be used on our No. 665 inspection holder.
- B, C. Some indicator holders have clamps for holding in different places.
- C, D. Indicators with straight stems or shanks can be held in snugs or in chucks and collets.





### Mechanical Dial Indicators and Attachments

### Electronic Indicators

### Indicator Holders

Accurate, rugged, versatile, convenient to use and inexpensive —for these reasons and more, mechanical dial indicators with bottom plungers are the measurement workhorses of industrial production.

Electronic indicators have an unmatched ability for the accurate recording of a great amount of measurement data which is used in a variety of Statistical Process Control (SPC) operations.

The first part of this section shows our complete line of mechanical/analog dial indicators – over 180 models to give you the widest selection in the industry. Our comparison guide, following these introduction pages, has all the significant specifications to help you make your selection.

### Application Specification Factors

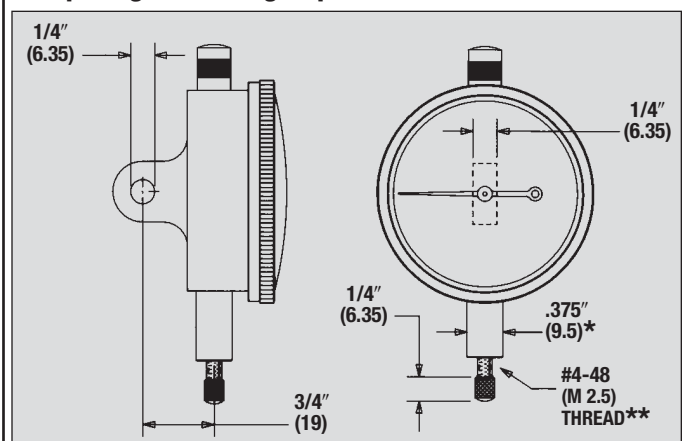
1. Regular analog styles with indicating hands are more readable than digital styles when the measurements are being visually monitored by an operator.
2. Select the dial size that gives you the readability you need. We offer five regular dial sizes which will fit most applications that have both space limitations and readability requirements.
3. Choose the accuracy and readout you need – don't select a .0001" (or 0.001mm) readout if .001" (or 0.01mm) will do your job.
4. Electronic styles are best when the measurement data needs to be collected, printed out or stored for future use.
5. Consider any special features you may need – inch or millimeter reading, special shockless movement, antimagnetic, long range, long stem, special backs, special contacts, special holders, etc. If you don't see what you need, please contact our Special Order Department. Even though we have a broad line of indicators to tackle most jobs, we also do a lot of special design, catering to the specific needs of our customers – challenge us!
6. Starrett indicators are made to American Gage Design Specifications (AGD). These specifications were developed in 1945 at the request of the U.S. Commerce Department through the National Bureau of Standards – now the National Institute of Standards and Technology (NIST). These specifications provide the dimensions to allow interchangeability between indicators of different manufacturers in fixturing. As you will see, these dimensions pertain to sizes for space consideration and for holding. Other countries have made their own design specifications which we can also furnish. However, the AGD design is probably more widely used, simply because it was the first standard created.
7. Basically, all dial indicators used worldwide fall into the following size ranges which relate to bezel diameters. Size 0 is a smaller dial indicator, having its own dimensions. Sizes 1 through 4 are AGD sizes. These sizes and the AGD dimensions

### The AGD Design Specifications

#### Bezel Diameters

|     | Size Group | Minimum Diameter |      | Maximum Diameter |      |
|-----|------------|------------------|------|------------------|------|
|     |            | Inch             | mm   | Inch             | mm   |
|     | 0          | 1"               | 25mm | 1-3/8"           | 35mm |
| AGD | 1          | 1-3/8"           | 35mm | 2"               | 50mm |
|     | 2          | 2"               | 50mm | 2-3/8"           | 60mm |
|     | 3          | 2-3/8"           | 60mm | 3"               | 75mm |
|     | 4          | 3"               | 76mm | 3-3/4"           | 95mm |

### Comparing AGD Design Specifications with Others



\*There are two major differences between American Gage Design and other specifications. The first is the stem diameter. AGD specifies .375" (9.5mm) and some other standards specify an 8mm (.315") diameter. International specifications allow for either one and we can furnish both diameters. The .375" (9.5mm) diameter provides a little more protection for the rack when clamped on the stem – 8mm stems are available on any model, please specify when ordering.

\*\*The other difference is the contact thread. AGD specifies a #4-48 thread. Other standards specify a metric thread, #M2.5.

are essentially the same for all manufacturers, except as noted.

8. Accuracy – All indicators should be "loaded" 1/8-1/4 of a turn before testing or measuring. Starrett dial indicators meet or exceed all known performance specifications. Most accuracies are specified plus or minus one graduation over the full range. This basically means a 2-1/2 turn range. Longer ranges have slightly wider tolerances. Starrett indicators are at least that accurate, but we are better than that in the final critical measuring zone of "10 o'clock to 2 o'clock" from zero.

AGD specifies 2-1/3 turn indicators to cover any particular range. The reason for this is that in an effort to get the most out of the indicator, the operator "loads" it to about 1-1/3 turns and sets zero on his master. The indicator will now show the accurate deviation for a full revolution, plus or minus.

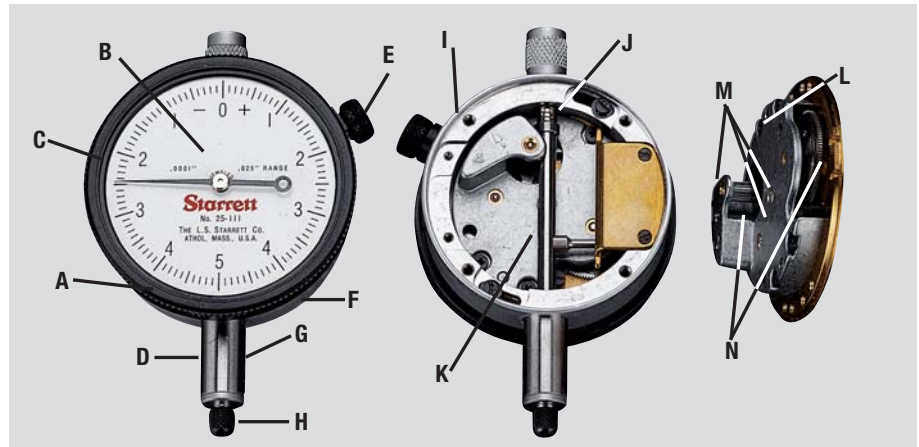




## Starrett Dial Indicator Design Features

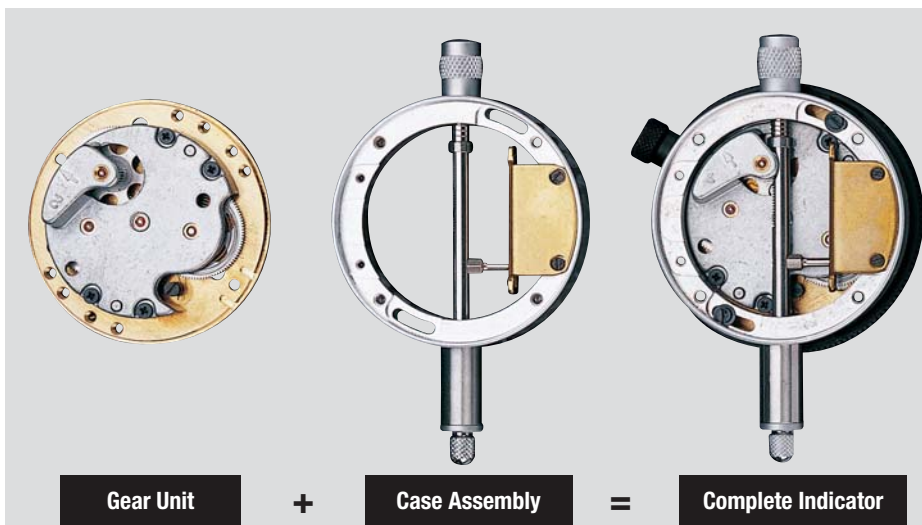
Unit construction is rugged and simple with a “universally fitting” design as shown in the photo below. (The same gear unit assembly fits the following:)

- ◆ AGD Group 2 (our No. 25 Series)
- ◆ AGD Group 3 (our No. 655 Series)
- ◆ AGD Group 4 (our No. 656 Series)
- ◆ The gear unit is constructed of a massive single bridge and plate assembly with a hardened stainless steel gear train
- ◆ All gear trains are fully jeweled for sensitivity, smoothness and life. (We do provide 1/2” and 1” range models with plain bronze bearings)
- ◆ The case is light but sturdy, with a hardened, precision stainless steel rack that rides in bronze bushings. Size Groups 0 and 1 indicators are of similar construction but smaller in size
- ◆ Hardened stainless steel bottom stems can be held in fixtures without cramping rack action
- ◆ Easy readability with the best, balanced style of graduation and number combination. (Too thick and accuracy suffers; too thin and readability suffers)
- ◆ Balanced and tapered hands are easy to follow
- ◆ Special nonshock mechanism (can be furnished on most styles) is ideal for when an indicator may be subjected to repeated and excessive shocks



- A. Sharp bezel serrations for positive grip
- B. Nonreflecting white eggshell finish on dial (millimeter models have yellow dials)
- C. Unbreakable crystal
- D. Hardened stainless steel stem
- E. Positive-acting clamp locks bezel in position
- F. No-glare satin finish on case
- G. .375” mounting diameter (all AGD models)
- H. Interchangeable contact point

- I. Four screw holes for 90° rotation of back
- J. Direct acting compression spring eliminates side friction
- K. Hardened stainless steel rack and spindle
- L. Massive bridge for rigid bearing support
- M. Replaceable low friction jewel bearings
- N. Hardened stainless steel gears and pinions







### Dials, Accessories and Options

- ◆ **Balanced or Continuous Dials** – Starrett AGD indicators are available with a balanced dial (plus on right) or a continuous dial (reading clockwise). A balanced dial is sent unless otherwise ordered

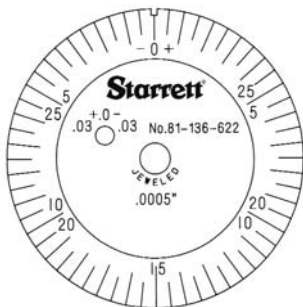


Balanced Dial



Continuous Dial

- ◆ **Plus and Minus Graduations** – Plus and minus readout – black figures read clockwise, red figures read counterclockwise, or colors reversed – are available on some No. 81 Series Dial Indicators



Dial with Plus and Minus Graduations



Dial with Special Trademark Imprint

- ◆ **Revolution Counters** – All AGD indicators with 2-1/2 revolutions can be furnished with double dial and count hand at a slight additional cost. Intermediate and long-range indicators have revolution counters
- ◆ **Special Dials** – Starrett dial indicators can be furnished with any standard dial marked with your company name or trademark. There is no charge when the indicators are purchased in lots of 25 or more. For quantities under 25, there is an additional charge. Prices are available on request
- ◆ **Antimagnetic Mechanism** – An antimagnetic mechanism can be furnished on most Series Nos. 81, 25, 655 and 656 Dial Indicators (and also on our No. 196B6 Universal Dial Indicator). This mechanism is desirable when the indicator is used near a magnetic chuck or a similar magnetic field which would disturb its operation. See individual listings for availability
- ◆ **Attachments and Accessories** – A variety of attachments and accessories are provided for mounting dial indicators on machine tools, inspection equipment and special fixtures

These include:

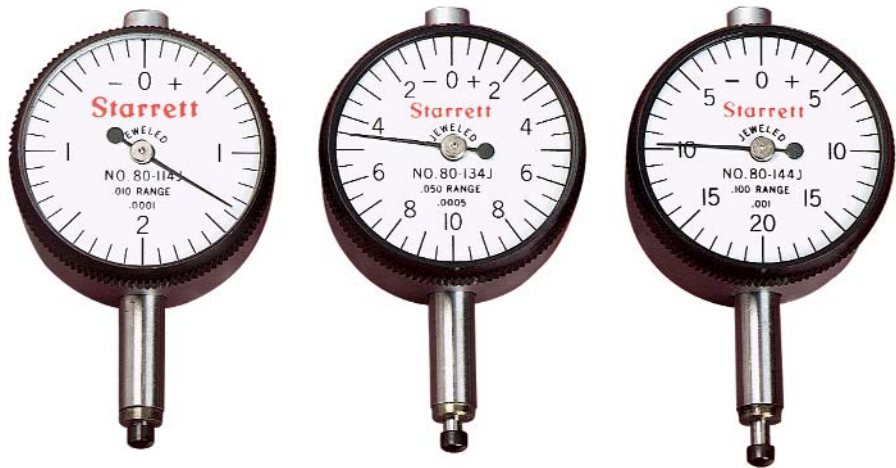
- ◆ Backs
- ◆ Contact Points
- ◆ Dust Guard
- ◆ Hole Attachments
- ◆ Special Nonshock Mechanism
- ◆ Spindle Travel Controls
- ◆ Stem and Back Mounting Accessories
- ◆ Tolerance and Maximum Reading Hands



**Miniature Dial Indicators**

**No. 80 Series  
ANSI Group 0**  
Ranges up to .100"  
1-1/4" bezel, 7/32" stem

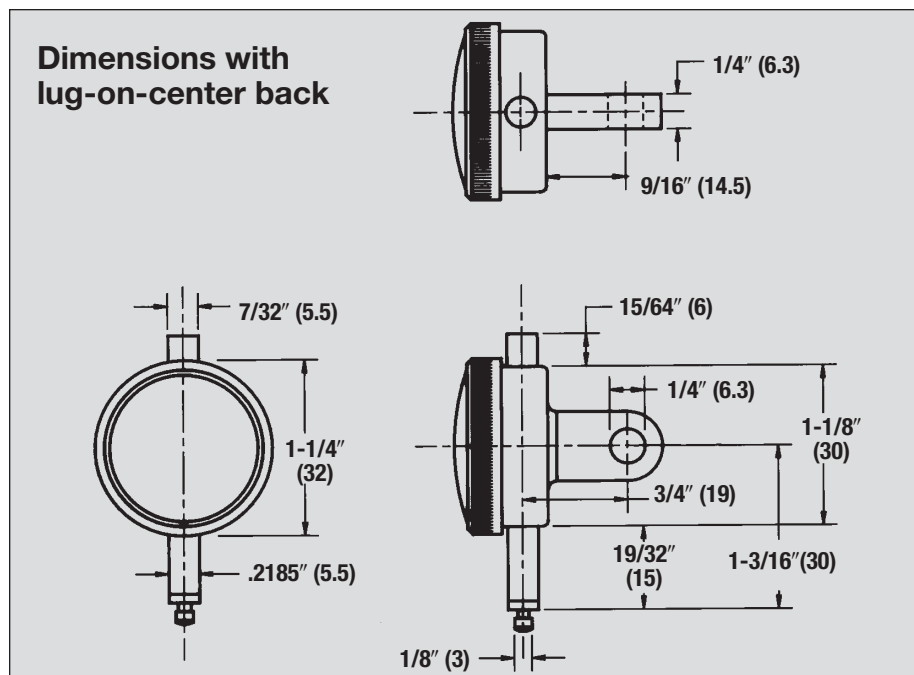
Similar in design to AGD dial indicators, these miniatures are built for gaging dimensions in tight places. Equipped with high precision, low friction movements, they are made in four models, all with frictionally adjustable bezels for quick, positive zero setting. No-glare, white eggshell finish dials. Black bezel, silver finish on case. Furnished with balanced dial, jeweled bearings and lug-on-center back.



Left-to-right: No. 80-114J, No. 80-134J, No. 80-144J.



No. 80-111J.



Free drafting template available for this size. Write The L. S. Starrett Co., Athol, MA 01331.

| Graduation | Range    |       | Dial Reading | Catalog No. | EDP No. |
|------------|----------|-------|--------------|-------------|---------|
|            | One Rev. | Total |              |             |         |
| .0001"     | .004"    | .010" | 0-2-0        | 80-114J     | 55891   |
|            | .010"    | .025" | 0-5-0        | 80-111J     | 67714   |
| .0005"     | .020"    | .050" | 0-10-0       | 80-134J     | 55892   |
| .001"      | .040"    | .100" | 0-20-0       | 80-144J     | 55893   |

Packed one in a box.

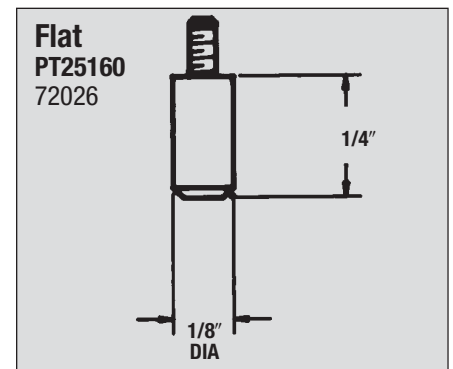
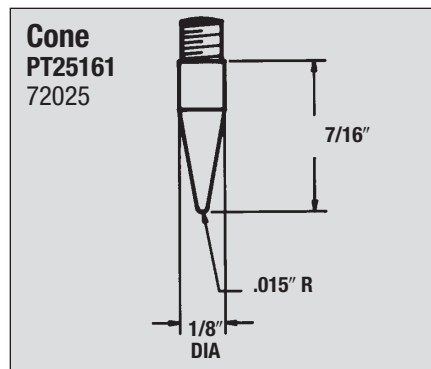
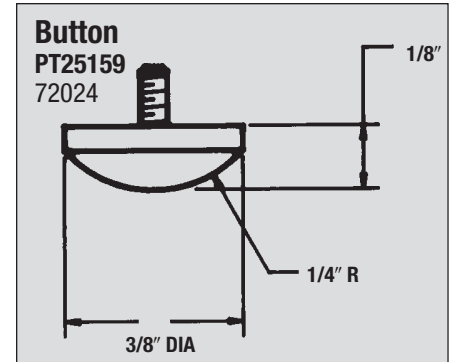
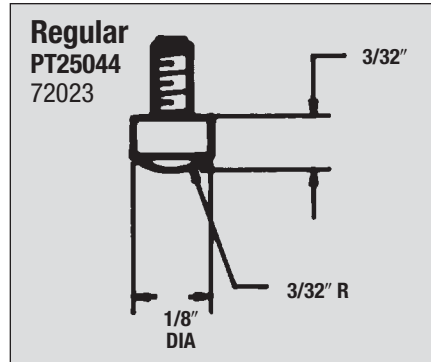
See following page for information on contact points and backs.



**Miniature Dial Indicator Accessories – No. 80 Series**

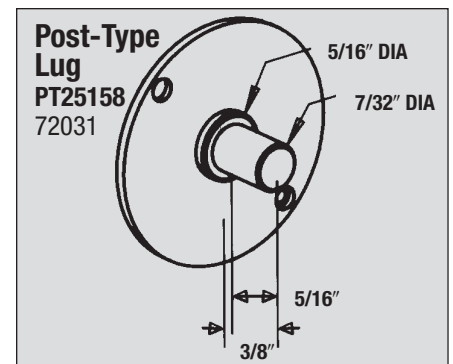
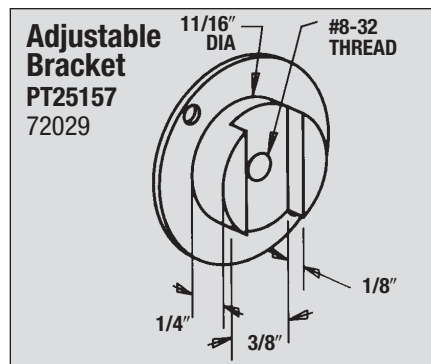
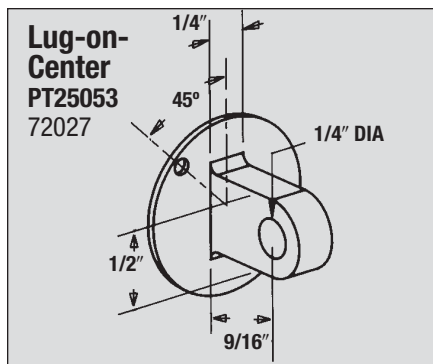
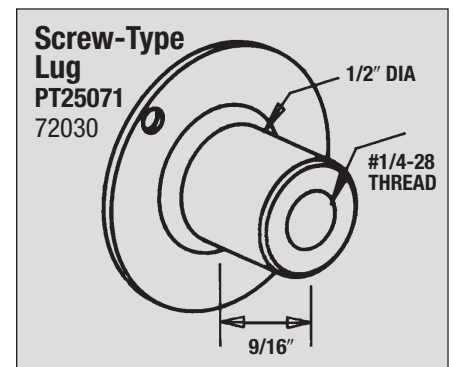
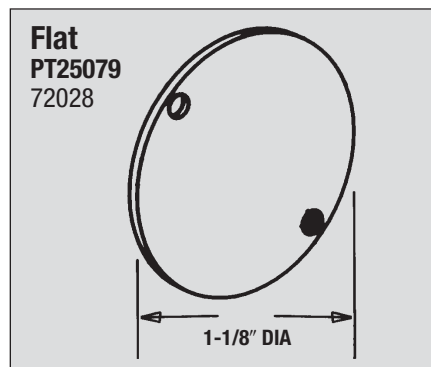
**Contact Points**

The regular contact point is furnished as standard on all No. 80 Series Dial Indicators. Button, cone and flat contact points are available individually, as listed. All have #0-80 thread.



**Backs**

The lug-on-center back is furnished standard on all No. 80 Series Dial Indicators.

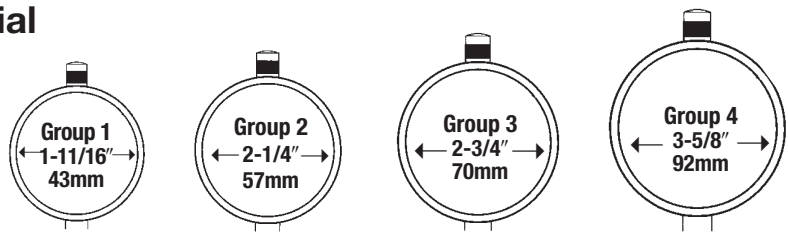


**NOTE:** Contact points and backs can be ordered individually. Order by part number/EDP number.



## Series 81, 25, 655 and 656 AGD Dial Indicators

This comparison table is an aid to help you find the indicator with the specific graduations and ranges you are looking for. Refer to the following pages for the exact catalog number and EDP number.



### Inch Reading (White Dials Furnished Standard)

| Graduation | Range    |        | Dial Reading   | No. 81 Series | No. 25 Series | No. 655 Series | No. 656 Series |
|------------|----------|--------|----------------|---------------|---------------|----------------|----------------|
|            | One Rev. | Total  |                |               |               |                |                |
| .00005"    | .006"    | .015"  | 0-3-0          |               | 25-109        |                | 656-109        |
|            |          |        | 0-6            |               | 25-209        |                | 656-209        |
| .0001"     | .006"    | .015"  | 0-3-0          |               | 25-116        |                |                |
|            |          |        | 0-4-0          |               | 25-118        | 655-118        | 656-118        |
|            | .008"    | .020"  | 0-8            |               | 25-218        |                |                |
|            |          |        | 0-5-0          | 81-111        | 25-111        | 655-111        | 656-111        |
|            | .010"    | .025"  | 0-10           | 81-211        | 25-211        | 655-211        | 656-211        |
|            |          |        | +0.10<br>-0.10 | 81-111-624*   |               |                |                |
|            | .010"    | .025"  | -0.10<br>+0.10 | 81-111-630*   |               |                |                |
|            |          |        | 0-5-0          |               | 25-511*       | 655-511*       | 656-511*       |
| .010"      | .200"    | 0-10   |                | 25-611*       | 655-611*      | 656-611*       |                |
|            |          | 0-10-0 |                |               |               | 656-517*       |                |
| .020"      | .400"    | 0-20   |                |               |               | 656-617*       |                |
|            |          |        |                |               |               |                |                |
| .00025"    | .010"    | .025"  | 0-5-0          | 81-124        | 25-124        | 655-124        | 656-124        |
|            |          |        | 0-10           | 81-224        | 25-224        | 655-224        | 656-224        |
|            | .020"    | .050"  | 0-10-0         | 81-128        | 25-128        | 655-128        | 656-128        |
|            |          |        | 0-20           | 81-228        | 25-228        | 655-228        | 656-228        |
|            | .030"    | .075"  | 0-15-0         |               |               | 655-129        | 656-129        |
|            |          |        | 0-30           |               |               | 655-229        | 656-229        |
| .0005"     | .020"    | .050"  | 0-10-0         | 81-134        | 25-134        | 655-134        | 656-134        |
|            |          |        | 0-20           | 81-234        | 25-234        | 655-234        | 656-234        |
|            | .030"    | .075"  | 0-15-0         | 81-136        | 25-136        | 655-136        | 656-136        |
|            |          |        | 0-30           | 81-236        | 25-236        | 655-236        | 656-236        |
|            | .030"    | .075"  | +0.30<br>-0.30 | 81-136-622*   |               |                |                |
|            |          |        | -0.30<br>+0.30 | 81-136-623*   |               |                |                |
|            | .040"    | .100"  | 0-20-0         | 81-138        | 25-138        | 655-138        | 656-138        |
|            |          |        | 0-40           | 81-238        | 25-238        | 655-238        | 656-238        |
|            | .050"    | .125"  | 0-25-0         | 81-131        | 25-131        | 655-131        | 656-131        |
|            |          |        | 0-50           | 81-231        | 25-231        | 655-231        | 656-231        |
|            | .050"    | .500"  | 0-50           |               | 25-431*       |                |                |
|            |          |        | 0-50           |               | 25-631*       |                |                |
| .050"      | 1.000"   | 0-50   |                |               |               |                |                |
|            |          |        |                |               |               |                |                |

\* With revolution counter on dial.

(Continued on next page.)





### Inch Reading (White Dials Furnished Standard) (continued)

| Graduation | Range    |        | Dial Reading | Group 1       | Group 2       | Group 3        | Group 4        |
|------------|----------|--------|--------------|---------------|---------------|----------------|----------------|
|            | One Rev. | Total  |              | No. 81 Series | No. 25 Series | No. 655 Series | No. 656 Series |
| .001"      | .020"    | .050"  | 0-10-0       | 81-142        | 25-142        | 655-142        | 656-142        |
|            |          |        | 0-20         | 81-242        | 25-242        | 655-242        | 656-242        |
|            | .030"    | .075"  | 0-15-0       | 81-143        | 25-143        | 655-143        | 656-143        |
|            |          |        | 0-30         | 81-243        | 25-243        | 655-243        | 656-243        |
|            | .030"    | .075"  | +0.30, -0.30 | 81-142-628*   |               |                |                |
|            |          |        | -0.30, +0.30 | 81-143-629*   |               |                |                |
|            | .040"    | .100"  | 0-20-0       | 81-144        | 25-144        | 655-144        | 656-144        |
|            |          |        | 0-40         | 81-244        | 25-244        | 655-244        | 656-244        |
|            | .050"    | .125"  | 0-25-0       | 81-145        | 25-145        | 655-145        | 656-145        |
|            |          |        | 0-50         | 81-245        | 25-245        | 655-245        | 656-245        |
|            | .100"    | .250"  | 0-50-0       | 81-141        | 25-141        | 655-141        | 656-141        |
|            |          |        | 0-100        | 81-241        | 25-241        | 655-241        | 656-241        |
|            | .100"    | .500"  | 0-50-0       |               | 25-341/5*     | 655-341/5*     | 656-341/5*     |
|            |          |        | 0-100        |               | 25-441/5*     | 655-441/5*     | 656-441/5*     |
|            | .100"    | 1.000" | 0-50-0       |               | 25-341*       | 655-341*       | 656-341*       |
|            |          |        | 0-100        |               | 25-441*       | 655-441*       | 656-441*       |
|            | .100"    | 2.000" | 0-100        |               | 25-2041*      | 655-2041*      | 656-2041*      |
|            |          |        |              | 3.000"        | 25-3041*      | 655-3041*      | 656-3041*      |
|            |          |        |              | 4.000"        | 25-4041*      | 655-4041*      | 656-4041*      |
|            |          |        |              | 5.000"        | 25-5041*      | 655-5041*      | 656-5041*      |
| 6.000"     |          |        |              |               |               | 656-6041*      |                |
| 7.000"     |          |        |              |               |               | 656-7041*      |                |
| 8.000"     |          |        |              |               |               | 656-8041*      |                |
| 9.000"     |          |        |              |               |               | 656-9041*      |                |
| 10.000"    |          |        |              |               |               | 656-10041*     |                |
| 11.000"    |          |        |              |               |               | 656-11041*     |                |
| 12.000"    |          |        | 656-12041*   |               |               |                |                |

### Millimeter Reading (Yellow Dials Furnished Standard)

|         |       |        |        |          |           |           |          |
|---------|-------|--------|--------|----------|-----------|-----------|----------|
| 0.001mm | 0.1mm | 0.25mm | 0-50-0 |          | 25-151*   |           |          |
|         |       |        | 0-100  |          | 25-251*   |           |          |
| 0.002mm | 0.2mm | 0.5mm  | 0-10-0 | 81-161   | 25-161    | 655-161   | 656-161  |
|         |       |        | 0-20   | 81-261   | 25-261    | 655-261   | 656-261  |
| 0.01mm  | 1mm   | 2.5mm  | 0-50-0 | 81-181   | 25-181    | 655-181   | 656-181  |
|         |       |        | 0-100  | 81-281   | 25-281    | 655-281   | 656-281  |
|         | 1mm   | 10mm   | 0-50-0 |          | 25-381*   |           |          |
|         |       |        | 0-100  |          | 25-481*   |           |          |
|         | 1mm   | 25mm   | 0-50-0 |          | 25-781*   |           |          |
|         |       |        | 0-100  |          | 25-881*   | 655-881*  | 656-881* |
|         | 1mm   | 50mm   | 0-100  |          | 25-2081*  | 655-2081* |          |
|         | 1mm   | 75mm   | 0-100  |          | 25-3081*  | 655-3081* |          |
| 1mm     | 100mm | 0-100  |        | 25-4081* | 655-4081* |           |          |
| 1mm     | 125mm | 0-100  |        | 25-5081* | 655-5081* |           |          |

\* With revolution counter on dial.

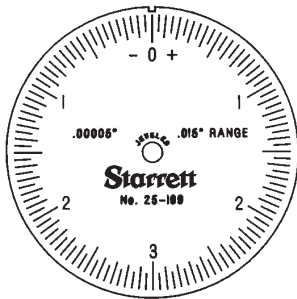


## Starrett Dial Numbering and Line Styles for Dial Indicators

These next four pages include all Starrett dial styles. (Actual size not shown.) Refer to the graduation, then range, and catalog number below the dial and then see the following pages for the specific dial reading and other indicator information. Most of the dials shown have balanced styles. Continuous dials have the same

graduations, but have consecutive numbers instead. For most indicators, the first number after the base catalog number signifies dial style. The number "1" signifies balanced dials (example: No. 25-109) and number "2" signifies continuous dials (example: No. 25-209).

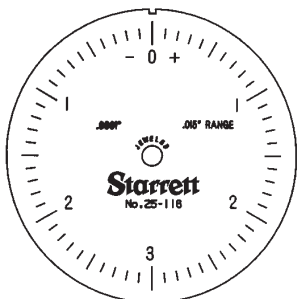
### .00005" Graduation



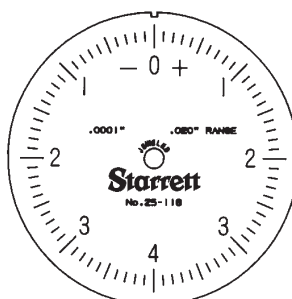
Total Range .015"

|             |                           |
|-------------|---------------------------|
| Catalog No. | No. 25-109<br>No. 656-109 |
|-------------|---------------------------|

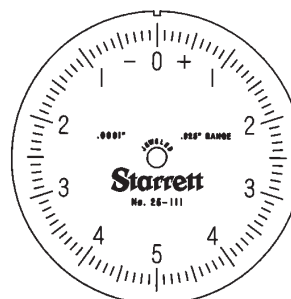
### .0001" Graduation



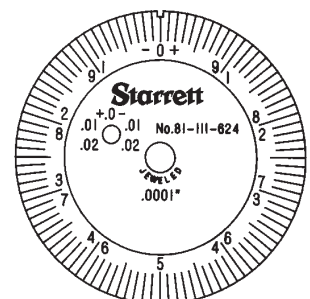
Total Range .015"



.020"

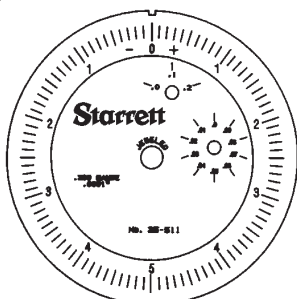


.025"

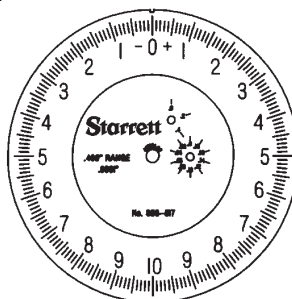


.025"

|             |            |  |  |   |
|-------------|------------|--|--|---|
| Catalog No. | No. 25-116 | No. 25-118<br>No. 655-118<br>No. 656-118 | No. 25-111<br>No. 80-111<br>No. 81-111<br>No. 655-111<br>No. 656-111 | No. 81-111-624<br>(with double row figures) |
|-------------|------------|--|--|---|



Total Range .200"



.400"

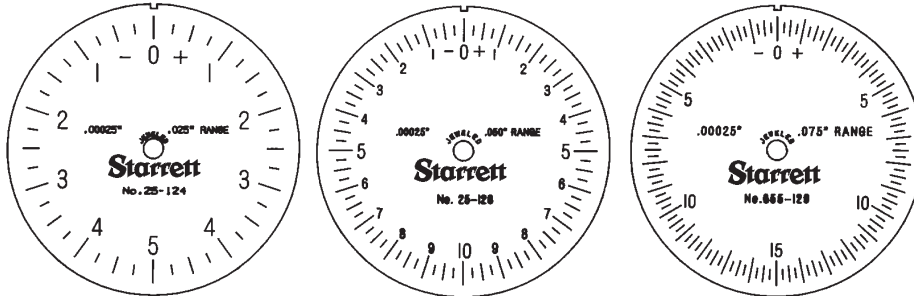
|             |  |             |
|-------------|--|-------------|
| Catalog No. | No. 25-511<br>No. 655-511<br>No. 656-511 | No. 656-517 |
|-------------|--|-------------|

(Continued on next page.)



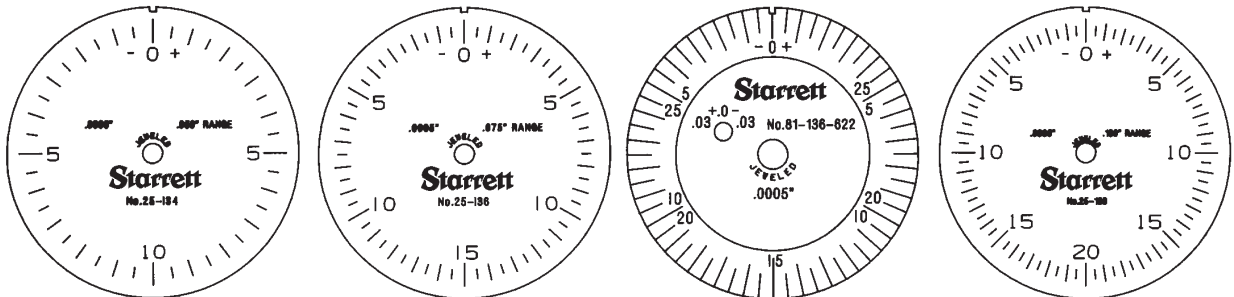
### Starrett Dial Numbering and Line Styles for Dial Indicators (continued)

#### .00025" Graduation

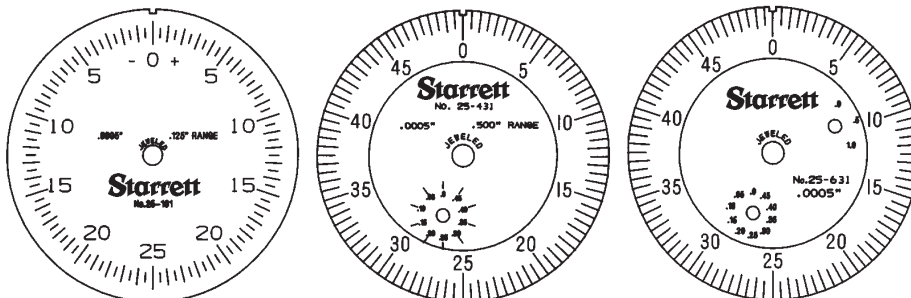


|                    |  |  |                            |
|--------------------|--|--|----------------------------|
| <b>Total Range</b> | <b>.025"</b>   | <b>.050"</b>   | <b>.075"</b>               |
| <b>Catalog No.</b> | No. 81-124<br>No. 25-124<br>No. 655-124<br>No. 656-124 | No. 81-128<br>No. 25-128<br>No. 655-128<br>No. 656-128 | No. 655-129<br>No. 656-129 |

#### .0005" Graduation



|                    |  |  |   |  |
|--------------------|--|--|---|--|
| <b>Total Range</b> | <b>.050"</b>   | <b>.075"</b>   | <b>.075"</b>                                | <b>.100"</b>   |
| <b>Catalog No.</b> | No. 81-134<br>No. 25-134<br>No. 655-134<br>No. 656-134 | No. 81-136<br>No. 25-136<br>No. 655-136<br>No. 656-136 | No. 81-136-622<br>(with double row figures) | No. 81-138<br>No. 25-138<br>No. 655-138<br>No. 656-138 |



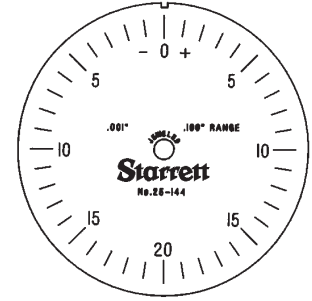
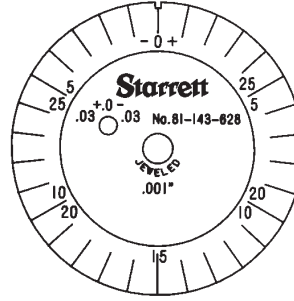
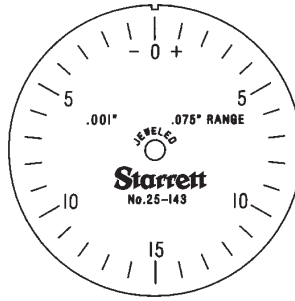
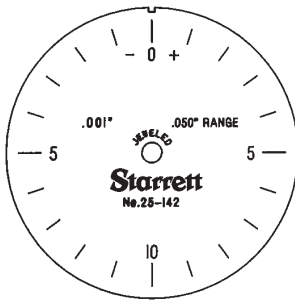
|                    |  |              |               |
|--------------------|--|--------------|---------------|
| <b>Total Range</b> | <b>.125"</b>   | <b>.500"</b> | <b>1.000"</b> |
| <b>Catalog No.</b> | No. 81-131<br>No. 25-131<br>No. 655-131<br>No. 656-131 | No. 25-431   | No. 25-631    |

(Continued on next page.)

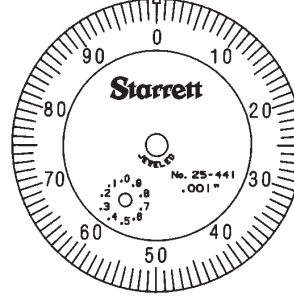
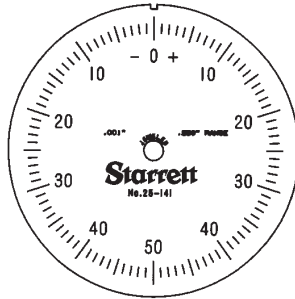
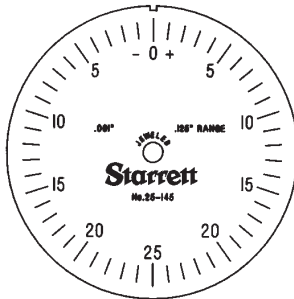


**Starrett Dial Numbering and Line Styles for Dial Indicators (continued)**

**.001" Graduation**



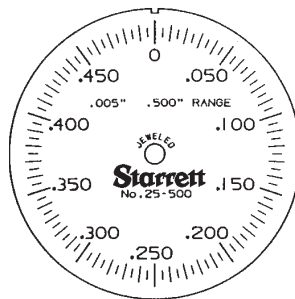
|                    |   |  |   |   |
|--------------------|---|--|---|---|
| <b>Total Range</b> | <b>.050"</b>  | <b>.075"</b>   | <b>.075"</b>                                | <b>.100"</b>  |
| <b>Catalog No.</b> | No. 81-142<br>*No. 25-142<br>*No. 655-142<br>*No. 656-142 | No. 81-143<br>No. 25-143<br>No. 655-143<br>No. 656-143 | No. 81-143-628<br>(with double row figures) | No. 81-144<br>*No. 25-144<br>*No. 655-144<br>*No. 656-144 |



|                    |   |   |   |
|--------------------|---|---|---|
| <b>Total Range</b> | <b>.125"</b>  | <b>.250"</b>  | <b>.500', 1.000"</b>  |
| <b>Catalog No.</b> | No. 81-145<br>*No. 25-145<br>*No. 655-145<br>*No. 656-145 | No. 81-141<br>*No. 25-141<br>*No. 655-141<br>*No. 656-141 | Nos. 25-441, 25-441/5<br>Nos. 655-441, 655-441/5<br>Nos. 656-441, 656-441/5 |

\*Also on long range models.

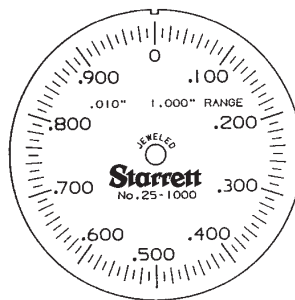
**.005" Graduation**



|                    |              |
|--------------------|--------------|
| <b>Total Range</b> | <b>.500"</b> |
| <b>Catalog No.</b> | No. 25-500   |

Available from the Special Order Department.

**.010" Graduation**



|                    |               |
|--------------------|---------------|
| <b>Total Range</b> | <b>1.000"</b> |
| <b>Catalog No.</b> | No. 25-1000   |

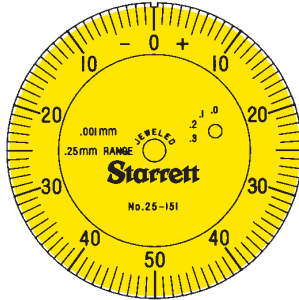
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### Starrett Dial Numbering and Line Styles for Dial Indicators (continued)

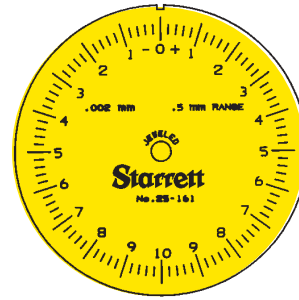
#### 0.001mm Graduation



Total Range .25mm

|             |            |
|-------------|------------|
| Catalog No. | No. 25-151 |
|-------------|------------|

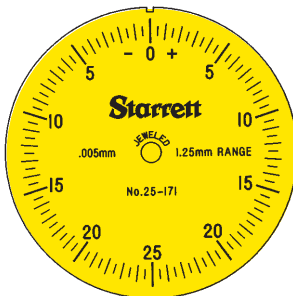
#### 0.002mm Graduation



Total Range 0.5mm

|             |  |
|-------------|--|
| Catalog No. | No. 81-161<br>No. 25-161<br>No. 655-161<br>No. 656-161 |
|-------------|--|

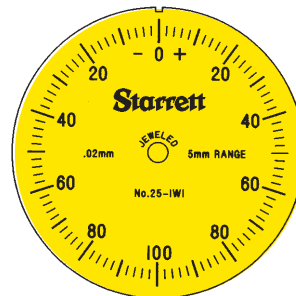
#### 0.005mm Graduation



Total Range 1.25mm

|             |            |
|-------------|------------|
| Catalog No. | No. 25-171 |
|-------------|------------|

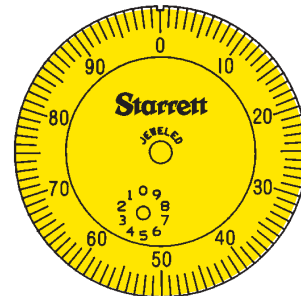
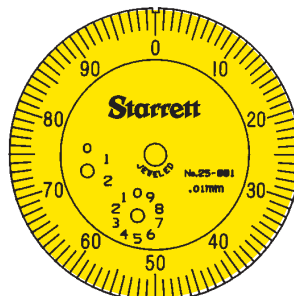
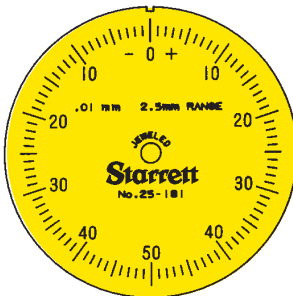
#### 0.02mm Graduation



Total Range 5.0mm

|             |            |
|-------------|------------|
| Catalog No. | No. 25-1W1 |
|-------------|------------|

#### 0.01mm Graduation



| Total Range | 2.5mm  | 25mm                                     | 10mm       | 50, 75, 100, 125mm                                       |
|-------------|--|--|------------|--|
| Catalog No. | No. 81-181<br>No. 25-181<br>No. 655-181<br>No. 656-181 | No. 25-881<br>No. 655-881<br>No. 656-881 | No. 25-381 | No. 25-2081<br>No. 25-3081<br>No. 25-4081<br>No. 25-5081 |



## Dial Indicators

### No. 81 Series AGD Group 1

Ranges up to .250" and 2.5mm

These Indicators have a shockless, hardened steel gear train and jewel bearings. They are furnished with a lug-on-center back. Antimagnetic and special nonshock mechanisms are options available for all models. For more information on these and other attachments, accessories and contact points, refer to the end of the AGD Dial Indicator listings. For dial styles, see previous pages. For dimensions, see next page.



No. 81-141J.



No. 81-161J.

Packed one in a box.

### Inch Reading

| Graduation | Range    |        | Dial Reading   | Catalog No.    | EDP No. |
|------------|----------|--------|----------------|----------------|---------|
|            | One Rev. | Total  |                |                |         |
| .0001"     | .010"    | .025"  | 0-5-0          | <b>81-111J</b> | 53378   |
|            |          |        | 0-10           | <b>81-211J</b> | 53414   |
| .00025"    | .010"    | .025"  | 0-5-0          | <b>81-124J</b> | 53384   |
|            |          |        | 0-10           | <b>81-224J</b> | 53416   |
|            | .020"    | .050"  | 0-10-0         | <b>81-128J</b> | 53386   |
|            |          |        | 0-20           | <b>81-228J</b> | 53418   |
| .0005"     | .020"    | .050"  | 0-10-0         | <b>81-134J</b> | 53390   |
|            |          |        | 0-20           | <b>81-234J</b> | 53422   |
|            | .030"    | .075"  | 0-15-0         | <b>81-136J</b> | 53392   |
|            |          |        | 0-30           | <b>81-236J</b> | 53424   |
|            | .040"    | .100"  | 0-20-0         | <b>81-138J</b> | 53398   |
|            |          |        | 0-40           | <b>81-238J</b> | 53426   |
| .050"      | .125"    | 0-25-0 | <b>81-131J</b> | 53388          |         |
|            |          | 0-50   | <b>81-231J</b> | 53420          |         |
| .001"      | .020"    | .050"  | 0-10-0         | <b>81-142J</b> | 53402   |
|            |          |        | 0-20           | <b>81-242J</b> | 53430   |
|            | .030"    | .075"  | 0-15-0         | <b>81-143J</b> | 53404   |
|            |          |        | 0-30           | <b>81-243J</b> | 53432   |
|            | .040"    | .100"  | 0-20-0         | <b>81-144J</b> | 53408   |
|            |          |        | 0-40           | <b>81-244J</b> | 53434   |
|            | .050"    | .125"  | 0-25-0         | <b>81-145J</b> | 53410   |
|            |          |        | 0-50           | <b>81-245J</b> | 53436   |
|            | .100"    | .250"  | 0-50-0         | <b>81-141J</b> | 53400   |
|            |          |        | 0-100          | <b>81-241J</b> | 53428   |

### Millimeter Reading

| Graduation | Range    |       | Dial Reading | Stem Dia. | Catalog No.      | EDP No. |
|------------|----------|-------|--------------|-----------|------------------|---------|
|            | One Rev. | Total |              |           |                  |         |
| 0.002mm    | 0.2mm    | 0.5mm | 0-10-0       | .375"     | <b>81-161J</b>   | 56043   |
|            |          |       |              | 8mm       | <b>81-161J-8</b> | 64643   |
|            |          |       | 0-20         | .375"     | <b>81-261J</b>   | 56045   |
|            |          |       |              | 8mm       | <b>81-261J-8</b> | 64644   |
| 0.01mm     | 1.0mm    | 2.5mm | 0-50-0       | .375"     | <b>81-181J</b>   | 53412   |
|            |          |       |              | 8mm       | <b>81-181J-8</b> | 64645   |
|            |          |       | 0-100        | .375"     | <b>81-281J</b>   | 53438   |
|            |          |       |              | 8mm       | <b>81-281J-8</b> | 64646   |



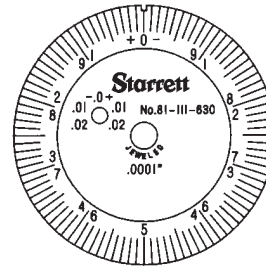
### Dial Indicators

#### No. 81 Series with double row figures AGD Group 1 Ranges up to .075"

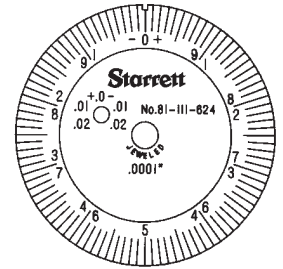
These indicators have the exact same features as our No. 81 Series on the previous page, except the dials have double-row figures, as illustrated on the right, and they cannot be specified with a special nonshock mechanism.



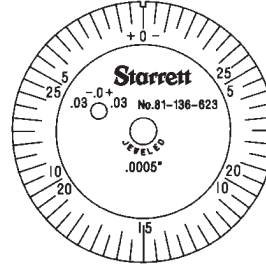
No. 81-111-624J.



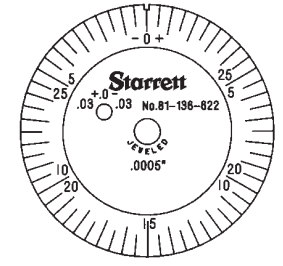
81-111-630J



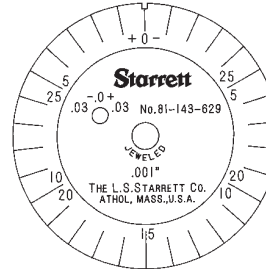
81-111-624J



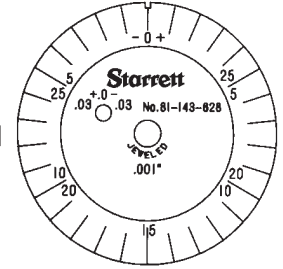
81-136-623J



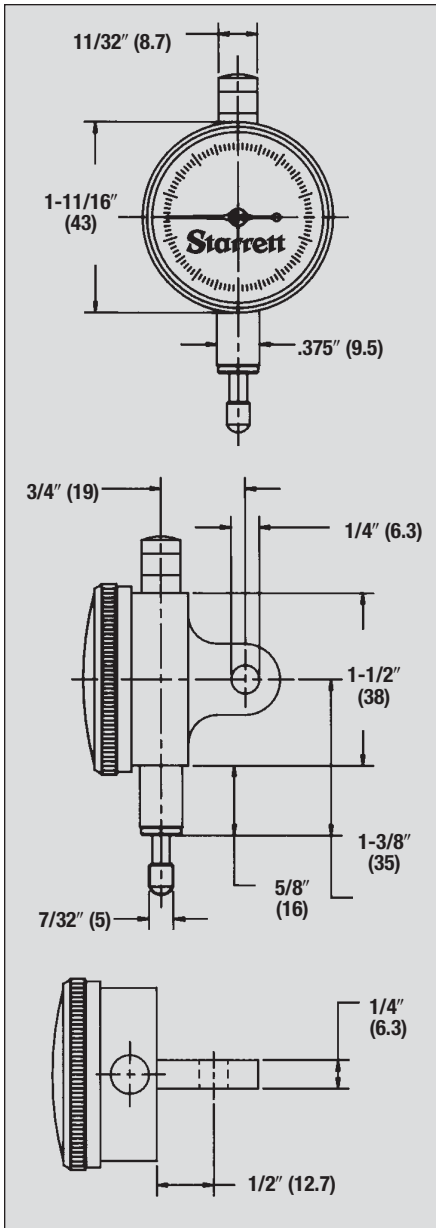
81-136-622J



81-143-629J



81-143-628J



Free drafting template available for this size. Write The L.S. Starrett Co., Athol, MA 01331.

| Graduation | Dial Reading | Figures           |       | Range    |       | Catalog No. | EDP No. |
|------------|--------------|-------------------|-------|----------|-------|-------------|---------|
|            |              | Direction         | Color | One Rev. | Total |             |         |
| .0001"     | +0-10        | Clockwise         | Black | .010"    | .025" | 81-111-624J | 53380   |
|            | -0-10        | Counter-clockwise | Red   |          |       |             |         |
|            | +0-10        | Counter-clockwise | Black |          |       |             |         |
| .0005"     | -0-10        | Clockwise         | Red   | .030"    | .075" | 81-111-630J | 53382   |
|            | +0-30        | Counter-clockwise | Red   |          |       |             |         |
|            | +0-30        | Counter-clockwise | Black |          |       |             |         |
| .001"      | -0-30        | Clockwise         | Red   | .030"    | .075" | 81-136-622J | 53394   |
|            | +0-30        | Counter-clockwise | Black |          |       |             |         |
|            | -0-30        | Clockwise         | Red   |          |       |             |         |
|            | +0-30        | Counter-clockwise | Black |          |       |             |         |
|            | -0-30        | Clockwise         | Red   |          |       |             |         |
| .001"      | +0-30        | Clockwise         | Black | .030"    | .075" | 81-136-623J | 53396   |
|            | -0-30        | Counter-clockwise | Red   |          |       |             |         |
|            | +0-30        | Counter-clockwise | Black |          |       |             |         |
| .001"      | -0-30        | Clockwise         | Red   | .030"    | .075" | 81-143-628J | 53406   |
|            | +0-30        | Clockwise         | Red   |          |       |             |         |
| .001"      | +0-30        | Counter-clockwise | Black | .030"    | .075" | 81-143-629J | 66666   |
|            | -0-30        | Clockwise         | Red   |          |       |             |         |

Packed one in a box.

NOTE: Other models with double-row figures can be furnished by request.

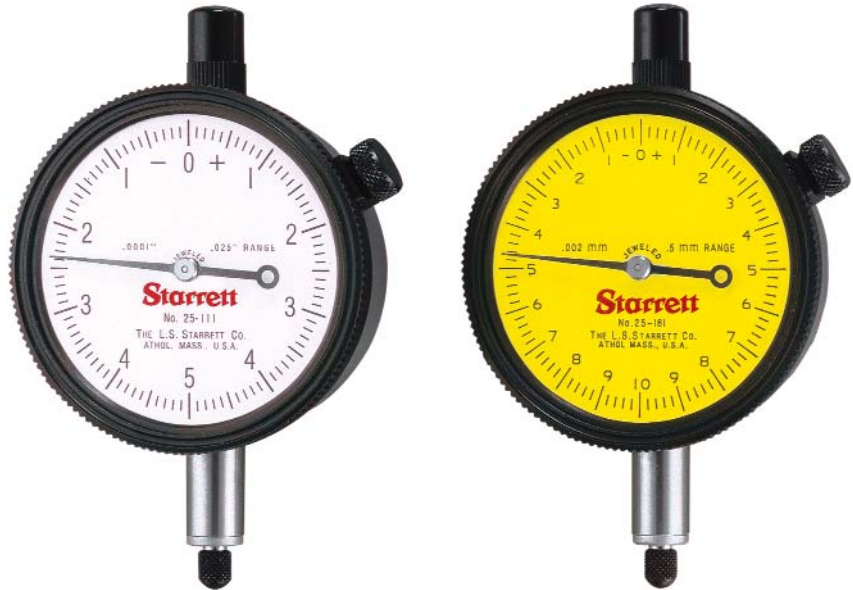


## Dial Indicators

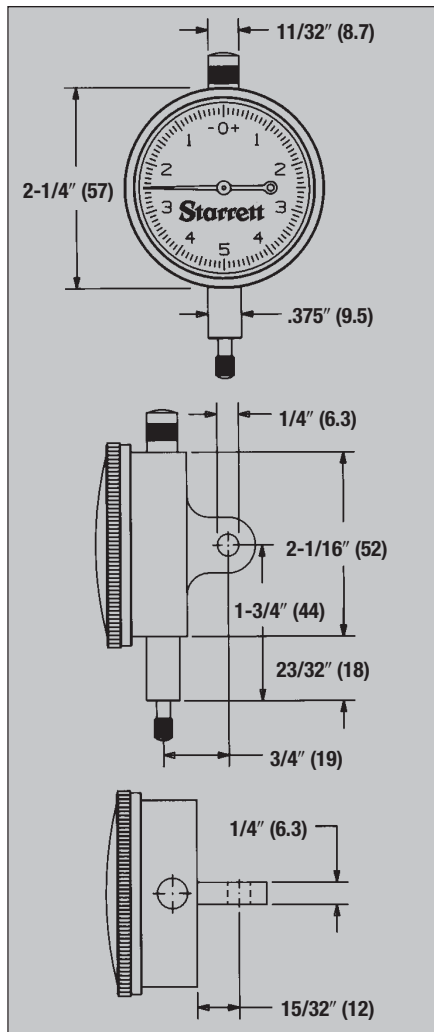
### No. 25 Series AGD Group 2

Ranges up to 1" and 25mm

These indicators have a shockless, hardened steel gear train and jewel bearings, except where noted. They are furnished with a lug-on-center back. Anti-magnetic mechanism is optional for all models. Special nonshock mechanism is available for all models except Nos. 25-109, 25-209 and 25-116. For more information on these and other attachments, accessories and contact points, refer to the end of the AGD Dial Indicator listings. For dial styles, see previous pages.



Left, No. 25-111J; right, No. 25-161J.



Free drafting template available for this size.  
Write The L.S. Starrett Co., Athol, MA 01331.

Packed one in a box.

### Inch Reading Models with Jewel Bearings

| Graduation | Range    |       | Dial Reading | Catalog No. | EDP No. |
|------------|----------|-------|--------------|-------------|---------|
|            | One Rev. | Total |              |             |         |
| .00005"    | .006"    | .015" | 0-3-0        | 25-109J     | 53222   |
|            |          |       | 0-6          | 25-209J     | 53254   |
| .0001"     | .006"    | .015" | 0-3-0        | 25-116J     | 53225   |
|            |          |       | 0-4-0        | 25-118J     | 53226   |
|            |          |       | 0-8          | 25-218J     | 53257   |
|            |          |       | 0-5-0        | 25-111J     | 53223   |
|            |          |       | 0-10         | 25-211J     | 53255   |
|            |          |       | 0-5-0        | 25-511J     | 53299   |
| .00025"    | .010"    | .025" | 0-5-0        | 25-124J     | 53228   |
|            |          |       | 0-10         | 25-224J     | 53259   |
|            |          |       | 0-10-0       | 25-128J     | 53230   |
|            |          |       | 0-20         | 25-228J     | 53261   |
| .0005"     | .020"    | .050" | 0-10-0       | 25-134J     | 53234   |
|            |          |       | 0-20         | 25-234J     | 53265   |
|            |          |       | 0-15-0       | 25-136J     | 53236   |
|            |          |       | 0-30         | 25-236J     | 53267   |
|            |          |       | 0-20-0       | 25-138J     | 53238   |
|            |          |       | 0-40         | 25-238J     | 53269   |
|            |          |       | 0-25-0       | 25-131J     | 53232   |
|            |          |       | 0-50         | 25-231J     | 53263   |
| .001"      | .020"    | .050" | 0-50         | 25-431J     | 53292   |
|            |          |       | 1.000"       | 25-631J     | 53304   |
| .001"      | .020"    | .050" | 0-10-0       | 25-142J     | 53242   |
|            |          |       | 0-20         | 25-242J     | 53273   |





### Inch Reading Models with Jewel Bearings (continued)

| Graduation | Range    |       | Dial Reading    | Catalog No.      | EDP No. |
|------------|----------|-------|-----------------|------------------|---------|
|            | One Rev. | Total |                 |                  |         |
| .001"      | .030"    | .075" | 0-15-0          | 25-143J          | 53244   |
|            |          |       | 0-30            | 25-243J          | 53275   |
|            |          |       | 0-20-0          | 25-144J          | 53246   |
|            | .040"    | .100" | 0-40            | 25-244J          | 53277   |
|            |          |       | 0-25-0          | 25-145J          | 53248   |
|            | .050"    | .125" | 0-50            | 25-245J          | 53279   |
|            |          |       | 0-50-0          | 25-141J          | 53240   |
|            | .100"    | .250" | 0-100           | 25-241J          | 53271   |
|            |          |       | 0-50-0          | 25-341/5J        | 53285   |
|            |          |       | 0-100           | 25-441/5J        | 53293   |
|            |          |       | 0-100           | 25-441/5J W/SLC* | 66864   |
|            |          |       | 0-50-0          | 25-341J          | 53287   |
| 0-100      |          |       | 25-441J         | 53295            |         |
|            | 1.000"   | 0-100 | 25-441/J W/SLC* | 66863            |         |

### Inch Reading Models with Plain Bearings

|       |       |        |        |           |       |
|-------|-------|--------|--------|-----------|-------|
| .001" | .100" | .500"  | 0-50-0 | 25-341/5P | 53286 |
|       |       |        | 0-100  | 25-441/5P | 53294 |
|       |       | 1.000" | 0-50-0 | 25-341P   | 53288 |
|       |       |        | 0-100  | 25-441P   | 53296 |

### Millimeter Models with Jewel Bearings

| Graduation | Range    |        | Dial Reading | Stem Dia. | Catalog No. | EDP No. |
|------------|----------|--------|--------------|-----------|-------------|---------|
|            | One Rev. | Total  |              |           |             |         |
| 0.001mm    | 0.1mm    | 0.25mm | 0-50-0       | .375"     | 25-151J     | 67644   |
|            |          |        |              | 8mm       | 25-151J-8   | 68646   |
|            |          |        | 0-100        | .375"     | 25-251J     | 68118   |
|            |          |        |              | 8mm       | 25-251J-8   | 68647   |
| 0.002mm    | 0.2mm    | 0.5mm  | 0-10-0       | .375"     | 25-161J     | 53250   |
|            |          |        |              | 8mm       | 25-161J-8   | 64651   |
|            |          |        | 0-20         | .375"     | 25-261J     | 53281   |
|            |          |        |              | 8mm       | 25-261J-8   | 64652   |
| 0.02mm     | 2.0mm    | 5.0mm  | 0-100-0      | .375"     | 25-1W1J     | 68642   |
| 0.005mm    | 0.5mm    | 1.25mm | 0-25-0       | .375"     | 25-171J     | 68643   |
| 0.01mm     | 1.0mm    | 2.5mm  | 0-50-0       | .375"     | 25-181J     | 53252   |
|            |          |        |              | 8mm       | 25-181J-8   | 64653   |
|            |          |        | 0-100        | .375"     | 25-281J     | 53283   |
|            |          |        |              | 8mm       | 25-281J-8   | 64654   |
|            |          | 10mm   | 0-50-0       | .375"     | 25-381J     | 53289   |
|            |          |        |              | 8mm       | 25-381J-8   | 64655   |
|            |          |        | 0-100        | .375"     | 25-481J     | 53297   |
|            |          |        |              | 8mm       | 25-481J-8   | 64656   |
|            |          | 25mm   | 0-50-0       | .375"     | 25-781J     | 53305   |
|            |          |        |              | 8mm       | 25-781J-8   | 64657   |
|            |          |        | 0-100        | .375"     | 25-881J     | 53307   |
|            |          |        |              | 8mm       | 25-881J-8   | 64658   |

### Dial Indicator Sets

#### No. 253 Series Inch and Millimeter Reading

These sets provide in one handy, compact kit three No. 25 Series Dial Indicators to handle most gaging jobs at a minimum cost. Sets are ideal for tool and die shops, machine shops and toolrooms having occasional work where a heavy investment in dial indicators would not be practical. The indicators are furnished with jewel bearings.



No. S253Z.

#### Inch Set

| Description   | Catalog No. | EDP No. |
|---|-------------|---------|
| Set of 3 Inch Reading Dial Indicators:<br>Nos. 25-111J, 25-131J and 25-441J | S253Z       | 51218   |

#### Millimeter Set

|   |        |       |
|---|--------|-------|
| Set of 3 Millimeter Reading Dial Indicators:<br>Nos. 25-161J, 25-181J and 25-881J | S253MZ | 56283 |
|---|--------|-------|

\* Includes redemption card for Standard Letter of Certification (SLC).

Sets furnished in attractive, protective case. Packed one in a box.



**Dial Indicators**

**No. 655 Series  
AGD Group 3  
Ranges up to 1" and 25mm**

These indicators have a shockless, hardened steel gear train and jewel bearings. They are furnished with a lug-on-center back. Antimagnetic and special nonshock mechanisms are options available for all models. For more information on these and other attachments, accessories and contact points, refer to the end of the AGD Dial Indicator listings. For dial styles, see previous pages. For dimensions, see next page.



Left, No. 655-111J; right, No. 655-161J-8.

**Inch Reading**

| Graduation | Range           |                 | Dial Reading    | Catalog No.     | EDP No.         |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|            | One Rev.        | Total           |                 |                 |                 |
| .0001"     | .008"           | .020"           | 0-4-0           | <b>655-118J</b> | 53507           |
|            |                 | .010"           | .025"           | 0-5-0           | <b>655-111J</b> |
|            | .200"           |                 | 0-10            | <b>655-211J</b> | 53537           |
|            |                 |                 | 0-5-0           | <b>655-511J</b> | 53615           |
|            | 0-10            | <b>655-611J</b> | 53617           |                 |                 |
| .00025"    | .010"           | .025"           | 0-5-0           | <b>655-124J</b> | 53509           |
|            |                 | .020"           | 0-10            | <b>655-224J</b> | 53539           |
|            | .030"           |                 | 0-10-0          | <b>655-128J</b> | 53511           |
|            |                 |                 | 0-20            | <b>655-228J</b> | 53541           |
|            | 0-15-0          | <b>655-129J</b> | 53513           |                 |                 |
| 0-30       | <b>655-229J</b> | 53543           |                 |                 |                 |
| .0005"     | .020"           | .050"           | 0-10-0          | <b>655-134J</b> | 53517           |
|            |                 |                 | 0-20            | <b>655-234J</b> | 53587           |
|            | .030"           | .075"           | 0-15-0          | <b>655-136J</b> | 53519           |
|            |                 |                 | 0-30            | <b>655-236J</b> | 53589           |
|            | .040"           | .100"           | 0-20-0          | <b>655-138J</b> | 53521           |
|            |                 |                 | 0-40            | <b>655-238J</b> | 53591           |
|            | .050"           | .125"           | 0-25-0          | <b>655-131J</b> | 53515           |
| 0-50       |                 |                 | <b>655-231J</b> | 53585           |                 |

Packed one in a box.

(Continued on next page.)



### Dial Indicators

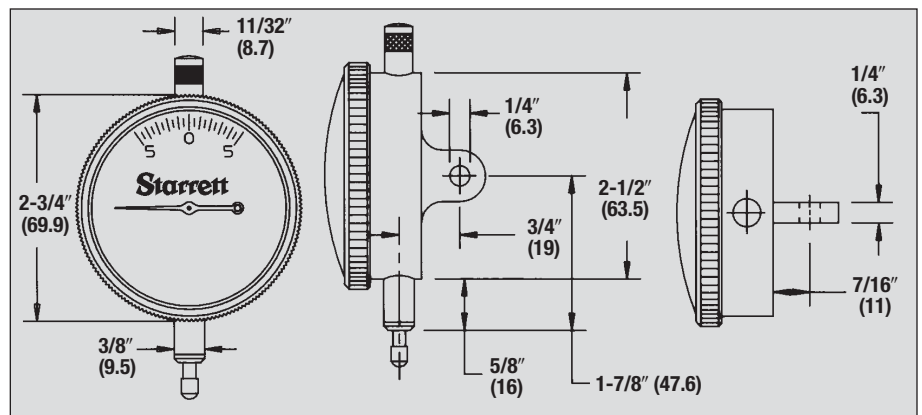
#### Series No. 655 (continued)

#### Inch Reading (continued)

| Graduation | Range    |        | Dial Reading | Catalog No.       | EDP No. |
|------------|----------|--------|--------------|-------------------|---------|
|            | One Rev. | Total  |              |                   |         |
| .001"      | .020"    | .050"  | 0-10-0       | <b>655-142J</b>   | 53525   |
|            |          |        | 0-20         | <b>655-242J</b>   | 53595   |
|            | .030"    | .075"  | 0-15-0       | <b>655-143J</b>   | 53527   |
|            |          |        | 0-30         | <b>655-243J</b>   | 53597   |
|            | .040"    | .100"  | 0-20-0       | <b>655-144J</b>   | 53529   |
|            |          |        | 0-40         | <b>655-244J</b>   | 53599   |
|            | .050"    | .125"  | 0-25-0       | <b>655-145J</b>   | 53531   |
|            |          |        | 0-50         | <b>655-245J</b>   | 53601   |
|            | .100"    | .250"  | 0-50-0       | <b>655-141J</b>   | 53523   |
|            |          |        | 0-100        | <b>655-241J</b>   | 53593   |
|            |          | .500"  | 0-50-0       | <b>655-341/5J</b> | 53607   |
|            |          |        | 0-100        | <b>655-441/5J</b> | 53611   |
|            |          | 1.000" | 0-50-0       | <b>655-341J</b>   | 53609   |
|            |          |        | 0-100        | <b>655-441J</b>   | 53613   |

#### Millimeter Reading

| Graduation | Range    |        | Dial Reading | Stem Dia. | Catalog No.       | EDP No. |
|------------|----------|--------|--------------|-----------|-------------------|---------|
|            | One Rev. | Total  |              |           |                   |         |
| 0.002 mm   | 0.2 mm   | 0.5 mm | 0-10-0       | .375"     | <b>655-161J</b>   | 53533   |
|            |          |        |              | 8 mm      | <b>655-161J-8</b> | 64659   |
|            |          |        | 0-20         | .375"     | <b>655-261J</b>   | 53603   |
|            |          |        |              | 8 mm      | <b>655-261J-8</b> | 64660   |
| 0.01 mm    | 1.0 mm   | 2.5 mm | 0-50-0       | .375"     | <b>655-181J</b>   | 53535   |
|            |          |        |              | 8 mm      | <b>655-181J-8</b> | 64661   |
|            |          |        | 0-100        | .375"     | <b>655-281J</b>   | 53605   |
|            |          |        |              | 8 mm      | <b>655-281J-8</b> | 64868   |
|            |          | 25 mm  | 0-100        | .375"     | <b>655-881J</b>   | 56229   |
|            |          |        |              | 8 mm      | <b>655-881J-8</b> | 64869   |



Packed one in a box.

Free drafting template available for this size. Write The L.S. Starrett Co., Athol, MA 01331.



**Dial Indicators**

**No. 656 Series  
AGD Group 4  
Ranges up to 1" and 25mm**

These indicators have a shockless, hardened steel gear train and jewel bearings. They are furnished with a lug-on-center back. Antimagnetic mechanism is optional for all models. Special nonshock mechanism is available for all models except Nos. 656-109 and 656-209. For more information on these and other attachments, accessories and contact points, refer to the end of the AGD Dial Indicator listings. For dial styles, see previous pages. For dimensions, see next page.



Left, No. 656-111J; right, No. 656-161J-8.

**Inch Reading**

| Graduation | Range           |       | Dial Reading | Catalog No.     | EDP No. |
|------------|-----------------|-------|--------------|-----------------|---------|
|            | One Rev.        | Total |              |                 |         |
| .00005"    | .006"           | .015" | 0-3-0        | <b>656-109J</b> | 53661   |
|            |                 |       | 0-6          | <b>656-209J</b> | 53694   |
| .0001"     | .008"           | .020" | 0-4-0        | <b>656-118J</b> | 53664   |
|            |                 |       | 0-5-0        | <b>656-111J</b> | 53662   |
|            | .010"           | .025" | 0-10         | <b>656-211J</b> | 53695   |
|            |                 |       | 0-5-0        | <b>656-511J</b> | 53791   |
|            | .010"           | .200" | 0-10         | <b>656-611J</b> | 53795   |
|            |                 |       | 0-10-0       | <b>656-517J</b> | 53793   |
| 0-20       | <b>656-617J</b> | 53797 |              |                 |         |
| .00025"    | .010"           | .025" | 0-5-0        | <b>656-124J</b> | 53666   |
|            |                 |       | 0-10         | <b>656-224J</b> | 53697   |
|            | .020"           | .050" | 0-10-0       | <b>656-128J</b> | 53668   |
|            |                 |       | 0-20         | <b>656-228J</b> | 53699   |
|            | .030"           | .075" | 0-15-0       | <b>656-129J</b> | 53670   |
|            |                 |       | 0-30         | <b>656-229J</b> | 53701   |

Packed one in a box.

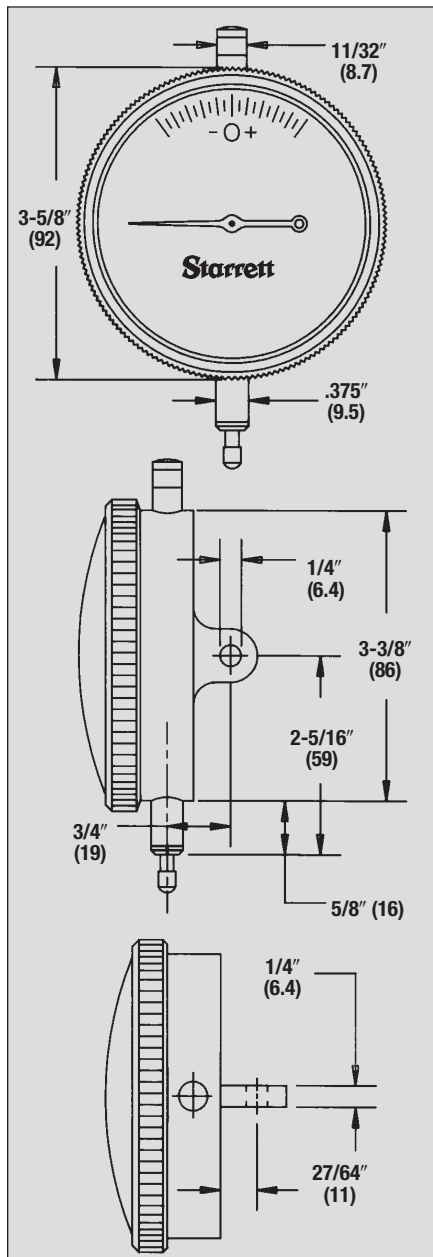
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### Dial Indicators

#### No. 656 Series (continued)



Free drafting template available for this size.  
Write The L.S. Starrett Co., Athol, MA 01331.

#### Inch Reading (continued)

| Graduation | Range    |        | Dial Reading    | Catalog No.       | EDP No. |
|------------|----------|--------|-----------------|-------------------|---------|
|            | One Rev. | Total  |                 |                   |         |
| .0005"     | .020"    | .050"  | 0-10-0          | <b>656-134J</b>   | 53674   |
|            |          |        | 0-20            | <b>656-234J</b>   | 53705   |
|            | .030"    | .075"  | 0-15-0          | <b>656-136J</b>   | 53676   |
|            |          |        | 0-30            | <b>656-236J</b>   | 53707   |
|            | .040"    | .100"  | 0-20-0          | <b>656-138J</b>   | 53678   |
|            |          |        | 0-40            | <b>656-238J</b>   | 53709   |
| .050"      | .125"    | 0-25-0 | <b>656-131J</b> | 53672             |         |
| .001"      | .020"    | .050"  | 0-10-0          | <b>656-142J</b>   | 53682   |
|            |          |        | 0-20            | <b>656-242J</b>   | 53713   |
|            | .030"    | .075"  | 0-15-0          | <b>656-143J</b>   | 53684   |
|            |          |        | 0-30            | <b>656-243J</b>   | 53715   |
|            | .040"    | .100"  | 0-20-0          | <b>656-144J</b>   | 53686   |
|            |          |        | 0-40            | <b>656-244J</b>   | 53717   |
|            | .050"    | .125"  | 0-25-0          | <b>656-145J</b>   | 53688   |
|            |          |        | 0-50            | <b>656-245J</b>   | 53719   |
|            | .100"    | .250"  | 0-50-0          | <b>656-141J</b>   | 53680   |
|            |          |        | 0-100           | <b>656-241J</b>   | 53711   |
|            |          |        | 0-50-0          | <b>656-341/5J</b> | 53783   |
|            |          | .500"  | 0-100           | <b>656-441/5J</b> | 53787   |
|            |          |        | 0-50-0          | <b>656-341J</b>   | 53785   |
|            |          | 1.000" | 0-100           | <b>656-441J</b>   | 53789   |

#### Millimeter Reading

| Graduation | Range    |       | Dial Reading | Stem Dia.         | Catalog No.       | EDP No. |
|------------|----------|-------|--------------|-------------------|-------------------|---------|
|            | One Rev. | Total |              |                   |                   |         |
| 0.002mm    | 0.2mm    | 0.5mm | 0-10-0       | .375"             | <b>656-161J</b>   | 53690   |
|            |          |       |              | 8mm               | <b>656-161J-8</b> | 64870   |
|            |          |       | 0-20         | .375"             | <b>656-261J</b>   | 53779   |
|            |          |       |              | 8mm               | <b>656-261J-8</b> | 64871   |
| 0.01mm     | 1.0mm    | 2.5mm | 0-50-0       | .375"             | <b>656-181J</b>   | 53692   |
|            |          |       |              | 8mm               | <b>656-181J-8</b> | 64872   |
|            |          |       | 0-100        | .375"             | <b>656-281J</b>   | 53781   |
|            |          | 8mm   |              | <b>656-281J-8</b> | 64873             |         |
|            |          | 25mm  | 0-100        | .375"             | <b>656-881J</b>   | 56234   |
|            |          |       |              | 8mm               | <b>656-881J-8</b> | 64874   |

Packed one in a box.



## Dial Indicators with long range

### Nos. 25, 655, 656 Series 2-5" ranges

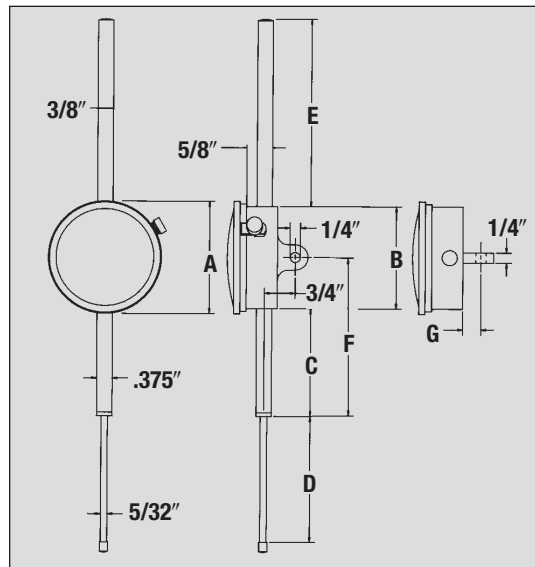
These indicators have a shockless, hardened steel gear train and are furnished with jewel bearings and lug-on-center backs unless otherwise ordered.

- ◆ Conforms to AGD specifications except for range
- ◆ Stem cap supplied as standard – top lift available when specified
- ◆ Furnished with continuous reading double dial with direct reading count hands



No. 25-2041J.

Packed one in a box.



**NOTE:** Not available with special nonshock mechanism. For other attachments, accessories and contact points, refer to the end of the AGD Dial Indicator listings.

### Approximate Dimensions

| Catalog No. | A      | B       | C        | D       | E       | F      | G      |
|-------------|--------|---------|----------|---------|---------|--------|--------|
| 25-2041J    | 2-1/4" | 2-1/16" | 1-13/16" | 2-1/16" | 3-3/32" | 2-7/8" | 15/32" |
| 655-2041J   | 2-3/4" | 2-1/2"  | 1-5/8"   | 2-1/16" | 3-3/32" | 2-7/8" | 7/16"  |
| 656-2041J   | 3-5/8" | 3-3/8"  | 1-1/4"   | 2-1/16" | 3-3/32" | 3"     | 27/64" |
| 25-3041J    | 2-1/4" | 2-1/16" | 2-13/16" | 3-1/16" | 4-9/16" | 3-7/8" | 15/32" |
| 655-3041J   | 2-3/4" | 2-1/2"  | 2-5/8"   | 3-1/16" | 4-9/16" | 3-7/8" | 7/16"  |
| 656-3041J   | 3-5/8" | 3-3/8"  | 2-1/4"   | 3-1/16" | 4-9/16" | 4"     | 27/64" |
| 25-4041J    | 2-1/4" | 2-1/16" | 3-13/16" | 4-1/16" | 6"      | 4-7/8" | 15/32" |
| 655-4041J   | 2-3/4" | 2-1/2"  | 3-5/8"   | 4-1/16" | 6"      | 4-7/8" | 7/16"  |
| 656-4041J   | 3-5/8" | 3-3/8"  | 3-1/4"   | 4-1/16" | 6"      | 5"     | 27/64" |
| 25-5041J    | 2-1/4" | 2-1/16" | 4-13/16" | 5-1/16" | 7-1/4"  | 5-7/8" | 15/32" |
| 655-5041J   | 2-3/4" | 2-1/2"  | 4-5/8"   | 5-1/16" | 7-1/4"  | 5-7/8" | 7/16"  |
| 656-5041J   | 3-5/8" | 3-3/8"  | 4-1/4"   | 5-1/16" | 7-1/4"  | 6"     | 27/64" |

| Graduation | Range  | Dial Reading | Revs. of Hand | AGD Group | Bezel Diameter | Catalog No. | EDP No.   |       |
|------------|--------|--------------|---------------|-----------|----------------|-------------|-----------|-------|
| .001"      | 2.000" | 0-100        | 20            | 2         | 2-1/4"         | 25-2041J    | 53309     |       |
|            |        |              |               | 3         | 2-3/4"         | 655-2041J   | 53619     |       |
|            |        |              |               | 4         | 3-5/8"         | 656-2041J   | 53799     |       |
|            |        |              |               | 2         | 2-1/4"         | 25-3041J    | 53310     |       |
|            |        |              |               | 3         | 2-3/4"         | 655-3041J   | 53620     |       |
|            |        |              |               | 4         | 3-5/8"         | 656-3041J   | 53800     |       |
|            | 3.000" |              | 30            | 40        | 2              | 2-1/4"      | 25-4041J  | 53311 |
|            |        |              |               |           | 3              | 2-3/4"      | 655-4041J | 53621 |
|            |        |              |               |           | 4              | 3-5/8"      | 656-4041J | 53801 |
|            |        |              |               |           | 2              | 2-1/4"      | 25-5041J  | 53312 |
|            |        |              |               |           | 3              | 2-3/4"      | 655-5041J | 53622 |
|            |        |              |               |           | 4              | 3-5/8"      | 656-5041J | 53802 |
| 4.000"     | 40     | 50           | 2             | 2-1/4"    | 25-5041J       | 53312       |           |       |
|            |        |              | 3             | 2-3/4"    | 655-5041J      | 53622       |           |       |
|            |        |              | 4             | 3-5/8"    | 656-5041J      | 53802       |           |       |
|            |        |              | 2             | 2-1/4"    | 25-5041J       | 53312       |           |       |
|            |        |              | 3             | 2-3/4"    | 655-5041J      | 53622       |           |       |
|            |        |              | 4             | 3-5/8"    | 656-5041J      | 53802       |           |       |
| 5.000"     | 50     | 50           | 2             | 2-1/4"    | 25-5041J       | 53312       |           |       |
|            |        |              | 3             | 2-3/4"    | 655-5041J      | 53622       |           |       |
|            |        |              | 4             | 3-5/8"    | 656-5041J      | 53802       |           |       |
|            |        |              | 2             | 2-1/4"    | 25-5041J       | 53312       |           |       |
|            |        |              | 3             | 2-3/4"    | 655-5041J      | 53622       |           |       |
|            |        |              | 4             | 3-5/8"    | 656-5041J      | 53802       |           |       |



### Metric Dial Indicators with long range

#### Nos. 25, 655 Series 50-125mm ranges

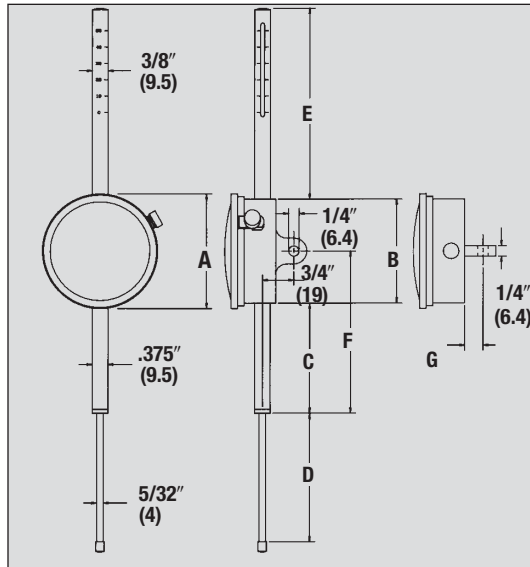
These indicators have a shockless, hardened steel gear train and are furnished with jewel bearings and lug-on-center backs unless otherwise ordered.

- ◆ Conforms to AGD specifications except for range
- ◆ Furnished with continuous reading double dial
- ◆ Direct readout accomplished by
  - (1) graduated top tube which indicates each 10mm of spindle travel,
  - (2) revolution counter which indicates each 1mm full turn of the indicator hand, and
  - (3) indicator hand which shows each 0.01mm of spindle movement



No. 655-2081J.

Packed one in a box.



**NOTE:** Not available with special nonshock mechanism. For contact points, attachments and accessories, refer to the end of the AGD Dial Indicator listings.

#### Approximate Dimensions Inch and Millimeter

| Catalog No. | A      | B       | C        | D       | E        | F      | G      |
|-------------|--------|---------|----------|---------|----------|--------|--------|
| 25-2081J    | 2-1/4" | 2-1/16" | 1-13/16" | 2-1/16" | 3-3/32"  | 2-7/8" | 15/32" |
|             | 57mm   | 52mm    | 46mm     | 52mm    | 79mm     | 73mm   | 12mm   |
| 655-2081J   | 2-3/4" | 2-1/2"  | 1-5/8"   | 2-1/16" | 3-3/32"  | 2-7/8" | 7/16"  |
|             | 70mm   | 63.5mm  | 41mm     | 52mm    | 79mm     | 73mm   | 11mm   |
| 25-3081J    | 2-1/4" | 2-1/16" | 2-13/16" | 3-1/16" | 4-9/16"  | 3-7/8" | 15/32" |
|             | 57mm   | 52mm    | 71mm     | 78mm    | 116mm    | 98mm   | 12mm   |
| 655-3081J   | 2-3/4" | 2-1/2"  | 2-5/8"   | 3-1/16" | 4-9/16"  | 3-7/8" | 7/16"  |
|             | 70mm   | 63.5mm  | 67mm     | 78mm    | 116mm    | 98mm   | 11mm   |
| 25-4081J    | 2-1/4" | 2-1/16" | 3-13/16" | 4-1/16" | 5-61/64" | 4-7/8" | 15/32" |
|             | 57mm   | 52mm    | 81mm     | 103mm   | 151mm    | 124mm  | 12mm   |
| 655-4081J   | 2-3/4" | 2-1/2"  | 3-5/8"   | 4-1/16" | 5-61/64" | 4-7/8" | 7/16"  |
|             | 70mm   | 63.5mm  | 92mm     | 103mm   | 151mm    | 124mm  | 11mm   |
| 25-5081J    | 2-1/4" | 2-1/16" | 4-13/16" | 5-1/16" | 7-1/4"   | 5-7/8" | 15/32" |
|             | 57mm   | 52mm    | 122mm    | 129mm   | 184mm    | 149mm  | 12mm   |
| 655-5081J   | 2-3/4" | 2-1/2"  | 4-5/8"   | 5-1/16" | 7-1/4"   | 5-7/8" | 7/16"  |
|             | 70mm   | 63.5mm  | 117.5mm  | 129mm   | 184mm    | 149mm  | 11mm   |

| Graduation | AGD Group | Stem Diameter  | Range | Dial Reading | Revs. of Hand | Catalog No. | EDP No.   |           |       |
|------------|-----------|----------------|-------|--------------|---------------|-------------|-----------|-----------|-------|
| 0.01mm     | 2         | .375"<br>9.5mm | 50mm  | 0-100        | 50            | 25-2081J    | 56225     |           |       |
|            | 3         |                |       |              |               | 655-2081J   | 56230     |           |       |
|            | 2         |                |       |              |               | 75mm        | 25-3081J  | 56226     |       |
|            | 3         |                |       |              |               |             | 655-3081J | 56231     |       |
|            | 2         |                |       |              |               |             | 100mm     | 25-4081J  | 56227 |
|            | 3         |                |       |              |               |             |           | 655-4081J | 56232 |
|            | 2         |                | 125mm |              | 25-5081J      |             |           | 56228     |       |
|            | 3         |                |       |              | 655-5081J     |             |           | 56233     |       |



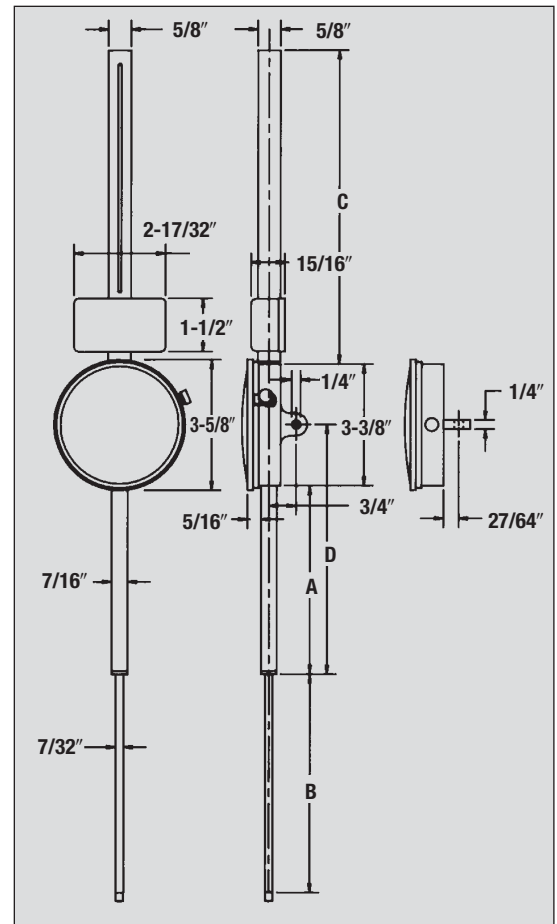
**Dial Indicators with extra-long range**

**No. 656 Series AGD Group 4 6-12" ranges**

These indicators have a shockless, hardened steel gear train and are furnished with jewel bearings and lug-on-center backs unless otherwise ordered.

- ◆ Use anywhere a long reach is needed – positioning of stops, measuring travel of slides and cam throws, and use in deep slots or holes
- ◆ Conforms to AGD specifications except for range, stems and contact point
- ◆ Top stem graduated in 1" increments, called out by red colored pointer
- ◆ Furnished with continuous reading double dial with direct reading count hand

**NOTE:** Not available with special nonshock mechanism. For contact points, attachments and accessories, refer to the end of the AGD Dial Indicator Section.



**Dimensions**

| Catalog No.       | A       | B        | C       | D         |
|-------------------|---------|----------|---------|-----------|
| <b>656-6041J</b>  | 5-1/4"  | 6-1/16"  | 8-3/4"  | 6-15/16"  |
| <b>656-7041J</b>  | 6-1/4"  | 7-1/16"  | 9-3/4"  | 7-15/16"  |
| <b>656-8041J</b>  | 7-1/4"  | 8-1/16"  | 10-3/4" | 8-15/16"  |
| <b>656-9041J</b>  | 8-1/4"  | 9-1/16"  | 11-3/4" | 9-15/16"  |
| <b>656-10041J</b> | 9-1/4"  | 10-1/16" | 12-3/4" | 10-15/16" |
| <b>656-11041J</b> | 10-1/4" | 11-1/16" | 13-3/4" | 11-15/16" |
| <b>656-12041J</b> | 11-1/4" | 12-1/16" | 14-3/4" | 12-15/16" |

**No. 656-6041J.**

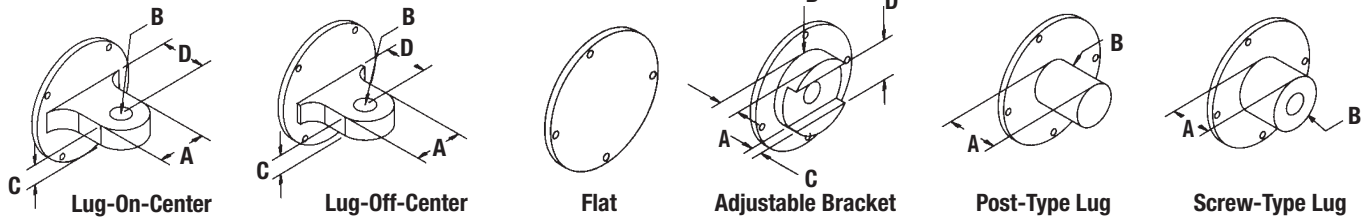
| Graduation | AGD Group | Dial Diameter | Range   | Dial Reading | Revs. of Hand | Catalog No.       | EDP No. |
|------------|-----------|---------------|---------|--------------|---------------|-------------------|---------|
| .001"      | 4         | 3-5/8"        | 6.000"  | 0-100        | 60            | <b>656-6041J</b>  | 53803   |
|            |           |               | 7.000"  |              | 70            | <b>656-7041J</b>  | 53804   |
|            |           |               | 8.000"  |              | 80            | <b>656-8041J</b>  | 53805   |
|            |           |               | 9.000"  |              | 90            | <b>656-9041J</b>  | 53806   |
|            |           |               | 10.000" |              | 100           | <b>656-10041J</b> | 53807   |
|            |           |               | 11.000" |              | 110           | <b>656-11041J</b> | 53808   |
|            |           |               | 12.000" |              | 120           | <b>656-12041J</b> | 53809   |

Packed one in a box.





### AGD Dial Indicator Backs



| Type                                 | Fits Starrett Indicator Series No. | Part No.  | EDP No. | Dimensions |        |        |        |      |       |        |        |
|--------------------------------------|------------------------------------|-----------|---------|------------|--------|--------|--------|------|-------|--------|--------|
|                                      |                                    |           |         | A          |        | B      |        | C    |       | D      |        |
|                                      |                                    |           |         | Inch       | mm     | Inch   | mm     | Inch | mm    | Inch   | mm     |
| *Lug-On-Center                       | 81                                 | PT06836-1 | 70856   | 5/8"       | 16mm   | 1/4"   | 6.3mm  | 1/4" | 6.3mm | 1/2"   | 12.7mm |
|                                      | 25, 2600                           | PT07206-1 | 70960   |            |        |        |        |      |       | 15/32" | 12mm   |
|                                      | 655                                | PT06966-1 | 70888   |            |        |        |        |      |       | 7/16"  | 11mm   |
|                                      | 656                                | PT07317-1 | 70980   |            |        |        |        |      |       | 27/64" | 10.7mm |
| **Lug-Off-Center                     | 81                                 | PT06836   | 70855   | 5/8"       | 16mm   | 1/4"   | 6.3mm  | 1/4" | 6.3mm | 1/2"   | 12.7mm |
|                                      | 25, 2600                           | PT06608-1 | 70770   |            |        |        |        |      |       | 15/32" | 12mm   |
|                                      | 655                                | PT06966A  | 71996   |            |        |        |        |      |       | 7/16"  | 11mm   |
|                                      | 656                                | PT07317A  | 71997   |            |        |        |        |      |       | 27/64" | 10.7mm |
| **Flat                               | 81                                 | PT06836J  | 70858   |            |        |        |        |      |       |        |        |
|                                      | 25, 2600                           | PT06608J  | 70774   |            |        |        |        |      |       |        |        |
|                                      | 655                                | PT06878J  | 70873   |            |        |        |        |      |       |        |        |
|                                      | 656                                | PT06903J  | 71995   |            |        |        |        |      |       |        |        |
| Flat (Plastic)                       | 81                                 | PT24921   | 67295   |            |        |        |        |      |       |        |        |
|                                      | 25, 2600                           | PT26160   | 67405   |            |        |        |        |      |       |        |        |
| †Screw-Type Lug (#1/4-20 Thread)     | 81                                 | PT24074   | 72482   | 1/2"       | 12.7mm | 5/8"   | 16mm   |      |       |        |        |
|                                      | 25, 2600                           | PT24076   | 72483   |            |        |        |        |      |       |        |        |
|                                      | 655                                | PT24078   | 72484   |            |        |        |        |      |       |        |        |
|                                      | 656                                | PT24080   | 72485   |            |        |        |        |      |       |        |        |
| †Screw-Type Lug (#3/8-24 Thread)     | 81                                 | PT06836S  | 72223   | 1/2"       | 12.7mm | 5/8"   | 16mm   |      |       |        |        |
|                                      | 25, 2600                           | PT06608E  | 70772   |            |        |        |        |      |       |        |        |
|                                      | 655                                | PT06878E  | 72224   |            |        |        |        |      |       |        |        |
|                                      | 656                                | PT06903E  | 72225   |            |        |        |        |      |       |        |        |
| †Screw-Type Lug (#1/4-28 Thread)     | 81                                 | PT24073   | 72486   | 1/2"       | 12.7mm | 5/8"   | 16mm   |      |       |        |        |
|                                      | 25, 2600                           | PT24075   | 72487   |            |        |        |        |      |       |        |        |
|                                      | 655                                | PT24077   | 72488   |            |        |        |        |      |       |        |        |
|                                      | 656                                | PT24079   | 72489   |            |        |        |        |      |       |        |        |
| †Post-Type Lug                       | 81                                 | PT06836F  | 70857   | 1-1/4"     | 32mm   | 1/2"   | 12.7mm |      |       |        |        |
|                                      | 25, 2600                           | PT06608F  | 70773   |            |        |        |        |      |       |        |        |
|                                      | 655                                | PT06878F  | 71992   |            |        |        |        |      |       |        |        |
|                                      | 656                                | PT06903F  | 71994   |            |        |        |        |      |       |        |        |
| †Adjustable Bracket (#1/4-20 Thread) | 81                                 | PT06836M  | 70859   | 1/4"       | 6.3mm  | 7/8"   | 22mm   | 1/8" | 3mm   | 1/2"   | 12.7mm |
|                                      | 25, 2600                           | PT06608M  | 70776   |            |        | 1-1/4" | 32mm   |      |       |        |        |
|                                      | 655                                | PT06878M  | 70874   |            |        |        |        |      |       |        |        |
|                                      | 656                                | PT06903M  | 70882   |            |        |        |        |      |       |        |        |

\* Regularly furnished on all listed indicators at no extra charge.  
 \*\* When specified, available on all listed indicators at no extra charge.

† NOTE: When specified, available at extra charge on all listed indicators.  
 Backs for special requirements are also available; priced on application.

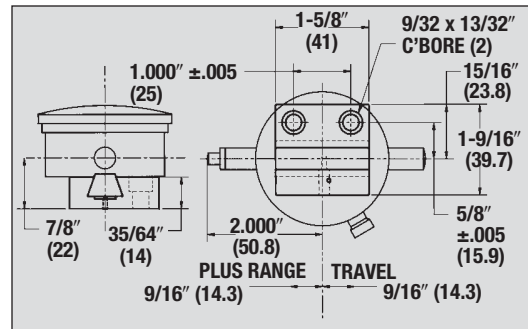
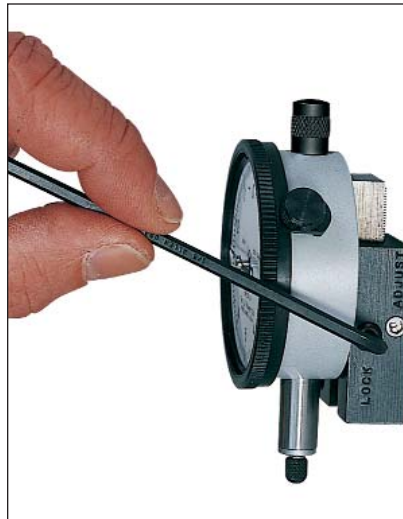


## Special Indicator Backs

### Backs with adjustable mounting bracket

#### No. 674 Series

For use with gages and gaging fixtures where an adjustable indicator mounting is required. A dovetail with rack and pinion adjustment provides 1-1/8" (28mm) indicator travel. A 1/8" hex wrench is used to adjust and lock the indicator in final position. The bracket has two counterbored mounting holes (for 1/4" socket head screws), and the back has four screw holes so the indicator back can be rotated.

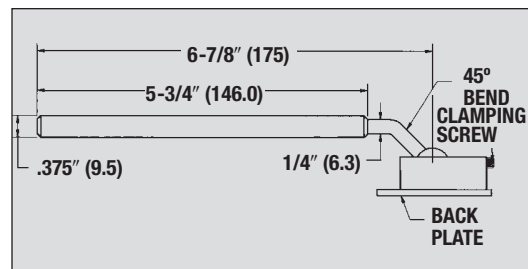


| Fits Starrett Series | Catalog No.  | EDP No. |
|----------------------|--------------|---------|
| No. 81               | <b>674-1</b> | 66374   |
| Nos. 25, 2600        | <b>674-2</b> | 52892   |
| No. 655              | <b>674-3</b> | 52893   |
| No. 656              | <b>674-4</b> | 52894   |

## Universal Backs

### No. 672 Series

Featuring a universal ball joint attached to the end of a gooseneck shank, these attachments make it possible to position an AGD indicator at any desired setting. The indicator can be rotated 360° and angularly up to 90° and locked in the desired position by tightening a single knurled nut. Straight shank is 3/8" (9.5mm) in diameter.

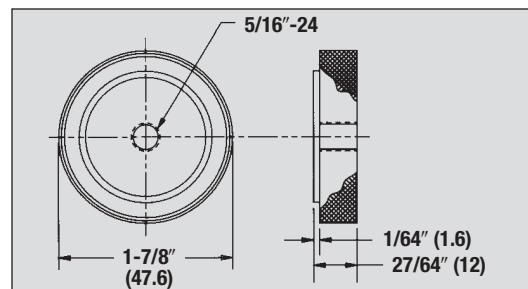


| Fits Starrett Series | Catalog No.  | EDP No. |
|----------------------|--------------|---------|
| Nos. 25, 2600        | <b>672-2</b> | 52887   |
| No. 655              | <b>672-3</b> | 52888   |
| No. 656              | <b>672-4</b> | 52889   |

## Magnetic Backs

### No. 676 Series

These magnetic backs provide a quick and easy means of attaching any Starrett AGD indicator to flat, ferrous metal surfaces. A real timesaver for machine, jig and fixture set up. Requires no clamps, rods or snugs. A special 5/16"-24 threaded stud back is provided to replace the standard lug back. The powerful, permanent magnet is then attached to the threaded stud. Anti-magnetic indicators are not required.



| Fits Starrett Series | Catalog No.  | EDP No.      |
|----------------------|--------------|--------------|
| No. 81               | <b>676-1</b> | <b>56647</b> |
| Nos. 25, 2600        | <b>676-2</b> | <b>56648</b> |
| No. 655              | <b>676-3</b> | <b>56649</b> |
| No. 656              | <b>676-4</b> | <b>56650</b> |



**AGD Indicator Attachments/Accessories**

**Indicator Hole Attachment**

**No. 670 Series**

These hole attachments make it possible to measure the inside of holes and other surfaces that cannot be reached with the regular indicator spindle. Both attachments have a .375" (9.5mm) diameter hole to fit all indicators made to AGD standards and can be securely clamped to the indicator stem. The ball end on the swivel arm which contacts the work is 1/8" (3mm) in diameter.



| Range (Approx.) |       | For Hole Depths to: |      | Catalog No. | EDP No. |
|-----------------|-------|---------------------|------|-------------|---------|
| Inch            | mm    | Inch                | mm   |             |         |
| 3/8"            | 9.5mm | 13/16"              | 20mm | <b>670A</b> | 52884   |
| 9/16"           | 14mm  | 1-11/16"            | 42mm | <b>670B</b> | 52724   |

**Universal Attachment**

**No. 671**

This Universal Attachment is for use with indicators having standard AGD .375" (9.5mm) stem diameters. It clamps on the indicator stem and its movement is transmitted through the contact point to the indicator. Furnished with two interchangeable arms, one straight for measuring internal surfaces and one angular for measuring at right angles to the indicator spindle.



| Range (Approx.) | Catalog No. | EDP No. |
|-----------------|-------------|---------|
| 1/8" (3mm)      | <b>671</b>  | 52886   |

**Special Nonshock Mechanism**

**NONSHOCK**

Starrett dial indicators have hardened, stainless steel gears, pinions and racks for maximum resistance to shock. Where the rack is subject to repeated, severe and/or excessive mechanical shocks, many Starrett AGD dial indicators may be ordered with a special nonshock mechanism. Based on a positive-loaded, split gear assembly, this simple device protects indicator accuracy, prolongs life, and reduces service costs.

When ordering, specify "N/S" after the dial indicator catalog number.

**NOTE:** Not available on the following indicators: Nos. 25-109, 25-209, 2600 and 2700 series; Nos. 656-109, 656-209 and all other indicators with 2" (50mm) range and above.

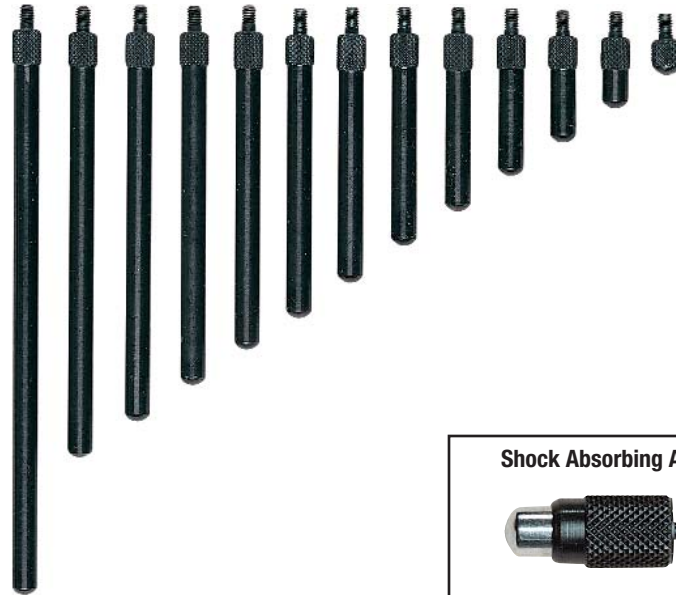


## AGD Indicator Contact Points and Accessories

Any of the contact points listed here can also be used with the Nos. 650, 651 Series and with the 196 Series Indicators by using the No. 196R Adapter.

### Extra-Length Regular-Style Contact Points with round or flat ends 1/4-4" (6-100mm)

All Starrett AGD indicators are regularly furnished with 1/4" (6.3mm) length interchangeable contact points. Available in standard lengths to 4" (100mm). Diameter is 13/64" (5mm), with a #4-48 screw thread. Made from high grade steel, hardened and ground. Other lengths are also available – priced on application. Available with round or flat ends as listed.



### Regular-Style Carbide Contact Points with round or flat end

Two round points are available in standard lengths. 1/4" (6.3mm), PT08399-X (EDP 66053) – or – 1/2" (13mm), PT06677-X (EDP 66054). One flat point is available in standard length; 1/4" (6.3mm), PT10453-X (EDP 66068). Interchangeable points have a #4-48 screw thread. Longer lengths can be easily obtained by adding contact point extensions (see next page). Other sizes also available by request.

### Shock Absorbing Anvil No. 28 / EDP No. 50199

Anvil replaces the regular contact point on any AGD indicator, protecting its movement against mechanical shock. Any sudden impact telescopes the anvil into the body of the unit against an internal spring. Acts as a solid contact point when the indicator is used normally. Furnished with #4-48 AGD standard screw thread.

#### Extra-Length Contact Points, Regular Style

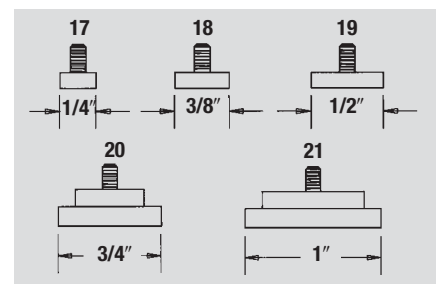
| Length |       | Rounded End |         | Flat End |         |
|--------|-------|-------------|---------|----------|---------|
| Inch   | mm    | Part No.    | EDP No. | Part No. | EDP No. |
| 1/4"   | 6.3mm | PT07215     | 70965   | PT10453  | 72048   |
| 1/2"   | 13mm  | PT06677     | 70823   | PT09560  | 71260   |
| 3/4"   | 19mm  | PT06677A    | 70824   | PT09560A | 71261   |
| 1"     | 25mm  | PT06677B    | 70825   | PT09560B | 71262   |
| 1-1/4" | 32mm  | PT06677C    | 70826   | PT09560C | 71263   |
| 1-1/2" | 38mm  | PT06677D    | 70827   | PT09560D | 71264   |
| 1-3/4" | 44mm  | PT06677E    | 70828   | PT09560E | 71265   |
| 2"     | 50mm  | PT06677F    | 70829   | PT09560F | 71266   |
| 2-1/4" | 57mm  | PT06677G    | 70830   | PT09560G | 71267   |
| 2-1/2" | 63mm  | PT06677H    | 70831   | PT09560H | 71268   |
| 2-3/4" | 70mm  | PT06677J    | 70832   | PT09560J | 71269   |
| 3"     | 75mm  | PT06677K    | 70833   | PT09560K | 71270   |
| 4"     | 100mm | PT10459     | 71327   |          |         |

### Flat-End Steel Points

The flat-end contact points have hardened steel contact surfaces, ground flat and lapped. They are furnished with a #4-48 screw thread for use on any AGD indicator.

#### Flat-End Steel Points

| Diameter |      | Style No. | Part No.   | EDP No. |
|----------|------|-----------|------------|---------|
| Inch     | mm   |           |            |         |
| 1/4"     | 6.3  | 17        | PT06632-17 | 70804   |
| 3/8"     | 9.5  | 18        | PT06632-18 | 70805   |
| 1/2"     | 12.7 | 19        | PT06632-19 | 70806   |
| 3/4"     | 19   | 20        | PT06632-20 | 70808   |
| 1"       | 25   | 21        | PT06632-21 | 70807   |







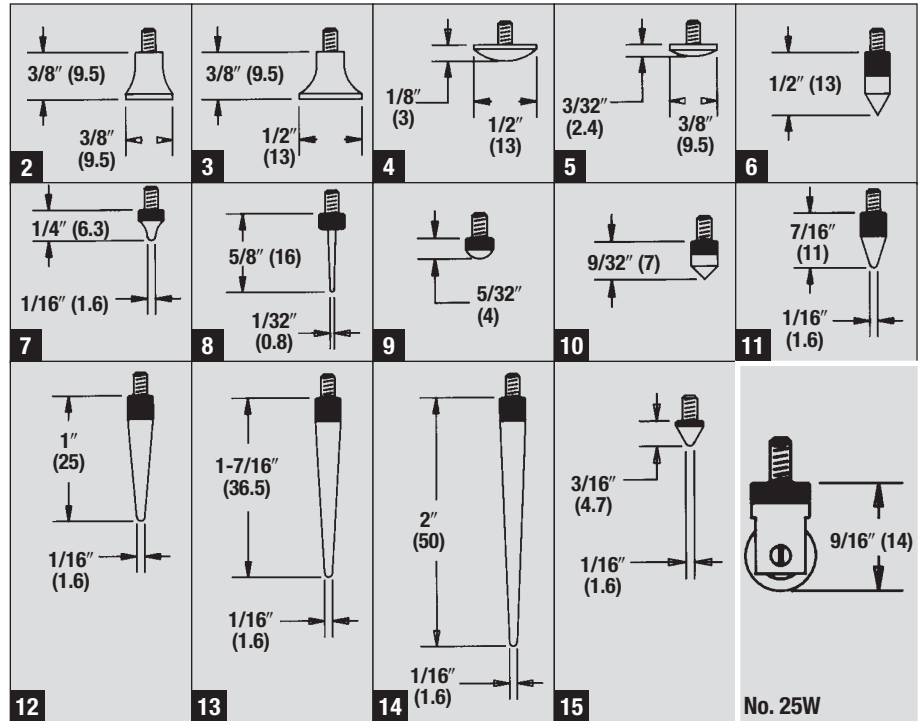
### AGD Indicator Special Contact Points and Accessories

#### Special Form Contact Points

Starrett Special Contact Points are furnished in fourteen shapes. Knurled diameter is approximately 13/64" (5mm). All have #4-48 screw thread and can be used on any AGD indicator. Other special shapes are available on special order.

Carbide, sapphire, diamond or teflon-coated contact points are also available by request.

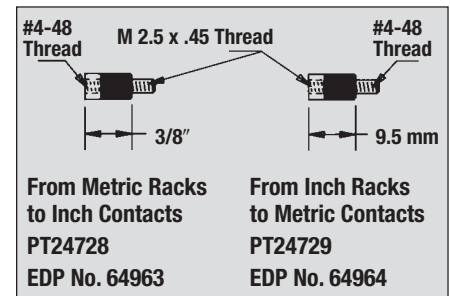
| Style No. | Part No.   | EDP No. |
|-----------|------------|---------|
| 2         | PT06632-2  | 70790   |
| 3         | PT06632-3  | 70791   |
| 4         | PT06632-4  | 70792   |
| 5         | PT06632-5  | 70793   |
| 6         | PT06632-6  | 70794   |
| 7         | PT06632-7  | 70795   |
| 8         | PT06632-8  | 70796   |
| 9         | PT06632-9  | 70797   |
| 10        | PT06632-10 | 70798   |
| 11        | PT06632-11 | 70799   |
| 12        | PT06632-12 | 70800   |
| 13        | PT06632-13 | 70801   |
| 14        | PT06632-14 | 70802   |
| 15        | PT06632-15 | 70803   |



#### Roller Contact Point No. 25W/EDP No. 53916

This contact has a small, hardened roller 3/8" (9.5mm) in diameter for continuous gaging of moving material where the material movement is at a slow speed. Contact has #4-48 screw thread and substitutes for the regular contact point provided on Starrett and other AGD indicators. Furnished with a knurled check nut for positioning the contact on the indicator spindle. See inset drawing above.

#### AGD Contact Adaptors

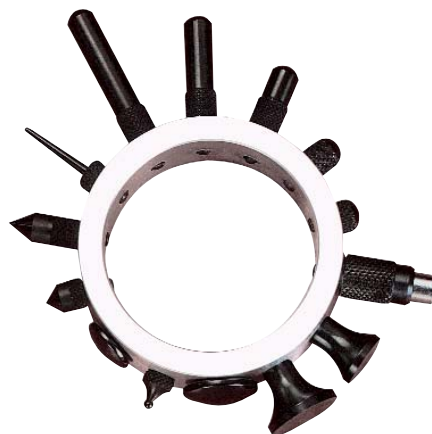


From Metric Racks to Inch Contacts  
PT24728  
EDP No. 64963

From Inch Racks to Metric Contacts  
PT24729  
EDP No. 64964

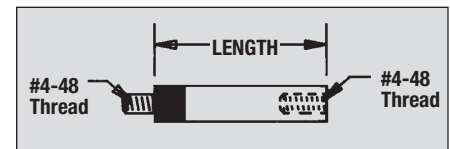
#### Contact Point Set No. 25R/EDP No. 50153

14 points with #4-48 screw thread to fit AGD indicators: a regular 1/4" (6.3mm) long point; 9 special form points; a No. 28 Shock Absorbing Anvil; and 3 extra long points 1/2", 3/4" and 1" (13, 19, 25mm) long. High grade steel, hardened and ground. All points are mounted on a convenient aluminum ring for safe keeping and easy selection.



No. 25R.

#### AGD Contact Point Extensions



| Length | Part No.    | EDP No. |
|--------|-------------|---------|
| 1/2"   | PT21697-1/2 | 64632   |
| 1"     | PT21697-1   | 64633   |
| 2"     | PT21697-2   | 64634   |
| 3"     | PT21697-3   | 64635   |
| 4"     | PT21697-4   | 64636   |



## AGD Indicator Accessories Split Collets

### No. 25 SC Series English and Metric Threads

For mounting AGD indicators with 3/8" (9.5 mm) or 8 mm stems in gaging and work location fixtures, these collets simplify fixture mounting. Screw the collet into the fixture or into our No. 648 Depth Gage Base, insert the indicator into the collet and tighten it in place with the hexagonal nut. Internal collet fingers grip the stem with equal pressure to eliminate spindle binding. Made of steel with black finish. Overall length of collet and threads is 1".



Left-to-right: Nos. 25SC14 and 25SC38.

#### English Thread

| Thread Size | Thread Length | Hole for Indicator Stem   | Catalog No.    | EDP No. |
|-------------|---------------|---|----------------|---------|
| 3/8-24NF    | 9/32" (7mm)   | .375" (9.5mm) Diameter to 1/2" (12.7mm) Depth; 1/4" (6.3mm) Diameter through Hole | <b>25SC14</b>  | 50155   |
| 1/2-20NF    |               | .375" (9.5mm) dia. through Hole   | <b>25SC38</b>  | 50156   |
| 1/2-32UN    |               | .375" (9.5mm) dia. through Hole   | <b>25SC38B</b> | 55995   |

#### Metric Thread

| M12 x 1.75 | 7mm | 8mm Diameter through Hole | <b>25SC8M</b> | 64885 |
|------------|-----|---------------------------|---------------|-------|
|------------|-----|---------------------------|---------------|-------|

## Depth Gage Bases with Stem Collet

### No. 648 Series

Bases are for mounting AGD indicators to measure depths. Indicators with .375" (9. mm) stems will fit the stem collet furnished with the base (No. 25SC38). Indicators with 8 mm stems need the split bushing No. 25MSB to adapt to the stem collet. Longer contacts or extensions may be required.

| Base Size  | Catalog No.  | EDP No. |
|------------|--------------|---------|
| 4" (100mm) | <b>648-4</b> | 65850   |
| 6" (150mm) | <b>648-6</b> | 65851   |
| 8" (200mm) | <b>648-8</b> | 65852   |



## Split Bushings

Split bushings fit over the indicator stem to increase the overall diameter for mounting in fixtures.



Split Bushing.

#### Fit Starrett No. 80 Series Miniature Dial Indicators

| Length | Diameter |         | Catalog No. | EDP No. |
|--------|----------|---------|-------------|---------|
|        | Inside   | Outside |             |         |
| 1/2"   | .219"    | .375"   | <b>80SB</b> | 56008   |

#### Fit Starrett AGD English Indicators

|      |       |       |             |       |
|------|-------|-------|-------------|-------|
| 1/2" | .375" | .500" | <b>25SB</b> | 50154 |
|------|-------|-------|-------------|-------|

#### Fit Starrett AGD Metric Indicators

|        |     |       |              |       |
|--------|-----|-------|--------------|-------|
| 12.7mm | 8mm | 9.5mm | <b>25MSB</b> | 56007 |
|--------|-----|-------|--------------|-------|

## Threaded Stems

Threaded stems on Starrett indicators with a .375" (9.5mm) diameter stem up to 1" (25mm) range (except long stem models) are available at additional cost. A threaded stem is often desirable for attaching the indicator to machine tools or fixtures. A 3/8-24 thread is furnished unless otherwise specified.



Threaded Stem.



### AGD Indicator Accessories

#### Long Stem Dial Indicators

Starrett Nos. 81, 25, 2600, 655 and 656 Indicators through the 1" (25mm) range can be furnished with long stems up to 12" (300mm). These are especially useful for gaging in deep holes or where obstructions prevent the use of regular indicators. Specify stem length from outside case diameter when ordering.

**NOTE:** Long stems not available on No. 80 Series Miniature Dial Indicators.

#### Range Limit Cap

##### No. 25LC EDP No. 50152

The Range Limit Cap replaces the stem cap furnished on most Starrett Series Nos. 81, 25, 2600, 655 and 656 AGD Indicators, preventing the possible error of a complete revolution. It can be adjusted to limit an indicator's measuring range any amount up to 3/8" (9.5mm).

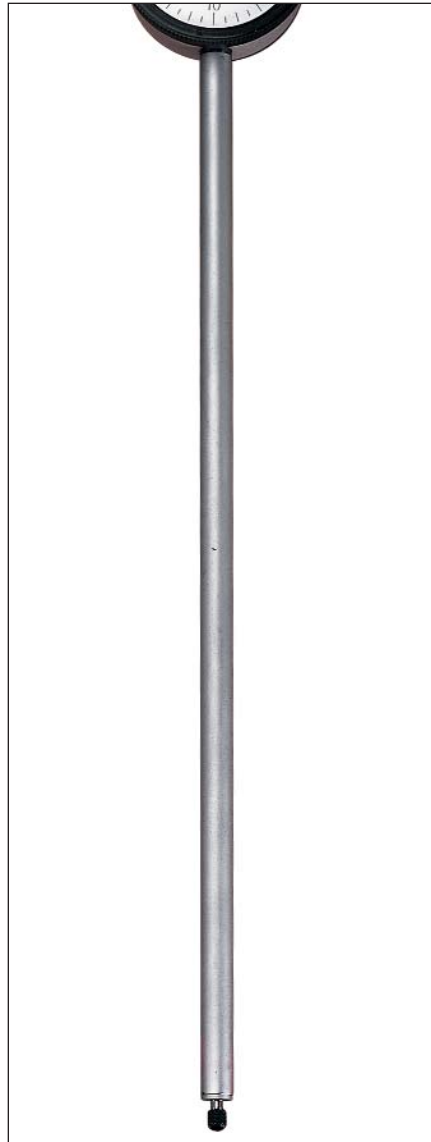
#### Lever Control

Fits only indicators with a case stem cap.

##### No. PT99356 EDP No. 72088

Handy attachment mounts in place of the stem cap and is interchangeable on most Starrett Series Nos. 81, 25, 2600, 655 and 656 AGD Indicators up to 1" or 25mm range. Pressing down the lever lifts the spindle; releasing it lets the spindle contact the work. Easy to install in the left or right hand position using a screwdriver and an open end wrench. If ordered on a new indicator, specify left or right hand position. (Furnished at left unless otherwise ordered.)

**NOTE:** .500", 1.000", 10mm or 25mm indicators must be originally ordered with case stem cap to be used with cam type lifting levers. No extra charge for case stem cap.



Long stem.

#### Top Lift

A knurled grip allows the spindle to be manually lifted and returned by spring action to contact the work. Furnished in place of the stem cap on .500", 1.000", 10mm and 25mm range indicators.

No extra charge on AGD indicators up to 1" (25mm) range; over 1" (25mm) range, priced on request. To order, specify "with Top Lift" after the indicator catalog number.

**NOTE:** Will not fit on No. 2700 Series Indicators.



Range cap.



Top lift.



Lever control.



Dust guard.

#### Rubber Dust Guard

Protects the rack of AGD Indicators from foreign matter under adverse gaging conditions. Made in lengths to fit Nos. 81, 25, 2600, 655 and 656 Indicators up to 1" (25mm) range.

| Indicator Range                              | Part No. | EDP No. |
|--|----------|---------|
| .400", .500", 1.000"<br>(10mm, 12.7mm, 25mm) | PT09545  | 71256   |
| Ranges under .400"<br>(10mm)                 | PT09763  | 71289   |





## AGD Dial Indicator Tolerance Hands

Starrett dial indicators may be ordered with crystal-mounted or bezel-mounted tolerance hands for visually checking the limits of any given dimension.

**Crystal-mounted hands**, both colored red, are positioned under the crystal and are individually adjustable through 360° by turning concentric knurled knobs on the outside of the crystal. Available for all Series Nos. 81, 25, 655 and 656 AGD Dial Indicators.

**Bezel-mounted hands**, both colored red, rotate inside the bezel. They are mounted outside the crystal and are independently adjustable through 360°. Available for Nos. 81 and 25 Series AGD Indicators only.

**New Snap-on bezel-mounted hands**, two hands colored red, are easily mounted on the outside of the bezel and are adjustable through 360°. Available for Starrett No. 25 Series AGD Indicators only. Order No. PT99513 (EDP No. 66038).



Indicators with (left) Snap-on bezel-mounted hands; (middle) Crystal-mounted hands; and (right) with bezel-mounted hands.

## Maximum Hand

This red-colored hand records the maximum position reached by the indicator hand within a single revolution. Mounted under the crystal, it has a small nib at its point. The indicator hand contacts the nib, advancing the maximum hand which remains in position when the indicator hand returns to its at-rest position. To reset the maximum hand, turn the knurled knob mounted outside the crystal.



Maximum Hand in at-rest position with indicator hand, left. In recording position, right.

To order Tolerance or Maximum Hands, specify the indicator catalog number followed by the name of the type of hand desired.





### Indicator Testers

**No. 716** 0-1"

**No. 716M** 0-25mm

With direct reading capability to .0001" or 0.002mm, these gages provide a rapid means for calibrating both AGD and dial test indicators for linearity and repeatability through ranges up to 1" or 25mm. This tester design is unlike others because it can be swung to any position between vertical and horizontal by loosening a large hand knob which fastens the gage assembly to the base.

In addition, the micrometer head can be turned on its axis and its scale positioned to suit the operator's convenience by loosening a single set screw. Tensioned locking screws prevent tipping of both the gage assembly and the indicator holding clamp during set-up and adjustment.

The micrometer head is our No. 469 Series super-precision head with reverse reading capability. When testing a Series No. 2600 or No. 2700 Electronic Indicator, a .000050" graduated head is advisable, available on special order.

An indicator mounting attachment holds dovetail mount indicators, AGD indicators with 3/8" (9.5mm) stems and indicators with a holder that has a 3/16" (4.7mm) shank. Unit also has a fine adjustment to zero the indicator.



No. 716.



Dial test indicator is held in place by an offset attachment.



Checking AGD dial indicator.

#### 0-1" Range

| Micrometer Head Graduation | Description   | Catalog No. | EDP No. |
|----------------------------|---|-------------|---------|
| .0001"                     | Tester with carbide faced spindle, Indicator Mounting and Offset Attachment | 716X        | 67228   |

#### 0-25mm Range

|         |   |       |       |
|---------|---|-------|-------|
| 0.002mm | Tester with carbide faced spindle, Indicator Mounting and Offset Attachment | 716MX | 67229 |
|---------|---|-------|-------|

**NOTE:** Also available on special order with resolution to .000050" or 0.001mm.

#### Accessory

| Description                        | Catalog No. | EDP No. |
|------------------------------------|-------------|---------|
| Indicator Mounting Attachment Only | PT26009     | 65102   |

Packed one in a box.



## Electronic Indicators

### No. 2600 Series AGD Group 2

Ranges up to 1" and 25mm

This series of indicators is available in two versions; one with basic functions and one with full functions for complete SPC compatibility.

#### Features and Benefits Common to Both Versions:

- ◆ Conform to the dimensions of AGD size Group 2
- ◆ Available with either a .375" (9.5mm) stem or an 8mm (.315") stem. Furnished with .375" (9.5mm) stem unless otherwise ordered
- ◆ 1" (25mm) range
- ◆ Readout available to .0005" and 0.01mm
- ◆ A large, right-sized, easy-to-read LCD digital readout, surrounded by a rotating black bezel
- ◆ Furnished with lug-on-center back
- ◆ Starrett-designed electronics microprocessor
- ◆ Output to Starrett SPC Plus® system components on most models
- ◆ Utilizes standard indicator accessories and holding devices
- ◆ Battery powered and portable
- ◆ Rugged, sealed enclosure makes them F.F.F. (factory floor friendly)

#### No. 2600 Basic Indicator Action Features

- ◆ Instant inch/mm conversion
- ◆ Zero at any position
- ◆ Plus/minus control to indicate direction
- ◆ ON/OFF control with automatic off after one hour of nonuse. (Zero references will not be lost from memory)



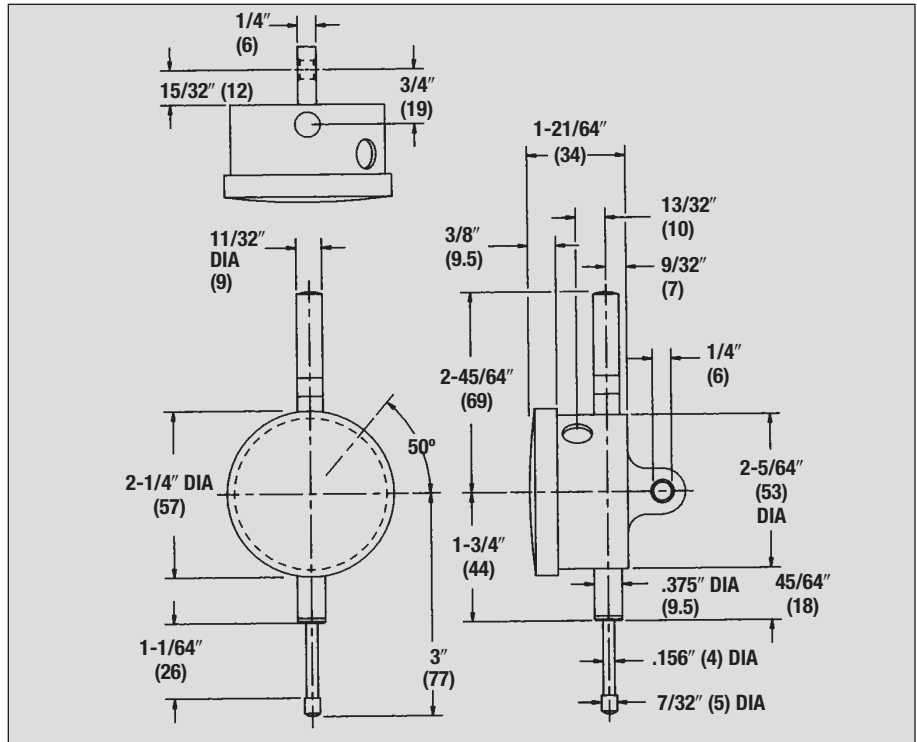
Left, No. 2600-0 basic model; right, No. 2600-8 Full-Function Indicator.

#### No. 2600 Full-Function Indicator Action Features

- ◆ Bezel rotates the reading for convenient positioning
- ◆ Instant inch/mm conversion
- ◆ Zero at any position
- ◆ Ability to retain and return reading to the original zero reference (zero absolute [ABS])
- ◆ Plus/minus control to indicate direction
- ◆ Min/Max/TIR – Min/max mode is used to retain the lowest and highest readings in a group, and TIR gives the difference between them
- ◆ Limits mode to enter low and high limits for tolerance control. This is easily done by the shift control to enter the proper function
- ◆ Preset is used to install any reading at any point in the display and is also done with the shift control
- ◆ ON/OFF control with automatic off after one hour of nonuse. (Zero references will not be lost from memory)
- ◆ Output jack allows data transmission to the following peripherals for SPC analysis, data collection and hard copy documentation
  - Starrett No. 772 Series Advanced Data Collection Systems
  - Starrett No. 761 Series Data Multiplexers
  - Works well with Starrett DataSure® Wireless Data Collection System
  - Other devices that support RS232C



**Electronic Indicators  
No. 2600 Series  
AGD Group 2 (continued)**



**Basic Models**

| Resolution |        | Output | Catalog No.   | EDP No. |
|------------|--------|--------|---------------|---------|
| Inch       | mm     |        |               |         |
| .001"      | 0.01mm | No     | <b>2600-7</b> | 66041   |
| .0005"     | 0.01mm | No     | <b>2600-0</b> | 65593   |
| .0005"     | 0.01mm | Yes    | <b>2600-1</b> | 64886   |

**Full Function Models**

|        |        |     |               |       |
|--------|--------|-----|---------------|-------|
| .001"  | 0.01mm | Yes | <b>2600-8</b> | 66042 |
| .0005" | 0.01mm | Yes | <b>2600-4</b> | 64889 |

**Accessories and Cables**

| Description   | Part No.       | EDP No. |
|---|----------------|---------|
| Adaptor from No. PT22938 Cable to PC (RS232C)   | <b>PT61768</b> | 66454   |
| Shielded Cable to Starrett No. 761 Data Multiplexer and No. 772 Series Data Collector Modules and No. PT61768 Adaptor | <b>PT22938</b> | 64059   |
| Spindle Lifting Cable   | <b>PT26263</b> | 66043   |
| One 3-Volt Battery No. CR2450   | <b>PT61120</b> | 65446   |

**Specifications**

| Range |      | Resolution |        | Accuracy |         |
|-------|------|------------|--------|----------|---------|
| Inch  | mm   | Inch       | mm     | Inch     | mm      |
| 1"    | 25mm | .001"      | 0.01mm | ±.001"   | ±0.03mm |
|       |      | .0005"     |        |          |         |

**Output Format**

4,800 BAUD, seven data bits, even parity, one stop bit, ASCII data.  
Transmission is exactly 16 characters followed by a carriage return and a line feed.





## WISDOM® Electronic Indicators

### No. 2700 Series AGD Groups 2, 3 and Rectangular Ranges up to 4" and 100mm

This is our most versatile line of electronic indicators, available in three styles, in addition to a remote display and accompanying probe series.

All indicators feature a glass scale design with an unsurpassed accuracy of  $\pm$  two resolutions when measuring from a known standard. All have rugged, sealed enclosures as well.

American designed and manufactured.

### WISDOM Basic Series

#### ◆ User Selectable Resolutions:

All available resolutions can be utilized in the same indicator, provided they are coarser than the resolution of the purchased model.

**Example:** selecting an indicator with the finest .00005"/0.00mm base resolution means you have all eight remaining resolutions "below" this which are usable in that model. If you select an indicator with a .001"/0.02mm base resolution, it will be your only available resolution for that model.

- ◆ 10 resolutions and 5 measuring ranges available (see specifications)
- ◆ Instant inch/mm conversion
- ◆ Plus or minus travel direction
- ◆ Maximum Reading Hold
- ◆ Zero the tool at any position of the spindle
- ◆ Rotating bezel
- ◆ Auto Off: After 10 minutes of nonuse. When Auto Off is engaged, an hourglass figure appears at the left side of the display
- ◆ Serial number: Indicators are furnished with individual serial number labels, coded with date for traceability
- ◆ Three power sources – operate by battery, A/C adaptor or through data port
- ◆ The output jack allows data transmission, either through a traditional wire or by connecting to a Starrett DataSure® Wireless Data Collection System end node



Left, No. F2730-0; right, No. 2720-4.

- ◆ Output data can be used by a variety of peripherals for analysis, data collection and hard copy documentation, including:
  - ◆ Starrett No. 772 Series Advanced Data Collection Systems
  - ◆ Starrett No. 761 Series Data Multiplexers
  - ◆ Other devices that support RS232C

### WISDOM Plus Series

These models have all the features and functions of the Basic Series, plus the following:

- ◆ Preset mode to install any reading at any point in the display. Reading is retained even if the indicator is turned off
- ◆ T.I.R.: Displays the difference between the highest and lowest values reached
- ◆ Tolerancing: Permits the entering of high and low tolerances. When tolerances are exceeded, the display will flash. Numbers are retained even if the indicator is turned off
- ◆ Minimum reading hold
- ◆ Hold button to freeze display: Displays and holds the reading after the measurement has been taken
- ◆ Feature lock: Unique feature locks user selections so that a wrong button push will not change your settings



Above: regular and oversized models.

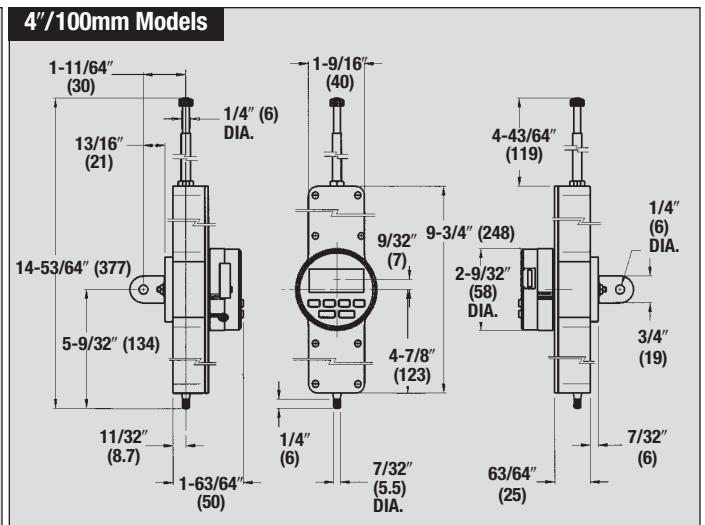
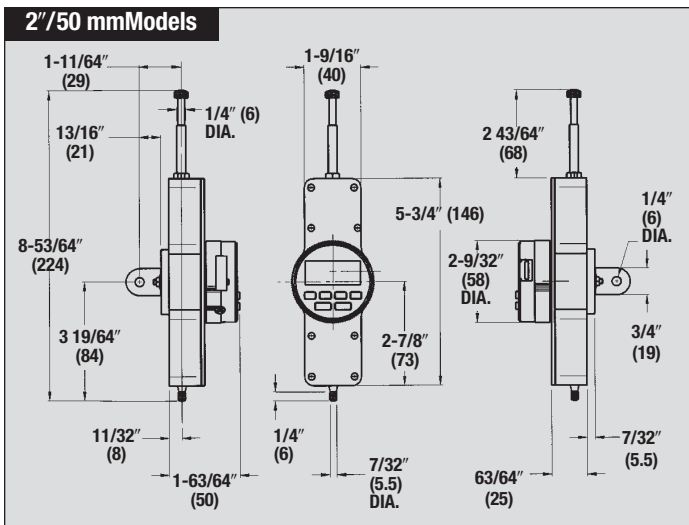
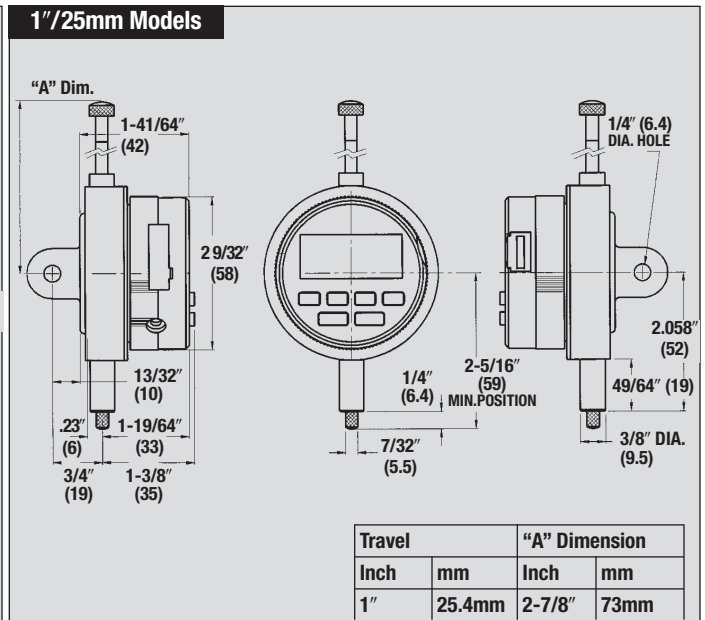
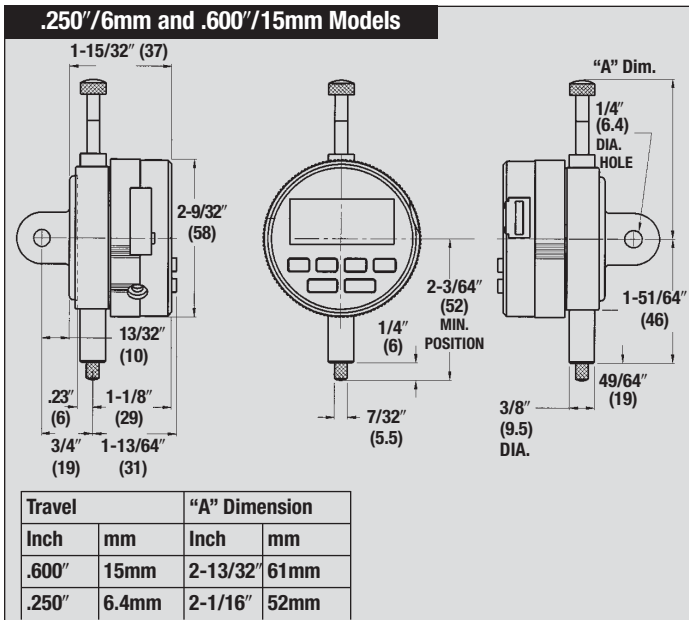
### WISDOM-OEM Indicators:

Starrett can customize WISDOM models to meet your needs. Any combination of features found in WISDOM Basic or Plus Series can be furnished. In addition, units can be designed with features such as:

- ◆ Special measuring ratios like 2:1, 4:1, etc.
- ◆ Other units of measurement (cm, lb., etc.)
- ◆ Custom LCDs, graphics
- ◆ Varying the auto-off after nonuse time (Example: 45 minutes vs. 10 minutes)

See specifications, next two pages.





### WISDOM® Series Remote Displays and Probes

These displays with probes will make absolute, incremental and/or comparative measurements and implement all the features of WISDOM Plus Indicators. System is ideal where viewing and operation ease are required. It is also suitable for any stand-alone gaging application.

- ◆ Remote display is a rugged enclosure with a 5/8" (16mm) high, easy-to-view LCD readout
- ◆ Power sources include 110V 50/60hz, or battery operated (without backlight)
- ◆ Probe and display can be separated by a distance of up to 6' (1.8 meters)
- ◆ Cable is hard wired to the probe and has a jack for convenient connection to the remote display box
- ◆ Readout box can be elevated for desired viewing



No. R2760-1.

See specifications on next page.



## WISDOM No. 2700 Series Indicators\*\* (continued)

| Range |     | Resolution |       | No. of Resolutions Avail. | AGD/Case    | Basic Series In/mm |         | Plus Series In/mm |         | Basic Series mm Only |         | Plus Series mm Only |         |
|-------|-----|------------|-------|---------------------------|-------------|--------------------|---------|-------------------|---------|----------------------|---------|---------------------|---------|
| Inch  | mm  | Inch       | mm    |                           |             | Cat. No.           | EDP No. | Cat. No.          | EDP No. | Cat. No.             | EDP No. | Cat. No.            | EDP No. |
| .250" | 6   | .00005"    | 0.001 | 10                        | AGD-2       | <b>2710-0</b>      | 65810   | <b>F2710-0</b>    | 65830   |                      |         | <b>F2710-0M</b>     | 66515   |
|       |     | .0001"     | 0.002 | 8                         |             | <b>2710-1</b>      | 65811   | <b>F2710-1</b>    | 65831   |                      |         |                     |         |
|       |     | .00025"    | 0.005 | 6                         |             | <b>2710-2</b>      | 65812   | <b>F2710-2</b>    | 65832   |                      |         |                     |         |
|       |     | .0005"     | 0.01  | 4                         |             | <b>2710-3</b>      | 65813   | <b>F2710-3</b>    | 65833   |                      |         |                     |         |
|       |     | .001"      | 0.02  | 2                         |             | <b>2710-4</b>      | 65814   | <b>F2710-4</b>    | 65834   |                      |         |                     |         |
| .600" | 15  | .00005"    | 0.001 | 8                         | AGD-2       | <b>2720-0</b>      | 65815   | <b>F2720-0</b>    | 65835   | <b>2720-0M</b>       | 67140   |                     |         |
|       |     | .0001"     | 0.002 | 6                         |             | <b>2720-1</b>      | 65816   | <b>F2720-1</b>    | 65836   |                      |         | <b>F2720-1M</b>     | 66516   |
|       |     | .0005"     | 0.01  | 4                         |             | <b>2720-3</b>      | 65817   | <b>F2720-3</b>    | 65837   | <b>2720-3M</b>       | 66508   | <b>F2720-3M</b>     | 66517   |
|       |     | .001"      | 0.02  | 2                         |             | <b>2720-4</b>      | 65818   | <b>F2720-4</b>    | 65838   |                      |         | <b>F2720-4M</b>     | 66518   |
| 1.0"  | 25  | .00005"    | 0.001 | 8                         | AGD-3       | <b>2730-0</b>      | 65819   | <b>F2730-0</b>    | 65839   | <b>2730-0M</b>       | 67106   | <b>F2730-0M</b>     | 66519   |
|       |     | .0001"     | 0.002 | 6                         |             | <b>2730-1</b>      | 65820   | <b>F2730-1</b>    | 65840   | <b>2730-1M</b>       | 67107   | <b>F2730-1M</b>     | 66520   |
|       |     | .0005"     | 0.01  | 4                         |             | <b>2730-3</b>      | 65821   | <b>F2730-3</b>    | 65841   |                      |         |                     |         |
|       |     | .001"      | 0.02  | 2                         |             | <b>2730-4</b>      | 65822   | <b>F2730-4</b>    | 65842   |                      |         |                     |         |
| 2.0"  | 50  | .0001"     | 0.002 | 6                         | Rectangular | <b>2740-1</b>      | 65824   | <b>F2740-1</b>    | 65844   | <b>2740-1M</b>       | 67141   | <b>F2740-1M</b>     | 66522   |
|       |     | .0005"     | 0.01  | 4                         |             | <b>2740-3</b>      | 65825   | <b>F2740-3</b>    | 65845   | <b>2740-3M</b>       | 66509   |                     |         |
|       |     | .001"      | 0.02  | 2                         |             | <b>2740-4</b>      | 65826   | <b>F2740-4</b>    | 65846   |                      |         | <b>F2740-4M</b>     | 66521   |
| 4.0"  | 100 | .0001"     | 0.002 | 6                         |             | <b>2750-1</b>      | 65827   | <b>F2750-1</b>    | 65847   | <b>2750-1M</b>       | 67142   | <b>F2750-1M</b>     | 66523   |
|       |     | .0005"     | 0.01  | 4                         |             | <b>2750-3</b>      | 65828   | <b>F2750-3</b>    | 65848   | <b>2750-3M</b>       | 66510   |                     |         |
|       |     | .001"      | 0.02  | 2                         |             | <b>2750-4</b>      | 65829   | <b>F2750-4</b>    | 65849   |                      |         | <b>F2750-4M</b>     | 66524   |

## WISDOM Series Remote Displays

| Resolution |       | Power    | In/mm          |         | mm Only         |         |
|------------|-------|----------|----------------|---------|-----------------|---------|
| Inch       | mm    |          | Cat. No.       | EDP No. | Cat. No.        | EDP No. |
| .00005"    | 0.001 | 110 Volt | <b>R2762-0</b> | 65878   | <b>R2762-0M</b> | 66514   |
|            |       | Battery  | <b>R2763-0</b> | 65879   | <b>R2763-0M</b> | 67149   |
| .0001"     | 0.002 | 110 Volt | <b>R2760-1</b> | 65876   | <b>R2760-1M</b> | 67147   |
|            |       | Battery  | <b>R2761-1</b> | 65877   | <b>R2761-1M</b> | 67148   |

## Remote Display Probes

| Range |     | Resolution |       | In/mm          |         | mm Only         |         |
|-------|-----|------------|-------|----------------|---------|-----------------|---------|
| Inch  | mm  | Inch       | mm    | Cat. No.       | EDP No. | Cat. No.        | EDP No. |
| .250" | 6   | .00005"    | 0.001 | <b>P2711-0</b> | 65870   | <b>P2711-0M</b> | 66511   |
|       |     | .0001"     | 0.002 | <b>P2711-1</b> | 65871   |                 |         |
| .600" | 15  | .00005"    | 0.001 | <b>P2721-0</b> | 65872   | <b>P2721-0M</b> | 66512   |
|       |     | .0001"     | 0.002 | <b>P2721-1</b> | 65873   | <b>P2721-1M</b> | 67146   |
| 1.0"  | 25  | .00005"    | 0.001 | <b>P2731-0</b> | 65874   | <b>P2731-0M</b> | 67144   |
|       |     | .0001"     | 0.002 | <b>P2731-1</b> | 65875   | <b>P2731-1M</b> | 67145   |
| 2.0"  | 50  | .0001"     | 0.002 | <b>P2741-1</b> | 65978   | <b>P2741-1M</b> | 67143   |
| 4.0"  | 100 | .0001"     | 0.002 | <b>P2751-1</b> | 65979   |                 |         |

\*Other backs, styles and accessories also available by request. To order contact points individually, see previous pages.

\*\*Other ranges and resolutions available on request.

## Accessories, Power Source, Cables

| Description  | Part No.       | EDP No. |
|--|----------------|---------|
| A/C Adaptor, 110-Volt  | <b>PT26413</b> | 65880   |
| Replacement Zinc Air Batteries, 4-Pack   | <b>PT26404</b> | 65884   |
| Replacement Battery, 1-Pack (req. 2)   | <b>PT61120</b> | 65446   |
| Cable to Module PT61490, to Connect to Starrett 772 Data Collectors and 761 Multiplexers | <b>PT61489</b> | 65904   |
| Cable for WISDOM Indicator to WISDOM Remote Display                                      | <b>PT26415</b> | 65882   |
| Cable to RS232 (PC/Compatible)   | <b>PT26441</b> | 65893   |
| Cable to M.T.I. Collectors and Processors  | <b>PT26546</b> | 66048   |
| 6' Extension Cable   | <b>PT05679</b> | 68752   |

## Backs/Lever\*

| Back/Lever                       | Part No.       | EDP No. |
|----------------------------------|----------------|---------|
| Flat Back                        | <b>PT26406</b> | 65886   |
| Offset Lug Back                  | <b>PT26407</b> | 65887   |
| Adjustable Lug Back              | <b>PT26411</b> | 65891   |
| Adjustable Back                  | <b>PT26408</b> | 65888   |
| Post-Type Back                   | <b>PT26409</b> | 65889   |
| Screw Bracket Back               | <b>PT26410</b> | 65890   |
| Adjustable Mounting Bracket Back | <b>PT26848</b> | 66293   |
| Lifting Lever                    | <b>PT26405</b> | 65885   |



### Electronic Indicators

#### No. 3600 Series

#### AGD Group 2

Ranges up to .500" and 12.7mm

No. 3600 Series Electronic Indicators have simple, powerful, easy-to-use functions, all at an attractive price. Versions are available for inch/metric and metric only.

#### Features

- ◆ Large, easy-to-read LCD
- ◆ AGD group 2 size
- ◆ Range: .500" or 12.7mm
- ◆ Resolution: .0005" or .01mm
- ◆ Power On / Off button
- ◆ Reverse travel ( $\pm$  control indicates direction)
- ◆ Zero setting at any position
- ◆ Long battery life
- ◆ 3/8" diameter stem for inch/mm model (8mm on metric-only model)
- ◆ 4-48 spindle thread on inch/mm model (M2.5 X .45 thread on metric-only model)
- ◆ Lug-on-center back + additional flat back
- ◆ Dust cap
- ◆ Plastic storage case with clear cover



#### Inch/mm

| Range |      | Resolution |      | Catalog No. | EDP No. |
|-------|------|------------|------|-------------|---------|
| Inch  | mm   | Inch       | mm   |             |         |
| .500  | 12.7 | .0005      | 0.01 | 3600-5      | 68813   |

#### Metric-Only

|  |      |  |      |         |       |
|--|------|--|------|---------|-------|
|  | 12.7 |  | 0.01 | 3600M-5 | 68918 |
|--|------|--|------|---------|-------|

#### Accessory

| Description  | Catalog No. | EDP No. |
|--------------|-------------|---------|
| SR44 Battery | PT61918     | 67169   |



## Magnetic Base Indicator Holders

Starrett offers a full line of indicator holders and stands to meet the requirements of a wide variety of applications.

Four of these are applicable to Dial and Electronic Indicator applications, and are also used with Test Indicators.

These models are detailed in the Test Indicator Section. Please refer to the appropriate page number for information about these models.



## No. 657 Series

Base has three precision ground, magnetic contact surfaces. Grips horizontally, vertically or upside down. V-step holds base to round surfaces. Extra #1/4-20 tapped hole in one side of base (not shown) for mounting post.

Available with or without Starrett AGD Dial Indicators: inch reading No. 25-131J (graduation .0005", dial reading 0-25-0, range .125") or millimeter reading No. 25-181J (graduation 0.01 mm, dial reading 0-50-0, range 2.5mm). Other indicators can be furnished on request.

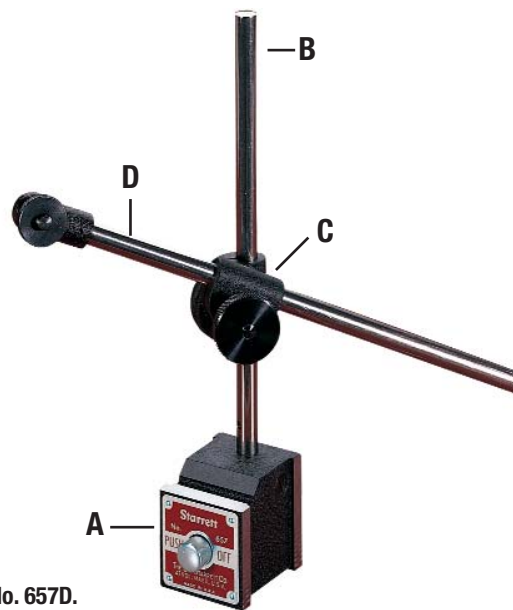
**A. No. 657P Magnetic Base** – 1-15/16" x 1-5/8" x 1-7/8" (50 x 40 x 48mm) deep. Push button on/off switch for one-hand operation.

**B. No. 657G Upright Base Post** – 3/8" (9.5mm) diameter x 7-7/16" (190mm) length overall.

**C. No. 657H Swivel Post Snug** – Allows universal indicator adjustment – up-and-down, any vertical angle, for a complete 360°. Two 3/8" (9.5mm) holes.

**D. No. PT06784-A Gage Holding Rod** – 3/8" x 9-1/2" (9.5 x 240mm) with clamping mechanism for gripping the indicator lug back (see photo below).

**E. and F. Nos. 57S and 58S Universal Snugs** – Adapt various scribers and indicator shanks to rods and posts.



No. 657D.



### Base Holder Assembly and Individual Components

| Photo Key | Description  | Catalog No.      | EDP No. |
|-----------|--|------------------|---------|
|           | Magnetic Base, Upright Post Assembly Including Post, Swivel Post Snug and Gage Holding Rod | <b>657D</b>      | 52749   |
| <b>A</b>  | Magnetic Base Only   | <b>657P</b>      | 52757   |
| <b>B</b>  | Upright Base Post Only   | <b>657G</b>      | 52753   |
| <b>C</b>  | Swivel Post Snug Only  | <b>657H</b>      | 52785   |
| <b>D</b>  | Gage Holding Rod with Clamp Mechanism  | <b>PT06784-A</b> | 52755   |
| <b>E</b>  | Universal Snug with 5/16" and 3/8" Hole Dia.   | <b>57S</b>       | 50296   |
| <b>F</b>  | Universal Snug with 1/4", 5/16" and 3/8" Hole Dia.   | <b>58S</b>       | 56613   |

### Sets Including Magnetic Base, Upright Post Assembly and AGD Dial Indicators

| Description  | w/Finished Wood Case |         | Without Case |         |
|--|----------------------|---------|--------------|---------|
|  | Catalog No.          | EDP No. | Catalog No.  | EDP No. |
| Base and Upright Post Assembly with Inch Reading Indicator No. 25-131J       | <b>657EZ</b>         | 52751   | <b>657E</b>  | 52750   |
| Base and Upright Post Assembly with Millimeter Reading Indicator No. 25-181J | <b>657MEZ</b>        | 56358   | <b>657ME</b> | 56357   |



Clamp mechanism grips indicator lug back.





**Heavy-Duty Magnetic Base Indicator Holder with rotary on/off switch.**

Furnished with or without Starrett AGD Dial Indicators

**No. 659 Series**

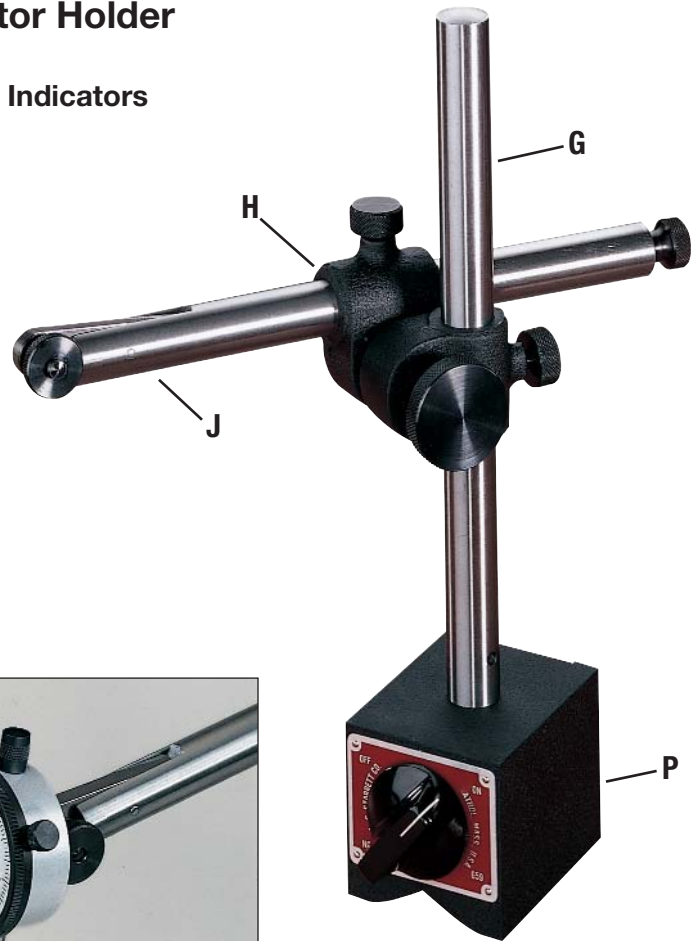
This holder has a powerful magnetic base that attaches to flat surfaces or on round work up to 5" (125mm) in diameter by a form-ground involute vee for accurate seating. It has approximately twice the holding power of our No. 657 Magnetic Base and has a rotary on/off switch.

A post snug with two 3/4" (19mm) gripping holes positions the dial indicator at any height and at any vertical angle and allows for 360° rotation of the gage rod. After locking the gage in place, the final indicator setting is made by an independent fine adjustment at the back end of the gage rod.

A second tapped hole (3/8"-24) in one side of the base is for mounting the post horizontally or adding another post for multiple inspection work. The base is furnished with a threaded adaptor, making it possible to use the No. 659 Series Magnetic Base post and attachments. Base and snug have a black wrinkle finish with precision ground contact surfaces.

Available with or without Starrett AGD Dial Indicators: inch reading No. 25-131J (.0005" graduation) or millimeter reading No. 25-181J (0.01mm graduation). Other mechanical AGD indicators are available on request. Electronic indicators, Nos. 2600 and 2700 Series, are also available on request.

Both the upright post and the gage rod are approximately 9 3/8" (238mm) long and 3/4" (19mm) in diameter.



No. 659A. Inset, No. 659A with No. 25-111J.

**Base Holder Assembly and Individual Components**

| Photo Key | Description  | Catalog No.    | EDP No. |
|-----------|--|----------------|---------|
|           | Magnetic Base, Upright Post Assembly Including Post, Snug, Gage Rod with Clamp and Fine Adjust, and Thread Adaptor, without Case | <b>659A</b>    | 56687   |
|           | Complete Assembly (Above) in Case  | <b>659AZ</b>   | 55947   |
| <b>P</b>  | Magnetic Base, Including Thread Adaptor  | <b>659P</b>    | 55949   |
| <b>G</b>  | Upright Base Post Only   | <b>659G</b>    | 56688   |
| <b>H</b>  | Swivel Post Snug Only with Two 3/4" (19mm) Gripping Holes  | <b>PT16846</b> | 71597   |
| <b>J</b>  | Gage Holding Rod Only, Including Clamp Mechanism and Fine-Adjustment   | <b>PT08903</b> | 72032   |
|           | Thread Adaptor Only  | <b>PT18318</b> | 72040   |

**Sets, Including Magnetic Base, Upright Post Assembly and AGD Dial Indicators**

| Description  | Catalog No.   | EDP No. |
|--|---------------|---------|
| Base and Upright Post Assembly with Inch Reading Indicator No. 25-131J in Case       | <b>659BZ</b>  | 55948   |
| Base and Upright Post Assembly with Millimeter Reading Indicator No. 25-181J in Case | <b>659MBZ</b> | 64892   |

Packed one in a box.



## Inspection Holder and Starrett AGD Dial Indicators

### No. 665 Series

This is the most versatile dial indicator holder with an extremely stable base (A) that is 8-1/2" (215mm) long x 2-1/4" (57mm) wide at the bottom. It can inspect workpieces on the top surface of the ground base or within a working area defined by the 8" (200mm) upright base post (B) and the 9-1/2" (238mm) long gage-holding rod (C). The base post can be conveniently located anywhere along the 8-1/2" (215mm) T-slot in the base.

This tool can be held in a vise or by a bolt in a machine T-slot coming up through one of the two 3/8" (9.5mm) holes in the base and fastening down on the top surface.

A great variety of mechanical AGD indicators and electronic indicators, Nos. 2600 and 2700 Series, are available on request.

#### D. Swivel Post Snug No. 665D

Snug has a .375" (9.5mm) hole for the gage holding rod and a .465" (11.8mm) hole for the upright post. Also comes with the No. 665L Reducing Bushing that can reduce the .465" (11.8mm) hole to 3/8" (9.5mm).

#### E. Base Reference Guide No. 665E

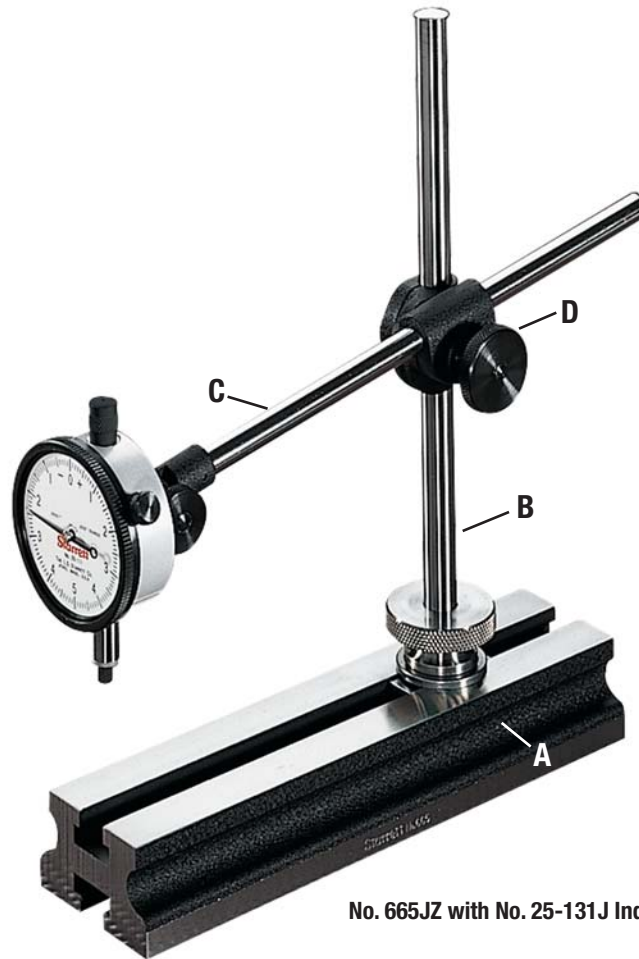
(Optional) – Guide is used to check parts or surfaces from straight or angular surfaces by use of the radiused guide stop. This fits into the T-slot in the bottom of the base and is fastened at right angles to the length.

Push up to a radius surface or slide along a radius surface.

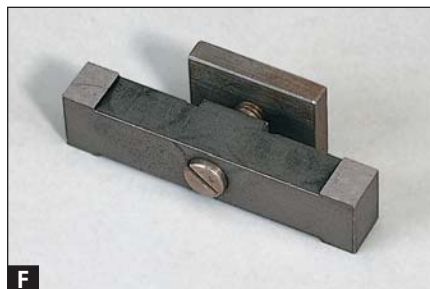
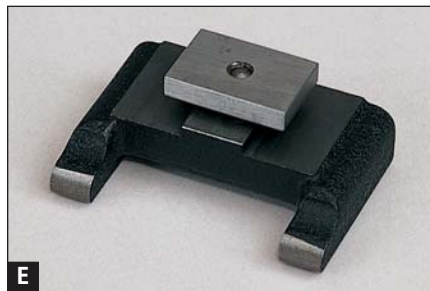
#### F. Square Keyway Guide No. 665F

(Optional) – This guide can also be referenced from a square edge, a T-slot or a keyway with at least a 1/2" (12.7mm) width. Has square edges and is fastened at right angles to the length.

Push up to a square edge or slide along a square edge.



No. 665JZ with No. 25-131J Indicator.



(Continued on next page.)



### No. 665 Series (continued)

There are three very useful inspection combinations that can be made by removing the complete swivel post snug and gage holding rod and using them as follows:

#### G. Clamp No. 665G

Take the clamp and put the clamp post into the snug and lock it. Now this combination can be used to clamp the gage holding rod and the indicator into hard-to-reach places for inspecting jigs, fixtures, lining up work on centers and machine tables.

The clamp has a 3" (75mm) capacity and a post with an approximately 5-3/4" (145mm) length. The clamp post is .464" (11.8mm) diameter that fits into the regular swivel post snug No. 665D.

There are three other clamp post diameter options available – No. 665G-3/8 is a 3/8" (9.5mm) diameter clamp post that can be used in the regular swivel post snug No. 665D with the addition of the No. 665L reducing bushing. The Nos. 665G-5/16 (7.9mm) and 665G-1/4 (6.3mm) can be used with other snugs to hold an indicator.

#### H. Tool Post Holder No. 665H

Put one end of the offset arm into the swivel post snug No. 665D (with the No. 665L reducing bushing in it). Then put this rectangular tool post holder No. 665H onto the other arm. This combination now allows for a good, tight setup in lathe tool posts and other machine setups.

#### I. Offset Arm No. 665G-1

Another very popular measuring combination is to put the reducing bushing (which is furnished) into the snug and then put one leg of the offset arm into it. Now the tool can be used in a 3/8" (9.5mm) chuck or collet to sweep a large area.

#### J. Reducing Bushing No. 665L

Bushing has a .465" (11.8mm) O.D. and a .375" (9.5mm) I.D.



### Individual Components

| Key | Description  | Catalog No. | EDP No. |
|-----|--|-------------|---------|
| A*  | Base Only  | 665A        | 52783   |
| B*  | Upright Base Post .464" x 8" (11.8 x 200mm) with Clamp Mechanism                           | 665B        | 52784   |
| C*  | Gage Holding Rod 3/8" x 9-1/2" (9.5 x 240mm) with Clamp Mechanism                          | PT06784-A   | 52755   |
| D*  | Swivel Post Snug with .465" and 3/8" (11.8 and 9.5mm) holes with No. 665L Reducing Bushing | 665D        | 52754   |
| E   | Base Reference Guide   | 665E        | 52787   |
| F   | Square Keyway Guide  | 665F        | 52788   |
| G*  | Clamp with .464" x 5-3/4" (11.8 x 146mm) Post  | 665G        | 52792   |
|     | Clamp with 1/4" (6.3mm) Diameter Post  | 665G-1/4    | 52793   |
|     | Clamp with 5/16" (7.9mm) Diameter Post   | 665G-5/16   | 52794   |
|     | Clamp with 3/8" (9.5mm) Diameter Post  | 665G-3/8    | 52795   |
| H*  | Tool Post Holder Approximately 1" x 7/16" (25 x 11mm)                                      | 665H        | 52790   |
| I*  | Offset Arm 3/8" (9.5mm) Diameter 3" and 5 1/2" (75 and 140mm) Arms                         | 665G-1      | 52789   |
| J*  | Reducing Bushing Only (for Swivel Post Snug) .465" (11.8mm) O.D. .375" (9.5mm) I.D.        | 665L        | 52756   |

### Inspection Sets with AGD Dial Indicators

| Description   | Catalog No. | EDP No. |
|---|-------------|---------|
| Complete with Components * and No. 25-131J Inch Reading Indicator in Case       | 665JZ       | 56275   |
| Complete with Components * and No. 25-181J Millimeter Reading Indicator in Case | 665MJZ      | 56276   |

Packed one in a box.





## Dial Comparators with granite base

No. 675GJ

No. 675GMJ

Extremely rugged and universally adjustable to any position, these gages are well suited for inspection, layout, checking and lineup operations anywhere in the shop. All settings are individually made without disturbing others.

These versatile stands allow the indicator to be positioned at any height within the capacity of the upright base post – 360° both horizontally and vertically.

The indicator can also be moved lengthwise within the capacity of the 3/4" x 9-7/8" (19 x 250mm) horizontal gage-holding rod.

A special feature of this tool is the sensitive, fine-adjustment at the end of the gage rod. The fine-adjustment range is approximately 1/4" (6.3mm).

A 1/4" (6.3mm) steel indicator contact point is provided, but contact points in other lengths and materials are also available – see previous accessory pages.

This holder has a Starrett Grade-A Crystal Pink Granite base that is 8" x 12" x 2" (200 x 300 x 50mm), and is finished to an overall tolerance of .0001" (0.0025mm).



### Complete Units

| Dial Indicator Specifications* |              |       |               | With Granite Base |         |
|--------------------------------|--------------|-------|---------------|-------------------|---------|
| Graduation                     | Dial Reading | Range | Indicator No. | Catalog No.       | EDP No. |
| .0005"                         | 0-25-0       | .125" | 25-131J       | 675GJ             | 55964   |
| 0.01mm                         | 0-50-0       | 2.5mm | 25-181J       | 675GMJ            | 56129   |

\*For complete specifications see previous pages.

### Individual Components

| Description   | Catalog No. | EDP No. |
|---|-------------|---------|
| Granite Base, Upright Base Post and Gage Holding Rod, Including Clamp Mechanism and Fine-Adjustment | 675G        | 66051   |
| Gage Holding Rod Only, Including Clamp Mechanism and Fine-Adjustment                                | PT08903     | 72032   |
| Swivel Post Snug Only with Two 3/4" (19mm) Gripping Holes   | PT16846     | 71597   |

**NOTE:** Available with special nonshock mechanism or without indicator. Any Starrett AGD Dial or Electronic Indicator can be interchanged with indicators listed. Please specify when ordering.



No. 675G with No. F2710-1 Electronic Indicator.





No. 653J.



No. 653GJ.

## Dial Comparators

### No. 653 Series with cast iron base, inch and mm reading

### No. 653G Series with granite base, inch and mm reading

These bench-type comparator gages are ruggedly built for in-process and final inspection work.

The dial indicator can be adjusted vertically and locked in any position. A sliding ring with locking screw below the beam permits swinging the indicator to either side. The ring also acts as a safety device, preventing the beam from accidentally dropping. There is a fine adjustment on the beam for final indicator setting.

The hand lifting lever on the indicator raises the spindle and releases it to contact the work. A left hand lever is furnished unless specified otherwise.

Both gages have a maximum vertical capacity of 9-1/4" (235mm) and a throat depth of 5" (125mm) and a vertical indicator fine adjustment of up to 1/2" (12.7mm). Post diameter is 1-1/2".

**No. 653 Series** have a ribbed, precision ground cast iron base measuring approximately 8" x 9" (200 x 225mm).

**No. 653G Series** have a Starrett Grade A, Crystal Pink Granite base, measuring 8" x 12" x 2" (200 x 300 x 50mm). Base is finished to an overall tolerance of .0001" (0.0025mm).

### Complete Units

| Dial Indicator Specifications* |              |       |               | With Cast Iron Base |         | With Granite Base |         |
|--------------------------------|--------------|-------|---------------|---------------------|---------|-------------------|---------|
| Graduation                     | Dial Reading | Range | Indicator No. | Catalog No.         | EDP No. | Catalog No.       | EDP No. |
| .001"                          | 0-50-0       | .250" | 655-141J      | <b>653J</b>         | 52737   | <b>653GJ</b>      | 55966   |
| 0.01mm                         |              | 2.5mm | 655-181J      | <b>653MJ</b>        | 56146   | <b>653GMJ</b>     | 56127   |

\*For complete specifications see previous pages.

### Individual Components

| Description                                       | Catalog No. | EDP No. |
|---|-------------|---------|
| Comparator with Cast Iron Base, without Indicator | <b>653</b>  | 55917   |
| Comparator with Granite Base, without Indicator   | <b>653G</b> | 56646   |

**NOTE:** Available with special nonshock mechanism or without indicator.

**Any Starrett AGD Dial or Electronic Indicator can be interchanged with indicators listed. Please specify accordingly.**



## Dial Bench Gages

### No. 652 Series with sliding table and fine-adjustment

These compact gages are used for bench or beside-the-machine inspection of small parts and materials. The hand lever is pressed down to lift the spindle and released to contact the work under uniform pressure. Gages are furnished with left hand lever unless specified otherwise. The dial can be rotated for zero setting and located in place with the bezel clamp.

The 652 has a ground and lapped table that can be adjusted vertically and locked in position. A sliding ring below a table bracket can also be locked in position permitting the table to swing to either side. Final setting of the table is made by a fine-adjusting screw.



No. 652JZ.

| Size Specifications       | Inch   | mm    |
|---------------------------|--------|-------|
| Maximum Vertical Capacity | 1-3/4" | 44mm  |
| Maximum Throat Depth      | 1-5/8" | 40mm  |
| Table Diameter            | 2"     | 50mm  |
| Table Fine-Adjustment     | 1/8"   | 3mm   |
| Base Diameter             | 5"     | 125mm |

| Dial Indicator Specifications* |              |       |               |             |         |
|--------------------------------|--------------|-------|---------------|-------------|---------|
| Graduation                     | Dial Reading | Range | Indicator No. | Catalog No. | EDP No. |
| .0005"                         | 0-25-0       | .125" | 25-131J       | 652JZ       | 52733   |
| 0.01mm                         | 0-50-0       | 2.5mm | 25-181J       | 652MJZ      | 52734   |

\*For complete specifications see previous pages.

**NOTE:** All gages can be furnished with tolerance hands; special nonshock mechanism; special sizes and shapes of contact points and tables. Available by request.

Furnished in case. Packed one in a box.



### Special Function Dial Gages

This section includes special function dial gages that we list as regular items. Gages are also available with electronic indicators on request, where noted.

- ◆ Chamfer Gages
- ◆ Countersink Gages
- ◆ Hole Gages
- ◆ Bore Gages – See Bore Gages Section
- ◆ Direct-Reading Thickness Gages
- ◆ Snap Gages
- ◆ Groove Gages
- ◆ Caliper Gages
- ◆ Depth Gages
- ◆ Out-of-roundness Gages
- ◆ Inside Dial Gages
- ◆ Automotive Gages
- ◆ Crankshaft Distortion Gages
- ◆ Cylinder Gages
- ◆ Disc Brake Gages
- ◆ Large Diameter Gages

In addition, we have made many other special function gages to suit a wide variety of our customers' specific requirements. If you have a special application, we invite you to submit your drawings and specifications to our Special Order Department at 121 Crescent Street, Athol, MA 01331, USA. We will be happy to provide a prompt quotation.

### Chamfer Gages

**For Internal Chamfers:**  
**No. 683 Series 0-90°**  
**No. 684 Series 90-127°**

**For External Chamfers:**  
**No. 685 Series 0-90°**  
**No. 686 Series 90-127°**

These gages directly measure the diameter of chamfered holes. No setting master is necessary. When the three-blade plunger is pressed against a flat surface, the gage should read the set number stamped on the back of the indicator. In case of wear, the gage may be adjusted to read the proper number.

All ground surfaces are of hardened tool steel. Indicators are AGD design.

Internal gages will measure the largest diameter of any chamfer that has an included angle within the range of angles printed on the dial face of the gage.

External gages will measure the smallest diameter of any chamfer within the range of angles printed on the dial face of the gage.



Left, No. 683-1Z;  
 Right, No. 685-3Z.

Right: No. 684-2Z Chamfer Gage with No. F2710-3 Electronic Indicator on the No. 695 Check Stand.

See specifications on next page.



**Chamfer Gages (continued)**

**Internal Gages**

**Inch Reading**

| Range  | 0-90° Angle   |         | 90-127° Angle |         |
|--------|---------------|---------|---------------|---------|
|        | Catalog No.   | EDP No. | Catalog No.   | EDP No. |
| 0-3/8" | <b>683-1Z</b> | 63684   | <b>684-1Z</b> | 63688   |
| 0-1/2" | <b>683-2Z</b> | 63685   | <b>684-2Z</b> | 63689   |
| 0-1"   | <b>683-3Z</b> | 63686   | <b>684-3Z</b> | 63690   |
| 1-2"   | <b>683-4Z</b> | 63687   | <b>684-4Z</b> | 63691   |

**Millimeter Reading with Yellow Dials**

|          |                |       |                |       |
|----------|----------------|-------|----------------|-------|
| 0-9.5mm  | <b>683M-1Z</b> | 64989 | <b>684M-1Z</b> | 64993 |
| 0-12.7mm | <b>683M-2Z</b> | 64990 | <b>684M-2Z</b> | 64994 |
| 0-25mm   | <b>683M-3Z</b> | 64991 | <b>684M-3Z</b> | 64995 |
| 25-50mm  | <b>683M-4Z</b> | 64992 | <b>684M-4Z</b> | 64996 |

**External Gages**

**Inch Reading**

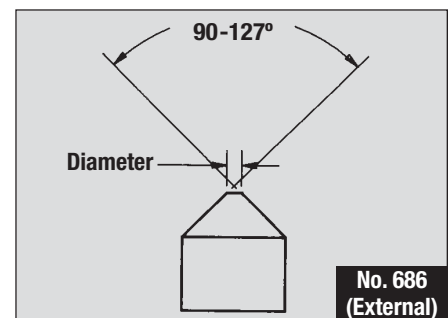
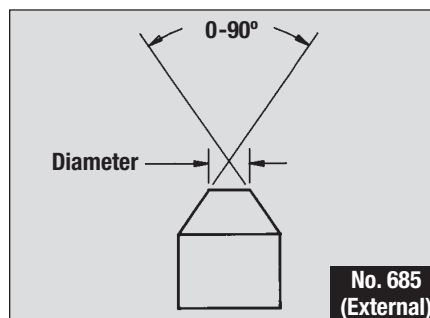
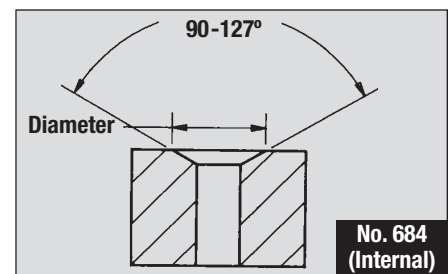
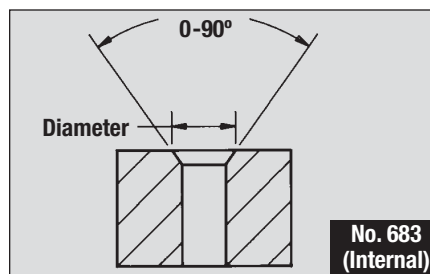
|          |               |       |               |       |
|----------|---------------|-------|---------------|-------|
| 1/8-1/2" | <b>685-1Z</b> | 63692 | <b>686-1Z</b> | 63695 |
| 3/16-1"  | <b>685-2Z</b> | 63693 | <b>686-2Z</b> | 63696 |
| 1-2"     | <b>685-3Z</b> | 63694 | <b>686-3Z</b> | 63697 |

**Millimeter Reading with Yellow Dials**

|            |                |       |                |       |
|------------|----------------|-------|----------------|-------|
| 3.2-12.7mm | <b>685M-1Z</b> | 64997 | <b>686M-1Z</b> | 65000 |
| 4.7-25mm   | <b>685M-2Z</b> | 64998 | <b>686M-2Z</b> | 65001 |
| 25-50mm    | <b>685M-3Z</b> | 64999 | <b>686M-3Z</b> | 65002 |

**Check Gage Stand for Chamfer, Countersink and Hole Gages**

| Description  | Catalog No. | EDP No. |
|--|-------------|---------|
| 8-3/16" H x 6" W x 4" D (212 x 150 x 100mm)<br>Hold Downs – 5" (125mm) on Center –<br>1/4" (6.3mm) Holes | <b>695</b>  | 63875   |



**NOTE:** Also available with electronic indicators.  
Please specify.

Gages furnished in deluxe padded case.





### Countersink Gages

- No. 687 Series 82°**
- No. 688 Series 90°**
- No. 689 Series 100°**

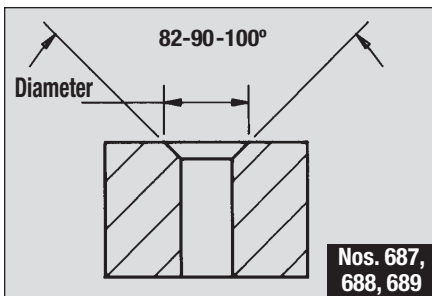
Starrett Countersink Gages are offered in three different angles so that the gage sets on the angular side of the countersink, as opposed to a chamfer gage which sets on the top edge of the chamfer.

This gage directly reads the large diameter of the countersink in .002" or 0.05 mm increments. A set master ring is furnished with each gage for calibration and setting. Press the button on top of the indicator to firmly depress the gage head into the countersink. When the gage is removed, the indicator reading is held in place until the reset button is activated.

All ground surfaces are of hardened tool steel. Indicators are AGD design.



Left-to-right: Nos. 687-4Z, No. 688-3Z, No. 689-1Z.



### Inch Reading

| Range      | 82° Angle     |         | 90° Angle     |         | 100° Angle    |         |
|------------|---------------|---------|---------------|---------|---------------|---------|
|            | Catalog No.   | EDP No. | Catalog No.   | EDP No. | Catalog No.   | EDP No. |
| .020-.170" | <b>687-1Z</b> | 63698   | <b>688-1Z</b> | 63702   | <b>689-1Z</b> | 63706   |
| .160-.360" | <b>687-2Z</b> | 63699   | <b>688-2Z</b> | 63703   | <b>689-2Z</b> | 63707   |
| .360-.560" | <b>687-3Z</b> | 63700   | <b>688-3Z</b> | 63704   | <b>689-3Z</b> | 63708   |
| .560-.780" | <b>687-4Z</b> | 63701   | <b>688-4Z</b> | 63705   | <b>689-4Z</b> | 63709   |

### Millimeter Reading with Yellow Dials

|             |                |       |                |       |                |       |
|-------------|----------------|-------|----------------|-------|----------------|-------|
| 0.5-4.3mm   | <b>687M-1Z</b> | 65003 | <b>688M-1Z</b> | 65007 | <b>689M-1Z</b> | 65011 |
| 4-9mm       | <b>687M-2Z</b> | 65004 | <b>688M-2Z</b> | 65008 | <b>689M-2Z</b> | 65012 |
| 9-14.2mm    | <b>687M-3Z</b> | 65005 | <b>688M-3Z</b> | 65009 | <b>689M-3Z</b> | 65013 |
| 14.2-19.8mm | <b>687M-4Z</b> | 65006 | <b>688M-4Z</b> | 65010 | <b>689M-4Z</b> | 65014 |

### Check Gage Stand for Chamfer, Countersink and Hole Gages

| Description   | Catalog No. | EDP No. |
|---|-------------|---------|
| 8-3/16" H x 6" W x 4" D (212 x 150 x 100mm)<br>Hold Downs – 5" (125mm) on Center – 1/4" (6.3mm) Holes | <b>695</b>  | 63875   |

**NOTE:** Also available with electronic indicators. Please specify.

Gages furnished in deluxe padded case.



## Hole Gages

**No. 690 Series**  
.010-.330"

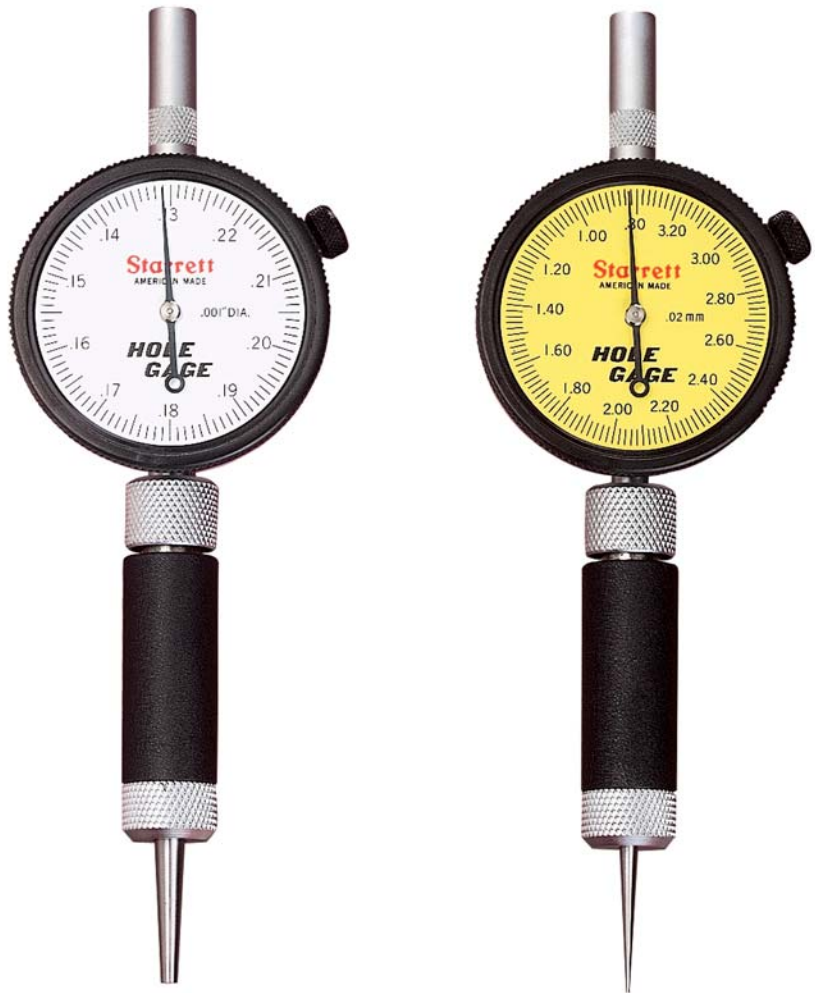
**No. 690M Series**  
0.25-8.35mm

These hole gages will check hole diameters to .001" and 0.02mm. They are fast, accurate, easy to read and have a balanced design for easy one-hand operation.

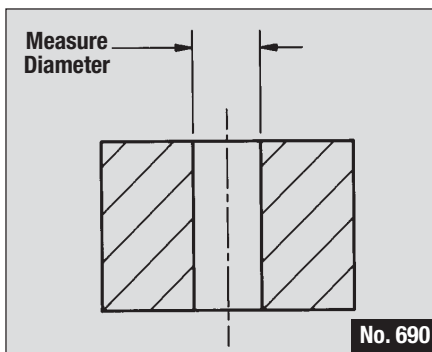
The gage can be pressed down on a flat surface and checked so the size should read the same as the set number stamped on the back of the indicator. It can also be checked and set with an optional "setting master".

All ground surfaces are of hardened tool steel. Indicators are AGD design.

Holes that need to be accurately checked must have no chamfers or countersinks.



Left, No. 690-3Z; right, No. 690M-2Z.



### Inch Reading

| Range      | Gages         |         | Set Masters (Optional) |         |
|------------|---------------|---------|------------------------|---------|
|            | Catalog No.   | EDP No. | Part No.               | EDP No. |
| .010-.040" | <b>690-1Z</b> | 63710   | <b>PT23710-1</b>       | 63879   |
| .030-.130" | <b>690-2Z</b> | 63711   | <b>PT23710-2</b>       | 63880   |
| .130-.230" | <b>690-3Z</b> | 63712   | <b>PT23710-3</b>       | 63881   |
| .230-.330" | <b>690-4Z</b> | 63713   | <b>PT23710-4</b>       | 63882   |

### Millimeter Reading with Yellow Dials

|             |                |       |                  |       |
|-------------|----------------|-------|------------------|-------|
| .25-1.00mm  | <b>690M-1Z</b> | 63714 | <b>PT23710-5</b> | 63883 |
| .75-3.30mm  | <b>690M-2Z</b> | 63715 | <b>PT23710-6</b> | 63884 |
| 3.30-5.85mm | <b>690M-3Z</b> | 63716 | <b>PT23710-7</b> | 63885 |
| 5.85-8.35mm | <b>690M-4Z</b> | 63717 | <b>PT23710-8</b> | 63886 |

### Check Gage Stand for Chamfer, Countersink and Hole Gages

| Description  | Catalog No. | EDP No. |
|--|-------------|---------|
| 8-3/16" H x 6" W x 4" D (212 x 150 x 100mm)<br>Hold Downs - 5" (125mm) on Center -<br>1/4" (6.3mm) Holes | <b>695</b>  | 63875   |

**NOTE:** Also available with electronic indicators.  
Please specify.

Gages furnished in deluxe padded case.



### Thickness Gages

Three handy, specialized, direct-reading gages, as shown on these two pages.

### Dial Sheet Gages

**No. 170** .150"

**No. 170M** 2.5mm

Measures the thickness of sheet materials like paper, cardboard, leather, plastics and metals. Raise the movable contact, insert the work, remove thumb, and spring pressure holds the work parallel with the contacts. The thickness is registered on the dial. By turning the knurled bezel, the dial may be moved to bring the hand to zero. The contact edges are radiused to prevent the work from being marred or deflected. The flat contact area measures 5/16" (8mm) in diameter. Black finish.

- ◆ Throat depth is 1-1/8" (28.5mm)
- ◆ Furnished in deluxe padded case



No. 170Z.

#### Inch Reading

| Range | Graduation | Dial Reading | Catalog No. | EDP No. |
|-------|------------|--------------|-------------|---------|
| .150" | .001"      | 0-100        | 170Z        | 50647   |

#### Millimeter Reading

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 2.5mm | 0.2mm | 0-100 | 170MZ | 66036 |
|-------|-------|-------|-------|-------|

### Dial Indicator Pocket Gages

**No. 1010 Series** .375"

**No. 1010M** 9mm

Handy pocket gage is approximately the size of a thin pocket watch. Ideal for inspectors, purchasing agents and salespeople to check the size of materials up to 3/8" or 9mm thick. The gage fits naturally into the curve between the thumb and index finger. A slight pull on the serrated top plate raises the spindle.

- ◆ The throat depth ranges from 1/2" (12.7mm) down to 5/16" (8mm)
- ◆ Models are available with flat or rounded contacts as listed
- ◆ The diameter of both the flat or round contacts are 1/4" (6.3mm)
- ◆ The gage has a small count hand for recording each revolution of the large hand
- ◆ The case is chrome plated, and the dial is covered with an unbreakable crystal
- ◆ Furnished in attractive, protective case



No. 1010RZ.

#### Inch Reading

| Range | Graduation | Dial Reading | Contacts | Catalog No. | EDP No. |
|-------|------------|--------------|----------|-------------|---------|
| .375" | .001"      | 0-100        | Flat     | 1010Z       | 53114   |
|       | .0005"     | 0-50         |          | 1010EZ      | 53115   |
| .275" | .001"      | 0-100        | Round    | 1010RZ      | 56067   |

#### Millimeter Reading

|     |        |       |      |        |       |
|-----|--------|-------|------|--------|-------|
| 9mm | 0.01mm | 0-100 | Flat | 1010MZ | 53116 |
|-----|--------|-------|------|--------|-------|





**Portable Dial  
Thickness Gages**

**No. 1015 Series 0-1"**

**No. 1015M Series 0-25mm**

After inserting work between the measuring contacts, releasing the lever will cause the spindle to contact the work, giving an accurate size reading because measuring pressure is independent of the user. Indicators have jewel bearings and continuous dials. (Models with balanced dials, other graduations and ranges are also available on special order. Electronic indicators can also be furnished.) Throat depths include 2-1/2", 4", and 6". The contact edges are radiused to prevent the work from being marred or deflected. The flat contact area measures 1/4" (6.3mm) in diameter and is 1/8" (0.125mm) thick. Special contact sizes and shapes are available by request.



No. 1015A.



No. 1015A-6.

**Inch Reading**

| Throat Depth | Range | Graduation | Dial Reading | Dial Indicator Model No. | Without Case   |         | Case Only      |         |
|--------------|-------|------------|--------------|--------------------------|----------------|---------|----------------|---------|
|              |       |            |              |                          | Catalog No.    | EDP No. | Catalog No.    | EDP No. |
| 2-1/2"       | 1/2"  | .0005"     | 0-50         | 1015A-431J               | <b>1015A</b>   | 53119   | <b>1015AZZ</b> | 55407   |
|              | 1"    | .001"      | 0-100        | 1015B-441J               | <b>1015B</b>   | 53121   | <b>1015BZZ</b> | 55408   |
| 4"           | 1/2"  | .0005"     | 0-50         | 1015A-431J               | <b>1015A-4</b> | 67646   |                |         |
|              | 1"    | .001"      | 0-100        | 1015B-441J               | <b>1015B-4</b> | 67649   |                |         |
| 6"           | 1/2"  | .0005"     | 0-50         | 1015A-431J               | <b>1015A-6</b> | 67652   |                |         |
|              | 1"    | .001"      | 0-100        | 1015B-441J               | <b>1015B-6</b> | 67655   |                |         |

**Millimeter Reading**

|       |      |        |       |             |                   |       |                |       |
|-------|------|--------|-------|-------------|-------------------|-------|----------------|-------|
| 63mm  | 10mm | 0.01mm | 0-100 | 1015MA-481J | <b>1015MA</b>     | 56131 | <b>1015AZZ</b> | 55407 |
|       | 25mm |        |       | 1015MB-881J | <b>1015MB</b>     | 56133 | <b>1015BZZ</b> | 55408 |
| 100mm | 10mm |        |       | 1015MA-481J | <b>1015MA-100</b> | 67647 |                |       |
|       | 25mm |        |       | 1015MB-881J | <b>1015MB-100</b> | 67650 |                |       |
| 150mm | 10mm |        |       | 1015MA-481J | <b>1015MA-150</b> | 67653 |                |       |
|       | 25mm |        |       | 1015MB-881J | <b>1015MB-150</b> | 67656 |                |       |

Packed one in a box.





### Dial Indicator Snap Gages

#### No. 1150 Series 0-8"

These compact gages have rigid aluminum alloy frames protected from hand heat by insulating handles. They are used to gage outside diameters to an accuracy of .0001".

Dimensional variations are transmitted to the dial indicator through a linear friction-free transfer mechanism totally enclosed for protection against side thrust, foreign matter and coolants. Flat gaging contacts simplify measurement close to shoulders. The top sensitive contact may be reversed to present a spherical face to the work. An adjustable backstop simplifies centering the work.

The contacts and backstop are 5/16" diameter hardened tool steel, precision ground and lapped flat. The contacts are individually adjustable to a maximum 2" range and are locked in position by tightening parallel-lock clamps to maintain parallelism of faces. Both contacts are also keyed to maintain orientation of faces regardless of adjustment.

Plus or minus tolerances are read directly from the indicator since the dial face has a double row of graduations reading in opposite directions from zero, with "minus" graduations in red and "plus" in black. The indicator can be rotated 360° and locked in position to read from any angle, and a fine-adjusting screw provides for zero setting the hand. A guard protects the dial indicator when the gage is laid down.

A bench stand is available to convert the gage to a bench comparator. The series is also available with indicators other than those listed, a No. 717 Gage Amplifier and gaging head in place of the indicator, carbide faces on the contacts, special



Left: No. 1150Z-2 as a handheld snap gage.  
Center: No. 1150Z-2 with No. F2710-1 Electronic Indicator.  
Right: No. 1150Z-2 mounted on a No. 1150 Bench Stand.



contact and backstop shapes and sizes, variable gaging pressure control, disc

setting and other special masters, and larger ranges.

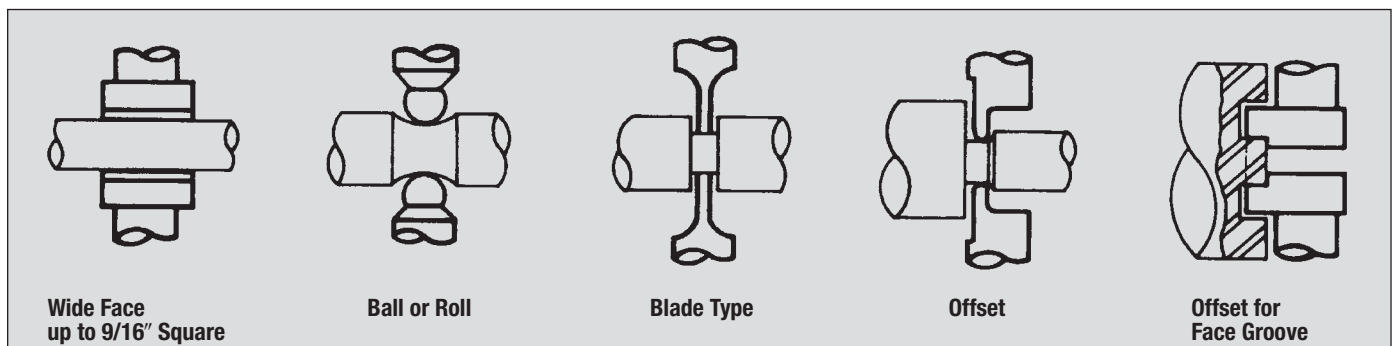
#### Inch Reading

| Range | Dial Indicator |              |       |             | Without Stand |         |
|-------|----------------|--------------|-------|-------------|---------------|---------|
|       | Graduation     | Dial Reading | Range | Model No.   | Catalog No.   | EDP No. |
| 0-2"  | .0001"         | + 10<br>- 10 | .040" | 81-111-1150 | 1150Z-2       | 53168   |
| 2-4"  |                |              |       |             | 1150Z-4       | 53169   |
| 4-6"  |                |              |       |             | 1150Z-6       | 53170   |
| 6-8"  |                |              |       |             | 1150Z-8       | 53171   |

#### Accessory

|                  |      |       |
|------------------|------|-------|
| Bench Stand Only | 1150 | 53172 |
|------------------|------|-------|

#### Special Contacts



Some of the many interchangeable anvil configurations designed to suit special applications.

Gages furnished in case. Packed one in a box.



## Dial Indicator Groove Gages

**No. 1175** .375-6"

**No. 1175M** 9.5-150mm

This lightweight gage is used for in-process or bench inspection of oil grooves, snap ring retainer grooves, "O" ring seat retainer grooves and similar internal recesses. It is also useful for checking bore dimensions and testing for taper, bell-mouth and out-of-roundness.

The movable, sensitive gaging contact has a 1/2" (12.7mm) retractable range and transfers the measurement through a linear, friction-free transfer mechanism to the dial indicator. The lower reference jaw is fixed and supports the entire weight of the gage and the operator's hands, thus preventing incorrect gaging pressure and false readings.

The reference jaw can be mounted in two positions on the range adjusting bar. The bar itself is also adjustable for greater or lesser range. A fine adjustment screw and a lock are also provided.

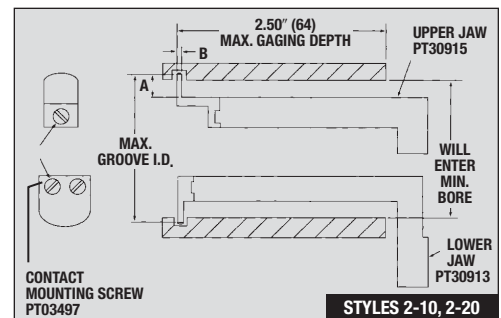
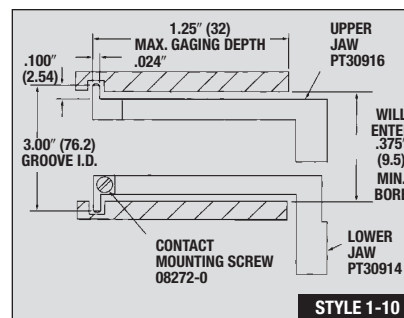
This gage has the following features:

- ◆ Supplied with two sets of jaws, both readily interchangeable
- ◆ Three sets of contacts are furnished (Styles 1-10, 2-10, 2-20) that can be attached to the ends of the jaws without replacing the entire jaw. Contacts have flush ends so that grooves at the bottom of blind holes can be gaged. The contacts are hardened steel with a hard chrome finish for long life
- ◆ Gage can be set with gage blocks or other methods such as micrometers, vernier calipers and ring gages.

Special jaws for 4" and 6" (100mm and 150mm) gaging depths, a diameter range extension bar from 6-12" (150-300mm), dial indicators graduated in .001", or any special modification of gaging contacts and jaws, are also available by request through our Special Order Department



**No. 1175Z.**



### Contact Set Specifications:

Style 1-10 is for the smaller jaws and can enter a .375" (9.5mm) bore. Styles 2-10 and 2-20 are used on the larger jaws to get the range up to 6" (150mm).

| Contact Set | Part No. |         | Will Enter Minimum Bore |      | Maximum Groove I.D. |     | A     |     | B     |     |
|-------------|----------|---------|-------------------------|------|---------------------|-----|-------|-----|-------|-----|
|             | Upper    | Lower   | Inch                    | mm   | Inch                | mm  | Inch  | mm  | Inch  | mm  |
| Style 1-10  | PT30917  | PT30917 | .375"                   | 9.5  | 3.00"               | 75  | .100" | 2.5 | .024" | 0.6 |
| Style 2-10  | PT30918  | PT30919 | .690"                   | 17.5 | 5.00"               | 125 | .140" | 3.6 | .034" | 0.8 |
| Style 2-20  | PT30920  | PT30921 | 1.00"                   | 25   | 6.00"               | 150 | .265" | 6.7 | .051" | 1.3 |

| Range     | Dial Indicator |            |         |       | Catalog No. | EDP No. |
|-----------|----------------|------------|---------|-------|-------------|---------|
|           | Model No.      | Graduation | Reading | Range |             |         |
| .375-6"   | 81-136-1175    | .0005"     | ±30     | .060" | 1175Z       | 53173   |
| 9.5-150mm | 81-181-1175    | 0.01mm     | ±100    | 2.5mm | 1175MZ      | 65032   |

Furnished with storage case. Packed one in a box.



### Dial Caliper Gages

**No. 1017 Series** Outside

**No. 1018 Series** Inside

#### No. 1017 Series – Outside

These gages are designed for use in measuring castings, forgings and sheet metal work. Large clearances have been provided to reach over part configurations for easy measurement of small sections. The convenient retraction lever allows for one-hand operation and good gage control.

The dial indicator has a direct reading count hand. The contacts are cylindrical carbide for long wear life.

#### No. 1018 Series – Inside

These gages are designed for use in measuring bores of castings and for inside reading in fabrications. Clearance has been provided for use in recessed bores. The convenient retraction lever allows one-hand operation.

The dial indicator has a direct reading count hand. The gage contacts are carbide balls for long wear life.



Top, No. 1017-4 Outside Model;  
Bottom/Right, No. 1018A Inside Model.

#### No. 1017 Series – Outside

| Range  | Graduation | Throat Depth | Catalog No.      | EDP No. |
|--------|------------|--------------|------------------|---------|
| 0-2"   | .001"      | 4"           | <b>1017-4</b>    | 65091   |
|        |            | 8"           | <b>1017-8</b>    | 64959   |
| 0-50mm | 0.02mm     | 100mm        | <b>1017M-100</b> | 64179   |
|        |            | 200mm        | <b>1017M-200</b> | 64180   |

#### No. 1018 Series – Inside

| Range   | Gaging Depth | Indicator Graduation | Catalog No.   | EDP No. |
|---------|--------------|----------------------|---------------|---------|
| 1-3"    | 3"           | .001"                | <b>1018A</b>  | 65092   |
|         |              | .010"                | <b>1018B</b>  | 65093   |
| 25-75mm | 75mm         | 0.02mm               | <b>1018MA</b> | 64181   |
|         |              | 0.10mm               | <b>1018MB</b> | 64182   |

### Internal Dial Caliper Gages

**No. 1019** .400-1.4"

**No. 1019M** 10-35mm

These indicating gages are ideal for obtaining fast, comparative I.D. measurements, especially in hard-to-reach locations. The user depresses the button on the indicator housing and releases, allowing the arms to make contact with the work.

- ◆ Makes convenient, accurate I.D. measurements
- ◆ Spring loaded design provides constant pressure and positive contact for reliable measurements
- ◆ Can be set with a micrometer or ring gage
- ◆ 3-1/4" arm length for ample reach
- ◆ Rotatable bezel for zero setting and bezel lock
- ◆ Jewel bearings
- ◆ .040" (1.016mm) dia. carbide ball measuring contacts



Left-to-right: Nos.  
1019-1, 1019M-25.

#### Inch Reading

| Range     | Description                   | Catalog No.   | EDP No. |
|-----------|-------------------------------|---------------|---------|
| .400-1.4" | .001" with Revolution Counter | <b>1019-1</b> | 66559   |

#### Millimeter Reading

|         |                                 |                 |       |
|---------|---------------------------------|-----------------|-------|
| 10-35mm | 0.025mm with Revolution Counter | <b>1019M-25</b> | 67120 |
|---------|---------------------------------|-----------------|-------|

Packed one in a box.





## Dial Out-Of-Roundness Gages

**No. 681** 1-1/4-5"

**No. 681M** 30-125mm

A compact, easy-to-apply gage for checking the out-of-roundness of connecting rod bearings and holes of shallow depth. Also for inspecting parallelism and for alignment of slots and assembled parts in jig and fixture work. A dial indicator is mounted on top of the base, and on the bottom a positive adjustable slide which is readily set to the approximate hole size or slot width. This slide holds the stationary contact plus two centralizing contacts under spring tension, insuring constant alignment. Bearing surfaces and contact points are of hardened steel. The contact points are inserted to a depth of approximately 3/8" (9.5mm).



| Range    | Dial Indicator |              |       | Model No. | Catalog No. | EDP No. |
|----------|----------------|--------------|-------|-----------|-------------|---------|
|          | Graduation     | Dial Reading | Range |           |             |         |
| 1-1/4-5" | .001"          | 0-25-0       | .125" | 81-145    | <b>681</b>  | 52899   |
| 30-125mm | 0.01mm         | 0-50-0       | 2.5mm | 81-181    | <b>681M</b> | 52900   |

Packed one in a box.

## Inside Dial Gages

**No. 697** 2-3/8-18"

**No. 697M** 61-458mm

These gages are used between two walls to check parallelism and also to take comparative measurements of internal diameters. There are ten rods. Bearing surfaces and contact points are of hardened steel. The rods are marked to designate the approximate overall length of the gage. All measuring contacts are rounded. Tool can be set with a micrometer.

The indicator bezel is rotated to adjust the dial in relation to the hand and has a non-breakable crystal. The movement of the dial indicator is approximately 5/32" (4mm). Rods of different lengths can also be furnished on request.



| Range     | Graduation | Dial Reading | One Revolution | Catalog No.  | EDP No. |
|-----------|------------|--------------|----------------|--------------|---------|
| 2-3/8-18" | .001"      | 0-20-0       | .040"          | <b>697Z</b>  | 52907   |
| 61-458mm  | 0.02mm     | 0-50-0       | 1.0mm          | <b>697MZ</b> | 52908   |

Furnished in attractive, protective case. Packed one in a box.





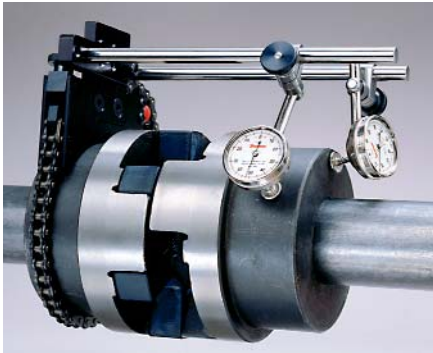
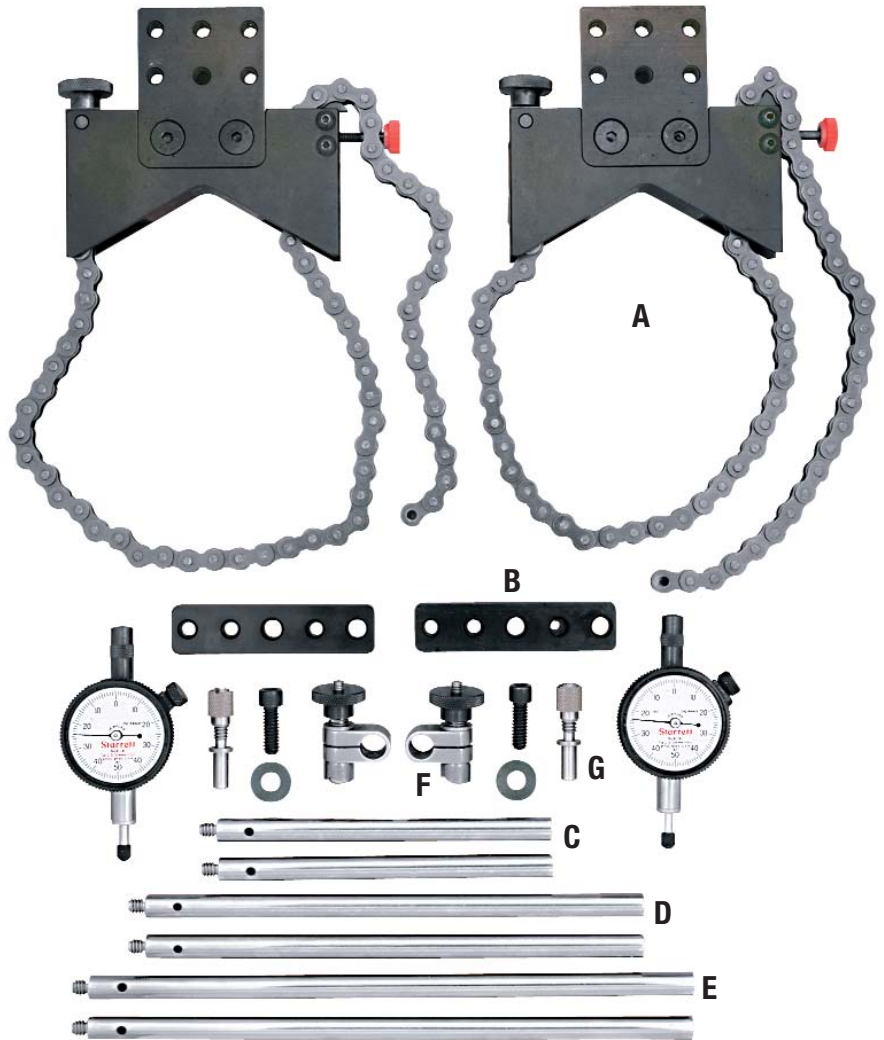
### Shaft Alignment Clamp Sets

#### No. 668 Series

The Starrett Shaft Alignment Clamp is designed for fast, precise alignment of motors, pumps, compressors, etc. This system is capable of addressing radial and angular misalignment problems and can be set up within minutes.

#### Features

- ◆ Lightweight clamp design made of black anodized aluminum
- ◆ Rigid 3/8" diameter stainless steel indicator posts provided in three lengths (5", 7-7/16", and 9")
- ◆ Extension plate allows for added radial clearance
- ◆ Heavy-duty roller chain can accommodate up to a 7-1/2" diameter shaft
- ◆ Sets are available with either two Starrett Nos. 196B5 or 81-141J Indicators
- ◆ Excess roller chain can be secured to the side of the chain clamp
- ◆ A second shaft alignment clamp can be mounted across from the first clamp to act as a vertical "target" for face alignment



No. S668CZ mounted on coupling.

No. S668DZ.

| Photo Key | Individual Components            | Catalog No. | EDP No. |
|-----------|----------------------------------|-------------|---------|
| A         | Chain Clamp Only                 | 668         | 67155   |
| B         | Extension Plate<br>Screw, Washer | PT99529     | 67454   |
| C         | 5" Post                          | PT27981     | 67302   |
| D         | 7-7/16" Post                     | 657G        | 52753   |
| E         | 9" Post                          | PT27982     | 67303   |
| F         | Snug Complete                    | PT18724     | 50710   |
| G         | Indicator Attachment             | 657Y        | 52765   |

| Description   | Catalog No. | EDP No. |
|---|-------------|---------|
| 1 each: Chain Clamp, Extension Plate, Posts (5", 7-7/16", 9"), without Case   | S668A       | 67150   |
| 2 each: Chain Clamp, Extension Plate, Posts (5", 7-7/16", 9"), with Fitted Case   | S668BZ      | 67151   |
| 2 each: Chain Clamp, No. 196B5 Indicator, PT18724 Snug, Extension Plate, Posts (5", 7-7/16", 9"), with Fitted Case                                      | S668CZ      | 67152   |
| 2 each: Chain Clamp, No. 81-141J Indicator, No. 657Y Indicator Attachment, No. PT18724 Snug, Extension Plate, Posts (5", 7-7/16", 9"), with Fitted Case | S668DZ      | 67153   |



## Crankshaft Distortion Dial/Strain Gage

**No. 696** 2-3/8-18"

**No. 696M** 61-458mm

An ideal gage for checking bearing alignment or shaft deflection without dismantling the engine. Also useful as a strain gage on engine frames. This inside measuring gage checks the distortion of crankshaft webs (Fig. 1 and Fig. 2 next page). This distortion bears a direct relation to existing misalignment or excessive bearing wear. The gage makes it possible to check bearing alignment or undue shaft deflection without dismantling the engine. Used on all diesel engine shafts and the center crankshafts on any type of engine or compressor, the gage can also be applied as a strain gage on engine frames (Fig. 3 and Fig. 4 next page) while the engine is operating. A comparison of readings taken at top and bottom positions indicates any misalignment of cylinder and frame which results in local over-stress and eventual cracking of the frame neck.

With a special spring tension in the dial indicator, the gage is self-sustaining in any position without sacrificing necessary rigidity, thus leaving the operator's hands free. The contact points are conical, with an approximate 60° included angle, hardened and ground to a sharp point, and will stay in place on 45° surfaces.

**No. 696B Balancing Attachment** is furnished with the gage. For certain applications, like turning the crank under test with the gage in place, the attachment can be adjusted to maintain the face of the indicator upward or in desired position. To install it on a strain gage in use, remove the knurled clamping nut, then the doweled plate or end strap at either end by the screw. The unit is then positioned over the hubs on two sides of the indicator head. A spring plunger provides the friction that holds the balance in proper relation to position. The parts are nickel plated.

The dial indicator movement is approximately 5/32" (4mm) and with rods and extension, provides a range from 2 3/8-18" or 61-458mm. There are 10 rods and one extension furnished. The rods are marked to designate the approximate overall length of the gage. The indicator has a movable bezel to adjust the dial in relation to the hand and a non-breakable crystal.

This gage was designed in collaboration with the Hartford Steam Boiler Inspection and Insurance Company. It was known as the Hartford Steam Boiler Engine Strain Gage and is used by their inspectors to check the distortion of engine shafts and frames as shown.



**No. 696B Balancing Attachment.**

See specifications on next page.



### Crankshaft Distortion Dial/Strain Gage (continued) No. 696

FIG. 1

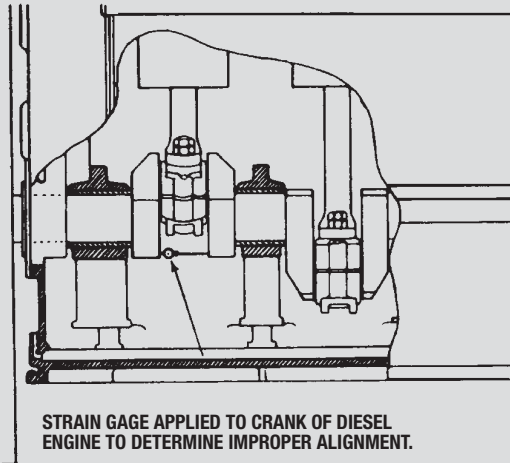
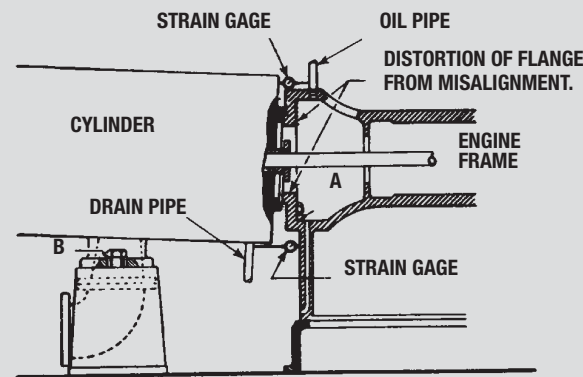
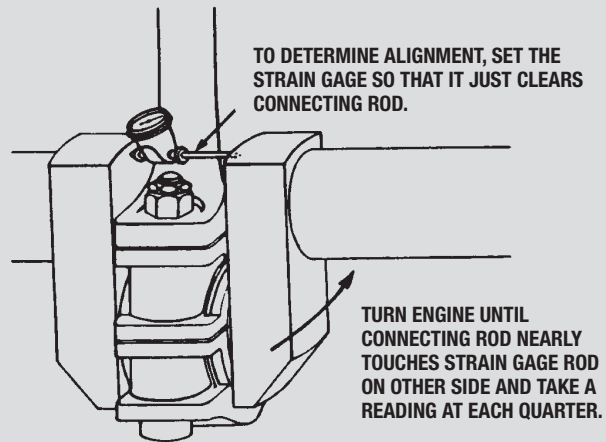
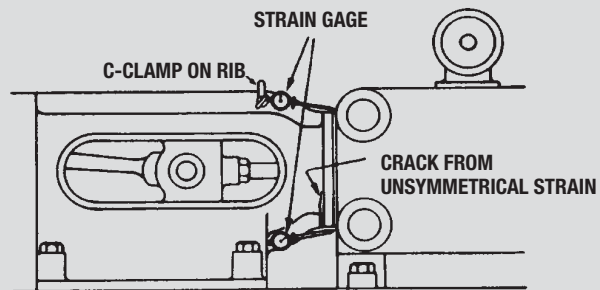


FIG. 2



MISALIGNMENT OF CYLINDER AND ENGINE FRAME (SHOWN EXAGGERATED FOR PURPOSES OF ILLUSTRATION).



STRAIN GAGE APPLIED TO ENGINE FRAME (WHILE OPERATING), DIFFERENCE BETWEEN TOP AND BOTTOM READINGS OF THE STRAIN GAGE INDICATES IMPROPER ALIGNMENT, CAUSING CRACKS.

FIG. 3

FIG. 4

| Range     | Dial Indicator |              |                | Description                                      | Catalog No.  | EDP No. |
|-----------|----------------|--------------|----------------|--|--------------|---------|
|           | Graduation     | Dial Reading | Range One Rev. |  |              |         |
| 2-3/8-18" | .001"          | 0-20-0       | .040"          | Strain Gage with Balancing Attachment            | <b>696Z</b>  | 52901   |
| 61-458mm  | 0.02mm         | 0-50-0       | 1mm            | Millimeter Strain Gage with Balancing Attachment | <b>696MZ</b> | 52902   |

| Description               | Catalog No. | EDP No. |
|---------------------------|-------------|---------|
| Balancing Attachment Only | <b>696B</b> | 52903   |

Gage furnished with 10 rods, sharp points and balancing attachment in attractive, protective case.





## Automotive Disc Brake Indicating Gages

**No. 1016** .300-2"

**No. 1016M** 8-50mm

This gage is a companion gage to the No. 458 Series Micrometer. It is an indicator gage used to measure the thickness of disc brake rotors and to determine the depth of grooves worn in the rotor.

This gage consists of a 1" (25mm) range, .001" (0.01mm) indicator reverse loaded, mounted on a frame with a 60° pointed anvil and a flat indicator contact. This gage is adjustable to allow reading dimensions from .300" (8mm) to 2" (50mm) in one gage, eliminating the need for two separate gages. The frame has a 3-3/8" (85mm) depth.

### Readability Features

- ◆ Clear, easily read large numbers and sharp graduations on both regular and counter dials

### Ease-of-Handling Features

- ◆ Balanced frame design for comfortable and accurate measuring
- ◆ Gracefully designed tapered frame for use in tight places
- ◆ Lightweight
- ◆ Easy plunger action to set the reading
- ◆ Adjustable to read through .300" (8mm) to 2" (50mm) range

### Accuracy and Long-Life Features

- ◆ Stable steel frame
- ◆ Hardened indicator gear action
- ◆ Extremely hard and finely finished measuring surfaces
- ◆ Furnished with a 1" or 25mm gage block standard



No. 1016.



Measuring the groove depth of a disc brake rotor with the No. 1016.

### .300-2" range

| Catalog No. | EDP No. | Graduation | Description  |
|-------------|---------|------------|--|
| 1016        | 63795   | .001"      | Adjustable Dial Indicator and No. 2G Gage Block Standard |

### 8-50mm range

|       |       |        |   |
|-------|-------|--------|---|
| 1016M | 63796 | 0.01mm | Adjustable Dial Indicator and No. 2MG Gage Block Standard |
|-------|-------|--------|---|

NOTE: Also see No. 458 Disc Brake Micrometer in the Micrometer section.

Packed one per box.





### Cylinder Gages

**No. 452 Series** 2-1/10–9"

**No. 452M Series** 54–150mm

These convenient, easy-to-use gages are used to determine taper and out-of-roundness of bores, offering a quick and accurate way to show your customer whether new rings or reconditioning is necessary.

The ranges are achieved by the use of two measuring contact rods. The gage is easily and accurately set to a micrometer.

Gages also include the following features:

- ◆ Dial is graduated to show plus or minus
- ◆ Bezel may be rotated for zero setting
- ◆ Sled is hardened and ground for long, accurate life and has two long-line contacts in constant alignment with the cylinder wall. These reference points are spring loaded, making the gage self-centering and non-collapsible
- ◆ The locking screw (stem protruding above the dial) clamps the contact points in position for measurement with a micrometer
- ◆ The handle can be locked in any perpendicular or angular position and may also be transformed by a slight turn into a toggle joint with a wide sweep
- ◆ Extra handles may be ordered to make a long extension



No. 452B.

#### Inch Reading

| Range     | Graduation | Dial Reading | One Rev. | Catalog No.   | EDP No. |
|-----------|------------|--------------|----------|---------------|---------|
| 2-1/2–6"  | .001"      | 0-100        | .100"    | <b>452B</b>   | 52339   |
| 2-1/2–9"  |            |              |          | <b>452B-9</b> | 52341   |
| 2-1/10–6" |            |              |          | <b>452E</b>   | 52342   |
| 2-1/10–9" |            |              |          | <b>452E-9</b> | 52344   |

#### Millimeter Reading

|          |        |       |       |              |       |
|----------|--------|-------|-------|--------------|-------|
| 63-150mm | 0.02mm | 0-100 | 1.0mm | <b>452MB</b> | 52340 |
| 54-150mm |        |       |       | <b>452ME</b> | 52343 |

#### Accessories

|                                     |                    |       |
|-------------------------------------|--------------------|-------|
| Extra Handle for Nos. 452B-9, 452MB | <b>PT05805-1/2</b> | 72175 |
| Extra Handle for Nos. 452E-9, 452ME | <b>PT06722</b>     | 72275 |

Packed one in a box.

**NOTE:** Height from contact points to top of handle is 10" (250mm).



## Dial Indicator Diameter Gages

These gages measure both outside and inside diameters by comparing dimensions to gage blocks or an adjustable setting master. Each gage consists of a strong rectangular box beam with a sensitive gaging contact at one end and a reference gaging contact at the other.

All of the diameter gages have these features:

- ◆ The sensitive contact transfers dimensions to the dial indicator through a linear friction-free mechanism
- ◆ There are two gage feet at the reference end of the gage and one foot at the sensitive end of the gage to set the gage on the work and align the contacts
- ◆ Gage depth is set by adjusting the gage feet up or down
- ◆ A lever-actuated reverse mechanism loads the gage for either inside or outside diameter measurements

- ◆ The gage contacts are easily changed to I.D. or O.D. gaging by turning them end for end
- ◆ Unless otherwise specified, the dial indicator sent with the gage reads in .0005" increments with a total range of  $\pm 0.30"$ . The dial has a double row of graduations reading in opposite directions – minus in red and plus in black
- ◆ On the following pages we list our standard line but to suit other needs we also can furnish the following:

1. Any length that is required
2. Any dial indicator with inch or millimeter reading
3. No. 717 Electronic Gage Amplifier and Gaging Head in place of the indicator
4. Electronic indicators can also be furnished on any of these gages except the No. 1102
5. Special contact shapes
6. Gaging contacts with more depth



## Dial Indicator Diameter Gages

**No. 1102** 1-12"

**No. 1102M** 25-300mm

This is a light, easy-to-handle gage that is a workhorse in its range. Approximate weight is 1 lb., 12 oz. (0.8kg). The gaging depth can be set within a range of 0-1" (0-25mm) by adjusting the rest foot.

Dial indicators are the No. 81-136-623 Inch Reading (.0005") or No. 81-181-623 Millimeter Reading (0.01mm) models.

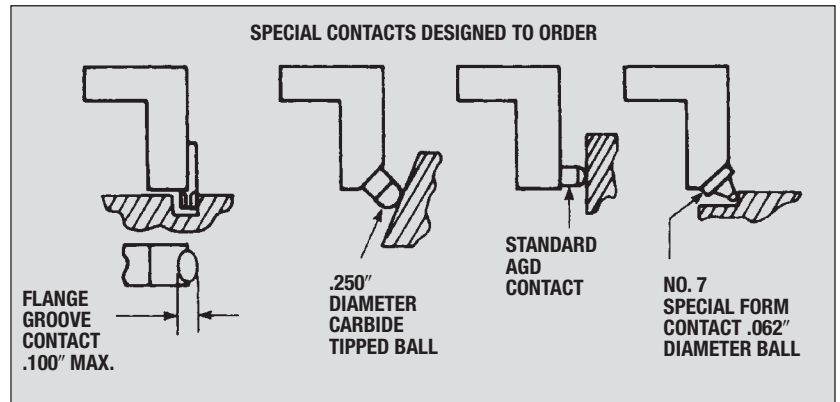
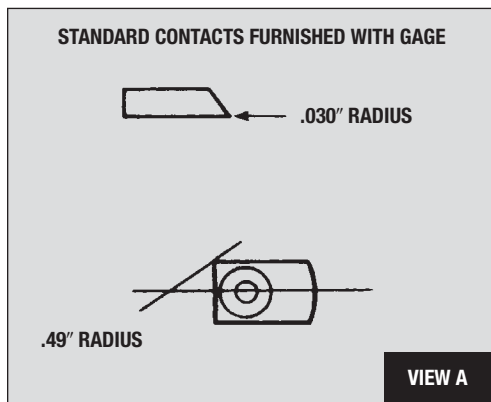
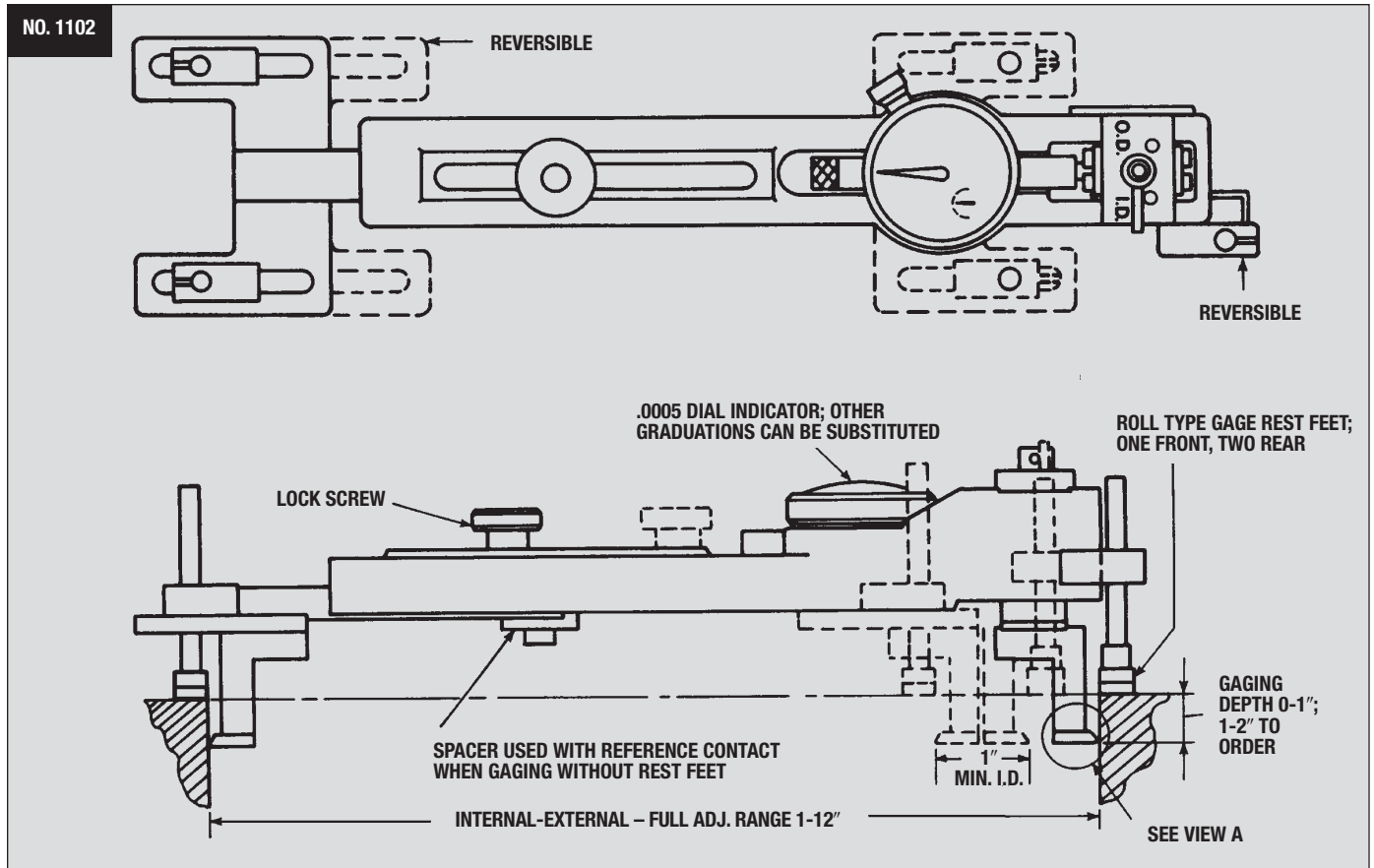
The gage should be checked against our No. 1127 Master for a precise reference standard during production gaging. (See the following pages.) Also available on request with .0001" or 0.002mm graduations.

| Photo Key | Description                                 |
|-----------|---|
| A         | Range Lock Screw                            |
| B         | I.D.-O.D. Preload Reversing Mechanism Lever |
| C         | Rest Foot                                   |
| D         | Reference Contact                           |
| E         | Sensitive Contact                           |

See specifications on next page.



**Dial Indicator Diameter Gages (continued)**  
**Nos. 1102, 1102M Series**

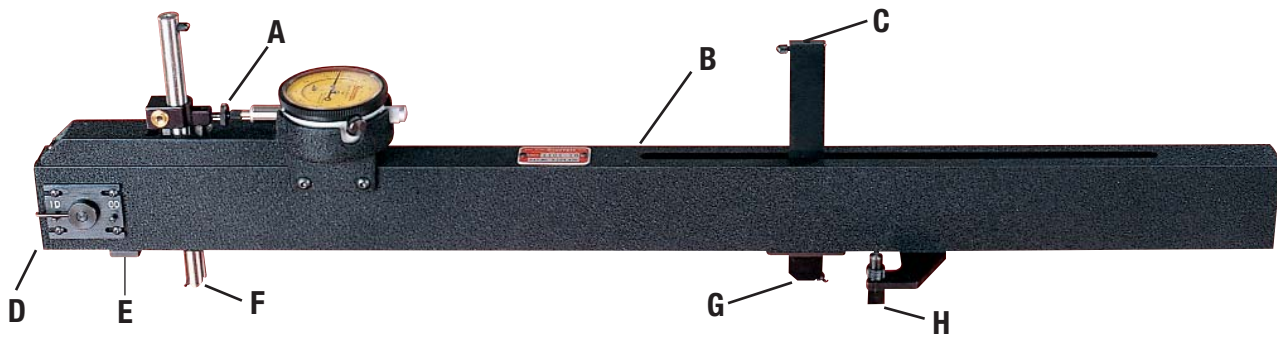


| Length Range | Height Adjustment | Catalog No. | EDP No. |
|--------------|-------------------|-------------|---------|
| 1-12"        | 0-1"              | 1102        | 56134   |
| 1-12"        | 0-1"              | 1102-1      | 69004   |
| 25-300mm     | 0-25mm            | 1102M       | 65020   |

**Case**

|  |        |       |
|--|--------|-------|
| Storage Case to Hold Both Gage and No. 1127 Master | 1102ZZ | 56136 |
|--|--------|-------|

Sent without case unless otherwise ordered.



**Dial Indicator Diameter Gages**

**No. 1101 Series 12-60"**

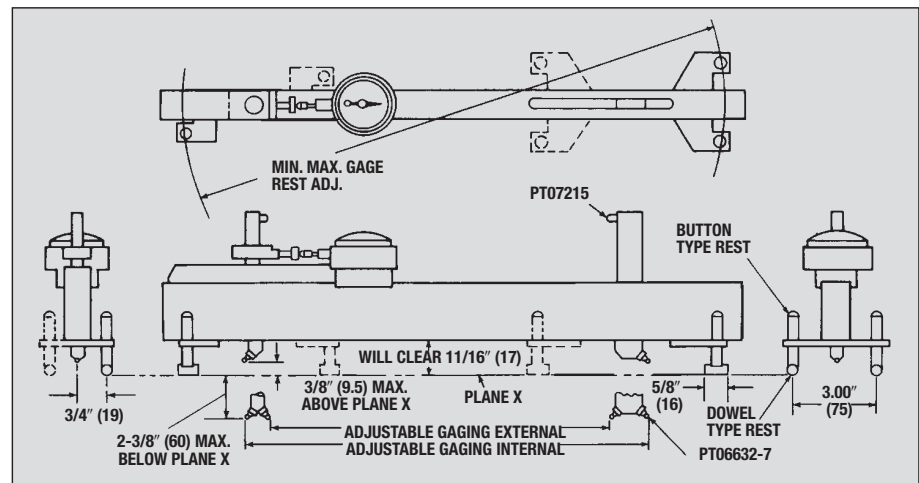
**No. 1101M Series 300-1500mm**

These gages allow for measurement beyond the size range of our No. 1102 models. Each gage adjusts a full 6" or 150mm. The contact carriers are vertically adjustable to handle various work depth. Special contacts are available.

This tool has dowel (line) contacts at one end of the gage feet, and a button (point) contact gage at the other end of the feet. These can be reversed as needed and the gaging depth can be set within a range of 2-3/4" or 70mm.

This gage should be checked against our No. 1126 Master for a precise reference standard during production gaging. (See the following pages.)

| Photo Key | Description  |
|-----------|--|
| A         | Dial Indicator Fine-Adjusting Screw                        |
| B         | Beam – Rectangular Box Section                             |
| C         | Contact for Added Applications                             |
| D         | I.D.-O.D. Preload Reversing Mechanism Lever                |
| E         | Combination Dowel/Button Rest Feet                         |
| F         | Sensitive Contact  |
| G         | Reference Contact  |
| H         | Mounting Plate with Combination Dowel and Button Rest Feet |



| Length                       |             | Inch Reading<br>.0005" Graduations |         | Millimeter Reading<br>.01mm Graduations |         | Inch Reading<br>.0001" Graduations |         | Millimeter Reading<br>.002mm Graduations |         |
|------------------------------|-------------|------------------------------------|---------|---|---------|------------------------------------|---------|--|---------|
| Inch                         | mm          | Catalog No.                        | EDP No. | Catalog No.                             | EDP No. | Catalog No.                        | EDP No. | Catalog No.                              | EDP No. |
| 12-18"                       | 300-450mm   | 1101-18                            | 53144   | 1101M-450                               | 65015   | 1101-18-1                          | 69005   | 1101M-450-2                              | 69021   |
| 18-24"                       | 450-600mm   | 1101-24                            | 53146   | 1101M-600                               | 65016   | 1101-24-1                          | 69006   | 1101M-600-2                              | 69022   |
| 24-30"                       | 600-750mm   | 1101-30                            | 53148   | 1101M-750                               | 65017   | 1101-30-1                          | 69007   | 1101M-750-2                              | 69023   |
| 30-36"                       | 750-900mm   | 1101-36                            | 53150   | 1101M-900                               | 65018   | 1101-36-1                          | 69008   | 1101M-900-2                              | 69024   |
| 36-42"                       | 900-1050mm  | 1101-42                            | 53152   | 1101M-1050                              | 65019   | 1101-42-1                          | 69009   | 1101M-1050-2                             | 69025   |
| 42-48"                       | 1050-1200mm | 1101-48                            | 53154   | 1101M-1200                              | 65021   | 1101-48-1                          | 69010   | 1101M-1200-2                             | 69026   |
| 48-54"                       | 1200-1350mm | 1101-54                            | 53156   | 1101M-1350                              | 65022   | 1101-54-1                          | 69011   | 1101M-1350-2                             | 69027   |
| 54-60"                       | 1350-1500mm | 1101-60                            | 53158   | 1101M-1500                              | 65023   | 1101-60-1                          | 69012   | 1101M-1500-2                             | 69028   |
| <b>Gaging Contact Range:</b> |             | ±.050"                             |         | ±1.3mm                                  |         | ±.050"                             |         | ±1.3mm                                   |         |

**NOTE:** Sent without case unless otherwise ordered. To order case, specify the Catalog No. and "ZZ" (For example: No. 1101ZZ-18).





### Heavy-Duty Dial Indicator Diameter Gages

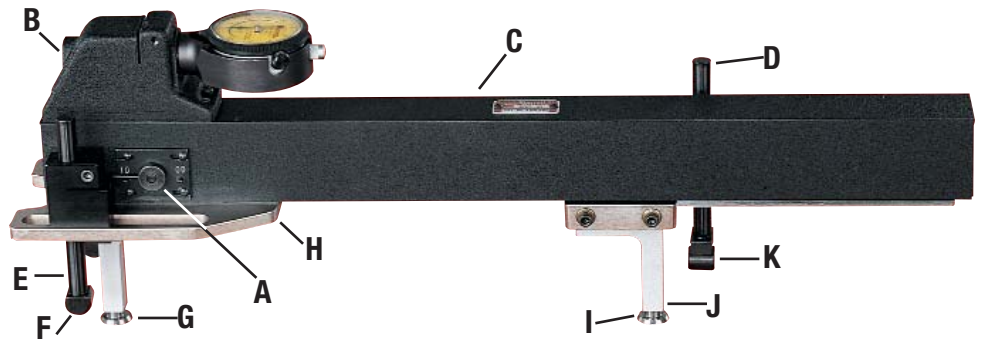
**No. 1100 Series 12-60"**

**No. 1100M Series 300-1500mm**

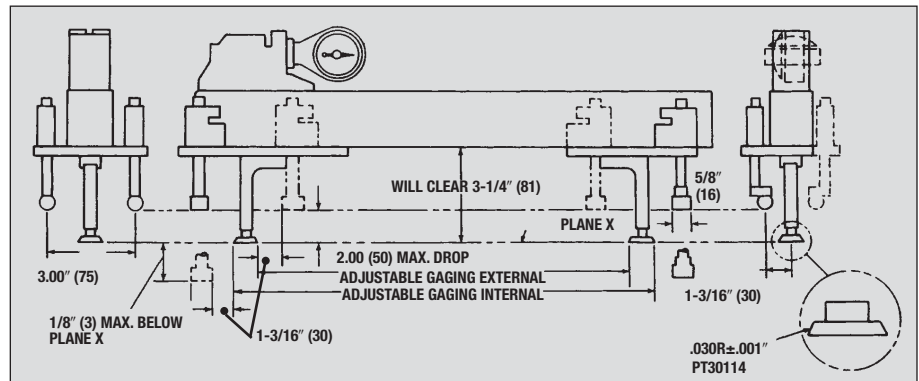
These gages combine heavy-duty construction features with adaptability for a wide range of internal and external measurements. The adjustable dowel rest legs ride on slotted mounting plates for horizontal adjustment. Each of the legs are vertically adjustable to obtain the proper rest position on the work and correct alignment on the gaging contacts. 2" or 50 mm range is the vertical adjustment.

The gaging contacts are radiused but may be modified by request to suit special gaging conditions.

The indicator and its housing can be rotated through to 360° so that the indicator may be read at the most convenient angle. The gage should be checked against our No. 1126 Master for a precise reference standard during production gaging. (See the following pages.)



| Photo Key | Description                                   |
|-----------|---|
| A         | I.D.-O.D. Preload Reversing Mechanism Lever   |
| B         | Tamper Proof Dial Indicator Fine-Adjust Screw |
| C         | Beam – Rectangular Box Section                |
| D, E      | Adjustable Dowel Rest Leg                     |
| F, K      | Dowel Rest                                    |
| G         | Sensitive Contact                             |
| H         | Slotted Rest Leg Mounting Plate               |
| I         | Reference Contact                             |
| J         | Reference Contact Carrier                     |



| Length                       |             | Inch Reading<br>.0005" Graduations |         | Millimeter Reading<br>.01mm Graduations |         | Inch Reading<br>.0001" Graduations |         | Millimeter Reading<br>.002mm Graduations |         |
|------------------------------|-------------|------------------------------------|---------|---|---------|------------------------------------|---------|--|---------|
| Inch                         | mm          | Catalog No.                        | EDP No. | Catalog No.                             | EDP No. | Catalog No.                        | EDP No. | Catalog No.                              | EDP No. |
| 12-18"                       | 300-450mm   | <b>1100-18</b>                     | 53128   | <b>1100M-450</b>                        | 65024   | 1100-18-1                          | 69013   | 1100M-450-2                              | 69029   |
| 18-24"                       | 450-600mm   | <b>1100-24</b>                     | 53130   | <b>1100M-600</b>                        | 65025   | 1100-24-1                          | 69014   | 1100M-600-2                              | 69030   |
| 24-30"                       | 600-750mm   | <b>1100-30</b>                     | 53132   | <b>1100M-750</b>                        | 65026   | 1100-30-1                          | 69015   | 1100M-750-2                              | 69031   |
| 30-36"                       | 750-900mm   | <b>1100-36</b>                     | 53134   | <b>1100M-900</b>                        | 65027   | 1100-36-1                          | 69016   | 1100M-900-2                              | 69032   |
| 36-42"                       | 900-1050mm  | <b>1100-42</b>                     | 53136   | <b>1100M-1050</b>                       | 65028   | 1100-42-1                          | 69017   | 1100M-1050-2                             | 69033   |
| 42-48"                       | 1050-1200mm | <b>1100-48</b>                     | 53138   | <b>1100M-1200</b>                       | 65029   | 1100-48-1                          | 69013   | 1100M-1200-2                             | 69034   |
| 48-54"                       | 1200-1350mm | <b>1100-54</b>                     | 53140   | <b>1100M-1350</b>                       | 65030   | 1100-54-1                          | 69013   | 1100M-1350-2                             | 69035   |
| 54-60"                       | 1350-1500mm | <b>1100-60</b>                     | 53142   | <b>1100M-1500</b>                       | 65031   | 1100-60-1                          | 69020   | 1100M-1500-2                             | 69036   |
| <b>Gaging Contact Range:</b> |             | ±.050"                             |         | ±1.3mm                                  |         | ±.050"                             |         | ±1.3mm                                   |         |

**NOTE:** Sent without case unless otherwise ordered. To order case, specify the Catalog No. and "ZZ" (For example: No. 1101ZZ-18).



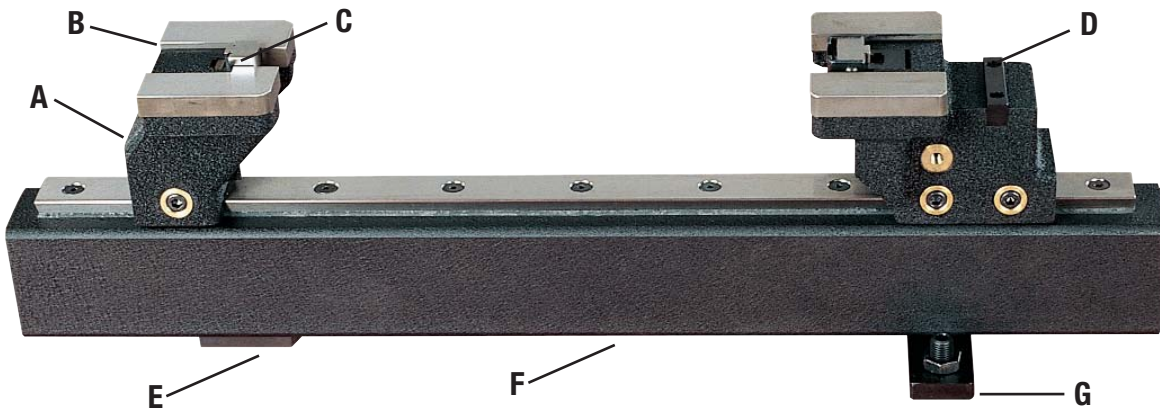
## Setting Masters For Dial Indicator Diameter Gages

These setting masters are used to check and reset diameter gages under production gaging conditions. Each master consists of a rigid box beam with reference and sensitive heads which are individually adjustable along dovetail ways.

A platen on each head locates the diameter gage from its feet. The position of the gage contacts is matched by the anvils on the masters which are vertically adjustable. The reference head anvil has a fine adjustment for final settings, plus a restrictor to help position the gage in the master.

Both heads can be reversed for I.D. or O.D. settings. Each master has a fixed single point rest and two leveling screws which provide a three-point suspension. All contact and working surfaces are hardened and ground.

The setting procedure is as follows: set the diameter gage precisely to gage blocks or height gages. Then, using the diameter gage, set the master which can then be used as a precise reference standard for the diameter gage during production gaging.

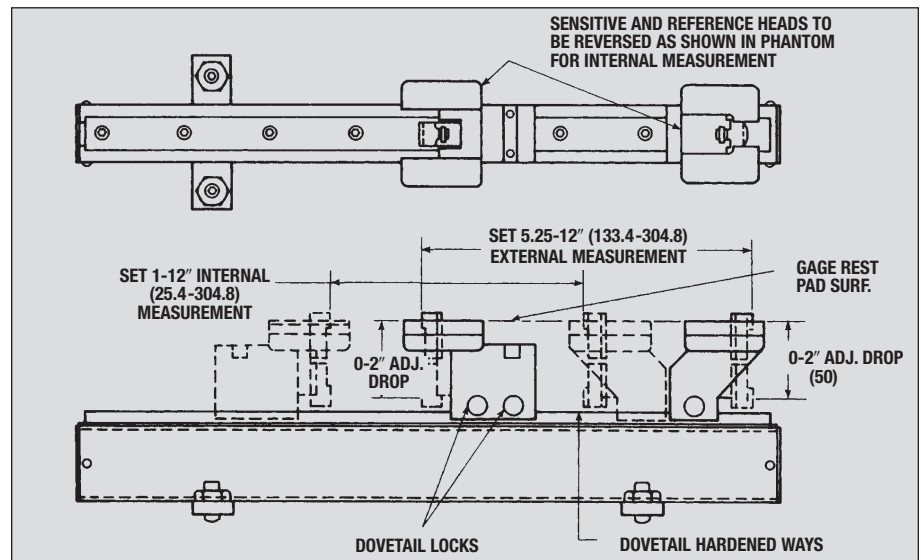


### Internal-External Adjustable Setting Master for Starrett No. 1102 Diameter Gages Catalog No. 1127 EDP 56135

This set master is used with our No. 1102 Diameter Gages. The internal adjustment range is 1-12" (25-300mm) and external adjustment is 5-1/4-12" (133-300mm). Storage case is available to hold both the gage and master (Catalog No. 1102ZZ, EDP 56136).

| Photo Key | Description          |
|-----------|----------------------|
| A         | Sensitive Head       |
| B         | Hardened Rest Platen |
| C         | Anvil                |
| D         | Reference Head       |

| Photo Key | Description                    |
|-----------|--------------------------------|
| E         | Fixed Single Point Button Rest |
| F         | Beam – Rectangular Box Section |
| G         | Leveling Screws (2)            |



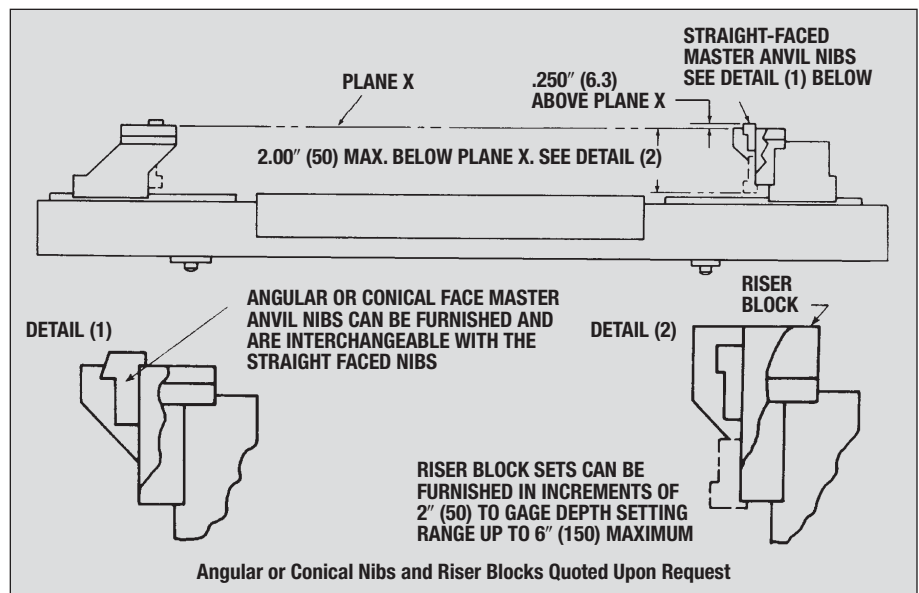


**Internal-External  
Adjustable Setting  
Masters for Starrett  
Nos. 1100 and 1101  
Series Diameter Gages**

**No. 1126 Series  
12-60" (300-1500mm)**

These set masters are used to check and reset Starrett Nos. 1100 and 1101 Diameter Gages under production gaging conditions. The range is from 12-60" or 300-1500mm.

| Photo Key | Description                    |
|-----------|--------------------------------|
| A         | Sensitive Head                 |
| B         | Hardened Rest Platen           |
| C         | Anvil                          |
| D         | Reference Head                 |
| E         | Leveling Screws (2)            |
| F         | Beam – Rectangular Box Section |
| G         | Fixed Single Point Button Rest |



| Length Range |             | For Use With Diameter Gage Nos. |            |         |            | Catalog No.    | EDP No. |
|--------------|-------------|---------------------------------|------------|---------|------------|----------------|---------|
| Inch         | mm          | Inch                            | mm         | Inch    | mm         |                |         |
| 12-18"       | 300-450mm   | 1100-18                         | 1100M-450  | 1101-18 | 1101M-450  | <b>1126-18</b> | 53160   |
| 18-24"       | 450-600mm   | 1100-24                         | 1100M-600  | 1101-24 | 1101M-600  | <b>1126-24</b> | 53161   |
| 24-30"       | 600-750mm   | 1100-30                         | 1100M-750  | 1101-30 | 1101M-750  | <b>1126-30</b> | 53162   |
| 30-36"       | 750-900mm   | 1100-36                         | 1100M-900  | 1101-36 | 1101M-900  | <b>1126-36</b> | 53163   |
| 36-42"       | 900-1050mm  | 1100-42                         | 1100M-1050 | 1101-42 | 1101M-1050 | <b>1126-42</b> | 53164   |
| 42-48"       | 1050-1200mm | 1100-48                         | 1100M-1200 | 1101-48 | 1101M-1200 | <b>1126-48</b> | 53165   |
| 48-54"       | 1200-1350mm | 1100-54                         | 1100M-1350 | 1101-54 | 1101M-1350 | <b>1126-54</b> | 53166   |
| 54-60"       | 1350-1500mm | 1100-60                         | 1100M-1500 | 1101-60 | 1101M-1500 | <b>1126-60</b> | 53167   |

**NOTE:** Setting masters for larger diameters are also available by request – priced on the application.

Sent without case. Cases are available to hold gage and master. To order case, specify the Catalog No. and "ZZ" (For example: 1126ZZ-18).



## SPECIAL FUNCTION INDICATOR GAGES



### Dial Depth Gages

No. 640 Series 0-1/2"

No. 640M Series 0-10mm

No. 643 0-.125"

No. 644 0-3"

No. 644M 0-75mm

*See Page 137 for complete details.*



Left-to-right: Nos. 640JZ, 643JZ, 644JZ.

### Top Reading Dial Depth Gages

No. 642 Series 0-8.6"

No. 642M Series 0-215mm

*See Page 138 for complete details.*



Left, No. 642AZ side view; right, top view.

### Special Function Dial Gages – A Final Note

In addition to the products detailed in this section, we have made many other special function gages to suit a wide variety of our customers' specific requirements.

If you have a special application, we invite you to submit your drawings and specifications to our Special Order Department at 121 Crescent Street, Athol, MA 01331, USA . We will be happy to provide a prompt quotation.







## Bore Gage Measuring Tips

Whether to use a two-point or three-point contact measuring tool is usually a matter of preference, but there are some differences.

A two-point contact rod-type inside micrometer is usually lighter, easier to handle, and more versatile over long ranges from approximately 6-107" (150-2700mm).

Any two-point contact micrometer, regardless of range, can probe a hole better to find the geometry of that hole than a three-point contact.

Most three-point contact tools have setting rings to insure accuracy. If you desire very

close tolerance work with two-point contact inside micrometers, it is recommended that they be set to a ring gage or to an outside micrometer.

A three-point contact micrometer has an advantage in that it can be seated in position more quickly than a two-point contact tool.

Usually these tools can also be read to a finer accuracy. The three-point tool will tell the maximum true diameter that can enter the hole a little faster than a two-point contact tool.

Micrometer heads used in these tools are accurate to  $\pm 0.0001$ " or 0.002mm, but overall accuracy on tools that add rods is dependent on good practice and technique.

To insure accuracy, these practices should be followed:

- ◆ Always make sure that there are no specks of dirt between the clamping surfaces of the rods and micrometer heads
- ◆ Tighten all rods uniformly, not too tightly, not too loosely, but a fairly firm assembly
- ◆ Assembling long sections should be done vertically or, with support, horizontally
- ◆ Because temperature can affect long rods used in these tools, they should be assembled in the same environment in which they will be used

## AccuBore® Electronic Bore Gages with output

### No. 781XT Series

.080"-8" (2-200mm)

AccuBore® is a high-quality, trigger-activated, three-point contact bore gaging system with extended range. Its convenient single-hand operation provides speed and control. Simply squeeze the trigger, insert the gage into the bore and release the trigger for an instant reading from the large, easy-to-read digital display.

What makes AccuBore® superior to other gages are features like the mechanically-driven parallel anvils which extend simultaneously, establishing a more true alignment to the axis of the bore. This provides consistent pressure, resulting in more accurate readings than models with spring-driven contacts which are subject to pressure variations.

Speed and convenience are further enhanced by the repositionable AccuBore® indicator, which may be swiveled and rotated for left, right hand or even vertical viewing. The gage also features a set of "go/no go" lights above the readout display that quickly indicate whether a bore measurement is within a preset tolerance window.

#### Features

- ◆ Single-hand operation with right- and left-hand viewing flexibility
- ◆ Large, easy-to-read display
- ◆ Enhanced wear life with carbide-faced contacts – available from 1/2" to 8"
- ◆ Convenient "Go/No Go" tolerance indicator lights



#### No. 781XTZ-138.

- ◆ True alignment with mechanically-driven parallel anvils
- ◆ Resolution .00005" (0.001 mm)
- ◆ Accuracy of up to .00015" (.004 mm)
- ◆ Push button inch/metric conversion
- ◆ Preset and preset recall
- ◆ Hold, max/min and zeroing capabilities
- ◆ Blind bore measurement is standard from .50" (12.7 mm) and above.
- ◆ Specialized heads available for thread, groove and other non-standard measurements on request
- ◆ Output capability for Statistical Process Control (SPC) analysis via devices such as the Starrett Nos. 772 Collector or 761 Multiplexer, or download of data directly to a PC by an RS232 connection. (Direct to PC cable available on request.)



Output jack enables collection of measurement data for SPC analysis.

(Continued on next page.)



### AccuBore® Electronic Bore Gages (continued)

#### No. 781XT Series



AccuBore® XT's indicator can be rotated, allowing easy reading from either the right or left hand, or when accessing difficult to reach holes.



Sets include gage, contacts, setting rings, instructions, certificate of calibration and a 3v lithium battery in a protective carrying case.

### Specifications

#### Individual – 2-Point Contact .080-.250" (2-6mm) range

| Range     |       | Accuracy    | Approx Meas. Depth |    | Ring Diameter     |       | Catalog No.       | EDP No. |
|-----------|-------|-------------|--------------------|----|-------------------|-------|-------------------|---------|
| Inch      | mm    | Inch/mm     | Inches             | mm | Inches            | mm    |                   |         |
| .080-.100 | 2-2.5 | .00015/.004 | 3/8                | 9  | .100              | 2.54  | <b>781XTZ-100</b> | 68159   |
| .100-.120 | 2.5-3 |             |                    |    |                   |       | <b>781XTZ-120</b> | 68160   |
| .120-.160 | 3-4   |             | 1/2                | 12 | .160              | 4.06  | <b>781XTZ-160</b> | 68161   |
| .160-.200 | 4-5   |             | 3/4                | 18 |                   |       | <b>781XTZ-200</b> | 68162   |
| .200-.250 | 5-6   |             |                    |    | <b>781XTZ-250</b> | 68163 |                   |         |

#### Individual – 3-Point Contact 1/4-8" (6-200mm) range – fixed anvils

|               |         |                 |                   |                   |                   |                 |                   |       |
|---------------|---------|-----------------|-------------------|-------------------|-------------------|-----------------|-------------------|-------|
| 1/4 – 5/16    | 6-8     | .00015/.004     | 2 1/4             | 58                | .3125             | 7.94            | <b>781XTZ-312</b> | 68164 |
| 5/16 – 3/8    | 8-10    |                 |                   |                   | <b>781XTZ-375</b> | 68165           |                   |       |
| 3/8 – 1/2     | 10-12.5 |                 | 2 3/8             | 62                | .500              | 12.7            | <b>781XTZ-500</b> | 68166 |
| 1/2 – 5/8     | 12.5-16 |                 |                   |                   | <b>781XTZ-625</b> | 68167           |                   |       |
| 5/8 – 3/4     | 16-20   |                 | <b>781XTZ-750</b> | 68168             |                   |                 |                   |       |
| 3/4 – 1       | 20-25   | 2 5/8           | 66                | .750              | 19.05             | <b>781XTZ-1</b> | 68651             |       |
| 1 – 1-3/8     | 25-35   |                 |                   | <b>781XTZ-138</b> | 67685             |                 |                   |       |
| 1-3/8 – 2     | 35-50   | .0002/.005      | 3 1/16            | 80                | 1.375             | 34.93           | <b>781XTZ-2</b>   | 67686 |
| 2 – 2-5/8     | 50-65   |                 |                   |                   | <b>781XTZ-258</b> | 67687           |                   |       |
| 2-5/8 – 3-1/4 | 65-80   |                 | 3 3/8             | 85                | 3.250             | 82.55           | <b>781XTZ-314</b> | 67688 |
| 3-1/4 – 4     | 80-100  | <b>781XTZ-4</b> |                   |                   | 67689             |                 |                   |       |
| 4 – 5         | 100-125 | .00025/.006     | 4                 | 100               | 5.0               | 127.00          | <b>781XTZ-5</b>   | 67690 |
| 5 – 6         | 125-150 | <b>781XTZ-6</b> |                   |                   |                   |                 | 67691             |       |
| 6 – 7         | 150-175 | .0003/.007      |                   |                   | 7.0               | 177.80          | <b>781XTZ-7</b>   | 67692 |
| 7 – 8         | 175-200 |                 | <b>781XTZ-8</b>   | 67693             |                   |                 |                   |       |

#### Pistol Grip Gage Only With Indicator\*

| Range     |         | Catalog No.        | EDP No. |
|-----------|---------|--------------------|---------|
| Inch      | mm      |                    |         |
| .080-.250 | 2-6     | <b>781XTP-250</b>  | 68705   |
| 1/4-3/4   | 6-20    | <b>781XTP-750</b>  | 68706   |
| 3/4-4     | 20-100  | <b>781XTP-4</b>    | 68707   |
| 4-12      | 100-300 | <b>781XTP-12**</b> | 68708   |

#### Set – 2-Point Contact .080-.250" (2-6 mm) range

| Range     |     | Number of Heads | Number of Rings | Catalog No.     | EDP No. |
|-----------|-----|-----------------|-----------------|-----------------|---------|
| Inch      | mm  |                 |                 |                 |         |
| .080-.250 | 2-6 | 5               | 3               | <b>S781XTBZ</b> | 68169   |

Larger sizes available on special order.

Gages are also available with dial indicators on special order.

\* Does not include heads, rings, etc.

\*\*Heads above 8" available on special order.

(Continued on next page.)





**AccuBore® Electronic Bore Gages (continued)**

**No. 781XT Series**

**Sets – 3-Point Contact .250-8" (6-200mm) range – fixed anvils**

| Range     |         | Number Of Heads | Number Of Rings | Catalog No.     | EDP No. |
|-----------|---------|-----------------|-----------------|-----------------|---------|
| Inch      | mm      |                 |                 |                 |         |
| .250-.375 | 6-10    | 2               | 1               | <b>S781XTCZ</b> | 68170   |
| .250-.750 | 6-20    | 5               | 3               | <b>S781XTHZ</b> | 68658   |
| .375-.750 | 10-20   | 3               | 2               | <b>S781XTDZ</b> | 68171   |
| .750-2.00 | 20-50   | 3               | 3               | <b>S781XTEZ</b> | 67694   |
| .750-4.00 | 20-100  | 6               | 4               | <b>S781XTJZ</b> | 67697   |
| 2.00-4.00 | 50-100  | 3               | 2               | <b>S781XTFZ</b> | 67695   |
| 4.00-8.00 | 100-200 | 4               | 4               | <b>S781XTGZ</b> | 67696   |
| 4.00-6.00 | 100-150 | 2               | 1               | <b>S781XTKZ</b> | 67698   |
| 6.00-8.00 | 150-200 | 2               | 1               | <b>S781XTLZ</b> | 67699   |

**Accessories**

| Description  | Part No.       | EDP No. |
|--|----------------|---------|
| Cable Link to 772 Data Collector, 761 Multiplexer          | <b>PT61340</b> | 65648   |
| Starrett Module #4 for 772 Data Collector, 761 Multiplexer | <b>PT61285</b> | 65647   |
| Two 3-volt Batteries, No. CR2032                           | <b>PT99492</b> | 65650   |

Larger sizes available on special order.  
Gages are also available with dial indicators on special order.



Extensions from 2 1/2-6" can be added to the No. 781XT Series, enabling internal measurements in deep hole bores.

**Extensions**

| Catalog No.    | EDP No. | Ext. Size |     | Fits Models                      | Model Size |         |
|----------------|---------|-----------|-----|----------------------------------|------------|---------|
|                |         | Inches    | mm  |                                  | Inches     | mm      |
| <b>78/782F</b> | 65484   | 2.5       | 63  | 78XT/780XT/781XT/782XT-312-375   | 1/4-5/16   | 6-8     |
| <b>78/782G</b> | 65485   | 3         | 75  | 78XT/780XT/781XT/782XT-375-500   | 3/8-1/2    | 10-12.5 |
| <b>78/782H</b> | 65486   | 4         | 100 | 78XT/780XT/781XT/782XT-625-750   | 1/2-3/4    | 12.5-20 |
| <b>78/782J</b> | 65487   | 6         | 150 | 78XT/780XT/781XT/782XT-1 thru 2  | 3/4-2      | 20-50   |
| <b>78/782K</b> | 65488   | 6         | 150 | 78XT/780XT/781XT/782XT-2 thru 12 | 2-12       | 50-300  |





### Electronic Internal Micrometers with IP65 Protection (with output)



### No. 780XT Series .040-12" (1-300mm)

780XT Series Electronic Internal Micrometers provide IP65 level of protection against coolant, water, dirt and dust in hostile shop environments. In addition, they offer extended travel, reducing the need to exchange anvils.

The ground contact points seat the internal micrometer faster and more accurately than the spherical contacts found in other gages. These rugged and accurate internal micrometers are available individually or in sets from .040" (1mm) to 12" (300mm).

#### Features

- ◆ Wide measurement range without changing anvils
- ◆ IP65 level of protection against coolant, water, dirt and dust
- ◆ Resolution to .00005" (0.001mm)
- ◆ Large high-contrast LCD digital readout is easy to read and reduces error
- ◆ RS232 output
- ◆ Carbide measuring faces on sizes above 1/2" (12.5mm) diameter
- ◆ Extensions available for deep holes
- ◆ Includes instant inch/millimeter conversion and preset + and - functions
- ◆ Precision ratchet stop provides correct contact pressure for accurate readings



Each micrometer with head comes with a wooden case, complete with setting ring, contacts, adjusting wrench, spare battery, and instructions.



No. 780XTZ-138 (1 - 1-3/8" model).

.040-12" / 300mm Range

### Individual – 2-Point Contact .040-.250" (1-6mm) range

| Range     |          | Accuracy    | Approx. Meas. Depth |    | Ring Diameter |                   | Cat. No.          | EDP No. |
|-----------|----------|-------------|---------------------|----|---------------|-------------------|-------------------|---------|
| Inch      | mm       | Inch/mm     | Inch                | mm | Inch          | mm                |                   |         |
| .040-.045 | 1-1.15   | .00010/.003 | 1/4                 | 6  | .045          | 1.15              | <b>780XTZ-045</b> | 12010   |
| .045-.050 | 1.15-1.3 |             |                     |    | .060          | 1.52              | <b>780XTZ-050</b> | 12011   |
| .050-.060 | 1.3-1.5  |             | 5/16                | 8  | .060          | 1.52              | <b>780XTZ-060</b> | 12012   |
| .060-.070 | 1.5-1.75 |             |                     |    | .075          | 1.90              | <b>780XTZ-070</b> | 12013   |
| .070-.080 | 1.75-2   | .00015/.004 | 3/8                 | 9  | .100          | 2.54              | <b>780XTZ-100</b> | 12015   |
| .080-.100 | 2-2.5    |             |                     |    | .160          | 4.06              | <b>780XTZ-160</b> | 12017   |
| .100-.120 | 2.5-3    |             | 3/4                 | 18 | .160          | 4.06              | <b>780XTZ-200</b> | 12019   |
| .120-.160 | 3-4      | .200        |                     |    | 5.08          | <b>780XTZ-250</b> | 12020             |         |
| .160-.200 | 4-5      |             |                     |    |               |                   |                   |         |
| .200-.250 | 5-6      |             |                     |    |               |                   |                   |         |

### Individual – 3-Point Contact 1/4-12" (6-300mm) range – fixed anvils

|               |         |             |        |     |       |        |                   |       |
|---------------|---------|-------------|--------|-----|-------|--------|-------------------|-------|
| 1/4 – 5/16    | 6-8     | .00015/.004 | 2-1/4  | 58  | .3125 | 7.94   | <b>780XTZ-312</b> | 12021 |
| 5/16 – 3/8    | 8-10    |             |        |     | .500  | 12.7   | <b>780XTZ-375</b> | 12022 |
| 3/8 – 1/2     | 10-12.5 |             |        |     | .750  | 19.05  | <b>780XTZ-750</b> | 12026 |
| 1/2 – 5/8     | 12.5-16 | .00020/.005 | 2-3/8  | 62  | .750  | 19.05  | <b>780XTZ-1</b>   | 12027 |
| 5/8 – 3/4     | 16-20   |             |        |     | 1.375 | 34.93  | <b>780XTZ-138</b> | 12028 |
| 3/4 – 1       | 20-25   | .00025/.006 | 2-5/8  | 66  | 2.625 | 65.68  | <b>780XTZ-2</b>   | 12029 |
| 1 – 1-3/8     | 25-35   |             |        |     | 3.250 | 82.55  | <b>780XTZ-4</b>   | 12033 |
| 1-3/8 – 2     | 35-50   |             |        |     | 5.0   | 127.00 | <b>780XTZ-5</b>   | 12034 |
| 2 – 2-5/8     | 50-65   | .00030/.007 | 3-1/16 | 80  | 7.0   | 177.80 | <b>780XTZ-6</b>   | 12035 |
| 2-5/8 – 3-1/4 | 65-80   |             |        |     | 9.0   | 228.60 | <b>780XTZ-7</b>   | 12036 |
| 3-1/4 – 4     | 80-100  | .00035/.009 | 4-1/2  | 115 | 11.0  | 279.40 | <b>780XTZ-8</b>   | 12037 |
| 4 – 5         | 100-125 |             |        |     | 9.0   | 228.60 | <b>780XTZ-9</b>   | 12038 |
| 5 – 6         | 125-150 |             |        |     | 11.0  | 279.40 | <b>780XTZ-10</b>  | 12039 |
| 6 – 7         | 150-175 | .00030/.007 | 4-5/8  | 118 | 11.0  | 279.40 | <b>780XTZ-11</b>  | 12040 |
| 7 – 8         | 175-200 |             |        |     | 11.0  | 279.40 | <b>780XTZ-12</b>  | 12041 |
| 8 – 9         | 200-225 |             |        |     |       |        |                   |       |
| 9 – 10        | 225-250 |             |        |     |       |        |                   |       |
| 10 – 11       | 250-275 |             |        |     |       |        |                   |       |
| 11 – 12       | 275-300 |             |        |     |       |        |                   |       |

#### Accessories

| Description                      | Part No.       | EDP No. |
|----------------------------------|----------------|---------|
| Cable Link to PC                 | <b>PT28318</b> | 12181   |
| Two 3-volt Batteries, No. CR2032 | <b>PT99492</b> | 65650   |

See the right columns on the top of the following page for available 780XT Series 2-point contact and 3-point contact sets.



## Electronic Sets No. 780XT Series (continued)

### Sets – 2-Point Contact .040-.250" (1-6mm) range

| Range     |     | No. of Heads | No. of Rings | Catalog No.     | EDP No. |
|-----------|-----|--------------|--------------|-----------------|---------|
| Inch      | mm  |              |              |                 |         |
| .040-.080 | 1-2 | 5            | 3            | <b>S780XTAZ</b> | 12042   |
| .080-.250 | 2-6 |              |              | <b>S780XTBZ</b> | 12043   |

### Sets – 3-Point Contact 1/4-8" (6-200mm) range – fixed anvils

| Range   | mm      | No. of Heads | No. of Rings | Catalog No.     | EDP No. |
|---------|---------|--------------|--------------|-----------------|---------|
| 1/4-3/8 | 6-10    | 2            | 1            | <b>S780XTCZ</b> | 12044   |
| 3/8-3/4 | 10-20   | 3            | 2            | <b>S780XTDZ</b> | 12045   |
| 3/4-2   | 20-50   | 3            | 2            | <b>S780XTEZ</b> | 12046   |
| 2-4     | 50-100  | 3            | 2            | <b>S780XTFZ</b> | 12047   |
| 4-6     | 100-150 | 2            | 1            | <b>S780XTKZ</b> | 12049   |
| 4-8     | 100-200 | 4            | 2            | <b>S780XTGZ</b> | 12048   |
| 6-8     | 150-200 | 2            | 1            | <b>S780XTLZ</b> | 12050   |

## No. 782ST Internal Micrometer Stand

The adjustable depth stop/collar helps align the micrometer squarely to the hole, positions the measuring contacts where you want them and can protect against breakage to smaller contacts. Fits Nos. 78XT and 780XT models, .040-.250" (1-6mm) range.



| Cat. No.       | EDP No. | Description |
|----------------|---------|-------------|
| <b>782ST</b>   | 65489   | Stand       |
| <b>PT24272</b> | 64359   | Depth Stop  |

## Internal Extensions for 78, 780, 781 & 782 Series



### Extensions

| Ext. Size |     | Fits Models                      | Model Size |         | Catalog No.    | EDP No. |
|-----------|-----|----------------------------------|------------|---------|----------------|---------|
| Inches    | mm  |                                  | Inches     | mm      |                |         |
| 2.5       | 63  | 78XT/780XT/781XT/782XT-312-375   | 1/4-5/16   | 6-8     | <b>78/782F</b> | 65484   |
| 3         | 75  | 78XT/780XT/781XT/782XT-375-500   | 3/8-1/2    | 10-12.5 | <b>78/782G</b> | 65485   |
| 4         | 100 | 78XT/780XT/781XT/782XT-625-750   | 1/2-3/4    | 12.5-20 | <b>78/782H</b> | 65486   |
| 6         | 150 | 78XT/780XT/781XT/782XT-1 thru 2  | 3/4-2      | 20-50   | <b>78/782J</b> | 65487   |
| 6         | 150 | 78XT/780XT/781XT/782XT-2 thru 12 | 2-12       | 50-300  | <b>78/782K</b> | 65488   |

Extensions from 2-1/2 – 6" can be added to both the 780XT and 78XT Series, enabling internal measurements in deep hole bores. (Multiple extensions can also be used.)



### No. 78XT Series .080-12"

### No. 78MXT Series 1-300mm

The No. 78XT Series Internal Micrometers feature extended travel, reducing the need to exchange anvils. The ground contact points seat the internal micrometer faster and more accurately than the spherical contacts found in other gages. These rugged and accurate internal micrometers are available individually or in economical sets from .040-12" (1-300mm).

#### Features

- ◆ Wide measurement range without changing anvils
- ◆ Resolution from .0001" (0.0025mm) on the 2-point contact tools ranging up to 1/4" (6mm) and .0002" (0.005mm) on the 3-point contact tools ranging from 1/4"-12" (6mm - 300mm)
- ◆ Tungsten carbide measuring faces on all 3-point heads above 1/2" (12.5mm)
- ◆ Ratchet stop ensures consistent measurements
- ◆ Self-centering contacts for true readings
- ◆ Blind bore measuring capability above 1/2" (12.5mm) diameter
- ◆ Extensions available up to 6" (150mm) for deep hole measuring
- ◆ Setting rings included
- ◆ Depth stop/collar also available for .080"-.250" (1-6mm) range

.080-12" / 1-300mm Ranges



No. 78XTZ-2 (inch model).

## No. 78XT Series

### 2-Point Contact .080-.250" range

| Range     | Accuracy | Approximate Measuring Depth | Setting Ring Diameter | Catalog No.      | EDP No. |
|-----------|----------|-----------------------------|-----------------------|------------------|---------|
| Inches    | Inches   | Inches                      | Inches                |                  |         |
| .080-.100 | .00010"  | 3/8                         | .100                  | <b>78XTZ-100</b> | 68124   |
| .100-.120 |          | 3/8                         | .100                  | <b>78XTZ-120</b> | 68125   |
| .120-.160 |          | 15/32                       | .160                  | <b>78XTZ-160</b> | 68126   |
| .160-.200 |          | 3/4                         | .160                  | <b>78XTZ-200</b> | 68127   |
| .200-.250 |          | 3/4                         | .200                  | <b>78XTZ-250</b> | 68128   |

### 3-Point Contact 1/4-12" range

|               |         |        |       |                  |       |
|---------------|---------|--------|-------|------------------|-------|
| 1/4 - 5/16    | .00015" | 2-1/4  | .3125 | <b>78XTZ-312</b> | 68129 |
| 5/16 - 3/8    |         | 2-1/4  | .3125 | <b>78XTZ-375</b> | 68130 |
| 3/8 - 1/2     |         | 2-1/4  | .500  | <b>78XTZ-500</b> | 68131 |
| 1/2 - 5/8     |         | 2-7/16 | .500  | <b>78XTZ-625</b> | 68132 |
| 5/8 - 3/4     |         | 2-7/16 | .750  | <b>78XTZ-750</b> | 68133 |
| 3/4 - 1       | .00020" | 2-5/8  | .750  | <b>78XTZ-1</b>   | 68134 |
| 1 - 1-3/8     |         | 2-5/8  | 1.375 | <b>78XTZ-138</b> | 67674 |
| 1-3/8 - 2     |         | 3-1/16 | 1.375 | <b>78XTZ-2</b>   | 67675 |
| 2 - 2-5/8     | .00025" | 3-1/16 | 2.625 | <b>78XTZ-258</b> | 67676 |
| 2-5/8 - 3-1/4 |         | 3-1/16 | 2.625 | <b>78XTZ-314</b> | 67677 |
| 3-1/4 - 4     |         | 4      | 3.250 | <b>78XTZ-4</b>   | 67678 |
| 4 - 5         | .00030" | 4      | 5.0   | <b>78XTZ-5</b>   | 67679 |
| 5 - 6         |         | 4-1/2  | 5.0   | <b>78XTZ-6</b>   | 67680 |
| 6 - 7         | .00035" | 4-1/2  | 7.0   | <b>78XTZ-7</b>   | 67681 |
| 7 - 8         |         | 4-1/2  | 7.0   | <b>78XTZ-8</b>   | 67682 |
| 8 - 9         |         | 4-1/2  | 9.0   | <b>78XTZ-9</b>   | 67857 |
| 9 - 10        |         | 4-5/8  | 9.0   | <b>78XTZ-10</b>  | 67858 |
| 10 - 11       | .00035" | 4-5/8  | 11.0  | <b>78XTZ-11</b>  | 67859 |
| 11 - 12       |         | 4-5/8  | 11.0  | <b>78XTZ-12</b>  | 67860 |



78XTZ-138 Measuring a bore.

Each micrometer is furnished in a case, complete with setting ring, contacts, wrenches, and instructions.

(Continued on next page.)

**No. 78XT Series Sets****2-Point Contact .250" range**

| Range      | No. of Heads | No. of Rings | Catalog No. | EDP No. |
|------------|--------------|--------------|-------------|---------|
| .120-.250" | 3            | 2            | S78XTBZ     | 68152   |

**3-Point Contact 1/4-4" range**

|          |   |   |         |       |
|----------|---|---|---------|-------|
| 1/4-3/8" | 2 | 1 | S78XTCZ | 68153 |
| 3/8-3/4" | 3 | 2 | S78XTDZ | 68154 |
| 3/4-2"   | 3 | 2 | S78XTEZ | 67683 |
| 2-4"     | 3 | 2 | S78XTFZ | 67684 |

**No. 78MXT Series****2-Point Contact 1-6mm range**

| Range mm | Accuracy mm | Approximate Measuring Depth mm | Setting Ring Dia. mm | Catalog No. | EDP No. |
|----------|-------------|--------------------------------|----------------------|-------------|---------|
| 1-1.15   | 0.003mm     | 6                              | 1                    | 78MXTZ-1.15 | 68135   |
| 1.15-1.3 |             | 6                              | 1.3                  | 78MXTZ-1.3  | 68136   |
| 1.3-1.5  |             | 6                              | 1.3                  | 78MXTZ-1.5  | 68137   |
| 1.5-1.75 |             | 8                              | 1.75                 | 78MXTZ-1.75 | 68138   |
| 1.75-2   |             | 8                              | 1.75                 | 78MXTZ-2    | 68139   |
| 2-2.5    | 0.004mm     | 9                              | 2.5                  | 78MXTZ-2.5  | 68140   |
| 2.5-3    |             | 9                              | 2.5                  | 78MXTZ-3    | 68141   |
| 3-4      |             | 12                             | 4                    | 78MXTZ-4    | 68142   |
| 4-5      |             | 18                             | 4                    | 78MXTZ-5    | 68143   |
| 5-6      |             | 18                             | 5                    | 78MXTZ-6    | 68144   |

**3-Point Contact 6-300mm range**

|         |         |     |            |             |       |
|---------|---------|-----|------------|-------------|-------|
| 6-8     | 0.004mm | 58  | 8          | 78MXTZ-8    | 68145 |
| 8-10    |         | 58  | 8          | 78MXTZ-10   | 68146 |
| 10-12.5 |         | 58  | 12.5       | 78MXTZ-12.5 | 68147 |
| 12.5-16 |         | 62  | 12.5       | 78MXTZ-16   | 68148 |
| 16-20   |         | 62  | 20         | 78MXTZ-20   | 68149 |
| 20-25   | 0.005mm | 66  | 20         | 78MXTZ-25   | 68150 |
| 25-35   |         | 66  | 35         | 78MXTZ-35   | 67861 |
| 35-50   |         | 80  | 35         | 78MXTZ-50   | 67862 |
| 50-65   |         | 80  | 65         | 78MXTZ-65   | 67863 |
| 65-80   |         | 80  | 65         | 78MXTZ-80   | 68650 |
| 80-100  | 100     | 80  | 78MXTZ-100 | 67864       |       |
| 100-125 | 0.006mm | 115 | 125        | 78MXTZ-125  | 67865 |
| 125-150 |         | 115 | 125        | 78MXTZ-150  | 67866 |
| 150-175 | 0.007mm | 115 | 175        | 78MXTZ-175  | 67867 |
| 175-200 |         | 115 | 175        | 78MXTZ-200  | 67868 |
| 200-225 | 0.008mm | 118 | 225        | 78MXTZ-225  | 67869 |
| 225-250 |         | 118 | 225        | 78MXTZ-250  | 67870 |
| 250-275 | 0.009mm | 118 | 275        | 78MXTZ-275  | 67871 |
| 275-300 |         | 118 | 275        | 78MXTZ-300  | 67872 |

**No. 78MXT Series Sets****2-Point Contact 2-6mm range**

| Range  | No. of Heads | No. of Rings | Catalog No. | EDP No. |
|--------|--------------|--------------|-------------|---------|
| 2-3 mm | 2            | 1            | S78MXTAZ    | 68155   |
| 3-6 mm | 3            | 2            | S78MXTBZ    | 68156   |

**3-Point Contact 6-100mm range**

|          |   |   |          |       |
|----------|---|---|----------|-------|
| 6-10mm   | 2 | 1 | S78MXTCZ | 68157 |
| 10-20mm  | 3 | 2 | S78MXTDZ | 68158 |
| 20-50mm  | 3 | 2 | S78MXTFZ | 67873 |
| 50-100mm | 3 | 2 | S78MXTFZ | 67874 |



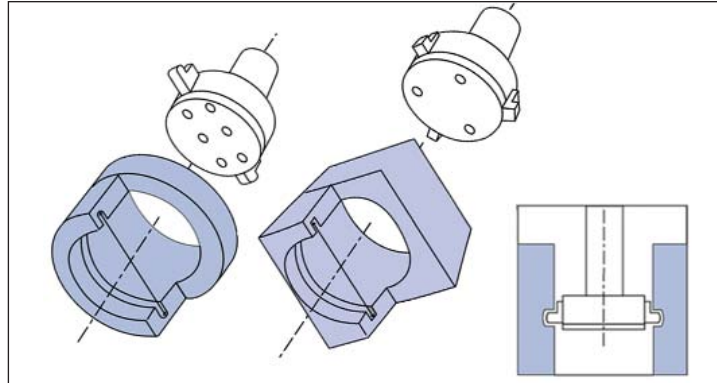


### Special Measuring Heads for 78, 780 & 782 Series

We offer several configurations of special purpose measuring heads for 780, and 782 Series bore gages, available by special order. Some, but not all, of these will also work with the 78 Series Internal Micrometer.

#### Groove Measuring Heads

- ◆ **Groove.** Available as a 2-point system for ovality measurement.
- ◆ Various 2-point anvil forms available with diameters from .080-12" (2-300mm).
- ◆ **Grooves.** Available as a 3-point system
- ◆ Various 3-point anvil forms available for diameters from .250-12" (6-300mm).



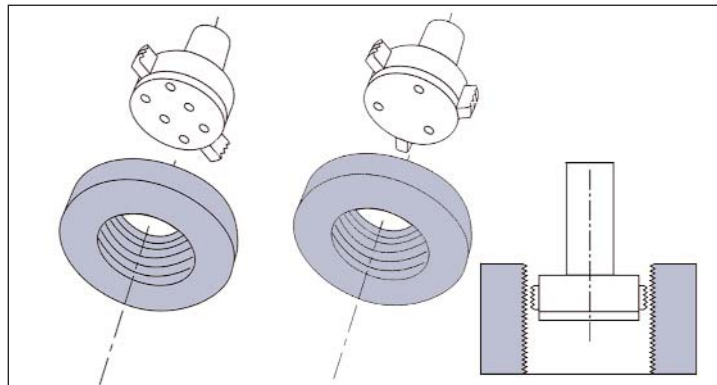
2-point and 3-point heads are available with various anvils to measure specialized internal grooves.



#### Thread Measuring Heads

Thread Measuring Heads are available as two point system from No. 8 to 5/16" (M4-8mm) and three point system from 3/8"-12" (9.5-300mm). Most forms available including UNC, UNF, UNJ, UNS, Buttress, Acme, Multi-start, LH and RH.

- ◆ **Thread.** Thread forms available as a 3-point system.
- ◆ **Internal.** To measure effective (functional) diameter, pitch diameter.
- ◆ Available as two point system from No. 8 to 5/16" (M4-8mm)
- ◆ Available as three point system from 3/8"-12" (9.5-300mm).
- ◆ Most forms available including UNC, UNF, UNJ, UNS, Buttress, Acme, Multi-start, LH and RH.

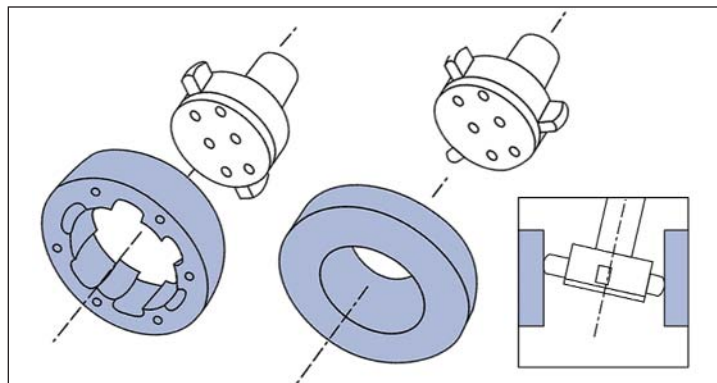


2-point and 3-point heads are available for thread measuring applications.



#### Spherical Radius Measuring Heads

- ◆ **Spherical Radius.** Available as 2-point to measure ovality or with 3-point contact.
- ◆ Available with diameters from .236-3.93" (6-100mm).
- ◆ **3-Point Spherical.** Available in .118-12" (3-300mm) range.
- ◆ Gives good repeatability even when somewhat out of line with bore center.



2-point and 3-point spherical radius heads are available.





**Dial Bore Gages**

**No. 82 Series .107-1.565"**

**No. 82M Series 2.7-39.75mm**

Dial bore gages are available in convenient sets or with individual probes and dial indicators. Each set consists of a dial indicator, a body and actuating rod, two adjusting wrenches and the probes as specified below.

The head may be ordered separately (includes dial indicator, body, and two adjusting wrenches). Individual probes can also be ordered as listed. All probes are furnished with an actuating rod. These gages are also available with electronic indicators by special order.

Measurements are taken by comparison so some type of set master should be used as a reference standard. We recommend setting as close to the hole being measured as possible, and this can be easily done with gage blocks or with a micrometer. We can also furnish master setting rings – by request.

- ◆ The split-ball contact is self-centering and the two-point contact makes the gage useful for detecting hole geometry problems like taper, bell-mouth and out-of-roundness
- ◆ Reads to .0001" and 0.002mm
- ◆ Useful for controlling approach to tolerance without removing the workpiece from a machine
- ◆ Interchangeable probes are hard chrome plated and polished



Left, No. 82AZ; right, No. 82BZ.

**Inch Reading**

| Total Range   | No. of Probes | Range Each Probe  | Max. Bore Depth | Graduation | Complete Sets |         | Heads Only   |         |
|---------------|---------------|---|-----------------|------------|---------------|---------|--------------|---------|
|               |               |   |                 |            | Cat. No.      | EDP No. | Cat. No.     | EDP No. |
| .107 - .266"  | 5             | .107 - .140"; .139 - .172";<br>.171 - .203"; .202 - .234";<br>.233 - .266"          | 13/16"          | .0001"     | <b>82AZ</b>   | 55791   | <b>82AB1</b> | 66013   |
|               |               | .217 - .594"  | 1-1/2"          |            | <b>82BZ</b>   | 55792   | <b>82AB1</b> | 66013   |
| .217 - .594"  | 6             | .217 - .281"; .279 - .344";<br>.342 - .405"   | 1-3/4"          |            | <b>82CZ</b>   | 55793   | <b>82C1</b>  | 66026   |
|               |               | .403 - .469"; .467 - .532";<br>.530 - .594"   | 2-1/2"          |            |               |         |              |         |
| .560 - 1.565" | 8             | .560 - .690"; .685 - .815";<br>.810 - .940"   | 5"*             |            |               |         |              |         |
|               |               | .935 - 1.065"; 1.060 - 1.190";<br>1.185 - 1.315"; 1.310 - 1.440";<br>1.435 - 1.565" |                 |            |               |         |              |         |

Sets are furnished in attractive, protective case.

**NOTES:** \*Includes insertion of gage body into bore.

Packed one in a box.

(Continued on next page.)



### Dial Bore Gages No. 82 Series (continued)

#### Millimeter Reading

| Total Range    | No. of Probes | Range Each Probe   | Max. Bore Depth | Graduation | Complete Sets |         | Heads Only**  |         |
|----------------|---------------|--|-----------------|------------|---------------|---------|---------------|---------|
|                |               |  |                 |            | Cat. No.      | EDP No. | Cat. No.      | EDP No. |
| 2.7 - 6.76mm   | 5             | 2.7 - 3.55mm;<br>3.55 - 4.35mm;<br>4.35 - 5.15mm;<br>5.15 - 5.95mm;<br>5.95 - 6.76mm     | 20.6mm          | 0.002 mm   | <b>82MAZ</b>  | 66010   | <b>82MAB1</b> | 66014   |
| 5.5 - 15.1mm   | 6             | 5.5 - 7.15mm;<br>7.1 - 8.75mm;<br>8.7 - 10.3mm   | 38mm            |            | <b>82MBZ</b>  | 66011   | <b>82MAB1</b> | 66014   |
|                |               | 10.25 - 11.9mm;<br>11.9 - 13.5mm;<br>13.5 - 15.1mm                                       | 44mm            |            |               |         |               |         |
| 14.2 - 39.75mm | 8             | 14.2 - 17.5mm;<br>17.4 - 20.7mm;<br>20.6 - 23.9mm  | 63mm            |            | <b>82MCZ</b>  | 66012   | <b>82MC1</b>  | 66027   |
|                |               | 23.75 - 27.05mm;<br>26.9 - 30.2mm;<br>30.1 - 33.4mm;<br>33.3 - 36.6mm;<br>36.5 - 39.75mm | 125mm*          |            |               |         |               |         |

NOTES: \*Includes insertion of gage body into bore. \*\* Includes dial indicator

#### Individual Probes Only

##### A Series

| Range        |               | Catalog No. | EDP No. |
|--------------|---------------|-------------|---------|
| Inch         | mm            |             |         |
| .107 - .140" | 2.7 - 3.55mm  | <b>82A2</b> | 66015   |
| .139 - .172" | 3.55 - 4.35mm | <b>82A3</b> | 66016   |
| .171 - .203" | 4.35 - 5.15mm | <b>82A4</b> | 66017   |
| .202 - .234" | 5.15 - 5.95mm | <b>82A5</b> | 66018   |
| .233 - .266" | 5.9 - 6.76mm  | <b>82A6</b> | 66019   |

##### B Series

| Range        | Catalog No. | EDP No. |
|--------------|-------------|---------|
| .217 - .281" | <b>82B2</b> | 66020   |
| .279 - .344" | <b>82B3</b> | 66021   |
| .342 - .405" | <b>82B4</b> | 66022   |
| .403 - .469" | <b>82B5</b> | 66023   |
| .467 - .532" | <b>82B6</b> | 66024   |
| .530 - .594" | <b>82B7</b> | 66025   |

##### C Series

| Range          |                 | Catalog No. | EDP No. |
|----------------|-----------------|-------------|---------|
| Inch           | mm              |             |         |
| .560 - .690"   | 14.2 - 17.5mm   | <b>82C2</b> | 66028   |
| .685 - .815"   | 17.4 - 20.7mm   | <b>82C3</b> | 66029   |
| .810 - .940"   | 20.6 - 23.9mm   | <b>82C4</b> | 66030   |
| .935 - 1.065"  | 23.75 - 27.05mm | <b>82C5</b> | 66031   |
| 1.060 - 1.190" | 26.9 - 30.2mm   | <b>82C6</b> | 66032   |
| 1.185 - 1.315" | 30.1 - 33.4mm   | <b>82C7</b> | 66033   |
| 1.310 - 1.440" | 33.3 - 36.6mm   | <b>82C8</b> | 66034   |
| 1.435 - 1.565" | 36.5 - 39.75mm  | <b>82C9</b> | 66035   |

NOTE: All probes come complete with actuating rod.

Sets are furnished in attractive, protective case; packed one in a box.



## Dial Bore Gages

**No. 84 Series** 1-1/2 – 12-1/8"

**No. 84M Series** 38-308mm

These bore gages allow for bore measurements beyond the size range of our No. 82 Series.

They are comparison gages and should be set with a master ring gage, gage blocks with parallel jaws, outside micrometers or vernier calipers. Ring gages are available by request, quoted by application. Good practice is to set the gage to zero, as near to the desired dimension as possible.

Gages are well balanced, easy to use and have the following features:

- ◆ Can be easily held to inspect bores and hole sizes without removing the workpiece
- ◆ An adjustable range screw and two centralizing plungers provide accurate, three-point contact for tool alignment in larger bores
- ◆ All contacts and centralized plungers are of hardened tool steel for wear and spring-loaded for sensitivity
- ◆ The housing and knurled handle are aluminum for light weight and good balance
- ◆ Dial indicators have jewel bearings for sensitivity
- ◆ Bore depths are also available up to 12" (300mm) in 1" (25mm) increments on special order
- ◆ Also available with carbide contacts or electronic indicators with output capability on special order
- ◆ Furnished in finished wood case



Left, No. 84Z-111-4J; right, No. 84Z-111-7J.



Above: Inspecting bore size with No. 84Z-111-4J.

### 1-1/2 – 12-1/8" Range

| Total Range with Extension | No. Ext. | Range Each Extension   | Max. Bore Depth | Plunger Travel | Indicator Grad. | Catalog No.       | EDP   |
|----------------------------|----------|--|-----------------|----------------|-----------------|-------------------|-------|
| 1-1/2 – 3"                 | 5        | 1.500 - 1.800";<br>1.800 - 2.100";<br>2.100 - 2.400";<br>2.400 - 2.700";<br>2.700 - 3.000" | 4"              | .030"          | .0001"          | <b>84Z-111-4J</b> | 56264 |
|                            |          |  |                 |                | .0005"          | <b>84Z-134-4J</b> | 56270 |
| 3 – 5-3/16"                | 3        | 3.000 - 3.750";<br>3.750 - 4.468";<br>4.468 - 5.187"                                       | 6"              | .035"          | .0001"          | <b>84Z-111-5J</b> | 50386 |
|                            |          |  |                 |                | .0005"          | <b>84Z-134-5J</b> | 50392 |
| 5 – 8-1/8"                 | 3        | 5.000 - 6.187";<br>6.187 - 7.125";<br>7.125 - 8.125"                                       | 6"              | .035"          | .0001"          | <b>84Z-111-6J</b> | 50388 |
|                            |          |  |                 |                | .0005"          | <b>84Z-134-6J</b> | 50394 |
| 8 – 12-1/8"                | 2        | 8.000 - 10.000";<br>10.000 - 12.125"   | 7"              | .035"          | .0001"          | <b>84Z-111-7J</b> | 50390 |
|                            |          |  |                 |                | .0005"          | <b>84Z-134-7J</b> | 50396 |

### 38 - 308mm Range

|                 |   |   |       |        |         |                    |       |
|-----------------|---|---|-------|--------|---------|--------------------|-------|
| 38 - 76.2mm     | 5 | 38 - 45.7mm;<br>45.7 - 53.35mm;<br>53.35 - 61mm;<br>61 - 68.6mm;<br>68.6 - 76.2mm | 100mm | 0.76mm | 0.002mm | <b>84MZ-161-4J</b> | 64922 |
|                 |   |   |       |        | 0.01mm  | <b>84MZ-181-4J</b> | 64923 |
| 76.2 - 131.75mm | 3 | 76.2 - 95.25mm;<br>95.25 - 113.5 mm;<br>113.5 - 131.75mm                          | 150mm | 0.9mm  | 0.002mm | <b>84MZ-161-5J</b> | 64924 |
|                 |   |   |       |        | 0.01mm  | <b>84MZ-181-5J</b> | 64925 |
| 127 - 206.37mm  | 3 | 127 - 157.15mm;<br>157.15 - 181mm;<br>181 - 206.37mm                              | 150mm | 0.9 mm | 0.002mm | <b>84MZ-161-6J</b> | 64926 |
|                 |   |   |       |        | 0.01mm  | <b>84MZ-181-6J</b> | 64927 |
| 203.2 - 308mm   | 2 | 203.2 - 254mm;<br>254 - 308mm   | 175mm | 0.9mm  | 0.002mm | <b>84MZ-161-7J</b> | 64928 |
|                 |   |   |       |        | 0.01mm  | <b>84MZ-181-7J</b> | 64929 |



Using the No. 84Z-111-4J with No. F2710-2 Electronic Indicator to check hole size.

Packed one in a box.





- ◆ Student & Apprentice
- ◆ Industrial
- ◆ Automotive
- ◆ Electronic
- ◆ Tool Chests







## Student Tool Sets

**No. S903 (Inch)**

**No. S903M (Millimeter)**

These sets include the basic tool necessities, in addition to the “Starrett Book for Student Machinists,” so that practical shop work and study can be combined. Furnished in attractive, protective cases.



**Inch Set  
No. S903Z / EDP 65116**

**Millimeter Set  
No. S903MZ / EDP 65117**

| Catalog No. | Description                         | Catalog No. |
|-------------|-------------------------------------|-------------|
| 11H-6-4R    | 6" or 15mm Basic Combination Square | 11MH-150    |
| 120A-6      | 6" or 150mm Dial Caliper            | 120M-150    |
| C304R-6     | 6" or 150mm Flexible Steel Rule     | C330-150    |
| 83A-6       | 6" (150mm) Solid Nut Divider        | 83A-6       |
| 117B        | Center Punch                        | 117B        |
| 1700        | Student Machinist Book              | 1700        |

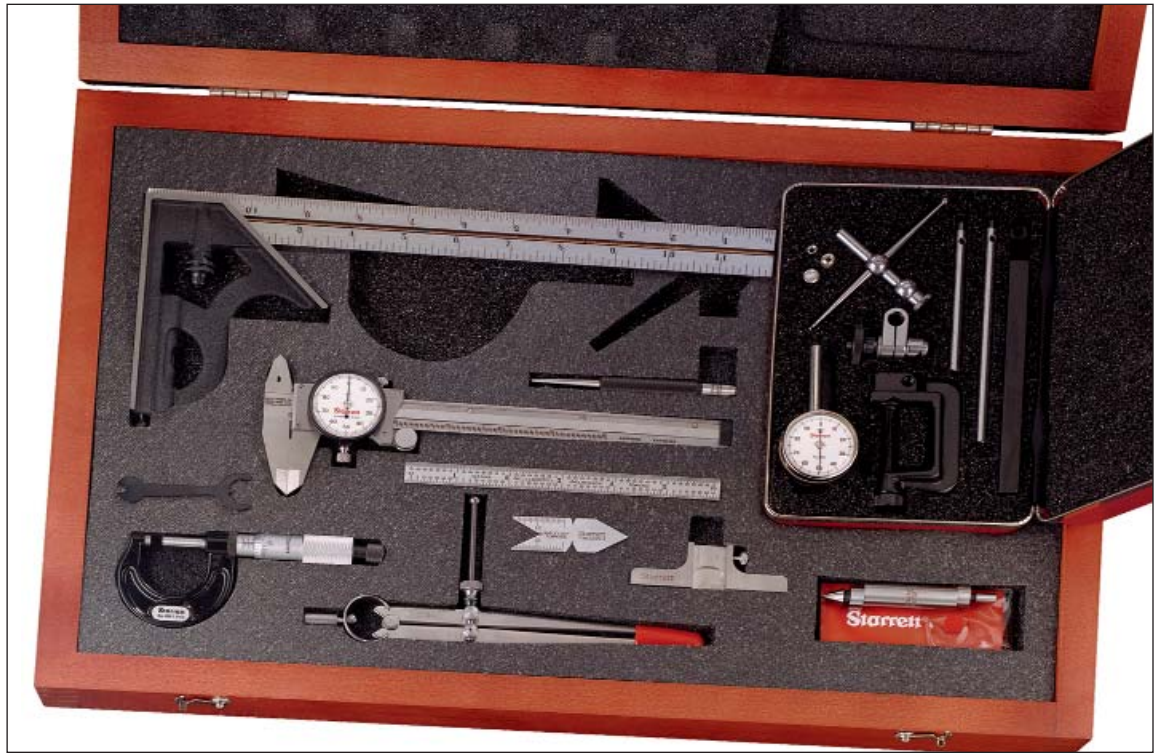


### Apprentice Tool Sets

**No. S904 (Inch)**

**No. S904M (Millimeter)**

These apprentice sets are more complete than the student sets. They have a full selection of the tools required for the increased skills that are being developed. Furnished in attractive, protective cases.



**Inch Set  
No. S904Z / EDP 65118**

**Millimeter Set  
No. S904MZ / EDP 65119**

| Catalog No. | Description                                      | Catalog No.   |
|-------------|--|---------------|
| T436.1XRL-1 | 1" or 25mm Outside Micrometer with Carbide Faces | V436.1MXRL-25 |
| 196A1Z      | Universal Dial Indicator with Attachments        | 196MA1Z       |
| 11H-12-4R   | 12" or 300mm Combination Square                  | 11MH-300      |
| 120A-6      | 6" or 150mm Dial Caliper                         | 120M-150      |
| PT22431     | Dial Caliper Depth Attachment                    | PT22431       |
| 827B        | Edge Finder                                      | 827MA         |
| C304R-6     | 6" or 150mm Flexible Steel Rule                  | C330-150      |
| C391        | Center Gage                                      | C398M         |
| 117B        | Center Punch                                     | 117B          |
| 83A-6       | 6" (150mm) Solid Nut Divider                     | 83A-6         |





**Basic Precision Measuring Tool Sets**

**No. S909 (Inch)**

**No. S909M (Millimeter)**

Sets contain three of the most commonly used precision tools. Furnished in attractive, protective cases.



**Inch Set  
No. S909Z / EDP 65122**

**Millimeter Set  
No. S909MZ / EDP 65668**

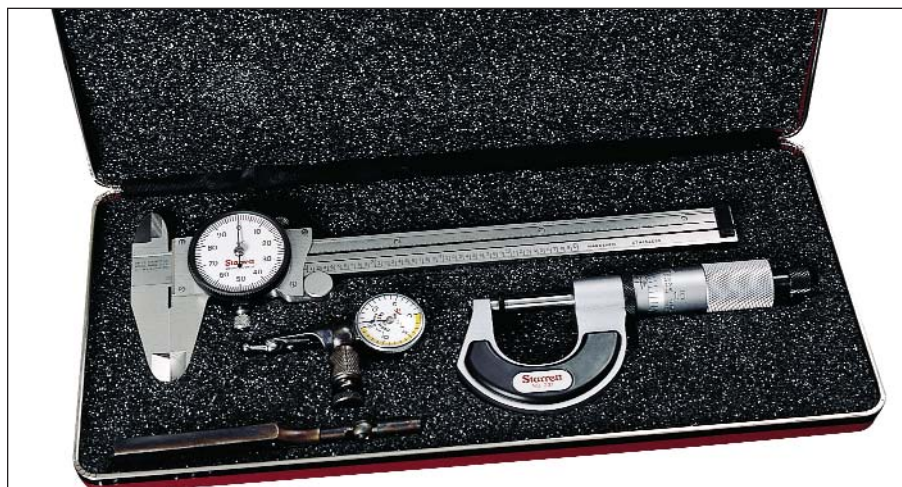
| Catalog No. | Description                                      | Catalog No.   |
|-------------|--|---------------|
| T436.1XRL-1 | 1" or 25mm Outside Micrometer with Carbide Faces | V436.1MXRL-25 |
| 120A-6      | 6" or 150mm Dial Caliper                         | 120M-150      |
| C604R-6     | 6" Spring Tempered Precision Rule                | C635E-150     |

**Select Precision Measuring Tool Sets**

**No. S905 (Inch)**

**No. S905M (Millimeter)**

Sets contain basic tools and a test indicator for a wide variety of measurements. Furnished in attractive, protective cases.



**Inch Set  
No. S905AZ / EDP 65805**

**Millimeter Set  
No. S905MAZ / EDP 65806**

| Catalog No.                | Description  | Catalog No.                  |
|----------------------------|--|------------------------------|
| T231XRL                    | 1" or 25mm Micrometer with Carbide Faces and Insulating Pads | V231MXRL                     |
| 120A-6                     | 6" or 150mm Dial Caliper                                     | 120M-150                     |
| C604RE-6                   | 6" Spring Tempered Precision Rule                            | C635E-150                    |
| 711FSA<br>.001" Graduation | Last Word® Dial Test Indicator with Universal Shank          | 711MFSA<br>0.01mm Graduation |





**Specialty / Micrometer Tool Sets**

**No. S906 (Inch)**

**No. S906M (Millimeter)**

A balanced selection of micrometers for outside, inside and depth measurements. Furnished in attractive, protective cases.



**Inch Set  
No. S906Z / EDP 56663**

**Millimeter Set  
No. S906MZ / EDP 56223**

| Catalog No. | Description                                      | Catalog No.   |
|-------------|--|---------------|
| T230XRL     | 1" or 25mm Outside Micrometer with Carbide Faces | V230MXRL      |
| T436.1XRL-2 | 2" or 50mm Outside Micrometer                    | V436.1MXRL-50 |
| 445A-3RL    | 0-3" or 0-75mm Depth Micrometer                  | 445MA-75RL    |
| 823A        | Tubular Inside Micrometer                        | 823MA         |



### Toolmakers' Sets

**No. S908 (Inch)**

**No. S908M (Millimeter)**

Mix of the precision tools required by toolmakers to perform typical layout and measuring work for many tool and die applications. Furnished in attractive, protective cases.



**Inch Set  
No. S908Z / EDP 65120**

**Millimeter Set  
No. S908MZ / EDP 65121**

| Catalog No. | Description   | Catalog No.   |
|-------------|---|---------------|
| T436.1XR-1  | 1" or 25mm Outside Micrometer with Carbide Faces        | V436.1MXRL-25 |
| 435-12-4R   | 12" or 300mm Combination Set with Reversible Protractor | 435M-300      |
| 709ACZ      | Dial Test Indicator                                     | 709MACZ       |
| 120A-6      | 6" or 150mm Dial Caliper                                | 120M-150      |
| PT22431     | Dial Caliper Depth Attachment                           | PT22431       |
| C604RE-6    | 6" or 150mm Spring Tempered Precision Rule              | C635E-150     |
| 827B        | Edge Finder   | 827MA         |
| 83A-6       | 6" (150mm) Solid Nut Divider                            | 83A-6         |
| 117B        | Center Punch  | 117B          |





**Automotive Service Tool Set**

**No. S917**

An automotive maintenance measuring set, ideal for everyday use. Inch measurement. Furnished in attractive, protective case.



**No. S917Z / EDP 53102**

| Catalog No. | Description   |
|-------------|---|
| 224ARL      | 2 – 6" Outside Micrometer with Interchangeable Anvils and Standards |
| 452B        | 2-1/2 – 6" Cylinder Gage  |
| 124A        | 2 – 8" Inside Micrometer  |
| 172AT       | 9 Tapered-Leaf Thickness Gage                                       |

**Automotive/Specialty Service Tool Set**

**No. S927**

Every shop doing regrind, rebore and general automotive maintenance and repair needs dependable measuring tools like these. Set is similar to our No. 917, but also has select tools for disc brake measurement and spark plug wire gaging. Furnished in attractive, protective case.



**No. S927Z / EDP 65123**

| Catalog No. | Description   |
|-------------|---|
| 224ARL      | 2 – 6" Outside Micrometer with Interchangeable Anvils and Standards |
| 452B        | 2-1/2 – 6" Cylinder Gage  |
| 458AXRL     | Disc Brake Micrometer with a Range of .300"-1.300"                  |
| 572A        | 22 Leaf Thickness Gage with Spark Plug Wires                        |



**Basic Electronic Tool Sets**

**No. S766A (without output)**

Basic starter sets for electronic measuring include slide calipers and 1"/25mm micrometers. Two sets without output are offered – No. S766AZ for English units and No. S766MAZ for metric. Both sets include an attractive, protective case.



**Inch Set (without output)  
No. S766AZ / EDP 12206**

**Millimeter Set (without output)  
No. S766MAZ / EDP 12207**

| Catalog No. | Description                               | Catalog No. |
|-------------|---|-------------|
| 799A-6/150  | 0-6"/0-150mm Electronic Slide Caliper     | 799A-6/150  |
| 734XFL-1    | 0-1"/0-25mm Electronic Outside Micrometer | 734MXFL-25  |



**No. S766B**

**(with output and IP Protection)**

Basic starter sets for electronic measuring with output capability for SPC, and IP protection against dirt, dust, water and coolant.

They include the 797B-6/150 Slide Calipers with IP65 protection and output, and the new 795 XFL-1 or 795MEXFL-25 1"/25mm micrometers with IP67 protection and output.

Two sets are offered – sets No. S766BZ and No. S766MBZ. Both sets include an attractive, protective case.

**NEW**



**Inch Set (with output)  
No. S766BZ / EDP No. 11606**

**Millimeter Set (with output)  
No. S766MBZ / EDP No. 11607**

| Catalog No. | Description   | Catalog No. |
|-------------|---|-------------|
| 797B-6/150  | 0-6"/0-150mm Electronic Slide Caliper with output     | 797B-6/150  |
| 795XFL-1    | 0-1"/0-25mm Electronic Outside Micrometer with output | 795MEXFL-25 |





### Tool Chest No. 200 Series

Perfect for machinists, tool and die makers, apprentices, mechanics and home workshops. The finest tool chest available, made to rigid Starrett specifications providing all the desired features required to store quality tools. Ample storage is provided with all drawers lined to avoid damage to tools. Rugged steel construction assures long life. The tool chest can be locked for added protection and to avoid misuse of expensive tools.

Tool chest is purchased without tools. Two different tool assortments are available to meet your needs.

- ◆ Seven drawers, all cloth lined
- ◆ Patented spring clips for easy drawer removal
- ◆ Friction clips prevent drawers from falling out
- ◆ Top storage
- ◆ Maroon wrinkle finish
- ◆ Dimensions 8-1/2" x 20" x 13-3/4"  
(215mm x 500mm x 350mm)
- ◆ Shipping weight 31 lbs. (14kg) (tool chest only)



**CONTENTS/SPECIFICATIONS ON THE FOLLOWING PAGE**



**Tool Chest  
No. 200 Series**

| Catalog No. | EDP No. | Description   |
|-------------|---------|---|
| <b>200</b>  | 55207   | Metal Chest Only, Furnished without Tools                         |
| <b>200B</b> | 56123   | Set of 14 Tools and Accessories Listed Below, without Metal Chest |
| <b>200C</b> | 56124   | Set of 18 Tools and Accessories Listed Below, without Metal Chest |

**Tool Chests Contents**

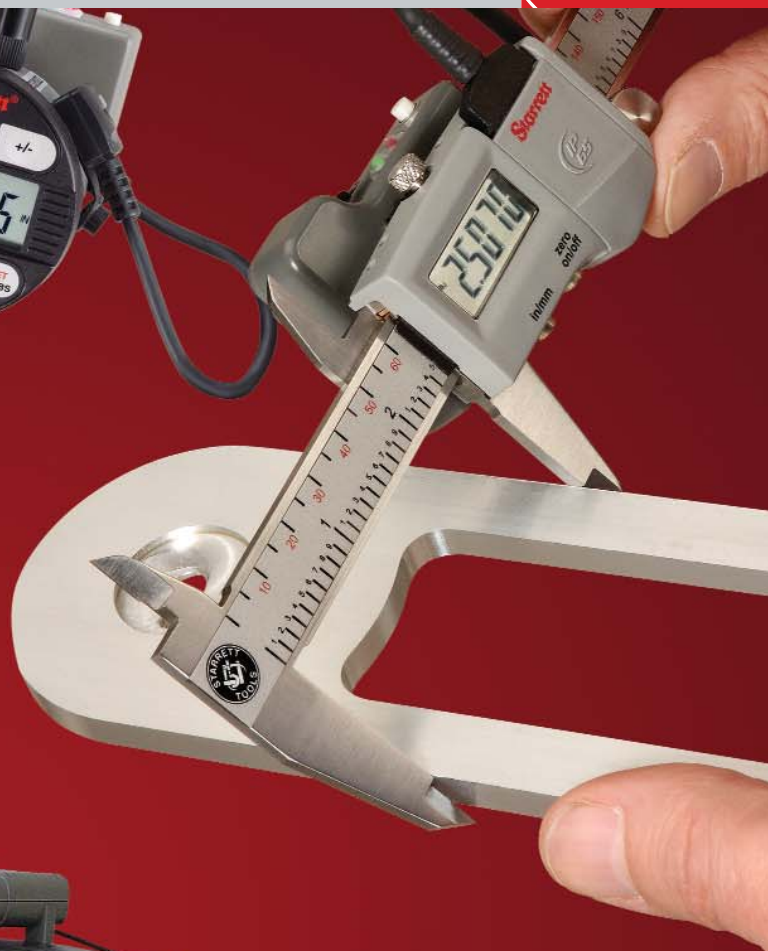
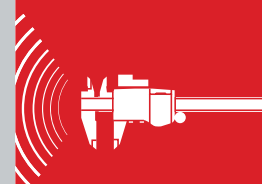
| Catalog No.        | Description   | 200B | 200C |
|--------------------|---|------|------|
| <b>T436.1XRL-1</b> | 1" Micrometer with Ratchet Stop, Lock Nut and Carbide Faces | X    |      |
| <b>11H-12-4R</b>   | 12" Combination Square with Square Head                     | X    |      |
| <b>C391</b>        | Center Gage   | X    | X    |
| <b>C309R-6</b>     | 6" Rule   | X    | X    |
| <b>827A</b>        | Edge Finder   | X    | X    |
| <b>70A</b>         | Scriber   | X    | X    |
| <b>120A-6</b>      | 6" Dial Caliper   | X    | X    |
| <b>PT22431</b>     | Dial Caliper Depth Attachment                               | X    | X    |
| <b>196A1Z</b>      | Universal Dial Indicator                                    | X    |      |
| <b>S229FZ</b>      | Telescoping Gages   | X    |      |
| <b>172A</b>        | Thickness Gage  | X    | X    |
| <b>278</b>         | V Blocks and Clamps   | X    | X    |
| <b>S117PC</b>      | Set of 5 Center Punches                                     | X    | X    |
| <b>711GCSZ</b>     | Complete – Last Word Test Indicator                         |      | X    |
| <b>T230XRL</b>     | Satin Chrome Outside Micrometer                             |      | X    |
| <b>C604RE-6</b>    | 6" Satin Chrome Rule  | X    | X    |
| <b>33HC-12-4R</b>  | 12" Combination Square with Square Head and Center Head     |      | X    |
| <b>20-4-1/2</b>    | 4-1/2" Hardened Steel Master Square                         |      | X    |
| <b>S579GZ</b>      | Telescoping Gages   |      | X    |
| <b>257A</b>        | Surface Gage – 9" with Hardened Base                        |      | X    |
| <b>472</b>         | Screw Pitch Gage  |      | X    |
| <b>161B</b>        | Parallel Clamps   |      | X    |
| <b>1620</b>        | Tool and Instrument Oil                                     | X    | X    |
| –                  | Starrett Catalog and Price List                             | X    | X    |
| –                  | Starrett Tools and Rules Booklet                            | X    | X    |
| –                  | Starrett Story Booklet                                      | X    | X    |
| –                  | Decimal Equivalent Card                                     | X    | X    |
| –                  | Memo Book   | X    | X    |

**NOTE:** Chest and tools ship separately.



# Starrett®

## DATA COLLECTION SYSTEMS







## DataSure® Wireless Data Collection System

### *DataSure® — The Wireless Age Reaches the Factory Floor*

Actually, it reaches anywhere measurements are taken with electronic metrology tools. Shop floors, labs, quality assurance departments — they can all benefit from the unique capabilities of the new DataSure wireless data collection system from Starrett.

Cost-effective for bench-top or shop-wide data collection, DataSure systems can cover thousands of square feet while reliably protecting the integrity of the vital measurement data being collected.

DataSure gathers data from electronic measuring tools and delivers it to a PC. The data can then be analyzed by your statistical process control (SPC) application. With DataSure you can say goodbye to your manual and wired data collection systems.

### What is DataSure Wireless Data Collection?

DataSure wireless data collection systems consist of three primary elements:

- ◆ Miniature radios (called End Nodes) that are attached to the data output ports of electronic tools
- ◆ A Gateway that connects to a PC
- ◆ Routers to extend the system's range and make the network more robust



DataSure works with a wide variety of calipers, indicators, micrometers and other electronic measuring tools with data output from Starrett and other manufacturers.



DataSure offers a comprehensive, robust wireless solution for the shopfloor that ensures the integrity of your data.

### Why Go Wireless?

A wireless data collection system can significantly reduce human error in data recording. It removes wiring-related placement, installation, safety and cost issues. And it makes it easier for you to bring a precision measuring tool to the work, rather than having to bring work to the measuring tool.

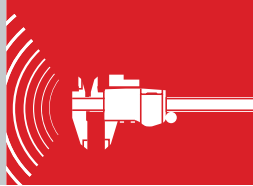
### A Comprehensive, Robust Solution

There are other wireless data collection systems available, but only DataSure offers a complete, robust solution.

- ◆ **DataSure maintains data integrity for accurate recording.** The safe delivery of your data is ensured even in the hostile environment of electrically noisy shops, thanks to proprietary Starrett technology.
- ◆ **DataSure sends a signal to assure you that data is received at the PC.** Each measurement is time-stamped and logged into a database. DataSure sends a signal to assure you that data is received at the PC. There's no reason to wonder what happens to your data — the system sends a confirmation signal when it is successfully received.

- ◆ If receipt is not acknowledged at the host SPC system, DataSure will store several readings and resend them until they are safely recorded. With DataSure, there's no need to worry about losing a shift's worth of collected data.
- ◆ **DataSure adapts to all major brands of electronic measuring tools** and a variety of software and tools so you don't have to invest in proprietary technology.
- ◆ It installs easily on a standard PC (requires Windows® XP Professional OS), and works with most SPC software packages, including Starrett Shop Floor Pro™, SPC Excel™ IV, Infinity QS®, SPC Express, SPC+® II and Microsoft Excel®, MeasureLink® and others.
- ◆ **DataSure's versatility means it will work in almost any environment.** Its highly configurable system architecture adapts to your work environment. Each DataSure system supports up to 100 active tools and can be remotely accessed via your intranet connection.





### DataSure®

#### WIRELESS DATA COLLECTION

(continued)

### DataSure at a Glance

An overview of DataSure Wireless Data Collection:

- ◆ DataSure users receive confirmation at the tool, indicating successful or unsuccessful data transmission.
- ◆ End Node radios can store up to 10 readings in the event that the main system is down or busy.
- ◆ The DataSure radio system works with Starrett, Mitutoyo, Sylvac, CDI tools, and other gages.
- ◆ One DataSure Gateway can handle up to active 100 tools.
- ◆ Each Gateway's radio range is about 100 feet (30 meters). Adding Routers can increase range in 100 foot increments. Endnode range is 65 ft.
- ◆ The multi-mode function allows one tool to be connected to a Gateway for simple installations, or to more than one multiplexer with many tools for complex shop environments.
- ◆ The DataSure system features a license-free 916MHz ISM band radio and a self-configuring and self-healing network.
- ◆ Data acquisition from tools can be initiated by operator or host control.
- ◆ Network, tool and end node battery status are all automatically monitored and recorded on screen and stored in the system's database.
- ◆ Rechargeable routers are ideal for mobile applications and physically large component data collection environments such as aircraft assembly hangars, large casting foundries, auto body stamping facilities and more.
- ◆ Easy-to-use software offers user-configurable names for tools and groups. Its user interface runs in the familiar Microsoft Internet Explorer browser.
- ◆ DataSure's flexibility means it can output data directly to the main application screen, your SPC software, a local or networked database, and/or TSV, CSV, XLS, and XML file formats.

### What goes into a DataSure System?

DataSure Wireless Systems start with superior engineering, state-of-the-art technology and rugged durability. Every

component of the DataSure system is built to perform reliably in just about any environment. Sturdy construction and heavy

duty materials help them withstand the rigors of everyday use under demanding conditions.

#### End Nodes



The **DataSure End Node** (above) plugs directly into most digital metrology tools. It sends measurement data and indicates with a green light when that data has been received by the Gateway.

#### End Node Features

- ◆ User feedback
- ◆ On-tool data storage
- ◆ Adapts to many tool families
- ◆ Compact design
- ◆ **Power:** CR2450 lithium or CR2477
- ◆ **Range:** 65 ft (20m)
- ◆ **Size:** 2.18" x 1.7" x 0.7"  
55.3mm x 43.2mm x 17.8mm

#### Router



Each **DataSure Router** (above) extends the system's range in increments of 30 meters. They ensure system robustness by providing alternate signal paths.

#### Router Features

- ◆ Range extender
- ◆ Transmits around interference
- ◆ Wall mount or mobile
- ◆ **Power:** AC, NiMH
- ◆ **Range:** 100 ft (30m)
- ◆ **Size:** 7.0" x 5.5" x 2.5"  
178mm x 140mm x 63.5mm

#### Gateway



The **DataSure Gateway** (above) is the central point for data collection and tool management. The Gateway plugs into your PC through a USB port (shown above).

#### Gateway Features

- ◆ USB
- ◆ Sends data to application or database
- ◆ Multi-file export features
- ◆ Unique system ID
- ◆ **Power:** USB
- ◆ **Range:** 100 ft (30m)
- ◆ **Size:** 7.0" x 5.5" x 2.5"  
178mm x 140mm x 63.5mm



# DataSure®

## WIRELESS DATA COLLECTION

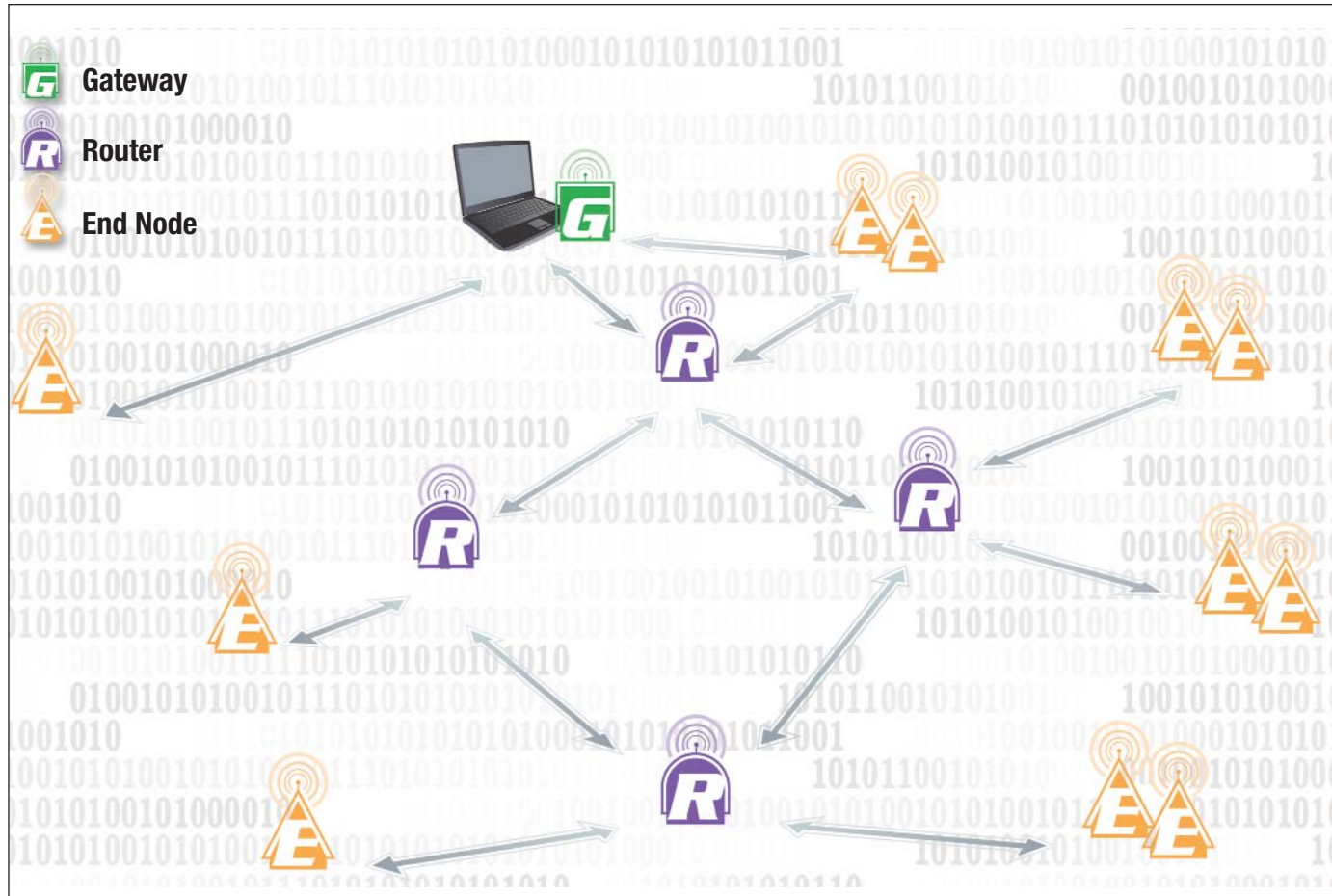
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### A DataSure Shopfloor

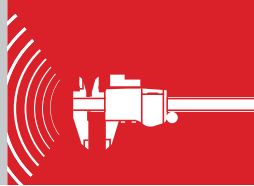
Here's an example of how a large shop could be networked with DataSure.

Individual tools at various locations in the shop collect data. The tools' End Nodes send the data to the nearest Router, which then

passes the data to the Gateway, or directly to the Gateway (whichever is the shortest or most robust connection path). The Gateway sends a signal back through the same path to the End Node to confirm receipt of the data.







## DataSure®

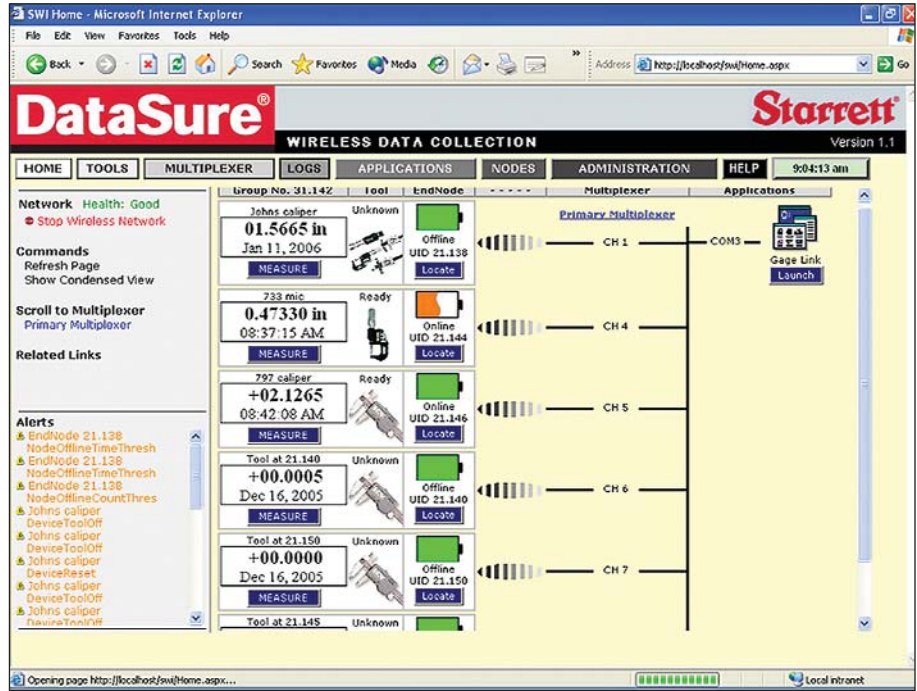
### WIRELESS DATA COLLECTION

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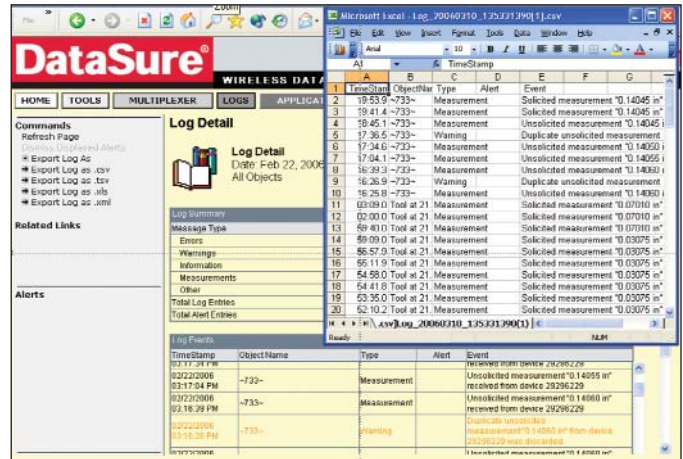
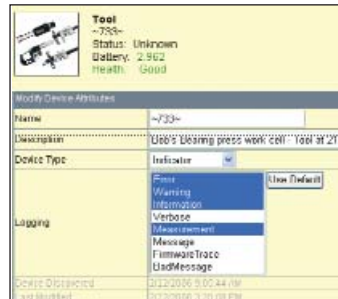
## DataSure Wireless Data Collection Manager

The DataSure Wireless Data Collection Manager runs within the Microsoft Internet Explorer browser to connect and manage your tools, network, data and third party SPC applications.

- ◆ Monitors your wireless network, tools, system status, end node battery voltages and tools measurements all from one screen
- ◆ Measurements can be initiated and viewed directly from the home page
- ◆ Data can be exported in many formats including: TSV, CSV, XML or XLS
- ◆ Data is stored locally with programmable, scheduled backup
- ◆ Remote personnel can configure tools, export data and monitor activity via intranet with no additional software
- ◆ Virtual multiplexers allow data to be directed from specific tools to multiple software applications
- ◆ Each radio end node can be personalized with a descriptive name (right)
- ◆ System Requirements: DataSure runs with Windows® XP Professional with Service Pack 2 (uses IIS and .NET framework components)



Above: DataSure Wireless Data Collection Manager Software provides a powerful, intuitive interface and works well with many popular SPC applications.



Above: The Log Detail Screen allows you to view data directly or export to a spreadsheet





# DataSure®

## WIRELESS DATA COLLECTION

(continued)

### How to Buy DataSure

If you would like to buy a new DataSure installation, contact us to work with you to specify a system for your application. If you need End Nodes or Routers for an existing system, they must be made to match the Group Number that is on the label of your existing components.

The End Nodes listed here are currently available. Many additional End Nodes will become available as we create them for new applications. Please call us to discuss your requirements.

#### Gateways and Router

| Catalog No. | EDP   | Description          |
|-------------|-------|----------------------|
| 1500-1-UN   | 12051 | Gateway for USB Port |
| 1500-2-N    | 12059 | Router, 120/240 VAC  |

#### End Nodes

|            |       |   |
|------------|-------|---|
| 1500-3-1N  | 12064 | For Starrett Opto, Cat. Nos. 782, 797, CDI, Sylvac    |
| 1500-3-3N  | 12072 | For Starrett 3rd Generation, Cat. Nos. 721, 733, 2600 |
| 1500-3-4N  | 12076 | For Starrett 2700 Indicators                          |
| 1500-3-5N  | 12080 | For Starrett Cat. Nos. 2000, 2001, 3752               |
| 1500-3-6N  | 12084 | For Mitutoyo 6-Pin                                    |
| 1500-3-7N  | 12088 | For Mitutoyo w/o absolute encoder                     |
| 1500-3-8N  | 12267 | RS232, User configurable                              |
| 1500-3-9N  | 12185 | For Mitutoyo IP66 Micrometer                          |
| 1500-3-10N | 12186 | For Mitutoyo IP65 Micrometer                          |
| 1500-3-11N | 12187 | For Digimatic W/D-Sub 9-pin                           |
| 1500-3-12N | 12192 | For Universal Mitutoyo 10-pin rectangular connector   |
| 1500-3-13N | 12196 | For Mitutoyo w/Cable Nos. 936937 or 965014            |
| 1500-3-14N | 12214 | For Mahr-Federal with $\mu$ Maxum and XL              |
| 1500-3-15N | 12223 | For Opto/Duplex                                       |
| 1500-3-16N | 12266 | For Mahr-Federal EX Series                            |

#### Accessories

|           |  |
|-----------|--|
| PT62785-0 | Mushroom head fastener kit to attach end node to tools (2 pair included with every End Node) |
| PT62742   | Gateway/Router mounting bracket  |

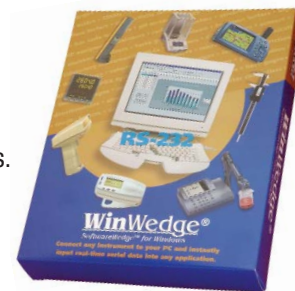


### Software Wedge™

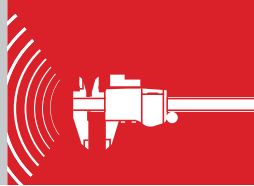
This fully customizable serial I/O program allows you to input real-time data from Starrett gages and data collectors directly into spreadsheet and database programs.

It is easy to install and use and includes set-up examples for Starrett gages and on-line help.

Catalog No. 719 / EDP 66490







## SPC IV Excel Software

No. 771 / EDP 67434

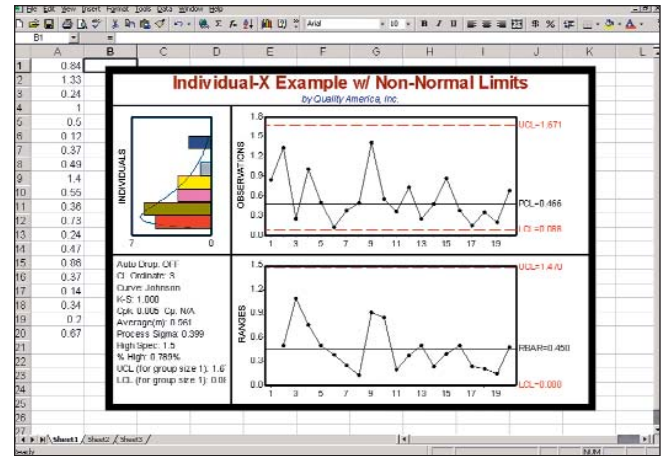
This Microsoft® Excel add-on is a fast, easy and affordable way to construct an SPC chart from Excel data with complete control over analysis and charting options. After a chart has been embedded to a spreadsheet, you can right-click on the chart and select "Amend chart" to change a setting without having to regenerate the entire chart.

SPC IV Excel correctly handles normally or non-normally distributed data with statistics shown directly on the chart and Advanced Statistics (subgroup stats) shown below the chart on the spreadsheet.

The product includes context sensitive help.

### Supported Chart Types

- ◆ Individual-X and Moving Range Chart
- ◆ X-Bar and Range Chart
- ◆ X-Bar and Sigma Chart
- ◆ Scatter Diagram
- ◆ Pareto
- ◆ Process Capability
- ◆ Attribute Charts (NP, C, P, U)
- ◆ Box and Whiskers
- ◆ Bull's-eye Chart



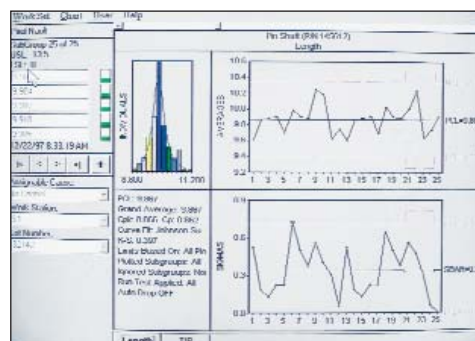
## Shop Floor Pro Software No. 728-3/ EDP 66662

Shop Floor Pro™ Software provides powerful data acquisition and analysis features in a simple-to-use interface.

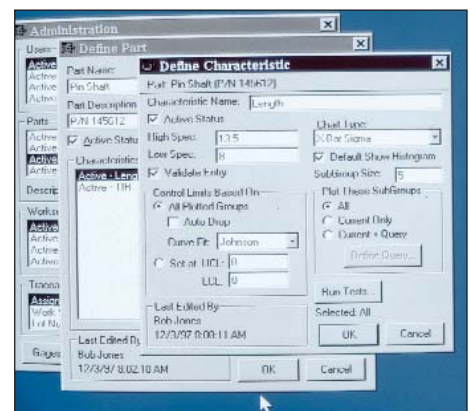
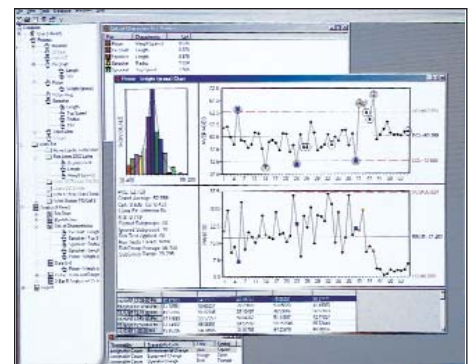
- ◆ Economical, easy to learn real-time data collection and control charting software package
- ◆ Operates in a stand-alone or networked environment
- ◆ Allows for data entry directly from gages or through the keyboard
- ◆ Automatically leads your operators through the data collection process
- ◆ Pre-defined Work Sets can be created for Work Centers, part numbers, etc. Each Work Set opens in a single step and supports up to 20 control charts.
- ◆ Control charts can show different characteristics for the same part or characteristics from multiple parts
- ◆ Chart Types include X-Bar/Range, X-Bar Sigma, Individual-X/Moving Range and Run Charts. User definable subgroup sizes range from 1-20.
- ◆ Each chart page displays a control chart with an optional Histogram and Summary Statistics window.
- ◆ Summary Statistics can be configured to suit your specific requirements
- ◆ Control Limits can be based on the plotted data or user defined
- ◆ Choose Normal Distribution or a Johnson Distribution to define the Individual-X control limits, as well as the curve displayed in the Histogram and the Process Capability Indices calculations
- ◆ Supports real time data entry via gages connected to a PC through a multiplexer

- ◆ Easy-to-understand data form provides for convenient manual data entry
- ◆ The data value box displays the data as user-defined specifications
- ◆ As each data value is entered, it is automatically marked with date, time, user and gage identification.
- ◆ Auto Advance automatically moves the data form to the next page or characteristic after entry is completed
- ◆ ODBC compliant database can be accessed by multiple workstations or other applications with ODBC query
- ◆ Change term names to those meaningful to your application
- ◆ Attribute analysis
- ◆ Password protection
- ◆ Ability to define privilege levels for 23 functions, allowing the administrator to control access to nearly all functions within the software
- ◆ Copy multiple characteristics from one process to another, saving setup time

- ◆ Foot switch sequencing for Starrett No. 761 Multiplexers
- ◆ Edit data including audit trails
- ◆ Toolbars for most common functions
- ◆ Analysis feature tracks out-of-control conditions
- ◆ "Explorer View" allows "drag-and-drop" copying from one part to another
- ◆ Larger users have the ability to use Microsoft SQL as the database platform
- ◆ Available charts: Scatter, Pareto, Attributes, Box and Whiskers, Bar and Pie



Above: Working Screen.  
Top Right: "Explorer View"  
Bottom Right: Easy Part Characteristic Setup.





**SPC Plus II Software No. 739 / EDP 64955**

SPC-PLUS® II is our desktop Statistical Process Control (SPC) Software Package. It provides many statistical process control features for an affordable price.

**User Features**

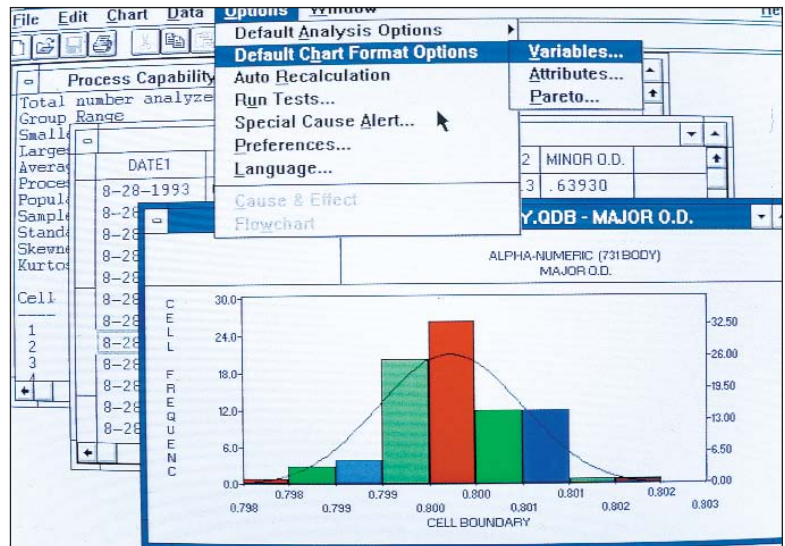
- ◆ Data can be accessed in a variety of ways
- ◆ Read directly from Excel Files. This allows you to take data previously recorded and immediately begin to analyze with control charts
- ◆ **Gages.** A wide variety of gages can be used to add data directly to the spreadsheet using our Real-Time Gage
- ◆ **Module.** Data goes in automatically!
- ◆ **ODBC import.** Any database that supports Microsoft's ODBC can easily be accessed. Data stored in Access or other database programs can be retrieved in seconds
- ◆ Data is entered directly into SPC-PLUS II's spreadsheet. Our spreadsheet contains many functions for calculating user-defined parameters

**Superior Data Reporting with SPC-PLUS II**

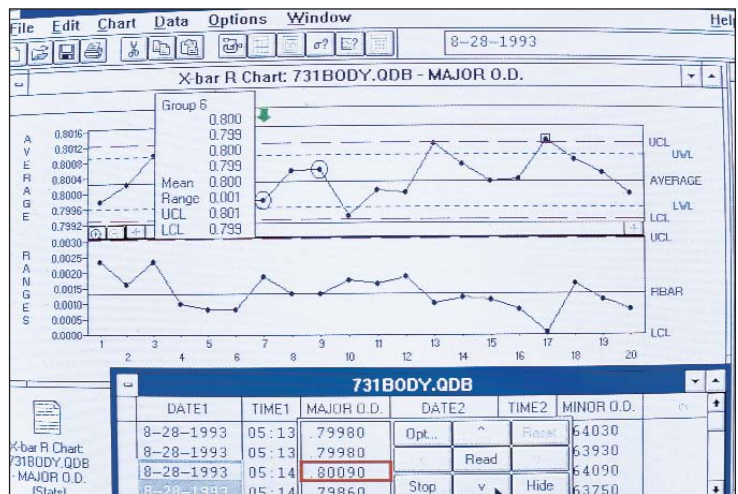
- ◆ You can print completed charts as jpeg images to be linked from your web pages
- ◆ You can effortlessly embed charts in word processing files (like MS Word) so reports to vendors, customers and associates contain all the information they need
- ◆ Annotation of charts allows you to assign causes, allowing identification for improvement opportunities
- ◆ Foreign Language Supported include: Spanish, French, German, Portugese, Italian, Swedish and Finnish

**Supported SPC Chart Types/Features:**

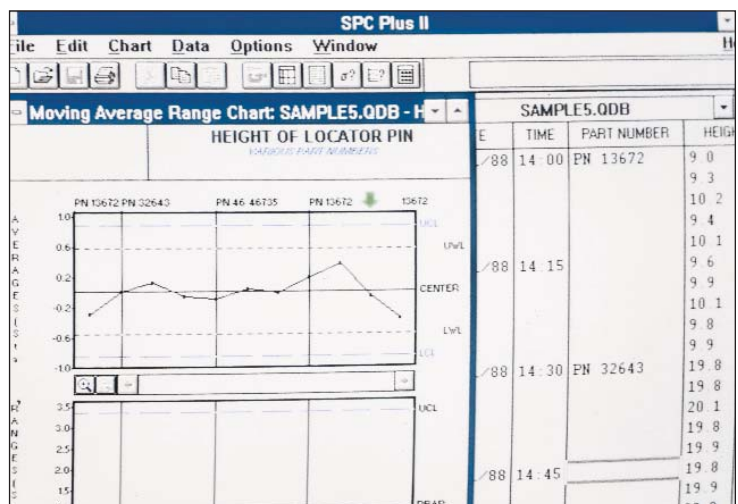
- ◆ Run? Chart
- ◆ Individual-X Chart
- ◆ XBar and Range Chart
- ◆ XBar and Sigma Chart
- ◆ Scatter Diagram (Regression)
- ◆ Pareto Charts
- ◆ Process Capability
- ◆ Histogram
- ◆ Autocorrelation? Function
- ◆ Attribute Charts: NP Chart, C? Chart, U Chart, P Chart
- ◆ Moving Average and Range Chart
- ◆ Moving Average and Sigma? Chart</



Histogram Screen.



Above: X-Bar/R-Bar. Below: Short Run Capability.







### Data Multiplexer No. 761 Series

The No. 761 Multiplexer is the computer gage interface for all Starrett as well as most other major electronic tools and measuring equipment. It is designed to work with PCs.

- ◆ Instant 'plug and work' interface to Starrett No. 739 SPC Plus II software and No. 728-3 Shop Floor Pro™ Software
- ◆ Includes Starrett Link 72
- ◆ Works with other major software
- ◆ Supplied with 4 Starrett Tool Modules
- ◆ Will accept other brands of tools using their standard cables with modules available from Starrett
- ◆ Accepts information from both analog and digital tools
- ◆ Can be expanded to handle 8 gages by adding No. 761B Expansion Unit
- ◆ AC powered

#### Easy-to-Use Features Include:

- ◆ Foot switch connectors as well as individual send buttons and indicator lights for each module port
- ◆ Controlled through easy to use software commands or simple dip-switch settings on the back of the unit.
- ◆ Housed in a rugged shop tough case with an easy-to-read faceplate



#### No. 761 Standard Components

| Catalog No. | EDP No. | Description   |
|-------------|---------|---|
| <b>761A</b> | 65854   | No. 761A Multiplexer Base Unit with 4 Starrett Modules* Installed, Power Supply, Link 72 Software Disks, and PT60642 Cable (9-Pin to 9-Pin) |
| <b>761B</b> | 65855   | No. 761B Multiplexer Expansion Unit with 4 Module Ports (No Modules are Supplied*), Complete with Cable to Attach to No. 761A Base Unit     |

\*See tool and module list at end of this section.

#### No. 761 Accessories

| Part No.       | EDP No. | Description  |
|----------------|---------|--|
| <b>PT60636</b> | 63839   | Power Supply Charger for USA and Canadian Configuration – 115/120 Volts/60 Cycle |
| <b>PT99340</b> | 66455   | Power Supply Charger for European Configuration – 100-240 VAC, 47-63Hz           |
| <b>PT99353</b> | 66456   | Power Supply Charger for United Kingdom Configuration – 100-240 VAC, 47-63Hz     |
| <b>PT99468</b> | 57092   | Foot Switch  |
| <b>PT61133</b> | 65045   | Pendant Switch   |



Tools linked to computer via Nos. 761A and 761B Multiplexers.

### Computer Interface Adaptor (for Direct Connection from Tool to Computer)

#### PT61768 / EDP 66454

This affordable, Windows®-compatible adaptor interfaces Starrett Electronic Measuring Tools\* to computers and peripherals which use an RS232C input. It allows fast and easy communication with PCs and compatibles. Installation requires No. PT22938 cable.



Left: PT61768 Computer Interface Adaptor. Right, PT61963 Single-Piece Cable and Adaptor

### Cable and Adaptor Single Piece

#### PT61963 / EDP 66636

Single-piece\*, 10' cable with adaptor (PT61768 Adaptor and PT22938 Starrett Cable incorporated into one unit), reducing the chance of a disconnect during data collection with the PC.



**Cable and Module List for Starrett Tools that Connect to Starrett 761 Multiplexers**

| Tools  | Cable            |         | Module         |         |                               |
|--|------------------|---------|----------------|---------|-------------------------------|
|  | Part No.         | EDP No. | Part No.       | EDP No. | Description                   |
| 714 Interchangeable Anvil Micrometer                 | <b>PT22938</b>   | 64059   | <b>PT61192</b> | 65444   | Starrett #3                   |
| 733 Micrometer                                       |                  |         |                |         |                               |
| 749 Depth Micrometer                                 |                  |         |                |         |                               |
| 753 Depth Gage                                       |                  |         |                |         |                               |
| 756 Disc Micrometer                                  |                  |         |                |         |                               |
| 760 Screw Thread Micrometer                          |                  |         |                |         |                               |
| 762 Micrometer Head                                  |                  |         |                |         |                               |
| 764 Sheet Metal Micrometer                           |                  |         |                |         |                               |
| 769 Tube Micrometer                                  |                  |         |                |         |                               |
| 777 Bench Micrometer                                 |                  |         |                |         |                               |
| 781 Bore Gage  |                  |         |                |         |                               |
| 786 Blade Micrometer                                 | <b>PT22938</b>   | 64059   | <b>PT61192</b> | 65444   | Starrett #3                   |
| 788 Round Anvil Micrometer                           |                  |         |                |         |                               |
| 789 Bore Gage  | <b>PT61489</b>   | 65904   | <b>PT61490</b> | 65905   | Starrett #5                   |
| 790 Multi Anvil Micrometer                           | <b>PT22938</b>   | 64059   | <b>PT61192</b> | 65444   | Starrett #3                   |
| 797 Caliper  | <b>PT61340</b>   | 65648   | <b>PT61285</b> | 65647   | Starrett #4                   |
| 795 Micrometer 1 meter shielded cable                | <b>PT62680-1</b> | 62021   | <b>PT61192</b> | 65444   | Starrett #3                   |
| 795 Micrometer 2 meter shielded cable                | <b>PT62680-2</b> | 62022   |                |         |                               |
| 795 Micrometer 3 meter shielded cable                | <b>PT62680-3</b> | 62023   |                |         |                               |
| 2000 Altissimo Height Gage                           | <b>PT62103</b>   | 67019   | <b>PT61192</b> | 65444   | Starrett #3                   |
| 2001 Altissimo "Platinum" Height Gage                |                  |         |                |         |                               |
| 2600 Series Indicator                                | <b>PT22938</b>   | 64059   | <b>PT61490</b> | 65905   | Starrett #5                   |
| 2700 Series Indicator                                | <b>PT61489</b>   | 65904   |                |         |                               |
| 3752 Height Gage                                     | <b>PT62103</b>   | 67019   | <b>PT61192</b> | 65444   | Starrett #3                   |
| RS232C (Selectable)<br>9600, 4800, 2400 or 1200 Baud |                  |         | <b>PT61924</b> | 66661   | Includes Cable for<br>No. 761 |

**Tool List for Cables that Connect  
Starrett Tools Directly to a PC**

| Cable          |       | Starrett Tool Numbers |      |        |
|----------------|-------|-----------------------|------|--------|
| Part No.       | EDP   |                       |      |        |
| <b>PT61963</b> | 66636 | 714                   | 760  | 786    |
|                |       | 733                   | 762  | 788    |
|                |       | 749                   | 764  | 790    |
|                |       | 751                   | 769  | 2600-1 |
|                |       | 753                   | 773  | 2600-4 |
|                |       | 756                   | 777  | 2600-8 |
| <b>PT62425</b> | 67658 | 2000                  | 2001 | 3752   |
| <b>PT62606</b> | 68822 | 797B                  |      |        |

**Cables and Modules for Other Manufacturers'  
Electronic Tools, for Use with Starrett 761 Multiplexers**

| Tools                                    | Cable                      | Module         |       |                        |
|--|----------------------------|----------------|-------|------------------------|
|  | Part No.                   | Starrett No.   | EDP   | Description            |
| Brown & Sharpe<br>599-1033 Indicator     | <b>B&amp;S 595-G-0196B</b> | <b>PT60672</b> | 63849 | B&S                    |
| Chicago Dial Indicator<br>"Logic" Series | <b>PT61489</b>             | <b>PT61490</b> | 65905 | Starrett #5            |
| Federal Maxum Indicator                  | <b>PT61528</b>             | <b>PT60674</b> | 63851 | Federal Max            |
| Federal Micro-Maxum<br>Indicator         | <b>PT61836</b>             | <b>PT60674</b> | 63851 | Federal<br>Micro-Maxum |
| Mitutoyo                                 | <b>MTI Cables</b>          | <b>PT60668</b> | 63846 | MTI                    |



# Starrett®

## GAGE AMPLIFIERS, HARDNESS & SURFACE TESTERS





## Analog Amplifier No. 718

This is a basic, affordable, compact shop floor analog amplifying comparator.

- ◆ Only three switches – one for inch/millimeter, one for fine or coarse resolution and one for polarity
- ◆ Zero set control
- ◆ Screwdriver adjustment for individual calibration
- ◆ Scales have mirror separation to minimize parallax viewing error
- ◆ Wire stand for easy readability
- ◆ Compact size of 8" x 4-3/4" x 2" (200 x 119 x 50mm)
- ◆ 110 volt AC operation (7.5 volt transformer furnished)
- ◆ Height gage and comparator attachment 1/4" x 1/2" (6.3 x 12.7mm) – available for adapting gaging heads to height gages, indicator holders and comparators. Attachment has a .375" (9.5mm) gripping hole

### Specifications

| Resolution |       | Range    |        |
|------------|-------|----------|--------|
| Inch       | mm    | Inch     | mm     |
| .0001"     | 0.010 | ±.003"   | ±0.300 |
| .000010"   | 0.001 | ±0.0003" | ±0.030 |



No. 718 Analog Amplifier with No. 715-1Z Lever-type Gaging Head.

| Description  | Catalog No.    | EDP No. |
|--|----------------|---------|
| Analog Amplifier with 7.5 Volt Transformer                                       | <b>718</b>     | 65164   |
| Height Gage and Comparator Attachment  | <b>PT99441</b> | 52991   |
| Lever-Type Gaging Head   | <b>715-1Z</b>  | 64479   |
| Cartridge-Type Gaging Head   | <b>715-2Z</b>  | 64480   |
| Power Supply Charger for USA and Canadian Configuration – 115/120 Volts/60 Cycle | <b>PT60636</b> | 63839   |
| Power Supply Charger for European Configuration – 100-240 VAC, 47-63Hz           | <b>PT99340</b> | 66455   |
| Power Supply Charger for United Kingdom Configuration – 100-240 VAC, 47-63Hz     | <b>PT99353</b> | 66456   |

**NOTE:** Probes are not furnished. Use with Starrett No. 715-1Z Lever-Type Gaging Head or No. 715-2Z Cartridge-Type Gaging Head. (See gage head descriptions on following pages.)



### Electronic Gage Amplifier No. 717

Starrett has made electronic gaging easier with the No. 717 Electronic Gage Amplifier. With both analog and digital output, the No. 717 offers flexibility in data presentation while providing the best approach to comparative, dynamic and differential precision measuring.

The No. 717 Gage Amplifier isn't just flexible, it's on the money with an accuracy within  $\pm 2$  percent of full scale. Ranges vary from  $\pm 0.010"$  to  $\pm 0.0001"$  ( $\pm 0.200$ mm to  $\pm 0.002$ mm), with gage graduations from  $.0005"$  to  $.000005"$  ( $0.01$ mm to  $0.0001$ mm).

#### Features

- ◆ Dual inputs for cumulative/differential measurements
- ◆ Selectable inch or millimeter ranges
- ◆ Selectable digital or analog output
- ◆ Simple "push-button" calibration
- ◆ Mirrored dial for parallax-free readability
- ◆ Rugged metal case can be used anywhere in the shop
- ◆ Uses standard Starrett lever and cartridge-type probes
- ◆ Remote zero using PC
- ◆ Front panel data send button
- ◆ Single and continuous data send modes
- ◆ Choice of remote data send using PC, pendant or foot switch



No. 717 Electronic Gage Amplifier with Nos. 252 Transfer Gage and 715-1Z Gaging Head.





## No. 717 Electronic Gage Amplifier (continued)

### Ranges/Graduations

| Range             | Each Gage Graduation |
|-------------------|----------------------|
| <b>Inch</b>       |                      |
| ±.010"            | .0005"               |
| ±.002"            | .0001"               |
| ±.001"            | .00005"              |
| ±.0002"           | .00001"              |
| ±.0001"           | .000005"             |
| <b>Millimeter</b> |                      |
| ±0.200 mm         | 0.01mm               |
| ±0.100 mm         | 0.005mm              |
| ±0.020 mm         | 0.001mm              |
| ±0.010 mm         | 0.0005mm             |
| ±0.002 mm         | 0.0001mm             |

### Accuracy

- ◆ Within ±2 percent of full scale.

### Power Requirements

- ◆ 110 volt VAC/60Hz (AC adaptor furnished)

### Data Output

- ◆ Digital: ASCII serial data
- ◆ Analog: ±2.5 VDC/Full scale

### Size

- ◆ Dimensions: Height 9-1/4" x width 5-1/2" x depth 5-1/2" (235 x 140 x 140mm)
- ◆ Weight: 6 lbs. (2.7kg)

| Description  | Catalog No.    | EDP No. |
|--|----------------|---------|
| <b>Amplifier with Power Supply Charger</b>   | <b>717</b>     | 67001   |
| <b>Lever-Type Gaging Head</b><br>Range ±.010" (0.25mm)   | <b>715-1Z</b>  | 64479   |
| <b>Cartridge-Type Gaging Head</b><br>Length 2-1/2" (64mm)<br>Range ±.020" (0.50mm)   | <b>715-2Z</b>  | 64480   |
| <b>Cartridge-Type Gaging Head</b><br>Pneumatic-Push, Length 2-3/4" (70mm)<br>Range ±.040" (0.100mm)  | <b>715-6</b>   | 64186   |
| <b>Cartridge-Type Gaging Head</b><br>Length 1-3/8" (35mm)<br>Range ±.020" (0.50mm)   | <b>715-7</b>   | 64187   |
| <b>Cartridge-Type Gaging Head</b><br>Length 2-1/2" (64mm)<br>Range ±.040" (0.100mm)  | <b>715-8</b>   | 64188   |
| <b>Cartridge-Type Gaging Head</b><br>Length 3-5/8" (92mm)<br>Range ±.080" (0.200mm)  | <b>715-9</b>   | 64189   |
| <b>Calibration Gage Block Set</b><br>2 Rectangular Steel Gage Blocks in<br>Case: .100", .110"<br>Federal Accuracy Grade 2:<br>.000004"-.000002"  | <b>715-5Z</b>  | 56312   |
| <b>Height Gage and Comparator Attachment</b> 1/4" x 1/2" (6.3 x 13.5mm)<br>(Adapts Gaging Heads to Height Gages, Magnetic Base Indicator Holders, Dial Comparators and Test Indicator Stands.) Has .375" (9.5mm) Snug Hole | <b>PT99441</b> | 52991   |
| <b>Foot Switch</b>   | <b>PT99468</b> | 57092   |
| <b>Pendant Switch</b>  | <b>PT61133</b> | 65045   |
| <b>Power Supply Charger</b> for USA and Canadian Configuration –<br>115/120 Volts/60 Cycle   | <b>PT60636</b> | 63839   |
| <b>Power Supply Charger</b> for European Configuration – 100-240 VAC, 47-63Hz  | <b>PT99353</b> | 66456   |
| <b>Power Supply Charger</b> for United Kingdom Configuration – 100-240 VAC, 47-63Hz  | <b>PT99340</b> | 66455   |
| <b>Link 72 Cable and Software</b> for Downloading to Computer  | <b>PT99523</b> | 65906   |
| <b>Cable to Computer</b> (9-Pin to 9-Pin)  | <b>PT60642</b> | 72499   |
| <b>SPC IV Excel™ Software</b>  | <b>771</b>     | 67434   |
| <b>SPC Plus® II Software</b>   | <b>739</b>     | 64955   |
| <b>Shop Floor Pro™ Software</b>  | <b>728-3</b>   | 66662   |
| <b>Software Wedge™ Program</b> for Interfacing to Spreadsheets   | <b>719</b>     | 66490   |





### No. 715 Electronic Gage Amplifier Gage Heads

#### Lever-Type Head

##### No. 715-1Z / EDP No. 64479

- ◆ Mounts directly in place of dial indicators with dovetail or AGD lug-type backs
- ◆ 8-12 grams pressure:  $\pm .010''$  (0.25mm) measuring range
- ◆  $.078''$  (2mm) diameter contact –  $.031''$  (0.8mm) and  $.062''$  (1.6mm) diameter carbide contacts are available

#### Cartridge-Type Heads

##### No. 715-2Z\* / EDP No. 64480

- ◆ 25-35 grams contact pressure: spindle range is  $\pm .020''$  (0.50mm)
- ◆ Hardened steel contact with radius tip. Head will accept all standard AGD contact points. Length:  $2-1/2''$  (64mm)
- ◆  $.375''$  (9.5mm) mounting diameter allows replacement of standard AGD dial indicators

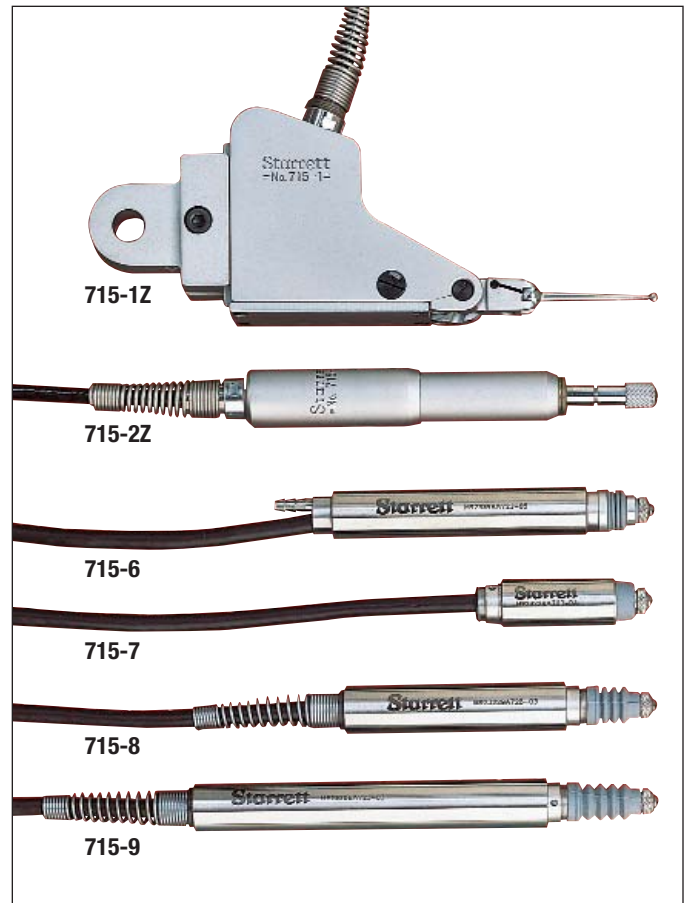
##### Nos. 715-6, 715-7, 715-8, and 715-9

- ◆ Tungsten carbide ball contacts
- ◆ Head will accept any AGD style contact\*\*
- ◆ Half-bridge construction, stainless steel body
- ◆  $.375''$  (9.5mm) mounting diameter allows replacement of standard AGD dial indicators

**NOTE:** Nos. 715-1Z, -2Z, -6, -7, -8, -9 Gaging Heads come with a 6' (1.8m) cable and male connector.

\*Longer range cartridge-type gaging heads are available, quoted on application.

\*\*No. 715-9 head will accept all standard AGD contacts.



| Spindle Range             | Length            | Contact Pressure | Cat. No.     | EDP No. |
|---------------------------|-------------------|------------------|--------------|---------|
| $\pm .040''$<br>(0.100mm) | 2-3/4"<br>(70mm)  | 70 grams         | <b>715-6</b> | 64186   |
| $\pm .020''$<br>(0.50mm)  | 1-3/8"<br>(35mm)  |                  | <b>715-7</b> | 64187   |
| $\pm .040''$<br>(0.100mm) | 2 -1/2"<br>(64mm) |                  | <b>715-8</b> | 64188   |
| $\pm .080''$<br>(0.200mm) | 3-5/8"<br>(92mm)  |                  | <b>715-9</b> | 64189   |



## Gage-Chek Multi-Axis Measured Value Display

### No. 776 Series

The Gage-Chek™ 776 is a multi-axis measured value display that accepts up to eight inputs. It features intuitive visual display, helpful audio cues and user-defined formulas. Gage-Chek also reports dynamic Min/Max measurements, provides SPC analysis from an integrated database, and includes connectivity to PCs and other Starrett tools.

#### Features

- ◆ Large (6") color flat-panel LCD screen built into a compact ergonomically designed case with an adjustable tilt base, allows comfortable positioning for the operator
- ◆ Supports 1, 4 or 8 input channels. These can be mathematically combined to display dimensions such as flatness, volume or runout
- ◆ Screens include individual readings with the capacity to display four lines simultaneously (each line 9/16" high), bar and dial position style displays, graphs and histograms of measurement statistics, and tables of measurement and SPC data
- ◆ Supports Starrett 776 Series LVTD probes and Heidenhain Specto style 12 and 30mm range digital probes
- ◆ Measurements can be taken by the operator or in a semi-automated manner
- ◆ Large comfortable buttons allow easy selection of measurement functions, display screen changes, data entry and zeroing the screen
- ◆ Speaker and external jack outputs can be adjusted to compensate for noisy work environments. Earphones can be plugged into speaker jack for silent operation
- ◆ Two 3" x 1/2" keys placed over the screen can be programmed as hot keys for frequently used functions
- ◆ Optional foot switch available



#### Specifications

|                               |  |
|-------------------------------|--|
| <b>LCD</b>                    | 6" color   |
| <b>Display Digit Size</b>     | .45"   |
| <b>Resolution Down To</b>     | .000004"/.0001mm   |
| <b>Operating Temperature</b>  | 32° - 115° F   |
| <b>Enclosure (W x H x D)</b>  | 11.5" x 7.5" x 2.75"   |
| <b>Base Width (W x H x D)</b> | 10" x 2" x 7.5"  |
| <b>Enclosure Weight</b>       | 3.5 lbs  |
| <b>Base Weight</b>            | 7 lbs  |
| <b>Input Voltage Range</b>    | 85 VAC - 264 VAC   |
| <b>Input Frequency</b>        | 43 Hz - 63 Hz  |
| <b>Inputs</b>                 | 1-, 4- and 8-axis input available  |
| <b>External Connections</b>   | Foot Switch, Remote Keypad, Touch Probe, RS232C Serial Port, Parallel Port |
| <b>Outputs</b>                | 2 Relay Outputs  |

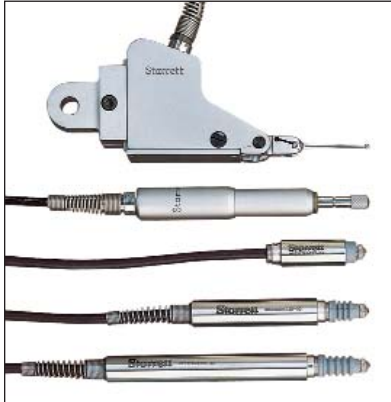
The 776 accepts multiple gage inputs simultaneously – invaluable for applications such as this Starrett special gage fixture.



(Continued on next page.)



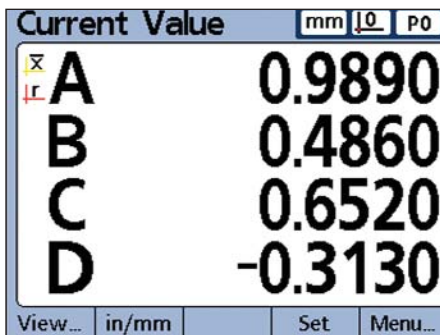
### No. 776 Gage-Chek Multi-Axis Measured Value Display (continued)



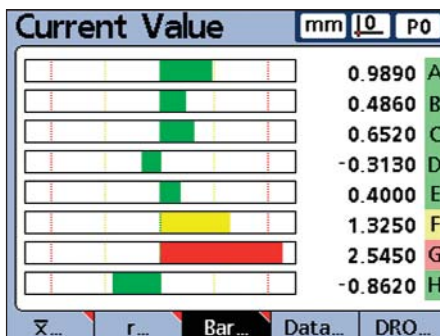
LVDT Probes.



Heidenhain Spectro Length Probes.



**DRO View:** Gage-Chek 776 features large, easy-to-read numerical display with custom dimension labels. Out of tolerance conditions are quickly identified by a change to red. Icons indicate that a process study has been performed, complete with in/out of tolerance alert. Mode switches include inch/metric, absolute/incremental, decimal degree/degrees, minutes, seconds.



**Column Gage View:** Color-enhanced vertical or horizontal bar graph. User selectable high and low tolerance and warning limits with audio alert provide instant feedback.

| Description                                 | Cat. No. | EDP No. |
|---|----------|---------|
| Gage-Chek – 140-SP with 4 Inputs, Specto    | 776A     | 68635   |
| Gage-Chek – 180-SP with 8 Inputs, Specto    | 776B     | 68636   |
| Gage-Chek – 110-ST with 1 Input, LVDT       | 776C     | 68761   |
| Gage-Chek – 140-ST with 4 Inputs, LVDT      | 776D     | 68762   |
| Gage-Chek – 180-ST with 8 Inputs, LVDT      | 776E     | 68763   |
| Software Wedge RS232 for Windows®           | 719      | 66490   |
| SPC Plus II Software                        | 739      | 64955   |
| Cable RS232, 9 to 9 Pin Serial Cable        | PT60642  | 72499   |
| Cable RS232, 9 to 25 Pin Serial Cable       | PT60643  | 63843   |
| Two-Function Foot Switch with 8' Cable      | PT99530  | 68637   |
| Eight-Function Remote Keypad with 15' Cable | PT62514  | 68638   |
| Gage-Chek Instruction Manual                | PT62515  | 68639   |
| .472" (12mm) Length Probe                   | 776-12   | 68640   |
| .472" (12mm) Length Probe Radial Exit       | 776-12R  | 68796   |
| 1.180" (30mm) Length Probe                  | 776-30   | 68641   |
| 1.180" (30mm) Length Probe Radial Exit      | 776-30R  | 68797   |
| 9.84' (3 meter) Extension Cable             | PT05713  | 68172   |
| 32.8' (10 meter) Extension Cable            | PT05727  | 68773   |
| ±.010" (0.25mm) Lever Type Probe            | 776-1Z   | 68817   |
| ±.020" (0.50mm) Traditional Probe           | 776-2    | 68818   |
| ±.020" (0.50mm) Short Probe                 | 776-7    | 68819   |
| ±.040" (0.100mm) Probe                      | 776-8    | 68820   |
| ±.100" (2.54mm) Probe                       | 776-9    | 68821   |
| 6' (1.82 meter) Extension Cable             | PT05414  | 68828   |
| 15' (4.5 meter) Extension Cable             | PT05415  | 68829   |





## Automated Digital Hardness Testing System

### No. 3817 / EDP 67756

The No. 3817 Automated Digital Hardness Testing System provides durable, precise results for even the most demanding applications. Capable of measuring all Rockwell, Rockwell Superficial, Vickers and Brinell Scales, it meets or exceeds all major industry standards requirements, offering unsurpassed accuracy, reliability and overall performance.

Easy-to-use and exceptionally precise, this full-featured system offers one-touch automated testing with minimal operator involvement. Overall, the No. 3817 is the ultimate hardness testing solution.

#### Features

- ◆ One-touch automated testing with minimal operator involvement
- ◆ Closed-loop NTEP load cell technology improves repeatability and efficiency, while eliminating conventional weights method
- ◆ Preset dwell times and automatic cylindrical correction for hardness value comply with ASTM E-18 tolerances
- ◆ Hardness numbers are displayed from 1 to 1/100th point on the digital control panel, which is easy to use and to view
- ◆ Built-in electronic conversion charts for cross-referencing hardness scales and approximating tensile strength – no mechanical or electronic adjustments required
- ◆ Meets or exceeds new ASTM and ISO requirements, and meets Direct NIST Traceability requirements
- ◆ RS232C output
- ◆ Detachable clamping device for oversized or irregular parts
- ◆ Self-contained head assembly adaptable for special applications
- ◆ Rigid, modular base assembly
- ◆ Upper and lower limit alarms
- ◆ Fitted tray for indentors and anvils
- ◆ Includes detachable clamping device, direct verification certificate for load, depth, hysteresis and timing, indirect verification certificate for B, C, 30N and 30T scales, operator manual, indenter installation tool, and AC power cable
- ◆ 2-year limited warranty
- ◆ Made in the U.S.A.



#### Specifications

|                                 |                        |
|---------------------------------|------------------------|
| <b>Minor Load</b>               | 10kg                   |
| <b>Minor Load – Superficial</b> | 3kg                    |
| <b>Major Load</b>               | 60/100/150kg           |
| <b>Major Load – Superficial</b> | 15/30/45kg             |
| <b>Test Force Control</b>       | Motorized              |
| <b>Results Display</b>          | Digital Readout        |
| <b>Throat Depth</b>             | 5-1/2"                 |
| <b>Maximum Test Height</b>      | 10" *                  |
| <b>Unit Height/Width/Depth</b>  | 33-1/4" x 8" x 19-3/4" |
| <b>Weight</b>                   | 185 lbs.               |

**NOTE:** For listings of test blocks and accessories, refer to the following pages in this section.

\* Requires bench alteration.





**Digital Bench  
Hardness Tester**

**No. 3816 / EDP 67755**

The microprocessor controlled No. 3816 Bench Hardness Tester offers easy, fully automated testing procedures and provides highly sensitive and accurate readings.

The No. 3816 can measure the full regular Rockwell Scales according to ASTM and SAE guidelines. It accommodates all types of hard or soft metals and alloys, in numerous configurations. Overall, the No. 3816 is packed with features and provides excellent value.

The tester is furnished with a diamond indenter, a 1/16" (1.6mm) ball indenter, three certified test blocks, four test tables – 5.87" (149mm) and 2.5" (63.5mm) flat anvils, 5/8" (15.9mm) spot anvil and a standard vee anvil – and an accessory case.

**Features**

- ◆ Automated routines reduce operator involvement and speed measurements
- ◆ Large, easy-to-view LED panel displays proper load setting
- ◆ Programmable scale conversions, dwell times and tester counter
- ◆ Sample averaging is automatically calculated
- ◆ RS232C output
- ◆ Convenient mini-printer for outputting readings
- ◆ Quality castings with large working area



**Specifications**

|                                |                                      |
|--------------------------------|--------------------------------------|
| <b>Minor Load</b>              | 10Kgf                                |
| <b>Major Load</b>              | A: 60Kgf, B: 100Kgf, C: 150Kgf       |
| <b>Test Force Application</b>  | (Dead weight applies test force)     |
| <b>Test Force Control</b>      | Motorized                            |
| <b>Results Display</b>         | Digital Readout                      |
| <b>Throat Depth</b>            | 6.6" (168mm)                         |
| <b>Maximum Test Height</b>     | 6.69" (169.9mm) **                   |
| <b>Unit Height/Width/Depth</b> | 28 x 8.9 x 19.6" (711 x 226 x 498mm) |
| <b>Unit Weight</b>             | 187 lbs. (85kg)                      |

| Description                   | Catalog No. | EDP No. |
|-------------------------------|-------------|---------|
| Digital Bench Hardness Tester | <b>3816</b> | 67755   |

**Accessories\***

|                                     |                |       |
|-------------------------------------|----------------|-------|
| "C" Regular                         | <b>PT05245</b> | 67944 |
| 1/16" (1.6mm) Ball Unit             | <b>PT05249</b> | 67948 |
| RA Test Block (Rockwell A Scale 80) | <b>PT05069</b> | 67897 |
| RB Test Block (Rockwell B Scale 90) | <b>PT05059</b> | 67888 |
| RC Test Block (Rockwell C Scale 63) | <b>PT05050</b> | 67879 |
| Master Block Set, Rockwell C Scale  | <b>PT05272</b> | 67969 |

\* For additional listings of test blocks and accessories, refer to the following pages in this section. \*\* Requires bench alteration.



## Analog Bench Hardness Tester

### No. 3814 / EDP 67754

The No. 3814 Hardness Tester provides reliable Rockwell Hardness values on all types of metal and alloys, hard or soft, and in many shapes. This reliable bench hardness tester has a high quality casting, is ergonomically designed for easy operation and is engineered to ensure accurate results.

It is an ideal basic hardness solution, economically priced to suit a variety of lab, workshop, toolroom and inspection department applications. The No. 3814 conforms to ASTM E-18 standard.

The tester is furnished with a diamond indenter, a 1/16" (1.6mm) ball indenter, three certified test blocks, four test tables – 5.87" (149mm) and 2.5" (63.5mm) flat anvils, 5/8" (15.9mm) spot anvil and a standard vee anvil – and an accessory case.

#### Features

- ◆ Ability to handle Rockwell Scales A through H and K
- ◆ Stable cast iron construction
- ◆ Ideal basic hardness testing for many typical applications



#### Specifications

|                                |                                    |
|--------------------------------|------------------------------------|
| <b>Minor Load</b>              | 10Kgf                              |
| <b>Major Load</b>              | A: 60Kgf, B: 100Kgf, C: 150Kgf     |
| <b>Test Force Application</b>  | (Dead weight applies test force)   |
| <b>Test Force Control</b>      | Hydraulic Dashpot System           |
| <b>Results Display</b>         | Analog – Dial Gage                 |
| <b>Throat Depth</b>            | 6.6" (168mm)                       |
| <b>Maximum Test Height</b>     | 6.69" (169.9mm) **                 |
| <b>Unit Height/Width/Depth</b> | 30 x 8.5 x 20" (762 x 216 x 508mm) |
| <b>Unit Weight</b>             | 267 lbs. (121kg)                   |

| Description            | Catalog No. | EDP No. |
|------------------------|-------------|---------|
| Analog Hardness Tester | <b>3814</b> | 67754   |

#### Accessories\*

| Description                         | Catalog No.    | EDP No. |
|-------------------------------------|----------------|---------|
| "C" Regular                         | <b>PT05245</b> | 67944   |
| 1/16" (1.6mm) Ball Unit             | <b>PT05249</b> | 67948   |
| RA Test Block (Rockwell A Scale 80) | <b>PT05069</b> | 67897   |
| RB Test Block (Rockwell B Scale 90) | <b>PT05059</b> | 67888   |
| RC Test Block (Rockwell C Scale 63) | <b>PT05050</b> | 67879   |
| Master Block Set, Rockwell C Scale  | <b>PT05272</b> | 67969   |

\* For additional listings of test blocks and accessories, refer to the following pages in this section. \*\* Requires bench alteration.



### Test Blocks and Accessories for Hardness Testers

Starrett blocks can be used to test Rockwell, Brinell or Vickers scales. They are available in steel, brass and aluminum. Each block is serialized, with a certificate detailing the environmental conditions used to test the block.

Actual readings are given, with the averages of these readings: min. reading, max reading and a repeatability figure. The blocks are calibrated according to ASTM E-18 standards, ANSI (NCSL) Z540-1, (ISO) 10012-1, ISO/IEC 17025 and Mil-std 45662A.

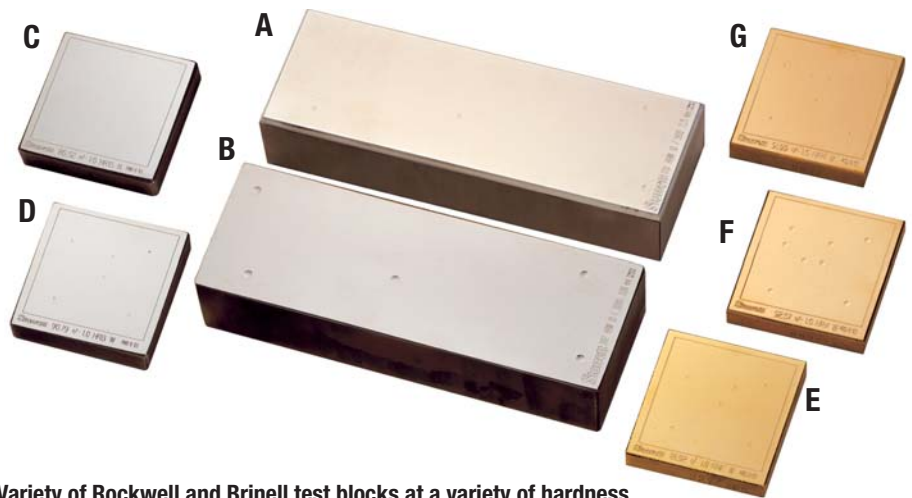
Starrett hardness test blocks are manufactured from square steel or brass plates, as opposed to the more common round bar stock. The use of plate gives a more accurate and consistent surface for inspection. Metallurgical tests have proved that during the production of round bar stock, suspended carbides in the mix migrate to the center of the rod.

The scientific name for this condition is carbide segregation and results in different readings being found in the center of a rod rather than at its outer edges. Some manufacturers remedy this situation by removing the centers from their blocks.

Hardness test blocks are designed to be used only on one side and the indents should be more than .010" from the centers of two indents or no closer to the block's edge than .040".

Calibration kits are also available from Starrett. No facility with a hardness tester in use should be without a calibration kit. These kits come with from 3 to 20 calibrated test blocks and the serialized penetrator that was used to inspect each of the blocks in the set. When a discrepancy is detected in a tester, these kits allow you to determine the direction to proceed to resolve the issue.

† Values expressed are not exact but will range within acceptable limits



Variety of Rockwell and Brinell test blocks at a variety of hardness levels. (A) Aluminum Brinell, (B) Steel Brinell, (C) Vickers, (D) Rockwell, (E) 187.5kg./2.5mm Brinell, (F) Extra-Soft Rockwell and (G) Brass Rockwell.

#### Rockwell Test Blocks

| Description †    | Part No. | EDP   |
|------------------|----------|-------|
| RC63 Test Block  | PT05050  | 67879 |
| RC60 Test Block  | PT05051  | 67880 |
| RC55 Test Block  | PT05052  | 67881 |
| RC50 Test Block  | PT05053  | 67882 |
| RC45 Test Block  | PT05054  | 67883 |
| RC40 Test Block  | PT05055  | 67884 |
| RC35 Test Block  | PT05056  | 67885 |
| RC30 Test Block  | PT05057  | 67886 |
| RC25 Test Block  | PT05058  | 67887 |
| RB90 Test Block  | PT05059  | 67888 |
| RB80 Test Block  | PT05060  | 67889 |
| RB70 Test Block  | PT05061  | 67890 |
| RB60 Test Block  | PT05062  | 67891 |
| RB50 Test Block  | PT05063  | 67892 |
| RB40 Test Block  | PT05064  | 67893 |
| RB30 Test Block  | PT05065  | 67894 |
| RB20 Test Block  | PT05067  | 67895 |
| RB10 Test Block  | PT05068  | 67896 |
| RA80 Test Block  | PT05069  | 67897 |
| RA70 Test Block  | PT05091  | 67898 |
| RA60 Test Block  | PT05092  | 67899 |
| RF100 Test Block | PT05100  | 67900 |
| RF90 Test Block  | PT05101  | 67901 |
| RF80 Test Block  | PT05102  | 67902 |
| RF70 Test Block  | PT05103  | 67903 |
| RF60 Test Block  | PT05104  | 67904 |
| RF50 Test Block  | PT05105  | 67905 |
| RE100 Test Block | PT05106  | 67906 |
| RE90 Test Block  | PT05107  | 67907 |
| RE80 Test Block  | PT05108  | 67908 |
| RE70 Test Block  | PT05112  | 67909 |
| RE60 Test Block  | PT05113  | 67910 |
| RE50 Test Block  | PT05114  | 67911 |

#### Rockwell Test Blocks

| Description †      | Cat. No. | EDP   |
|--------------------|----------|-------|
| HR30N80 Test Block | PT05115  | 67912 |
| HG30N70 Test Block | PT05122  | 67913 |
| HR30N60 Test Block | PT05123  | 67914 |
| HR30N50 Test Block | PT05124  | 67915 |
| HR30N40 Test Block | PT05125  | 67916 |
| HR30T80 Test Block | PT05127  | 67917 |
| HR30T70 Test Block | PT05128  | 67918 |
| HR30T60 Test Block | PT05129  | 67919 |
| HR30T50 Test Block | PT05130  | 67920 |
| HR30T40 Test Block | PT05177  | 67921 |
| HR30T30 Test Block | PT05178  | 67922 |
| HR30T20 Test Block | PT05179  | 67923 |
| HR30T10 Test Block | PT05180  | 67924 |
| HR15N90 Test Block | PT05181  | 67925 |
| HR15N80 Test Block | PT05182  | 67926 |
| HR15N10 Test Block | PT05183  | 67927 |
| HR15T90 Test Block | PT05184  | 67928 |
| HR15T80 Test Block | PT05185  | 67929 |
| HR15T70 Test Block | PT05186  | 67930 |
| HR15T60 Test Block | PT05187  | 67931 |
| HR45T70 Test Block | PT05188  | 67932 |
| HR45T60 Test Block | PT05189  | 67933 |
| HR45T50 Test Block | PT05191  | 67934 |
| HR45T40 Test Block | PT05192  | 67935 |
| HR45T20 Test Block | PT05193  | 67936 |
| HR45T10 Test Block | PT05194  | 67937 |
| HRH90 Test Block   | PT05195  | 67938 |
| HRH80 Test Block   | PT05196  | 67939 |
| HRR Test Block     | PT05197  | 67940 |
| HR30Y Test Block   | PT05198  | 67941 |
| HRM Test Block     | PT05199  | 67942 |
| HR15W Test Block   | PT05200  | 67943 |

**NOTE:** Contact The L.S. Starrett Co. for additional blocks and accessories.

(Continued on next page.)



**Test Blocks and Accessories for Hardness Testers (continued)**

**Brinell Test Blocks**

|                                |                |       |
|--------------------------------|----------------|-------|
| 3000kg High Brinell Test Block | <b>PT05257</b> | 67956 |
| 3000kg Low Brinell Test Block  | <b>PT05258</b> | 67957 |
| 500kg High Brinell Test Block  | <b>PT05259</b> | 67958 |
| 500kg Low Brinell Test Block   | <b>PT05260</b> | 67959 |



Standard and special anvils.

**Anvils and Table**

|                        |                |       |
|------------------------|----------------|-------|
| Pedestal Anvil         | <b>PT05267</b> | 67964 |
| 2-1/2" Flat Anvil      | <b>PT05268</b> | 67965 |
| Small "V" Anvil        | <b>PT05269</b> | 67966 |
| Large "V" Anvil        | <b>PT05270</b> | 67967 |
| 8" Anvil Testing Table | <b>PT05271</b> | 67968 |



PT05272 HRC 3-Block Master Calibration Kit.

**Master Calibration Kits**

| Description                                | Cat. No.       | EDP No. |
|--|----------------|---------|
| HRC 3-Block Master Calibration Kit         | <b>PT05272</b> | 67969   |
| HR30N 3-Block Master Calibration Kit       | <b>PT05273</b> | 67970   |
| HRB 3-Block Master Calibration Kit         | <b>PT05276</b> | 67971   |
| C&B Scale 20-Block Master Calibration Kit  | <b>PT05277</b> | 67972   |
| C&30N Scale 6-Block Master Calibration Kit | <b>PT05278</b> | 67973   |



Penetrators: (A) 1/2" Ball Unit, (B) 1/4" Ball Unit, (C) 1/8" Ball Unit, (D) 1/16" Ball Unit and (E) Diamond Cone or "C" Regular. (F) Vickers/Knoop and (G) Newage-type indenter styles are also shown – contact Starrett for further information.

**Penetrators**

|  |                |       |
|--|----------------|-------|
| "C" Regular                                    | <b>PT05245</b> | 67944 |
| Indentron                                      | <b>PT05246</b> | 67945 |
| Versitron                                      | <b>PT05247</b> | 67946 |
| "N" Regular                                    | <b>PT05248</b> | 67947 |
| 1/16" (1.6mm) Ball Unit                        | <b>PT05249</b> | 67948 |
| 1/8" (1.7mm) Ball Unit                         | <b>PT05250</b> | 67949 |
| 1/4" (6.4mm) Ball Unit                         | <b>PT05251</b> | 67950 |
| 1/2" (12.7mm) Ball Unit                        | <b>PT05252</b> | 67951 |
| 1/16" (1.6mm) Carbide Ball, with Certification | <b>PT05253</b> | 67952 |
| 1/8" (1.7mm) Carbide Ball, with Certification  | <b>PT05254</b> | 67953 |
| 1/4" (6.4mm) Carbide Ball, with Certification  | <b>PT05255</b> | 67954 |
| 1/2" (12.7mm) Carbide Ball, with Certification | <b>PT05256</b> | 67955 |
| Heavy Load, Vickers 5kg Load                   | <b>PT05261</b> | 67960 |
| Heavy Load Indentor                            | <b>PT05264</b> | 67961 |
| Min. Brinell 2 1/2mm Ball                      | <b>PT05265</b> | 67962 |
| Min. Brinell Block 187 1/2kg, 2-1/2mm Ball     | <b>PT05266</b> | 67963 |

**NOTE:** Contact The L.S. Starrett Co. for additional blocks and accessories.





### Portable Hardness Tester with Integrated, Multi-functional Features

#### No. 3811 / EDP 67184

The Starrett 3811 is an advanced, integrated hardness tester featuring a very compact size, high accuracy, a wide measuring range and simplicity of operation. It is ideal for testing the hardness of all metals in many areas of industry.

The 3811 combines the universal impact device D and a data processor designed into a single unit. With the ability to “plug and play” optional impact devices, this unit can effectively test almost any combination of material, size and shape.

It automatically computes at Vickers, Brinell, Rockwell and Shore hardness values. Statistical mean value is automatically provided.

#### Features

- ◆ Compact size, lightweight
- ◆ Power-packed at a very affordable price
- ◆ Built-in D impact probe with internal tungsten carbide test tip (optional probes also available)
- ◆ Back lighting, with LCD readout
- ◆ Utilizes new Leeb measuring method
- ◆ Battery operated
- ◆ Highly accurate and archives data
- ◆ Parts can be checked at any angle



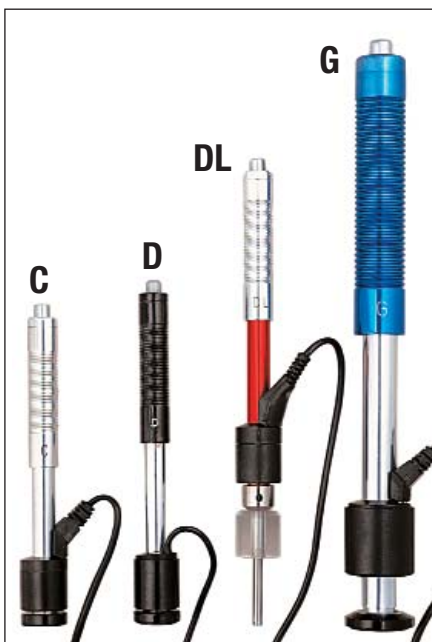
**No. 3811**  
Portable Hardness Tester.

- ◆ Furnished in handsome, rugged carry case with calibrated test block and manual
- ◆ Extended memory of up to 500 groups
- ◆ Error modification function
- ◆ Automatic shut off

#### Specifications

|   |  |
|---|--|
| <b>Dimensions</b>                       | 2-1/2" W x 1-1/8" D x 6-1/2" L (64 x 29 x 165mm)     |
| <b>Impact Device</b>                    | D (built-in)   |
| <b>Impact Energy</b>                    | 8 ft.-lbs. (11 Nmm)                                  |
| <b>Test Tip</b>                         | tungsten carbide                                     |
| <b>Measuring Accuracy</b>               | ±0.8% (corresponding to ±1 HRC @ HRC=58)             |
| <b>Maximum Hardness of Sample</b>       | 980HV  |
| <b>Weight</b>                           | 8.1 oz (28.6g)                                       |
| <b>Impact Direction</b>                 | Any angle  |
| <b>Operating Temperature</b>            | 32° – 122° F (0 – 50° C)                             |
| <b>Minimum Weight of Sample</b>         | 11 lbs./5kg (< 5kg – 0.1kg coupled on solid support) |
| <b>Minimum Thickness of Sample</b>      | 0.2" (5mm) (coupled: 0.12"/3mm)                      |
| <b>Minimum Thickness of Layers</b>      | 0.32" (0.8mm)  |
| <b>Minimum Radius of Curved Surface</b> | 1.2" (30mm) (with support rings: 0.43"/11mm)         |

Coupling paste is available for testing thin or small parts weighing less than 2.4 lbs. (2kg)



Optional Remote Impact Devices.

| Style       | Part No.                      | EDP   | Applications   |
|-------------|-------------------------------|-------|--|
| <b>D+15</b> | <b>PT28247</b><br>(not shown) | 67281 | Very narrow contact area with a set backed measurement coil. Measures hardness in grooves and recesses. Weight: 80g  |
| <b>C</b>    | <b>PT28250</b>                | 67284 | Reduced impact energy probe (2 ft.-lb.) for measuring hardness of coatings, surface hardened, thin wall or impact sensitive components. Applies superficial indentation. Weight: 75g   |
| <b>G</b>    | <b>PT28249</b>                | 67283 | Enlarged test tip and increased impact energy range (72 ft.-lb – approx. 9 times the D). For lower quality finishes measuring in the Brinell range only (max. 650 HB). Designed for components like heavy castings, forgings. Weight: 250g |
| <b>DL*</b>  | <b>PT28248</b>                | 67282 | Needle front section with 4mm diameter and 50mm length. Ideal for testing in confined spaces, the base of grooves and special components like gear wheels. Steel/Cast steel  |



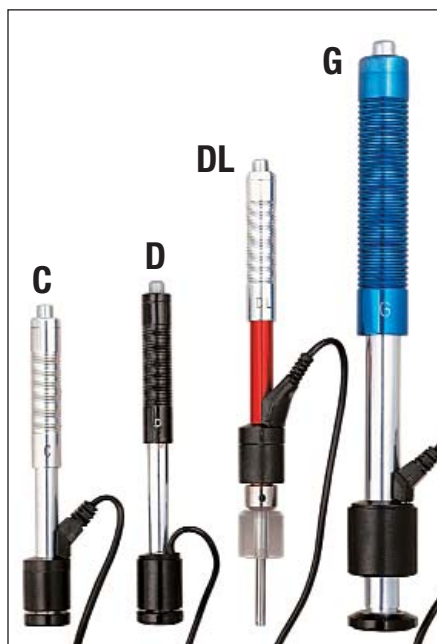
**Technical Data for  
Starrett Hardness  
Impact Devices**



**Technical Data**

| Impact Devices                             |                          | D/DC/DL          | D+15    | C       | G       |
|--|--------------------------|------------------|---------|---------|---------|
| <b>Impact Energy</b>                       |                          | 11 Nmm           | 11 Nmm  | 3 Nmm   | 90 Nmm  |
| <b>Mass of the Impact Body</b>             |                          | 5.5g             | 7.8g    | 3.0g    | 20g     |
| <b>Test Tip</b><br>DL: 7.3 g               | Hardness                 | 1600 HV          | 1600 HV | 1600 HV | 1600 HV |
|  | Diameter                 | 3mm              | 3mm     | 3mm     | 5mm     |
|  | Material                 | Tungsten carbide |         |         |         |
| <b>Impact Device</b>                       | Diameter                 | 20mm             | 20mm    | 20mm    | 30mm    |
|  | Length                   | 147/86mm         | 162mm   | 141mm   | 254mm   |
|  | Weight                   | 75/50 g          | 80 g    | 75 g    | 250 g   |
| <b>Max. Hardness of Sample</b>             |                          | 940 HV           | 940 HV  | 1000 HV | 650 HB  |
| <b>Preparation of Surface</b>              | Roughness class ISO      | N7               | N7      | N5      | N9      |
|  | Max. roughness depth Rt  | 10µm             | 10µm    | 2.5µm   | 30µm    |
|  | Average roughness Ra     | 2µm              | 2µm     | 0.4µm   | 7µm     |
| <b>Min. Weight of Sample</b>               | Of compact shape         | 5kg              | 5kg     | 1.5kg   | 15kg    |
|  | On solid support         | 2kg              | 2kg     | 0.5kg   | 5kg     |
|  | Coupled on plate         | 0.1kg            | 0.1kg   | 0.02kg  | 0.5kg   |
| <b>Min. Thickness of Sample</b>            | Coupled                  | 3mm              | 3mm     | 1mm     | 10mm    |
|  | Min. thickness of layers | 0.8mm            | 0.8mm   | 0.2mm   | —       |
| <b>Indentation of Test Tip with 300 HV</b> | Diameter                 | 0.54mm           | 0.54mm  | 0.38mm  | 1.03mm  |
|  | Depth                    | 24µm             | 24µm    | 12µm    | 53µm    |
| <b>Indentation of Test Tip with 600 HV</b> | Diameter                 | 0.45mm           | 0.45mm  | 0.32mm  | 0.90mm  |
|  | Depth                    | 17µm             | 17µm    | 8µm     | 41µmC   |
| <b>Indentation of Test Tip with 800 HV</b> | Diameter                 | 0.35mm           | 0.35mm  | 0.30mm  | —       |
|  | Depth                    | 10µm             | 10µm    | 7µm     | —       |

**Application and  
Hardness Ranges for  
Starrett Hardness  
Impact Devices**



**Optional Impact Devices**

| Material  | HRC       | HRB       | HB      | HV     | HSD       |
|---|-----------|-----------|---------|--------|-----------|
| <b>Impact Device – D, DC Measuring Range 200-900†</b>             |           |           |         |        |           |
| Steel   | 20.0-67.9 | 59.6-99.5 | 80-647  | 80-940 | 32.2-99.5 |
| C.W. Tool Steel   | 20.4-67.1 |           |         | 80-898 |           |
| Gray Cast Iron  |           |           | 93-334  |        |           |
| Nodular Cast Iron   |           |           | 131-387 |        |           |
| Cast Aluminum   |           |           | 30-159  |        |           |
| Brass   |           | 13.5-95.3 | 40-173  |        |           |
| Bronze  |           |           | 60-290  |        |           |
| Copper  |           |           | 45-315  |        |           |
| <b>Impact Device – D+15, Measuring Range 300-900† (not shown)</b> |           |           |         |        |           |
| Steel & Cast Steel  | 19.3-67.9 |           | 80-638  | 80-937 | 33.3-99.3 |
| <b>Impact Device – C, Measuring Range 350-950†</b>                |           |           |         |        |           |
| Steel & Cast Steel  | 20.0-69.5 |           | 80-683  | 80-996 | 31.9-99.6 |
| <b>Impact Device – G, Measuring Range 300-750†</b>                |           |           |         |        |           |
| Steel & Cast Steel  |           | 47.7-99.9 | 90-646  |        |           |
| Gray Cast Iron  |           |           | 92-326  |        |           |
| Nodular Cast Iron   |           |           | 127-364 |        |           |
| <b>Impact Device – DL, Measuring Range 300-900†</b>               |           |           |         |        |           |
| Steel & Cast Steel  | 20-68     | 37-100    | 80-650  | 80-940 | 30-97     |

† Leeb Measuring Range



### Digital Durometer

#### No. 3805A

The No. 3805A is a lightweight, ergonomically designed, reasonably priced durometer engineered to perform at the highest level of accuracy.

Capable of measuring hardness in Shore A values, the most popular scale, the portable durometer is ideal for fast, convenient testing of rubber, PVC, leathers, vinyl, acrylic and other similar materials. Contact is made with a 35° blunt point, ensuring superior accuracy.

#### Features

- ◆ Accurate and repetitive deviation of 20-90 HA <math>\pm 1</math> grade
- ◆ Resolution of .1HA
- ◆ Measuring range of 0-100HA
- ◆ Conforms to ASTM D-2240, ISO 7619 standards
- ◆ Large, easy-to-read LCD display
- ◆ Automatic Off
- ◆ Ability to allow averaging and to lock in peak value
- ◆ Weighs only 8.2 ounces (233 grams)
- ◆ Compact size of 6.40 x 2.56 x 1.12" (163 x 65 x 28mm)
- ◆ 4 AAA batteries, supplied with the tester
- ◆ Supplied with rubber test block RBR-63



Inspecting rubber o-ring for deterioration.

NEW

| Description                                    | Catalog No.   | EDP No. |
|--|---------------|---------|
| Durometer, in Fitted Case                      | <b>3805A</b>  | 12265   |
| Accessories                                    |               |         |
| Rubber Test Block, Shore A 27-30, Red          | <b>RBR-30</b> | 68197   |
| Rubber Test Block, Shore A 61-63, Clear        | <b>RBC-63</b> | 68198   |
| Rubber Test Block, Shore A 90-94, Black        | <b>RBB-94</b> | 68199   |
| Set of 3 Blocks (1 ea: RBR-30, RBC-63, RBB-94) | <b>SRB-3</b>  | 68200   |

### Ultrasonic Thickness Gage

#### No. 3812 / EDP 67668

The No. 3812 Ultrasonic Thickness Gage is a menu driven, multifunctional tester with basic measurement capabilities. This gage is designed to measure the thickness of metallic and non-metallic materials such as aluminum, titanium, plastics, ceramics,

glass and any other good ultrasonic wave conductor, as long as it has parallel top and bottom surfaces. The No. 3812 will accurately display readings in either inch or millimeter after a simple calibration to a known thickness or sound velocity.



Measuring a wall thickness that would be difficult to gage with conventional hand tools.

**NOTE:**  
Also available, Coupling Gel in 4 oz. bottle.  
Order No. PT28287  
EDP No. 67666.

#### Specifications

|                            |                                     |
|----------------------------|-------------------------------------|
| Display Type               | 4-Digit LCD                         |
| Minimum Display Unit       | 0.001" (0.01mm)                     |
| Measuring Range            | 0.04-8.0" in Steel w/Standard Probe |
| Display Accuracy           | 0.001" (0.01mm)                     |
| Sound Velocity Range       | 3280-32805 ft/s (1000-9999m/s)      |
| Operating Temperature      | 32°-122° F.                         |
| Ultrasonic Pulse Frequency | 5MHz                                |
| Update Rate                | 4Hz                                 |
| Power Supply               | 1.5V AAA Alkaline Batteries (2)     |
| Battery Life               | Approx. 250 Hours/Pair              |
| Power Consumption          | Working Current < 20mA              |
| Dimensions                 | 4-1/4" x 2-3/8" x 1"                |
| Weight                     | 4.7 oz.                             |





## Portable Surface Roughness Tester

**No. 3800 / EDP 67182**

The Starrett No. 3800 Surface Roughness Tester is an economical, small, hand-held instrument for measuring surface texture conforming to traceable standards. It can be used on the shop floor in any position including horizontal, vertical and in-between.

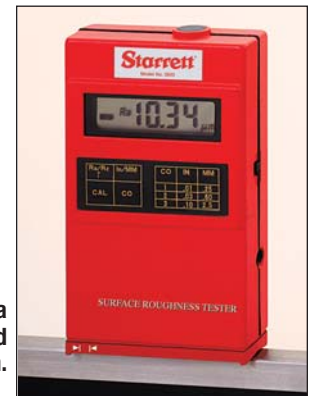
The easy-to-use No. 3800 operates on numerous surfaces including flat, outer cylinder, outer cone, grooves, and recesses greater than 3-1/4" x 1-1/4" (80 x 30mm), making it ideal for a wide range of applications like inspection departments, quality control, on the shop floor during machining, during assembly and on site.

The No. 3800 determines both roughness parameters **Ra** and **Rz** within a wide measuring range plus the piezo-electric pick-up stylus with diamond tip assures very reliable measurement within tolerances that conform to ISO class 3. Roughness parameter Ra is computed to conform to ISO and Rz is computed to conform to DIN.

The large, easy-to-read LCD display shows either roughness parameter Ra or Rz at the touch of a button, combined with the selected cutoff length. External calibration of the roughness values is provided by a special CAL button, which makes adjustment very easy. A beep signal informs the user about each individual measurement status when ready.

### Features

- ◆ Very affordable
- ◆ Handles basic roughness needs
- ◆ Simple to use
- ◆ Convenient, pocket-sized
- ◆ Vivid LCD display
- ◆ Measures Ra or Rz
- ◆ Battery powered or line cord
- ◆ Adjustable cutoff values
- ◆ Diamond tracer tip
- ◆ Comes with carrying case, charger, roughness standard and manual



Measuring surface texture of a steel bar. Results are obtained at the touch of a button.

### Specifications

|  |                                      |
|--|--------------------------------------|
| <b>Roughness Parameter</b>                     | Ra (ISO), Rz (DIN)                   |
| <b>Measuring Range</b>                         | Ra: 0.05 - 10.0µm / Rz: 0.1 - 50µm   |
| <b>Cutoff Lengths</b>                          | 0.0009", 0.03", 0.09"                |
| <b>Filter</b>                                  | RC analog                            |
| <b>Tracing Length</b>                          | 0.23" (6mm)                          |
| <b>Tracing Speed</b>                           | 0.04"/second (1.0mm/second)          |
| <b>Accuracy</b>                                | Conform ISO Class 3                  |
| <b>Pick-up Stylus</b>                          | Piezo-electric                       |
| <b>Tracer Tip</b>                              | Diamond, radius 10µm + -2.5µm        |
| <b>Operating Temperature</b>                   | 32-104° F (0-40° C)                  |
| <b>Power</b>                                   | 3.6v / 2xNiMh batteries              |
| <b>Charger</b>                                 | PV DC                                |
| <b>Contact Force on Probe</b>                  | <1.8 ozf (<1.6 gf)                   |
| <b>Static Measuring Force on Sensor Stylus</b> | <0.06 ozf (<1.6 gf)                  |
| <b>Dimensions</b>                              | 4.9" x 2.8" x 1.0" (125 x 73 x 26mm) |
| <b>Weight</b>                                  | 7 oz. (200 g)                        |



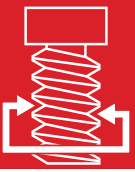


### Starrett Indicating Thread Gage Systems

Threaded fasteners are common for millions of different uses and vary in precision, depending on the application. All fasteners, such as screws, bolts, threaded components, etc., need to be measured. The Starrett Thread Gaging Systems listed in this section offer a fast and accurate way to control thread quality in a way that other methods cannot.

Starrett Thread Gaging Systems – Our systems are not simple, go/no-go gages. They will show the variations in dimensions to indicate exactly where the thread is within the allowable tolerance.





## Terminologies and Standards

**Thread dimensions** – Our standard listed gages measure functional size and pitch diameter, which involve angles, diameters, pitches, roundness, lead and taper. Our systems can also easily handle these and other special gaging applications.

**Functional size** is the size that includes the cumulative effect of variations in all dimensions. Functional size is the maximum material size that the thread can be in order to properly assemble it to its mating part.

**Multi-rib rolls and full-form segments** measure functional size. This set-up is the practical one to use when measuring for assembly.

**Pitch diameter** is defined as the diameter of a cylinder that passes through the thread profile to make the widths of the thread ridge and thread groove equal on both sides of the thread. Pitch diameter is the primary control and reference datum for measuring and manufacturing screw threads.

**Single-element rolls** (cone and vee) measure pitch diameter as well as out-of-roundness and taper.

**An ideal thread** is present when the multi-rib roll or full-form segment and the single-element roll provide identical indicator readings.

**Thread gaging standards** – There are many gaging standards, but the primary ones are:

**Unified Inch Screw Threads** are denoted by diameter and number of threads per inch. Example: .250-20 UNC (normally referred to as 1/4-20)

**ISO Metric Screw Threads** are denoted by the letter “M” for metric, then the diameter and then the pitch in millimeters. Pitch is the distance from a point on a thread to the corresponding point on the adjacent thread.

Example: M6 x 1 has a 6mm diameter and threads which are 1mm from point to corresponding point. Common practice for quick determination is to measure from crest to adjoining crest.

**Compliance** – All Starrett Thread Gages adhere to United States military specifications and industrial ANSI and ASME standards. Gaging provides compliance with System 21, 22 and 23 per U.S. Federal Standard H28/20.

**Compatibility** – Starrett Thread Gage rolls and segments are compatible with other major suppliers.

## Optional Equipment

The following are non-standard accessories that will enhance the use of our gaging systems.

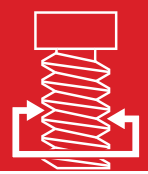
### Calibration Accessories

- ◆ **Roll Inspection Arbor** – For inspection of Starrett Nos. 1130, 1131, 1137, 1138 and 1140A Multi-Rib, and Cone and Vee Rolls for wear. Designed to be used in a Starrett optical comparator or equivalent in conjunction with comparator charts
- ◆ **Optical Comparator Charts** – For inspection of multi-rib and cone and vee rolls for wear
- ◆ **Stud Inspection Disk Kit** – For inspection of Nos. 1130, 1131, 1137 and 1138 Frame Assemblies. Kit aids in the inspection of the roll studs for squareness and diameter wear
- ◆ **Inspection Rings** – For inspection of Nos. 1140, 1141 and 1140A Body Assembly. Rings aid in the inspection of the reference mounting surface for Nos. 1140 and 1141 Segments and No. 1140A Adaptor Plate

**Thread Specification Disk** – Call, write or fax the Thread Gage Division for your free Unified National Thread Specifications floppy (3 1/2"). The program is written for PC.  
**Tel: (978) 249-3551 ext. 567 Fax: (978) 249-3699**

### Optional Accessories

- ◆ **Squareness Aligner** – This attachment is useful in aligning the threads to be checked to the thread gage for accurate engagement. Some aligners lock in position so the length of the thread requirements can be maintained
- ◆ **Mechanical Driven Gage Unit** – This attachment has belt-driven rolls to smoothly turn the product part and eliminate operator influence of size, squareness or concentricity readings that are taken of related surfaces
- ◆ **Ball Slide Units** – These gaging units are specifically designed to inspect various elements that are directly related to the thread, such as squareness and concentricity
- ◆ **2-Piece Indicator Holding Arm No. PT24882** – For use with No. 1141 Thread Gage. Unit attaches to the concentricity ring for checking concentricity or squareness of surfaces related to the thread
- ◆ **Body Extension** – For use with Nos. 1140, 1141 and 1140A Thread Gages. This attachment allows for the use of non-Starrett and non-AGD type indicators in these body assemblies



## How to Select a Starrett Thread Gage System

Before following the seven steps below you first need to determine what diameter and TPI (or pitch) that you need to gage. “Step number” notations are also included on specification tables on the following pages.

1. Select the frame or body size for that diameter.
2. Decide whether you require a single or double base, or a portable gage.
3. Decide on the indicator and the graduation you need. Also consider if you require SPC when gaging. If so, select an electronic indicator with output capability.
4. Select the rolls or segments for your thread pitch – cone and vee, multi-rib, or segment. Specify if left-hand thread.
5. Select the roll stud set necessary for your required pitch.
6. Select the template for the diameter of the thread to be checked.
7. Choose the thread master for each thread diameter and pitch (TPI).

Let's assume the use of the No. 1130 Gaging System, but the steps are identical for all systems.

**Example:** You need a single base functional gaging system for a 1/4 x 20 (.2500-20 UNC) thread. Follow the starred (★) items on the No. 1130 and 1131 specifications table on the next pages as follows:

**Step 1** – Choose the .164”-1” **range**

**Step 2** – Choose a **single base** PT24312 and thread gage **bench frame**, Catalog No. 1130-1

**Step 3** – You want a .0001” **graduation**, you need Catalog No. 25-111RTG

**Step 4** – You want a **multi-rib roll set** for 20 TPI, No. PT24344

**Step 5** – You need a **roll stud set** for 20 TPI, No. PT24370

**Step 6** – You need a **template** No. PT24381 for 1/4” (.2500) diameter

**Step 7** – You need a thread master No. PT23231 for 1/4 x 20 (.2500-20 UNC) threaded plug gage. (See last page of this section.)

You are now in business!

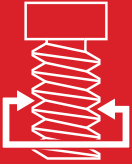
## Service and Expertise

If you have any questions regarding your specific thread gage application, please call, fax or write to:

The L. S. Starrett Company  
Thread Gage Division  
121 Crescent Street  
Athol, MA 01331 USA  
Tel: (978) 249-3551  
Fax: (978) 249-3699

We have some of the most knowledgeable thread gaging specialists in the world who are genuinely interested in helping you solve your thread gaging problems. You will find our people easy to work with, whether it be for standard or special gaging applications.





## Indicating-Type External Thread Gage Systems with three rolls

**No. 1130 Series** Bench

**No. 1131 Series** Portable

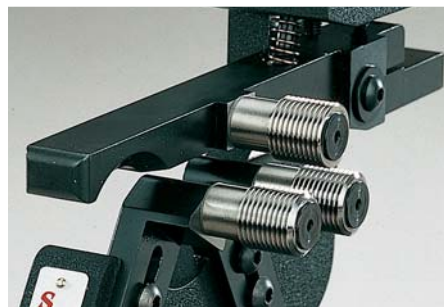
Two gaging series are available as follows:

**The No. 1130-0** has one frame with a capacity from #2 (.086" or 2.2mm) up to 3/8" (9.5mm).

**Nos. 1130-1, -2, -3** have three frames, ranging in capacity from #8 (.164" or 4.2mm) up to 3" (76mm). They are mounted on a baseplate for bench use, ideal for use at an inspection station. For ease of use, they are activated by lifting the front pivot arm.

**No. 1131 Series** are fundamentally the same gages, but they are available in three portable frames – ideal for bringing the gage to the work. For ease of use, these gages can be activated by depressing the lever.

- ◆ Gages provide actual measurements – not just go/no-go
- ◆ Gages have three rolls set 120° apart
- ◆ Each roll set can inspect any screw diameter with the same pitch
- ◆ Left-hand threads can be inspected using the same rolls by switching roll two with roll three
- ◆ Multi-rib rolls measure functional diameter
- ◆ Spacers and studs are included with the purchase of your thread gage frames when they are used with multi-rib rolls. When ordering replacement rolls, review the spacer and stud chart in the specifications for spacer length requirements
- ◆ Single-element rolls (cone and vee) measure pitch diameter
- ◆ Speedy setting templates allow for quick changeover to another diameter
- ◆ Each thread size requires a thread setting plug gage to set the gage comparator
- ◆ **Readouts** – three mechanical dial indicators with .0001", .00025" and 0.002mm readouts and one electronic indicator with .0001"/0.002mm resolution are offered as standard. Other indicators may also be specified. See Indicator Section



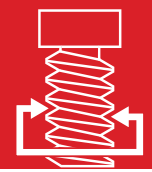
**Top: No. 1130 Bench Style (roll gaging with electronic indicators); Left, center: Cone and Vee Rolls for pitch diameter measurement; Left, bottom: Multi-Rib Rolls for functional diameter measurement; Right: No. 1131 Portable Style (roll gaging with analog indicators).**

- ◆ SPC capability – Storage of gage readout for analysis and documentation is possible when using electronic indicators such as our No. 2600 and No. 2700 Wisdom® Series with data collection devices such as the Starrett No. 772 Advanced Data Collection System

**Right: On-site threading operation convenience is made possible with the three portable No. 1131 models and large "C" frame gages.**







## External Thread Gage Systems Nos. 1130 and 1131 Series Specifications

### Step #1 Frame Assemblies

| Model    | Range           |         | Catalog No. |
|----------|-----------------|---------|-------------|
|          | Inch            | mm      |             |
| Bench    | #2 (.086")-3/8" | 2-10mm  | 1130-0      |
|          | #8 (.164")-1"★  | 4-25mm  | 1130-1      |
|          | 1"-2"           | 25-50mm | 1130-2      |
|          | 2"-3"           | 50-75mm | 1130-3      |
| Portable | #8 (.164")-1"   | 4-25mm  | 1131-1      |
|          | 1"-2"           | 25-50mm | 1131-2      |
|          | 2"-3"           | 50-75mm | 1131-3      |

### Step #2 Base & Hangers

| Description  | Part No. |
|--------------|----------|
| Single Base★ | PT24312  |
| Double Base  | PT24315  |
| Hanger Stand | PT24305  |

### Step #3 Indicators

For Nos. 1130-0, 1, 2, 3 Frames

| Graduation     | Catalog No.                    | Contact No.                          |
|----------------|--------------------------------|--------------------------------------|
| .0001"         | 25-111RTG★                     | PT06677-C<br>(for No. 1130-0 Only)   |
| .00025"        | 25-128RTG                      |                                      |
| 0.002mm        | 25-161RTG                      | PT06677-D<br>(for Nos. 1130-1, 2, 3) |
| .0001"/0.002mm | F2710-1 Electronic with Output |                                      |

For Nos. 1131-1, 2, 3 Frames

| Graduation     | Catalog No.                    | Contact No. |
|----------------|--------------------------------|-------------|
| .0001"         | 25-111RTGP                     | PT06677-B   |
| .00025"        | 25-128RTGP                     |             |
| 0.002mm        | 25-161RTGP                     |             |
| .0001"/0.002mm | F2710-1 Electronic with Output |             |

### Step #4 Rolls

Inch Rolls

| TPI | Cone and Vee Part No. |                                     | Multi-Rib Part Nos. |                                     |
|-----|-----------------------|-------------------------------------|---------------------|-------------------------------------|
|     | Fits Frame 1130-0*    | Fits Frames 1130-1,2,3 / 1131-1,2,3 | Fits Frame 1130-0*  | Fits Frames 1130-1,2,3 / 1131-1,2,3 |
| 8   |                       | PT24338                             |                     | PT24352                             |
| 9   |                       | PT80431                             |                     | PT80432                             |
| 10  |                       | PT24337                             |                     | PT24351                             |
| 11  |                       | PT24336                             |                     | PT24350                             |
| 12  |                       | PT24335                             |                     | PT24349                             |
| 13  |                       | PT24334                             |                     | PT24348                             |
| 14  |                       | PT24333                             |                     | PT24347                             |
| 16  | PT80773               | PT24332                             | PT80786             | PT24346                             |
| 18  | PT80774               | PT24331                             | PT80787             | PT24345                             |
| 20  | PT80775               | PT24330                             | PT80788             | PT24344★                            |
| 24  | PT80776               | PT24329                             | PT80789             | PT24343                             |
| 28  | PT80778               | PT24328                             | PT80791             | PT24342                             |
| 32  | PT80779               | PT24327                             | PT80792             | PT24341                             |
| 36  | PT80780               |                                     | PT80793             |                                     |
| 40  | PT80781               | PT24326                             | PT80794             | PT24340                             |
| 44  | PT80782               |                                     | PT80795             |                                     |
| 48  | PT80783               | PT24325                             | PT80796             | PT24339                             |
| 56  | PT80784               |                                     | PT80797             |                                     |
| 64  | PT80785               |                                     | PT80798             |                                     |

Step #4 continued on next page.



## Step #4 (continued) Metric Rolls Nos. 1130-1, 2, 3 / 1131-1, 2, 3 Frames

| Pitch (mm) | Cone and Vee Part No. | Multi-Rib Part No. |
|------------|-----------------------|--------------------|
| 3.00mm     | PT80800               | PT80810            |
| 2.50mm     | PT80801               | PT80811            |
| 2.00mm     | PT80802               | PT80812            |
| 1.75mm     | PT80803               | PT80813            |
| 1.50mm     | PT80804               | PT80814            |
| 1.25mm     | PT80805               | PT80815            |
| 1.00mm     | PT80806               | PT80816            |
| 0.80mm     | PT80807               | PT80817            |
| 0.75mm     | PT80808               | PT80818            |
| 0.70mm     | PT80809               | PT80819            |

## Step #5 Roll Stud Kits

| Fits Catalog No.                                | TPI/Pitch Range  | Approx. Length |      | (3 required)<br>Part No. |
|---|--|----------------|------|--------------------------|
|   | Inch (mm)  | Inch           | mm   |                          |
| 1130-1/1131-1<br>1130-2/1131-2<br>1130-3/1131-3 | All Cone & Vee Rolls and Multi-Rib Rolls 24-80 (1.1-0.2) | 7/16"          | 11mm | PT24369                  |

### Multi-Rib Rolls Only

|               |                     |        |      |         |
|---------------|---------------------|--------|------|---------|
| 1130-1/1131-1 | 16-20 (1.6-1.25mm)★ | 9/16"  | 14mm | PT24370 |
| 1130-2/1131-2 | 14-15 (1.8-1.7mm)   | 11/16" | 18mm | PT24371 |
| 1130-3/1131-3 | 8-13 (3-2.0mm)      | 15/16" | 24mm | PT24372 |

## Step #6 Setting Templates For No. 1130-0 Frame

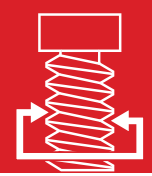
| Thread Size Inch* | Part No. |
|-------------------|----------|
| #2                | PT80311  |
| #3                | PT80312  |
| #4                | PT80313  |
| #5                | PT80314  |
| #6                | PT80315  |
| #8                | PT80316  |
| 3/16"             | PT80317  |
| #10               | PT80318  |
| #12               | PT80319  |
| #14               | PT80320  |
| 1/4"              | PT80321  |
| 5/16"             | PT80322  |
| 3/8"              | PT80323  |

\*Metric templates quoted on application.

## For Nos. 1130-1 / 1131-1 Frames

| Inch        |          | Metric      |          |
|-------------|----------|-------------|----------|
| Thread Size | Part No. | Thread Size | Part No. |
| #8          | PT24378  | 4mm         | PT80330  |
| #10         | PT24379  | 5mm         | PT80331  |
| #12         | PT24380  | 6mm         | PT80332  |
| #14         | PT80237  | 7mm         | PT80333  |
| 3/16"       | PT80238  | 8mm         | PT80334  |
| 1/4"★       | PT24381  | 9mm         | PT80335  |
| 5/16"       | PT24382  | 10mm        | PT80336  |
| 3/8"        | PT24383  | 11mm        | PT80337  |
| 7/16"       | PT24384  | 12mm        | PT80338  |
| 1/2"        | PT24385  | 14mm        | PT80339  |
| 9/16"       | PT24386  | 15mm        | PT80340  |
| 5/8"        | PT24387  | 16mm        | PT80341  |
| 11/16"      | PT80239  | 17mm        | PT80342  |
| 3/4"        | PT24388  | 18mm        | PT80343  |
| 13/16"      | PT24404  | 20mm        | PT80344  |
| 7/8"        | PT24389  | 22mm        | PT80345  |
| 15/16"      | PT24398  | 24mm        | PT80346  |
| 1"          | PT24390  | 25mm        | PT80347  |

Step #6 continued on next page.


**External Thread Gage Systems Nos. 1130 and 1131 (continued)**
**Step #6 (continued)**

For Nos. 1130-2 / 1131-2 Frames

| Thread Size | Part No. |
|-------------|----------|
| 1"          | PT24390  |
| 1-1/16"     | PT24399  |
| 1-1/8"      | PT24391  |
| 1 -3/16"    | PT80240  |
| 1-1/4"      | PT24395  |
| 1-5/16"     | PT24405  |
| 1-3/8"      | PT24396  |
| 1-7/16"     | PT80241  |
| 1-1/2"      | PT24397  |
| 1-9/16"     | PT80242  |
| 1-5/8"      | PT80243  |
| 1-11/16"    | PT80244  |
| 1-3/4"      | PT24392  |
| 1-13/16"    | PT80245  |
| 1-7/8"      | PT24400  |
| 1-15/16"    | PT80246  |
| 2"          | PT80247  |

For Nos. 1130-3 / 1131-3 Frames

| Thread Size | Part No. |
|-------------|----------|
| 2"          | PT80247  |
| 2-1/16"     | PT80249  |
| 2-1/8"      | PT24393  |
| 2-3/16"     | PT24402  |
| 2-1/4"      | PT80349  |
| 2-5/16"     | PT80348  |
| 2-3/8"      | PT24403  |
| 2-7/16"     | PT80329  |
| 2-1/2"      | PT24401  |
| 2-9/16"     | PT80328  |
| 2-5/8"      | PT80327  |
| 2-11/16"    | PT80326  |
| 2-3/4"      | PT24394  |
| 2 -3/16"    | PT80325  |
| 2-7/8"      | PT80324  |
| 2-15/16"    | PT80305  |
| 3"          | PT80306  |

**Step #7** – See Class W Threaded Plug Gages on last page of this section.

**Replacement Spacer Lengths for Nos. 1130 and 1131 Multi-Rib Rolls**
**NOTE:** You must measure the stud length on your gage frame before selecting the proper spacer. All spacers for Nos. 1130 and 1131 Gages are furnished in sets of three. These spacers allow thread rolls of different lengths to be adapted to a common roll stud.

| Approx. Gage Frame Stud Length |      | Multi-Rib Roll |            |                |      | Approx. Required Spacer Length |      | Part No. (Set of 3) |
|--------------------------------|------|----------------|------------|----------------|------|--------------------------------|------|---------------------|
|                                |      | TPI            | Pitch (mm) | Approx. Length |      |                                |      |                     |
| Inch                           | mm   |                |            | Inch           | mm   | Inch                           | mm   |                     |
| 15/16"*                        | 24mm | 8-13           | 3-2mm      | 15/16"         | 24mm | No Spacers Needed              |      |                     |
|                                |      | 14-15          | 1.8-1.7mm  | 11/16"         | 18mm | 1/4"                           | 6mm  | PT99471             |
|                                |      | 16-20          | 1.6-1.25mm | 9/16"          | 14mm | 3/8"                           | 10mm | PT99472             |
|                                |      | 24-80          | 1.1-0.2mm  | 7/16"          | 11mm | 1/2"*                          | 13mm | PT99473             |
| 11/16"                         | 18mm | 14-15          | 1.8-1.7mm  | 11/16"         | 18mm | No Spacers Needed              |      |                     |
|                                |      | 16-20          | 1.6-1.25mm | 9/16"          | 14mm | 1/8"                           | 3mm  | PT99474             |
|                                |      | 24-80          | 1.1-0.2mm  | 7/16"          | 11mm | 1/4"                           | 6mm  | PT99471             |
| 9/16"                          | 14mm | 16-20          | 1.6-1.25mm | 9/16"          | 14mm | No Spacers Needed              |      |                     |
|                                |      | 24-80          | 1.1-0.2mm  | 7/16"          | 11mm | 1/8"                           | 3mm  | PT99474             |
| 7/16"                          | 11mm | 24-80          | 1.1-0.2mm  | 7/16"          | 11mm | No Spacers Needed              |      |                     |

\*Cone and Vee Rolls – All cone and vee rolls are 7/16" long. If you have a gage with 15/16" studs and have been using this with multi-rib rolls, you can still use a cone and vee roll by adding a 1/2" spacer.



## Large Indicating-Type External Thread Gage Systems with three rolls

**No. 1137 “C” Line**  
Bench Series

**No. 1138 “C” Line**  
Portable Series

These gages are similar to our Nos. 1130 and 1131 Series, except that they span larger diameters.

They are three-roll gages that can be ordered with multi-rib or cone and vee rolls for both functional and pitch diameter readings.

The No. 1137 Series is a bench gage ranging in capacity from 3” (76mm) and larger.

The No. 1138 Gages are basically the same but are on portable frames.

- ◆ Gages have two gaging rolls 180° apart and one stabilizing roll between them
- ◆ Speedy setting templates allow for quick changeover to another diameter
- ◆ Roll spacers are offered to match available stud lengths. See specifications
- ◆ Each thread size requires a setting plug gage to set the gage comparator
- ◆ Gages are offered with mechanical dial indicators and electronic indicators with SPC capability



Left, No. 1138 Portable Style. Right, No. 1137 Bench Style. Both roll gaging with thread axis alignment.

### Step #1 Frame Assemblies

| Model    | Range  |           | Catalog No.** |
|----------|--------|-----------|---------------|
|          | Inch   | mm        |               |
| Bench    | 3-6"   | 75-150mm  | 1137-1 **     |
|          | 6-9"   | 150-230mm | 1137-2 **     |
|          | 9-12"  | 230-305mm | 1137-3 **     |
|          | 12-18" | 305-460mm | 1137-4 **     |
|          | 18-24" | 460-610mm | 1137-5 **     |
| Portable | 3-6"   | 75-150mm  | 1138-1 **     |
|          | 6-9"   | 150-230mm | 1138-2 **     |
|          | 9-12"  | 230-305mm | 1138-3 **     |
|          | 12-18" | 305-460mm | 1138-4 **     |
|          | 18-24" | 460-610mm | 1138-5 **     |

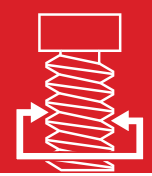
### Step #2 Base & Hangers

| Description  | Part No. |
|--------------|----------|
| Single Base  | PT80056  |
|              | PT80057  |
|              | PT80058  |
| *            | *        |
| *            | *        |
| Hanger Stand | PT80072  |
|              | PT80073  |
|              | PT80074* |
| *            | *        |
| *            | *        |

\*NOTE: Nos. 1137 and 1138 Single and Double Bases and Hangers are available – quoted on application.

\*\*NOTE: By special order only.





## External Thread Gage Systems Nos. 1137 and 1138 Specifications (continued)

### Step #3 Indicators

For Nos. 1137-1, 2, 3, 4, 5 Frames

| Graduation     | Catalog No.                    | Contact No. |
|----------------|--------------------------------|-------------|
| .0001"         | 25-111TG                       | PT06677-B   |
| .00025"        | 25-128TG                       |             |
| 0.002mm        | 25-161TG                       |             |
| .0001"/0.002mm | F2710-1 Electronic with Output |             |
| .0001"         | 81-111TG                       |             |
| .00025"        | 81-128TG                       |             |
| 0.002mm        | 81-161TG                       |             |

For Nos. 1138-1, 2, 3, 4, 5 Frames

| Graduation     | Catalog No.                    | Contact No. |
|----------------|--------------------------------|-------------|
| .0001"         | 25-111TGP                      | PT06677-B   |
| .00025"        | 25-128TGP                      |             |
| 0.002mm        | 25-161TGP                      |             |
| .0001"/0.002mm | F2710-1 Electronic with Output |             |
| .0001"         | 81-111TGP                      |             |
| .00025"        | 81-128TGP                      |             |
| 0.002mm        | 81-161TGP                      |             |

### Step #4 Rolls

Inch Rolls for All Frames

| TPI | Cone and Vee Part Nos. | Multi-Rib Part Nos. |
|-----|------------------------|---------------------|
| 4   | PT80450                | PT80452             |
| 6   | PT80451                | PT80453             |
| 8   | PT80100                | PT80114             |
| 12  | PT80103                | PT80117             |
| 16  | PT80106                | PT80120             |
| 20  | PT80108                | PT80122             |

Metric Rolls for All Frames

| Pitch  | Cone and Vee Part No. | Multi-Rib Part No. |
|--------|-----------------------|--------------------|
| 2.50mm | PT80417               | PT80421            |
| 1.75mm | PT80418               | PT80422            |
| 1.00mm | PT80419               | PT80423            |
| 0.70mm | PT80420               | PT80424            |

**NOTE:** All other pitch rolls quoted on application.

The above roll sets are **not** interchangeable with Catalog Nos. 1130/1131 Roll Sets.

### Step #5 Roll Stud Kits

All Cone and Vee Rolls

| Fits Frame No.                       | TPI/Pitch Range     | Approx. Length |      | (3 required)<br>Part No. |
|--------------------------------------|---------------------|----------------|------|--------------------------|
|                                      | Inch (mm)           | Inch           | mm   |                          |
| All Nos. 1137,<br>1138 listed frames | 24-64 (1.00-0.40mm) | 7/16"          | 11mm | PT24369                  |

All Multi-Rib Rolls

| All Nos. 1137,<br>1138 listed frames | 16-20 (1.60-1.25mm) | 9/16"   | 14mm | PT24370 |
|--------------------------------------|---------------------|---------|------|---------|
|                                      | 14-15 (1.80-1.70mm) | 11/16"  | 18mm | PT24371 |
|                                      | 8-13 (3.00-2.00mm)  | 15/16"  | 24mm | PT24372 |
|                                      | 4-7 (6.00-3.50mm)   | 1-3/16" | 26mm | PT24373 |

### Step #6 Setting Templates

Order by request as follows:

- ◆ Templates from 3-6" available in 1/8" increments
- ◆ Templates from 6-12" available in 1/4" increments
- ◆ Templates over 12" and metric quoted on application

### Step #7 Master Setting Plug – English & Metric

Quoted on application.



## Indicating-Type External Thread Gauge Systems with two contacts

**No. 1135 Series**  
Full-Form Bench

**No. 1136 Series**  
Full-Form Portable

The **No. 1135** models consist of two frames ranging in capacity from #2 (.086" or 2.2mm) up to 3" (76mm).

**No. 1136 Gages** are fundamentally the same, but are available in two portable frames.

- ◆ Gages provide actual measurements – not just go/no-go
- ◆ Gages have two full-form contacts 180° apart
- ◆ Full-form gaging segments provide peripheral contact along and around the thread axis. This is similar to a go/no-go gage, but it does more by quickly and easily showing the actual deviation from your target dimension. This advantage will tell you whether or not the part can be assembled properly
- ◆ This gaging is commonly used as functional size gaging, but can be easily combined with a No. 1130 Cone and Vee Roll Pitch Diameter Gage for 180°/120° System 22 gaging
- ◆ Cone and vee segments are also available on special order for 180°/180°



Above, Full-Form Segments for functional diameter measurement. Right, No. 1135 Bench Style (segment gaging with electronic indicator).



- ◆ System 22 gaging
- ◆ Ideal for any screw thread having more than one lead or a fast advance
- ◆ Each thread size requires a thread setting plug gage to set the gage comparator
- ◆ Readouts – three mechanical dial indicators with .0001", .00025" and 0.002mm readouts and one electronic indicator with .0001"/0.02mm resolution are offered as standard. Other indicators may also be specified – see Indicator section
- ◆ SPC Capability – Storage of gage readout for analysis and documentation

- ◆ is possible when using electronic indicators such as our No. 2600 and No. 2700 Series with data collection devices like the Starrett No. 772 Advanced Data Collection System
- ◆ Spacers and studs are included with the purchase of thread gage frames. When ordering replacement segments, please review the spacer and stud chart in the specifications for spacer length requirements

### Step #1 Frame Assemblies

| Model    | Range               |           | Catalog No. |
|----------|---------------------|-----------|-------------|
|          | Inch                | mm        |             |
| Bench    | #2 (.086") – 1-1/2" | 2-38mm    | 1135-1      |
|          | 1 1/2"-3"           | 38-75mm   | 1135-2      |
| Portable | #8 (.164") – 1-1/2" | 4-38mm    | 1136-1      |
|          | 1-1/2" – 3"         | 38-75mm   | 1136-2      |
|          | 3" – 6"             | 76-152mm  | 1136-3      |
|          | 6" – 9"             | 152-228mm | 1136-4      |

### Step #2 Base & Hangers

| Description  | Part No. |
|--------------|----------|
| Single Base  | PT24312  |
| Double Base  | PT24315  |
| Hanger Stand | PT24305  |

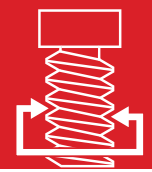
### Step #3 Indicators

For Nos. 1135-1, 2 Frames

| Graduation     | Catalog No.                    | Contact No. |
|----------------|--------------------------------|-------------|
| .0001"         | 25-111TG                       | PT06677-C   |
| .00025"        | 25-128TG                       |             |
| 0.002mm        | 25-161TG                       |             |
| .0001"/0.002mm | F2710-1 Electronic with Output |             |

For Nos. 1136-1, 2 Frames

| Graduation     | Catalog No.                    | Contact No. |
|----------------|--------------------------------|-------------|
| .0001"         | 25-111RTGP                     | PT06677-B   |
| .00025"        | 25-128RTGP                     |             |
| 0.00mm         | 25-161RTGP                     |             |
| .0001"/0.002mm | F2710-1 Electronic with Output |             |



### Step #4 Full-Form Segments Inch Segments – For Frame Nos. 1135-1/1136-1

| Thread Size    | Full-Form Part No. | Cone & Vee* Part No. |
|----------------|--------------------|----------------------|
| .1640-32 UNC   | PT80374            | PT80700*             |
| .1640-36 UNF   | PT80375            | PT80701*             |
| .1900-24 UNC   | PT80376            | PT80702*             |
| .1900-32 UNF   | PT80377            | PT80703*             |
| .2160-24 UNC   | PT80378            | PT80704*             |
| .2160-28 UNF   | PT80379            | PT80705*             |
| .2160-32 UNEF  | PT80478            | PT80471*             |
| .2500-20 UNC   | PT26171            | PT80706*             |
| .2500-28 UNF   | PT26172            | PT80707*             |
| .2500-32 UNEF  | PT80479            | PT80472*             |
| .3125-18 UNC   | PT26173            | PT80708*             |
| .3125-24 UNF   | PT80380            | PT80709*             |
| .3125-32 UNEF  | PT80480            | PT80473*             |
| .3750-16 UNC   | PT26174            | PT80710*             |
| .3750-24 UNF   | PT80381            | PT80711*             |
| .3750-32 UNEF  | PT80481            | PT80474*             |
| .4375-14 UNC   | PT26175            | PT80712*             |
| .4375-20 UNF   | PT80382            | PT80713*             |
| .4375-28 UNEF  | PT80926            | PT80933*             |
| .5000-13 UNC   | PT26176            | PT80714*             |
| .5000-20 UNF   | PT26177            | PT80715*             |
| .5000-28 UNEF  | PT80927            | PT80934*             |
| .5625-12 UNC   | PT80383            | PT80716*             |
| .5625-18 UNF   | PT80384            | PT80717*             |
| .5625-24 UNEF  | PT80928            | PT80935*             |
| .6250-11 UNC   | PT26178            | PT80718*             |
| .6250-18 UNF   | PT26179            | PT80719*             |
| .6250-24 UNEF  | PT80929            | PT80936*             |
| .6875-24 UNEF  | PT80930            | PT80937*             |
| .7500-10 UNC   | PT26180            | PT80720*             |
| .7500-16 UNF   | PT80385            | PT80721*             |
| .7500-20 UNEF  | PT80931            | PT80938*             |
| .8125-20 UNEF  | PT80932            | PT80939*             |
| .8750-9 UNC    | PT80372            | PT80722*             |
| .8750-14 UNF   | PT80386            | PT80723*             |
| .8750-20 UNEF  | PT80482            | PT80475*             |
| .9375-20 UNEF  | PT80483            | PT80476*             |
| 1.0000-8 UNC   | PT80387            | PT80724*             |
| 1.0000-12 UNF  | PT80388            | PT80725*             |
| 1.0000-20 UNEF | PT80484            | PT80477*             |
| 1.1250-7 UNC   | PT80389            | PT80726*             |
| 1.1250-12 UNF  | PT80390            | PT80727*             |
| 1.2500-7 UNC   | PT80391            | PT80728*             |
| 1.2500-12 UNF  | PT80392            | PT80729*             |
| 1.3750-6 UNC   | PT80393            | PT80730*             |
| 1.3750-12 UNF  | PT80394            | PT80731*             |
| 1.5000-6 UNC   | PT80395            | PT80732*             |
| 1.5000-12 UNF  | PT80396            | PT80733*             |

**NOTE:** Nos. 1137-1 Segments 2 through 6 quoted on application. Nos. 1135-2 and 1136-2, 3, 4 Segments 1 1/2" through 9" quoted on application.

### External Thread Gage Systems Nos. 1135 and 1136 Specifications (continued)



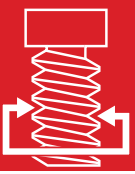
Full-form segments measure functional diameter size. No. 1136 portable style allows the gage to be brought to the part.

#### Millimeter Segments – For Frame Nos. 1135-1/1136-1

| Thread Size | Full-Form Part No. | Cone & Vee* Part No. |
|-------------|--------------------|----------------------|
| M5 x 0.8    | PT80734            | PT80748*             |
| M6 x 1.0    | PT80367            | PT80749*             |
| M8 x 1.0    | PT80366            | PT80750*             |
| M8 x 1.25   | PT26182            | PT80751*             |
| M10 x 0.75  | PT80735            | PT80752*             |
| M10 x 1.25  | PT80368            | PT80753*             |
| M10 x 1.5   | PT80369            | PT80754*             |
| M12 x 1.0   | PT80370            | PT80755*             |
| M12 x 1.25  | PT26184            | PT80756*             |
| M12 x 1.75  | PT26183            | PT80757*             |
| M14 x 1.5   | PT80736            | PT80758*             |
| M14 x 2.0   | PT80737            | PT80759*             |
| M16 x 1.5   | PT80738            | PT80760*             |
| M16 x 2.0   | PT80739            | PT80761*             |
| M18 x 1.5   | PT80740            | PT80762*             |
| M20 x 1.0   | PT80741            | PT80763*             |
| M20 x 1.5   | PT80742            | PT80764*             |
| M20 x 2.5   | PT80743            | PT80765*             |
| M22 x 1.5   | PT80744            | PT80766*             |
| M22 x 2.5   | PT80745            | PT80767*             |
| M24 x 2.0   | PT80746            | PT80768*             |
| M25 x 1.5   | PT80747            | PT80769*             |

**NOTE:** Nos. 1135-1 and 1136-1 Segments 2-4mm and 26-38mm quoted on application.

Nos. 1135-2 and 1136-2, 3, 4 Segments 38mm-228mm quoted on application. \* By special order only.



**External Thread Gage Systems Nos. 1135 and 1136 Specifications (continued)**

**Step #5 Segment Stud Kits**

| TPI/Pitch Range |            | Approx. Length |      | (2 required)<br>Part No. |
|-----------------|------------|----------------|------|--------------------------|
| Inch            | mm         | Inch           | mm   |                          |
| 24-64           | 1.1-0.40mm | 7/16"          | 11mm | <b>PT24369</b>           |
| 16-20           | 1.6-1.25mm | 9/16"          | 14mm | <b>PT24370</b>           |
| 14-15           | 1.8-1.7mm  | 11/16"         | 18mm | <b>PT24371</b>           |
| 9-13            | 2.8-2mm    | 15/16"         | 24mm | <b>PT24372</b>           |
| 4-8             | 6-3mm      | 103/16"        | 30mm | <b>PT24373</b>           |

**Step #6 Setting Templates** (Does not apply to these gages.)

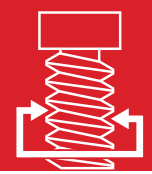
**Step #7** See last page for Class W Threaded Plug Gages.

**Replacement Spacer Lengths for Nos. 1135 and 1136 Full-Form Segments**

**NOTE:** You must measure the stud length on your gage frame before selecting the proper spacer. All spacers for Nos. 1135 and 1136 Gages are furnished in sets of two. These spacers allow segments of different lengths to be adapted to a common stud.

| Approx. Gage Frame Stud Length |      | Full-Form Segment |            |                |      | Approx. Required Spacer Length |      | Part No. (Set of 2) |
|--------------------------------|------|-------------------|------------|----------------|------|--------------------------------|------|---------------------|
|                                |      | TPI               | Pitch (mm) | Approx. Length |      |                                |      |                     |
| Inch                           | mm   |                   |            | Inch           | mm   | Inch                           | mm   |                     |
| 15/16"                         | 24mm | 9-13              | 2.8-2mm    | 15/16"         | 24mm | No Spacers Needed              |      |                     |
|                                |      | 14-15             | 1.8-1.7mm  | 11/16"         | 18mm | 1/4"                           | 6mm  | <b>PT99477</b>      |
|                                |      | 16-20             | 1.6-1.25mm | 9/16"          | 14mm | 3/8"                           | 10mm | <b>PT99478</b>      |
|                                |      | 24-80             | 1.1-0.2mm  | 7/16"          | 11mm | 1/2"                           | 13mm | <b>PT99479</b>      |
| 11/16"                         | 18mm | 14-15             | 1.8-1.7mm  | 11/16"         | 18mm | No Spacers Needed              |      |                     |
|                                |      | 16-20             | 1.6-1.25mm | 9/16"          | 14mm | 1/8"                           | 3mm  | <b>PT99476</b>      |
|                                |      | 24-80             | 1.1-0.2mm  | 7/16"          | 11mm | 1/4"                           | 6mm  | <b>PT99477</b>      |
| 9/16"                          | 14mm | 16-20             | 1.6-1.25mm | 9/16"          | 14mm | No Spacers Needed              |      |                     |
|                                |      | 24-80             | 1.1-0.2mm  | 7/16"          | 11mm | 1/8"                           | 3mm  | <b>PT99476</b>      |
| 7/16"                          | 11mm | 24-80             | 1.1-0.2mm  | 7/16"          | 11mm | No Spacers Needed              |      |                     |





### Indicating-Type Internal Thread Gage Systems

**No. 1140 Segment Gage**

**No. 1140A Roll Gage**

**No. 1141 with concentricity/squareness ring**

These Internal Thread Gaging Systems are versatile, easy-to-use and accurate. The Nos. 1140 and 1141 bodies have a capacity from #10 (.190" or 4.8mm) up to 3" (76mm). They can be mounted on base plates for bench use or used as hand-held portable gages. The No. 1140A combined with an adaptor plate will handle diameters over 3" (76mm).

- ◆ No. 1140 is a 2-contact, full-form functional segment gaging system. It can also measure pitch diameter with a single element cone and vee segment below 3" (76mm) in diameter
- ◆ The No. 1140A Gage requires internal rolls for sizes over 3" (76mm) diameters. These rolls are not interchangeable with external roll gaging systems

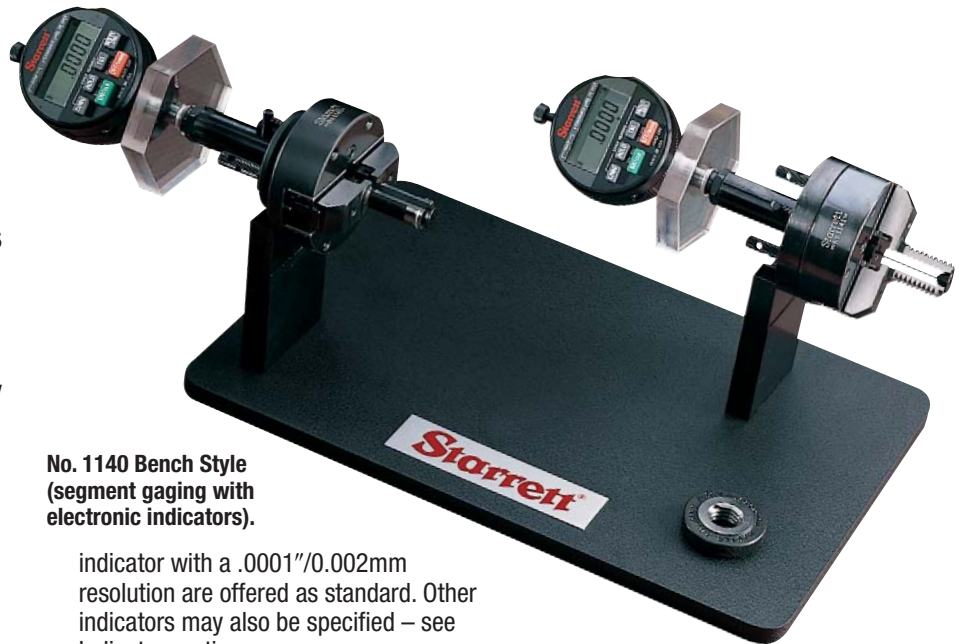
It uses single-element cone and vee rolls or multi-rib functional rolls for over 3" (76mm) diameters

- ◆ The No. 1141 has a body with a concentricity/squareness ring and has a range from #10 (.190" or 4.8mm) up to 3" (76mm). The ring checks internal threads for concentricity with external and internal diameters. It also checks internal threads for squareness with a chosen surface

Test indicators are available for this application. Our Nos. 708 and 709 Series Test Indicators are the standard offering, but the .250" (6.35mm) post will also accept our No. 711 Test Indicators (using Snug No. PT07097) and our No. 811 Test Indicators (using Snug No. PT22428)

- ◆ Gages are offered using elements to measure any thread profile of 60°, 55°, Acme or Buttress
- ◆ Each thread size requires a ring gage to set the gage comparator
- ◆ Readout – Three Mechanical Dial Indicators with .0001", .00025" and 0.002mm readouts and an electronic

**NOTE:** Certificate of calibration available upon request at additional charge.



**No. 1140 Bench Style (segment gaging with electronic indicators).**

indicator with a .0001"/0.002mm resolution as standard. Other indicators may also be specified – see Indicator section

- ◆ SPC Capability – Storage of gage readout for analysis and documentation is possible when using Electronic Indicators such as our No. 2600 and No. 2700 Series with data collection devices like the Starrett No. 772 Advanced Data Collection System
- ◆ Spacers and studs are included with the purchase of No. 1140A body. When purchasing replacement rolls, review the spacer and stud specifications for spacer length requirements

**Above/Right: No. 1140A Portable Style (roll gaging with analog indicators).**

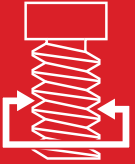
**Below/Left: Internal Portable Gaging Guard #00763 for use with Nos. 1140, 1141, and 1140A.**



**Below: Checking squareness (L) and external concentricity (R) using the No. 1141 Gage with Starrett No. 709 Test Indicator and attachments.**



See specifications on next page.



## Internal Thread Gage Series Nos. 1140 and 1141 Specifications

### Step #1 Body Assemblies

| Range          |           | Catalog No. |
|----------------|-----------|-------------|
| Inch           | mm        |             |
| #10 (.190")-3" | 4.80-75mm | 1140        |
|                |           | 1141        |

### Step #2 Bases

| Description | Part No. |
|-------------|----------|
| Single Base | PT24837  |
| Double Base | PT24626  |

### Step #3 Indicators Fits No. 1140, 1140A, 1141 Frames

| Graduation     | Catalog No.                    | Contact No. |
|----------------|--------------------------------|-------------|
| .0001"         | 81-111TG                       | PT07215     |
| .00025"        | 81-128TG                       |             |
| 0.002mm        | 81-161TG                       |             |
| .0001"/0.002mm | F2710-1 Electronic with Output | PT06632-9   |

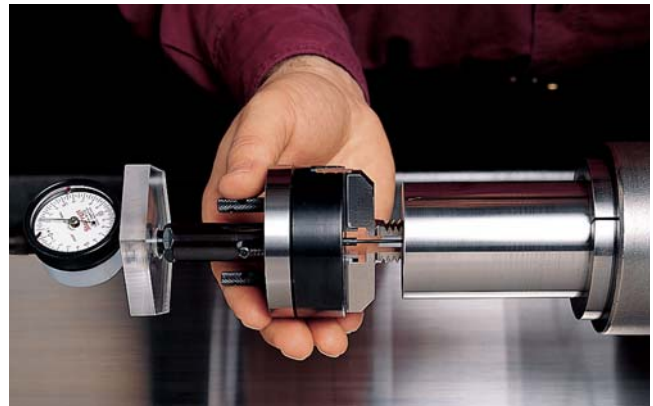
### Step #4 Full-Form and Cone and Vee Segments

Inch Segments – For 1140/1141 Gages

| Thread Size    | Full-Form Part No. | Cone & Vee Part No. |
|----------------|--------------------|---------------------|
| .1900-24 UNC   | PT80500            | PT80529             |
| .1900-32 UNF   | PT80501            | PT80530             |
| .2160-24 UNC   | PT80502            | PT80531             |
| .2160-28 UNF   | PT80503            | PT80532             |
| .2160-32 UNEF  | PT80504            | PT80533             |
| .2500-20 UNC   | PT80505            | PT80535             |
| .2500-28 UNF   | PT80506            | PT80536             |
| .2500-32 UNEF  | PT80507            | PT80537             |
| .3125-18 UNC   | PT80509            | PT80538             |
| .3125-24 UNF   | PT80511            | PT80540             |
| .3125-32 UNEF  | PT80513            | PT80542             |
| .3750-16 UNC   | PT80514            | PT80543             |
| .3750-24 UNF   | PT80516            | PT80545             |
| .3750-32 UNEF  | PT80518            | PT80547             |
| .4375-14 UNC   | PT80519            | PT80548             |
| .4375-20 UNF   | PT80521            | PT80550             |
| .4375-28 UNEF  | PT80522            | PT80551             |
| .5000-13 UNC   | PT80524            | PT80553             |
| .5000-20 UNF   | PT80526            | PT80555             |
| .5000-28 UNEF  | PT80527            | PT80556             |
| .5625-12 UNC   | PT80582            | PT80558             |
| .5625-18 UNF   | PT80583            | PT80559             |
| .5625-24 UNEF  | PT80616            | PT80621             |
| .6250-11 UNC   | PT80584            | PT80560             |
| .6250-18 UNF   | PT80585            | PT80561             |
| .6250-24 UNEF  | PT80617            | PT80622             |
| .6875-24 UNEF  | PT80618            | PT80623             |
| .7500-10 UNC   | PT80586            | PT80562             |
| .7500-16 UNF   | PT80587            | PT80563             |
| .7500-20 UNEF  | PT80619            | PT80624             |
| .8125-20 UNEF  | PT80620            | PT80625             |
| .8750-9 UNC    | PT80588            | PT80564             |
| .8750-14 UNF   | PT80589            | PT80565             |
| .8750-20 UNEF  | PT80613            | PT80626             |
| .9375-20 UNEF  | PT80614            | PT80627             |
| 1.0000-8 UNC   | PT80590            | PT80566             |
| 1.0000-12 UNF  | PT80591            | PT80567             |
| 1.0000-20 UNEF | PT80615            | PT80628             |
| 1.1250-7 UNC   | PT80592            | PT80568             |
| 1.1250-12 UNF  | PT80593            | PT80569             |
| 1.2500-7 UNC   | PT80594            | PT80570             |
| 1.2500-12 UNF  | PT80595            | PT80571             |
| 1.3750-6 UNC   | PT80596            | PT80572             |
| 1.3750-12 UNF  | PT80597            | PT80573             |
| 1.5000-6 UNC   | PT80598            | PT80574             |
| 1.5000-12 UNF  | PT80599            | PT80575             |

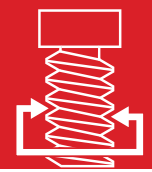
### Millimeter Segments

| Thread Size | Full-Form Part No. | Cone & Vee Part No. |
|-------------|--------------------|---------------------|
| M5 x 0.8    | PT80652            | PT80630             |
| M6 x 1.0    | PT80653            | PT80631             |
| M8 x 1.0    | PT80654            | PT80632             |
| M8 x 1.25   | PT80655            | PT80633             |
| M10 x 0.75  | PT80656            | PT80634             |
| M10 x 1.25  | PT80657            | PT80635             |
| M10 x 1.5   | PT80658            | PT80636             |
| M12 x 1.0   | PT80659            | PT80637             |
| M12 x 1.25  | PT80660            | PT80638             |
| M12 x 1.75  | PT80661            | PT80639             |
| M14 x 1.5   | PT80662            | PT80640             |
| M14 x 2.0   | PT80663            | PT80641             |
| M16 x 1.5   | PT80664            | PT80642             |
| M16 x 2.0   | PT80665            | PT80643             |
| M18 x 1.5   | PT80666            | PT80644             |
| M20 x 1.0   | PT80667            | PT80645             |
| M20 x 1.5   | PT80668            | PT80646             |
| M20 x 2.5   | PT80669            | PT80647             |
| M22 x 1.5   | PT80670            | PT80648             |
| M22 x 2.5   | PT80671            | PT80649             |
| M24 x 2.0   | PT80672            | PT80650             |
| M25 x 1.5   | PT80673            | PT80651             |



Portable gaging convenience for on-site applications.

**NOTE:** All other segments within the listed range are available – quoted on application.



### Internal Thread Gage Series Nos. 1140 and 1141 Specifications (continued)

**Step #5 Roll Stud Set** *Do not apply*  
**Step #6 Setting Templates**

**Step #7 Master Setting Rings**  
**Inch Rings – For 1140/1141 Gages**

| Thread Size      | Part No. |
|------------------|----------|
| .1900-24 UNC 3B  | PT26509  |
| .1900-32 UNF 3B  | PT26510  |
| .2160-24 UNC 3B  | PT26511  |
| .2160-28 UNF 3B  | PT26512  |
| .2160-32 UNEF 3B | PT80679  |
| .2500-20 UNC 3B  | PT26061  |
| .2500-28 UNF 3B  | PT26062  |
| .2500-32 UNEF 3B | PT80680  |
| .3125-18 UNC 3B  | PT26063  |
| .3125-24 UNF 3B  | PT26513  |
| .3125-32 UNEF 3B | PT80681  |
| .3750-16 UNC 3B  | PT26064  |
| .3750-24 UNF 3B  | PT26514  |
| .3750-32 UNEF 3B | PT80682  |
| .4375-14 UNC 3B  | PT26065  |
| .4375-20 UNF 3B  | PT26515  |
| .4375-28 UNEF 3B | PT80954  |
| .5000-13 UNC 3B  | PT26066  |
| .5000-20 UNF 3B  | PT26067  |
| .5000-28 UNEF 3B | PT80955  |
| .5625-12 UNC 3B  | PT26516  |
| .5625-18 UNF 3B  | PT26517  |
| .5625-24 UNEF 3B | PT80956  |
| .6250-11 UNC 3B  | PT26068  |
| .6250-18 UNF 3B  | PT26069  |
| .6250-24 UNEF 3B | PT80957  |
| .6875-24 UNEF 3B | PT80958  |

| Thread Size       | Part No. |
|-------------------|----------|
| .7500-10 UNC 3B   | PT26070  |
| .7500-16 UNF 3B   | PT26518  |
| .7500-20 UNEF 3B  | PT80959  |
| .8125-20 UNEF 3B  | PT80960  |
| .8750-9 UNC 3B    | PT26519  |
| .8750-14 UNF 3B   | PT26520  |
| .8750-20 UNEF 3B  | PT80683  |
| .9375-20 UNEF 3B  | PT80684  |
| 1.0000-8 UNC 3B   | PT26521  |
| 1.0000-12 UNF 3B  | PT26522  |
| 1.0000-20 UNEF 3B | PT80685  |
| 1.1250-7 UNC 3B   | PT26523  |
| 1.1250-12 UNF 3B  | PT26524  |
| 1.2500-7 UNC 3B   | PT26525  |
| 1.2500-12 UNF 3B  | PT26526  |
| 1.3750-6 UNC 3B   | PT26527  |
| 1.3750-12 UNF 3B  | PT26528  |
| 1.5000-6 UNC 3B   | PT26529  |
| 1.5000-12 UNF 3B  | PT26530  |

**NOTE:** 1-5/8" through 3"  
Masters quoted on application.

**Adjustable Thread Axis Aligner**  
**No. PT80228 for Nos. 1140, 1140A, and 1141.**



**Millimeter Rings – For 1140/1141 Gages**

| Thread Size   | Part No. |
|---------------|----------|
| M5 x 0.8-6H   | PT26485  |
| M6 x 1.0-6H   | PT26486  |
| M8 x 1.0-6H   | PT26487  |
| M8 x 1.25-6H  | PT26488  |
| M10 x 0.75-6H | PT26489  |
| M10 x 1.25-6H | PT26490  |
| M10 x 1.5-6H  | PT26491  |
| M12 x 1.0-6H  | PT26492  |
| M12 x 1.25-6H | PT26493  |
| M12 x 1.75-6H | PT26494  |
| M14 x 1.5-6H  | PT26495  |
| M14 x 2.0-6H  | PT26496  |
| M16 x 1.5-6H  | PT26497  |
| M16 x 2.0-6H  | PT26498  |
| M18 x 1.5-6H  | PT26499  |
| M20 x 1.0-6H  | PT26500  |
| M20 x 1.5-6H  | PT26501  |
| M20 x 2.5-6H  | PT26502  |
| M22 x 1.5-6H  | PT26503  |
| M22 x 2.5-6H  | PT26504  |
| M24 x 2.0-6H  | PT26505  |
| M25 x 1.5-6H  | PT26506  |

**NOTES:** M26 through M75 Masters quoted on application.  
Certificate of calibration available upon request at additional charge.

### Internal Thread Gage Series No. 1140A Specifications

**Step #1 Body Assemblies**

| Range  |          | Catalog No. |
|--------|----------|-------------|
| Inch   | mm       | 1140A       |
| 3"-30" | 75-760mm |             |

**Step #2 Bases**

| Description | Part No. |
|-------------|----------|
| Single Base | PT24837  |
| Double Base | PT24626  |

**Step #3 Indicators Fits No. 1140A Frames**

| Graduation     | Catalog No.               | Contact No. |
|----------------|---------------------------|-------------|
| .0001"         | 81-111TG                  | PT07215     |
| .00025"        | 81-128TG                  |             |
| 0.002mm        | 81-161TG                  |             |
| .0001"/0.002mm | F2710-1 Electr. w/ Output |             |

**Step #4 Rolls**  
**Inch Segments**

| TPI | Cone and Vee Part No. | Multi-Rib Part No. |
|-----|-----------------------|--------------------|
| 8   | PT80842               | PT80846            |
| 12  | PT80843               | PT80847            |
| 16  | PT80844               | PT80848            |
| 20  | PT80845               | PT80849            |

**Step #5 Roll Stud Kits**

**All Cone & Vee Rolls**

| Fits Frame No. | TPI/Pitch Range |           | Approx. Length |      | (3 required)<br>Part No. |
|----------------|-----------------|-----------|----------------|------|--------------------------|
|                | Inch            | mm        | Inch           | mm   |                          |
| 1140A          | 24-80           | 1.1-0.2mm | 7/16"          | 11mm | PT24369                  |

**All Multi-Rib Rolls**

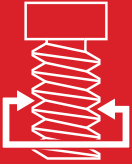
| 1140A | TPI   | Pitch Range | Length | Part No. |         |
|-------|-------|-------------|--------|----------|---------|
|       | 16-20 | 1.6-1.25mm  | 9/16"  | 14mm     | PT24370 |
|       | 14-15 | 1.8-1.7mm   | 11/16" | 18mm     | PT24371 |
|       | 8-13  | 3-2.0mm     | 15/16" | 24mm     | PT24372 |

**Step #6 Adaptor Plates for Specified Sizes** – Quoted on application.

**Step #7 Master Setting Ring – English & Millimeter** – Quoted on application.

**NOTES:** All other TPI Rolls within the listed range are available – quoted on application.  
Millimeter Pitch Rolls within the listed range are available – quoted on application.





## Replacement Spacer Lengths for No. 1140A Multi-Rib Rolls

**NOTE:** You must measure the stud length on your gage arm before selecting the proper spacer. All spacers for No.1140A are furnished in sets of three. These spacers allow thread rolls of different lengths to be adapted to a common roll stud.

| Approx. Gage Frame Stud Length |      | Multi-Rib Roll |            |                |      | Approx. Required Spacer Length |      | Part No. (Set of 3) |
|--------------------------------|------|----------------|------------|----------------|------|--------------------------------|------|---------------------|
|                                |      | TPI            | Pitch (mm) | Approx. Length |      |                                |      |                     |
| Inch                           | mm   |                |            | Inch           | mm   | Inch                           | mm   |                     |
| 15/16"                         | 24mm | 8-13           | 3-2mm      | 15/16"         | 24mm | No Spacers Needed              |      |                     |
|                                |      | 14-15          | 1.8-1.7mm  | 11/16"         | 18mm | 1/4"                           | 6mm  | PT99471             |
|                                |      | 16-20          | 1.6-1.25mm | 9/16"          | 14mm | 3/8"                           | 10mm | PT99472             |
|                                |      | 24-80          | 1.1-0.2mm  | 7/16"          | 11mm | 1/2"*                          | 13mm | PT99473             |
| 11/16"                         | 18mm | 14-15          | 1.8-1.7mm  | 11/16"         | 18mm | No Spacers Needed              |      |                     |
|                                |      | 16-20          | 1.6-1.25mm | 9/16"          | 14mm | 1/8"                           | 3mm  | PT99474             |
|                                |      | 24-80          | 1.1-0.2mm  | 7/16"          | 11mm | 1/4"                           | 6mm  | PT99471             |
| 9/16"                          | 14mm | 16-20          | 1.6-1.25mm | 9/16"          | 14mm | No Spacers Needed              |      |                     |
|                                |      | 24-80          | 1.1-0.2mm  | 7/16"          | 11mm | 1/8"                           | 3mm  | PT99474             |
| 7/16"                          | 11mm | 24-80          | 1.1-0.2mm  | 7/16"          | 11mm | No Spacers Needed              |      |                     |

\* Cone and Vee Rolls – All cone and vee rolls are 7/16" long. If you have a gage with 15/16" studs and have been using this with multi-rib rolls, you can still use a cone and vee roll by adding a 1/2" spacer.

## External Class W Threaded Gages with handle

### Step #7 Master Truncated Setting Plug Gages

#### Inch Plug Gages – For 1130/1131/1135 Gages

| Thread Size      | Part No. |
|------------------|----------|
| .1640-32 UNC 3A  | PT23226  |
| .1640-36 UNF 3A  | PT26452  |
| .1900-24 UNC 3A  | PT23227  |
| .1900-32 UNF 3A  | PT23228  |
| .2160-24 UNC 3A  | PT23229  |
| .2160-28 UNF 3A  | PT23230  |
| .2160-32 UNEF 3A | PT80485  |
| .2500-20 UNC 3A  | PT23231★ |
| .2500-28 UNF 3A  | PT23232  |
| .2500-32 UNEF 3A | PT80486  |
| .3125-18 UNC 3A  | PT23233  |
| .3125-24 UNF 3A  | PT23234  |
| .3125-32 UNEF 3A | PT80487  |
| .3750-16 UNC 3A  | PT23235  |
| .3750-24 UNF 3A  | PT23236  |
| .3750-32 UNEF 3A | PT80488  |
| .4375-14 UNC 3A  | PT23237  |
| .4375-20 UNF 3A  | PT23238  |
| .4375-28 UNEF 3A | PT80919  |
| .5000-13 UNC 3A  | PT23239  |
| .5000-20 UNF 3A  | PT23240  |
| .5000-28 UNEF 3A | PT80920  |
| .5625-12 UNC 3A  | PT23241  |

| Thread Size      | Part No. |
|------------------|----------|
| .5625-18 UNF 3A  | PT23242  |
| .5625-24 UNEF 3A | PT80921  |
| .6250-11 UNC 3A  | PT23243  |
| .6250-18 UNF 3A  | PT23244  |
| .6250-24 UNEF 3A | PT80922  |
| .6875-24 UNEF 3A | PT80923  |
| .7500-10 UNC 3A  | PT23245  |
| .7500-16 UNF 3A  | PT23246  |
| .7500-20 UNEF 3A | PT80924  |
| .8125-20 UNEF 3A | PT80925  |
| .8750-9 UNC 3A   | PT26453  |
| .8750-14 UNF 3A  | PT24411  |
| .8750-20 UNEF 3A | PT80489  |
| .9375-20 UNEF 3A | PT80490  |
| 1.0000-8 UNC 3A  | PT24412  |
| 1.0000-12 UNF 3A | PT26454  |
| 1.000-20 UNEF 3A | PT80491  |
| 1.1250-7 UNC 3A  | PT26455  |
| 1.1250-12 UNF 3A | PT26456  |
| 1.2500-7 UNC 3A  | PT26457  |
| 1.2500-12 UNF 3A | PT26458  |
| 1.3750-6 UNC 3A  | PT26459  |
| 1.3750-12 UNF 3A | PT26460  |
| 1.5000-6 UNC 3A  | PT26461  |
| 1.5000-12 UNF 3A | PT26462  |

#### Millimeter Plug Gages – For 1130/1131/1135 Gages

| Thread Size   | Part No. |
|---------------|----------|
| M5 x 0.8 6g   | PT26463  |
| M6 x 1.0 6g   | PT26464  |
| M8 x 1.0 6g   | PT26465  |
| M8 x 1.25 6g  | PT26466  |
| M10 x 0.75 6g | PT26467  |
| M10 x 1.25 6g | PT26468  |
| M10 x 1.5 6g  | PT26469  |
| M12 x 1.0 6g  | PT26470  |
| M12 x 1.25 6g | PT26471  |
| M12 x 1.75 6g | PT26472  |
| M14 x 1.5 6g  | PT26473  |
| M14 x 2.0 6g  | PT26474  |
| M16 x 1.5 6g  | PT26475  |
| M16 x 2.0 6g  | PT26476  |
| M18 x 1.5 6g  | PT26477  |
| M20 x 1.0 6g  | PT26478  |
| M20 x 1.5 6g  | PT26479  |
| M20 x 2.5 6g  | PT26480  |
| M22 x 1.5 6g  | PT26481  |
| M22 x 2.5 6g  | PT26482  |
| M24 x 2.0 6g  | PT26483  |
| M25 x 1.5 6g  | PT26484  |







## The Starrett Special Gage Division

For many years, The L.S. Starrett Company has provided a unique service for building special gages that varied from our regular line. In response to growing demand, we established the Starrett Special Gage Division in 1958. Since then we have served the U.S. Government, NASA and virtually all industries in the metalworking field, such as aircraft, automotive, ordnance, as well as other fields, such as high-technology plastics and medical components.

The Special Gage Division is an independent division within the Company that devotes its total effort to special gages only. The staff and facilities are isolated from other departments producing standard products. However, the entire Starrett technical staff and state-of-the-art production equipment are immediately available to the Special Gage Division as required.

### Special Gage Division Mission

We design and build dimensional measuring instruments that provide guaranteed performance to meet our customers' specifications. We are in the business of solving measuring problems when standard gages cannot be used.

### Design and Performance

You, the customer, tell us what you need and we will design and build special gages that will perform as you expect — gages with rugged construction for lasting use and easy-operation features. Gages are guaranteed to meet your specifications for accurate, reliable part measurement.

Our designs are prepared on state-of-the-art CAD systems or drafted by hand. They can be supplied to you on reproducible paper or by electronic transfer. Design work is treated in a strictly confidential manner. Design-and-build prices are quoted at no charge. Prices are fixed at order entry.

### Accuracy Guarantee

The Special Gage Division has access to our Webber Gage Division, which produces gage block base standards. This division offers certification and calibration service in accordance with ANSI/NCSL Z540-1 and ISO Guide 25 for calibration of gage blocks and accessories. This means that the Starrett/Webber location is at the highest level for this type of calibration. Starrett/Webber laboratory master gage blocks are accurate to  $\pm 0.00001''$  (0.0000254mm).

### Single-Source Reliability

We make and use Starrett AGD dial or digital indicators, mechanical and dial protractors, test indicators, micrometers and vernier scales. Our electronic calipers, micrometers and indicators output to our own various data processing collection systems. In our opinion, our service and expertise are second to none, since we control the entire process from concept through design, manufacture, inspection and delivery — all under one roof.

The resources of this unique problem-solving division are immediately yours to innovate, design, and build the equipment you need to control product quality and reduce dimensional gaging costs. The following pages demonstrate only several of the many examples of problem-solving gages.

All special gage inquiries for services, or products like the ones shown in this section, should be forwarded directly to:

The L. S. Starrett Company  
Special Gage Division  
121 Crescent Street ♦ Athol, MA 01331-1915  
Tel: (978) 249-3551 ♦ Fax: (978) 249-3699  
e-mail: [specialgage@starrett.com](mailto:specialgage@starrett.com)



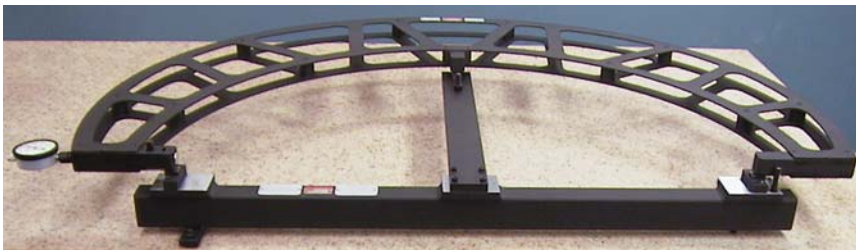
Wall thickness gages.



Deep throat thickness gage.



Large caliper with long reach for high temperature environment.



Lightweight "C" frame diameter gage.

## Proposal Information That Will Help The Starrett Special Gage Division Serve You

### About the part:

- ◆ Send a marked-up print showing what characteristics and what dimensions are to be gaged
- ◆ We need the tolerance necessary for the dimensions affected, and these should be written near the dimensions, if not a part of this drawing
- ◆ Gage-locating surfaces should be marked on the print
- ◆ Show part orientation in the machine or on a bench. Indicate which end or axis of the part is vertical or horizontal
- ◆ Obstructions such as clamps, arbors, fixtures, and unmachined stock that could interfere with the gage should be noted
- ◆ Environmental conditions are a design consideration. Shop conditions such as abrasive dust, high temperature, or corrosive atmosphere affect gaging

**NOTE:** Drawings can be supplied on your company's prepared borders, reproducible paper, or by most of today's electronic transfer methods. You will need to supply company paper or CAD file and drafting requirements.

### Gage Information

To assist you in deciding on the most suitable type of gage, we would like to know your preferences on the following:

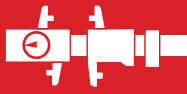
- ◆ Type of gage: hand-held, bench fixture, multi-check
- ◆ Readout: dial or digital indicator, micrometer or vernier, separate display or SPC interface
- ◆ Your gage specifications for design and construction
- ◆ Number of gage cycles per day, hour or minute
- ◆ Setting master or standards required
- ◆ Storage containers and type, if required
- ◆ Quantity required
- ◆ Delivery requirements
- ◆ Certification requirements, if any
- ◆ Technical contact – name and phone number

Your requirements will be analyzed by our Engineering Department to apply or develop a solution. A quotation, with a concept sketch if required, will be sent to your attention at no charge.

Send your information to:

**The L. S. Starrett Company**  
**Special Gage Division**  
 121 Crescent Street ♦ Athol, MA 01331-1915  
 Tel: (978) 249-3551 ♦ Fax: (978) 249-3699  
 e-mail: [specialgage@starrett.com](mailto:specialgage@starrett.com)





## Electronic Gaging

### Remote Display/ SPC Input

On the Starrett WISDOM® Remote Display, out-of-tolerance conditions are displayed for quick interpretation by the flashing of the large L.E.D. display. Either "high" or "low" will be indicated on the display. The bright L.E.D. display is plainly visible even in poorly lit areas.

Readings are taken quickly and accurately. The data can be transmitted to a PC or printer by push button or optional foot switch or the device itself.

Gage calibration is completed in five seconds. The gage can give the reading and transmit the data instantly. In contrast, it could take up to a week to get data from a metrology lab.

Like all of our Special Gage products, this provides a unique solution for a gaging problem.



## Data Collection

SPC requires accurate input of product dimensions. Cost effective data collection will help you keep your competitive edge. Speed and accuracy are the demands met by this special gage and the Starrett Gage Chek No. 776.

### The Guaranteed Solution

One special gage and one Starrett No. 776 displays and stores up to eight dimensions. The larger diameter, small diameter, concentricity and length are all checked in one step in the example shown here. It takes less than ten seconds to take and store all four dimensions.

The sum of the inputs from opposing transducers insures .00005" accuracy on the large diameter. All other measurements are taken to less than .0001".

The actual sizes are entered into the No. 776 display. Both the variance from nominal size plus actual size can be displayed.



Internal storage on the No. 776 Display holds data for analysis or future transfer to a PC.





## Outside and Inside Diameter Gages

Designed and built on application, this gage features a low-friction ball bushing direct-transfer mechanism. Typical of all-purpose built gaging, it will repeat within one graduation. It is made of aluminum for light weight and to preserve the proper "feel". Gage contacts and rest feet are carbide for long wear. The steel tube master has carbide rests and pads for accuracy and wear control.

Shown here is an outside diameter gage in position on the setting master for setting the indicator to zero. The top view of the gage shows the indicator, body, rest feet and gaging contacts. This specific gage was designed to measure the diameter on conical parts.



**Diameter Gage with Setting Master.**

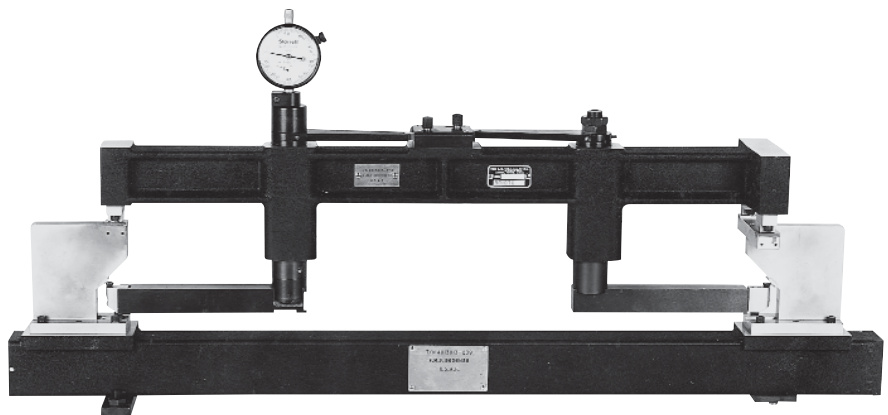
## Inside Diameter Double-Turret Gage

This gage was designed to fit through a diameter much smaller than the one to be gaged.

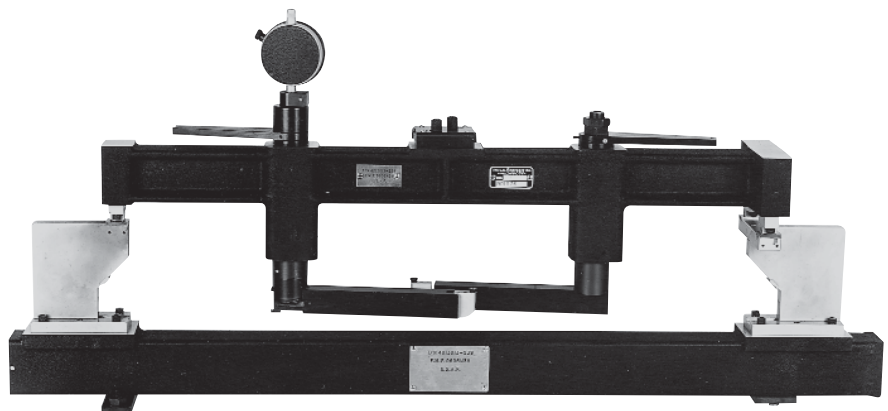
A double-turret gage can check an I.D. up to two times larger than the hole it will pass through.

Single-turret gages can be designed for I.D.s up to one and one-half times larger than the hole it will pass through.

Accurate gages have been supplied that will reach 36" deep.



**Gage shown open for mastering or measuring.**

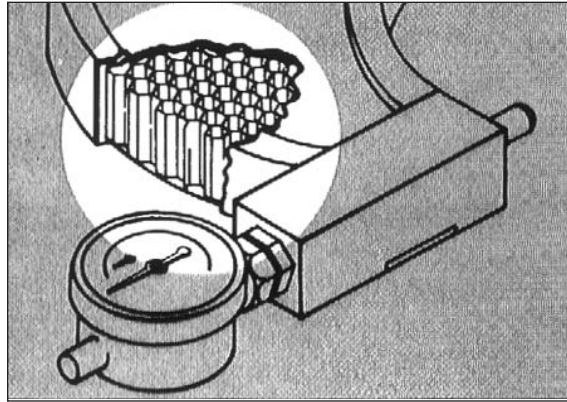


**Gage shown folded for insertion or removal.**



### Ultra-Light Honeycomb Deep Throat and Large Diameter Gages

A large diameter or deep-throated gage no longer has to be heavy and hard to handle. Starrett special gage engineers have studied the physical and structural properties of honeycomb aluminum, establishing standards covering the selection and use of this lightweight material. The results were long-range measurement to close tolerances in hand-held gages of many configurations, all combining great rigidity with light weight and ease of handling. It measures diameters to 72" (180cm) and throat depths to 24" (60cm).



Honeycomb aluminum material lightens gage weight.

### Ultra-Light Deep Throat Gage

This deep throat indicating micrometer gage solves the problem of checking the .281" ( $\pm .005$ ) thickness of a fan rotor shaft at a point nearly 15" from its edge.



Ultra-Light Deep Throat Gage.

### Ultra-Light Large Diameter Gage

This gage is used as an indicating snap gage by setting the indicator to zero with the set master and then reading the part size variations on the indicator. These gages can be supplied with dial or digital indicators.

Sizes are available from 18" to 24" through 84" to 90".

A Starrett No. 234 End Measuring Rod with insulated grips and saddle-centering mounts is the set master.

This gage can be made into an adjustable snap gage by fitting one end with a micrometer and the other end with an indicator. Other concepts are available to suit specific requirements.





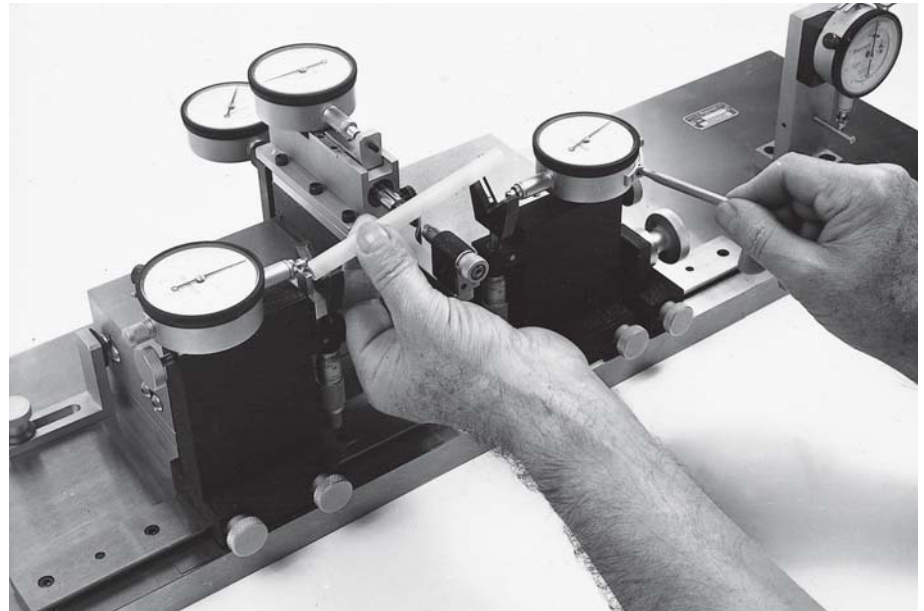
### Multi-Readout and Special Purpose Gages

This five-station fixture gage checks critical dimensions and geometry of precision ceramic cylinders 4-1/2" long x .375" O.D. After the indicators are set to a master, the cylinders are staged individually in two V rests and checked as follows:

- Station 1** – Overall length 4.500" ±.010"
- Station 2** – Squareness of ends to axis and parallelism of ends to within .002"
- Station 3** – Longitudinal bow to within .005"/inch
- Station 4** – Out-of-roundness to within .003" T.I.R.
- Station 5** – Wall thickness .030" ±.003"

**Features of this multi-indicator gage:**

- ◆ Micrometer head height adjustment of the work-staging V rests
- ◆ Precision ball slide mounts for dial indicators at stations 3-4
- ◆ Wear-resisting carbide contacts at all gaging stations



Inserting ceramic cylinder in gage to check squareness and parallelism of ends, longitudinal bow and out-of-roundness.

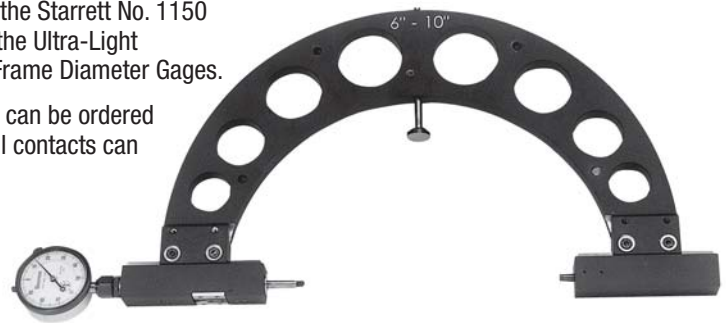
### Dial Indicator Snap Gages

With a lightweight, aluminum frame and low-friction ball bushing motion transfer, .0001" accuracy is insured. Simple and rugged construction, including sturdy dovetail slides for range adjustment, means low maintenance and a long trouble-free life.

Once the gage is set to zero with a set master, the indicator reads part size directly. The indicator can be rotated and locked for easy viewing in any position. Digital indicators are an option for easy reading or for SPC output.

Three size ranges are available: 6" to 10", 10" to 14", and 14" to 18". These gages fill the gap between the Starrett No. 1150 Snap Gages and the Ultra-Light Honeycomb "C" Frame Diameter Gages.

Optional contacts can be ordered for grooves or ball contacts can be specified.

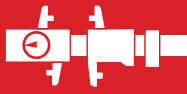


### Quick-Adjusting Micrometer Head

A special gage equipped with this Starrett No. 204 Quick Adjusting Micrometer Head greatly increases the speed with which measurements can be taken. Pressing a button on the thimble allows the spindle to slide along its axis to any position within its range. Releasing the button re-engages the spindle threads, and thimble rotation is then used for final size adjustment.







## PI-Gage for I.D. and O.D.

Starrett PI-Gages protect product quality by maintaining critical diameter tolerances of plastic lids and containers where shrinkage, temperature and mold affect parts manufacturing. The diameter of these parts is critical to the sealing integrity between lids and containers.

The Starrett PI-Gage checks diameters accurately to within .001 of an inch.

Designed to measure any flexible circular part, the PI-Gage has been in use for over 25 years. It is the industry standard for accuracy, replacing the old 2- and 3-point systems previously used.



## PI-Plate Fixture for Large O.D. or I.D. Measurement. Designed to fit your part.



Metal band I.D. fixture for 1-gallon container.



Master in position to set indicator to zero.



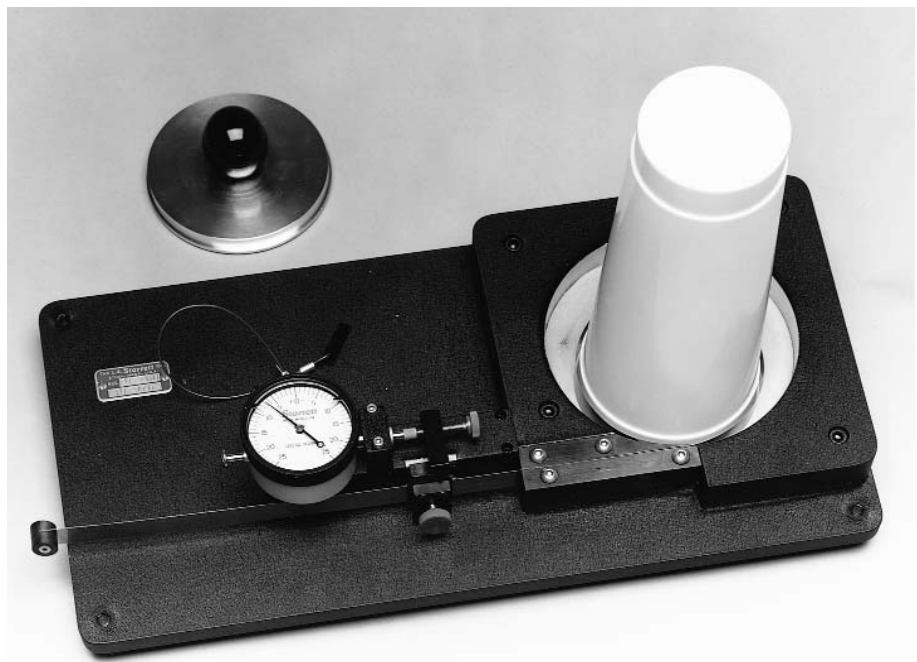
Top of 1-gallon container in measuring position.

## PI-Plate Gage for O.D.

This gage ensures container quality requirements with an easy-to-use gage system. With dial or digital indicator for SPC, this gage measures flexible product diameters to .001" accuracy.

Each gage from the 2" to 4" range through the 10" to 12" range is quickly set to zero with the master provided as an option. Push the button on the indicator to insert a part and release the button to gage a part within  $\pm .025"$  diameter range from the master size. Featuring quick changes from size-to-size, ease of use and .001" accuracy will ensure process control.

It takes less than one minute to set the band to a different master and zero the indicator.



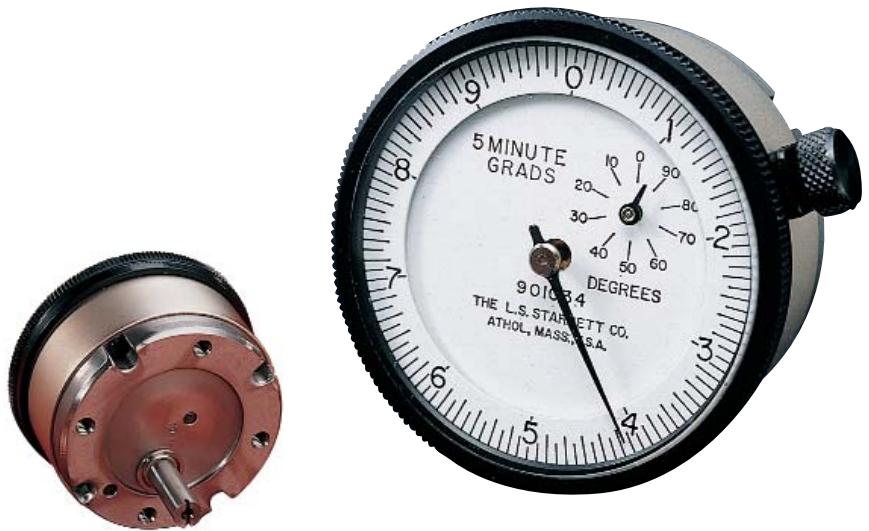




## Dial Protractor Heads

Starrett Dial Protractor Heads for special applications permit rapid angular measurements. With 90° range and graduations of 5' they will assure accurate measurements.

Specifications – Bezel diameter is 2-1/4"; case thickness is 1.34" from crystal to back; .25" dia. input shaft projects .63" from back of case. Main dial reading to customer specification; graduation – specify 0°5', 0°10' or 0°15'. Also available with balanced dials and with counterclockwise figures in red.

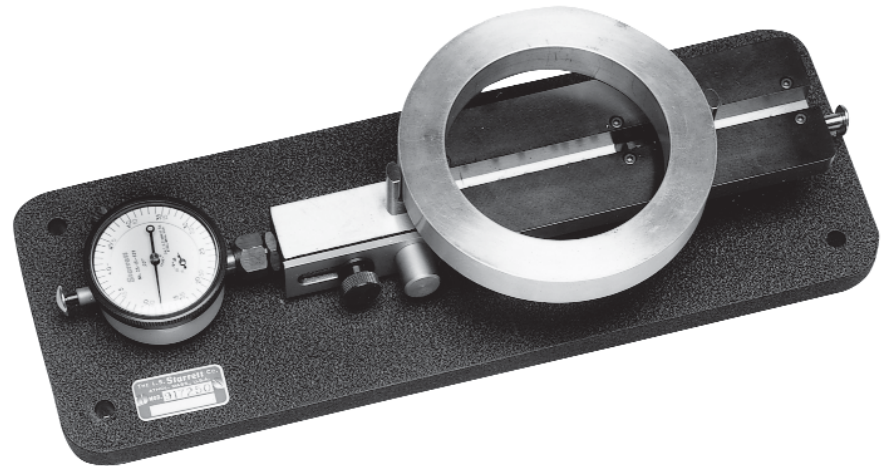


## Universal Bench Gage

Sizes from 0 to 4" are rapidly checked to .0001" accuracy with a dial or digital indicator. The gage range is  $\pm .100$ " from the zero set point on a master. The digital indicator holds the reading from one sweep over the part to eliminate errors. A rugged ball bushing motion transfer provides accuracy for many maintenance-free years.

With optional contacts, this gage can be quickly set up to check inside and outside diameters, slot and groove widths, length or thickness, and splines or gear pitch diameters.

Move the lockable slide to reverse this gaging direction. Attach the required contacts and set the indicator to zero with a master. You are ready to gage a different part in less than five minutes.



Contacts are available for numerous applications. Optional 2- or 3-point contact sets are available with flat or rounded faces, conical points, steel or carbide balls, and pins for over-roll dimensions.

## Hot Material Thickness Gage

Starrett Cat. No S00811 in 1" range sizes. Gage locks thickness of material into digital indicator to view away from the hot material.

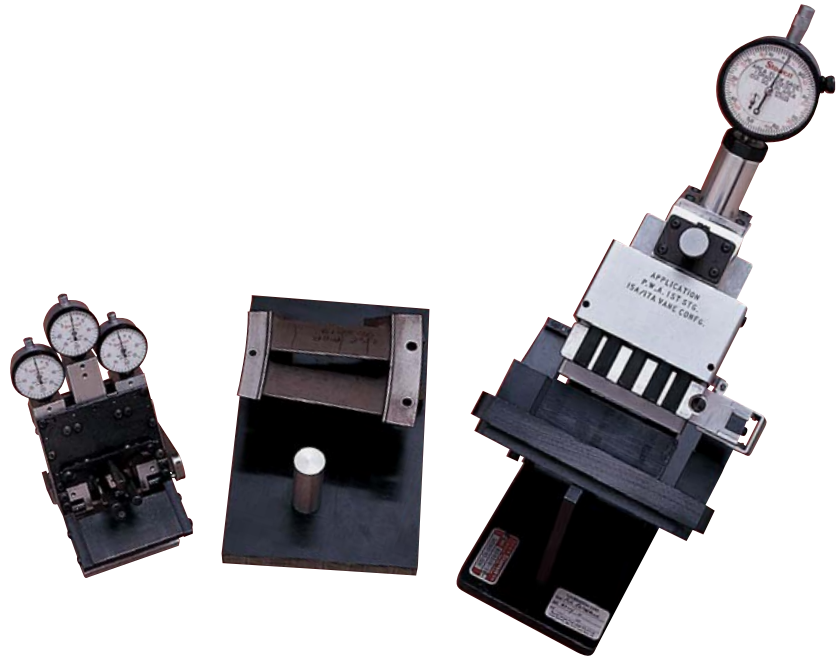




## Turbine Nozzle Diaphragm Opening Gages

The gage on the left, in connection with the reference nozzle shown in the center, is a simplified and cost effective gage to measure throat geometry of turbine nozzle openings. From the raw data area calculator, SPC and other data acquisition are easily accomplished.

The gage on the right is a rugged, proven hydro-mechanical area flow gage suitable for production purposes, and it has been the industry standard for over 30 years.

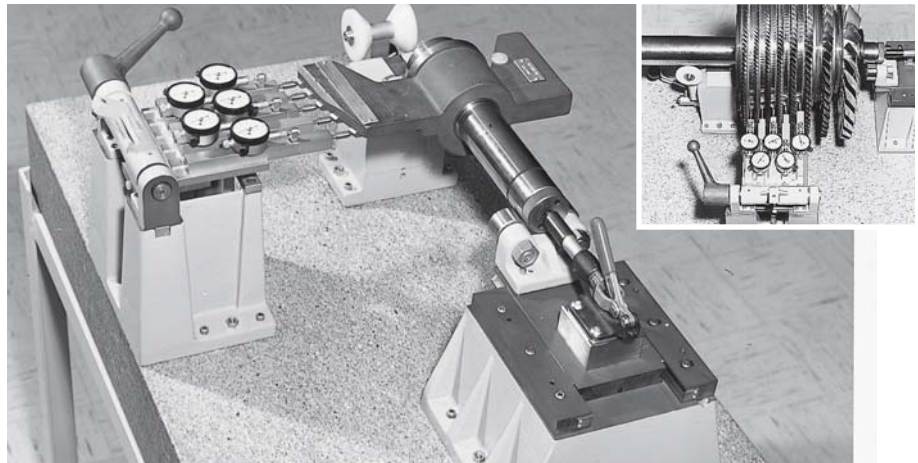


## Turbine Compressor Rotor Spacers

This inspection fixture checks gas turbine engine compressor rotor spacers for radial size and runout at five stages.

It represents a specific Starrett special gage capability — the designing and building of large, ultra-precise fixture gages mounted on Starrett precision granite surface plates which meet or exceed U.S. Federal Specification GGG-P-463C.

**Inset: Rotor turned 360° on its axis to determine runout and radial deviation.**



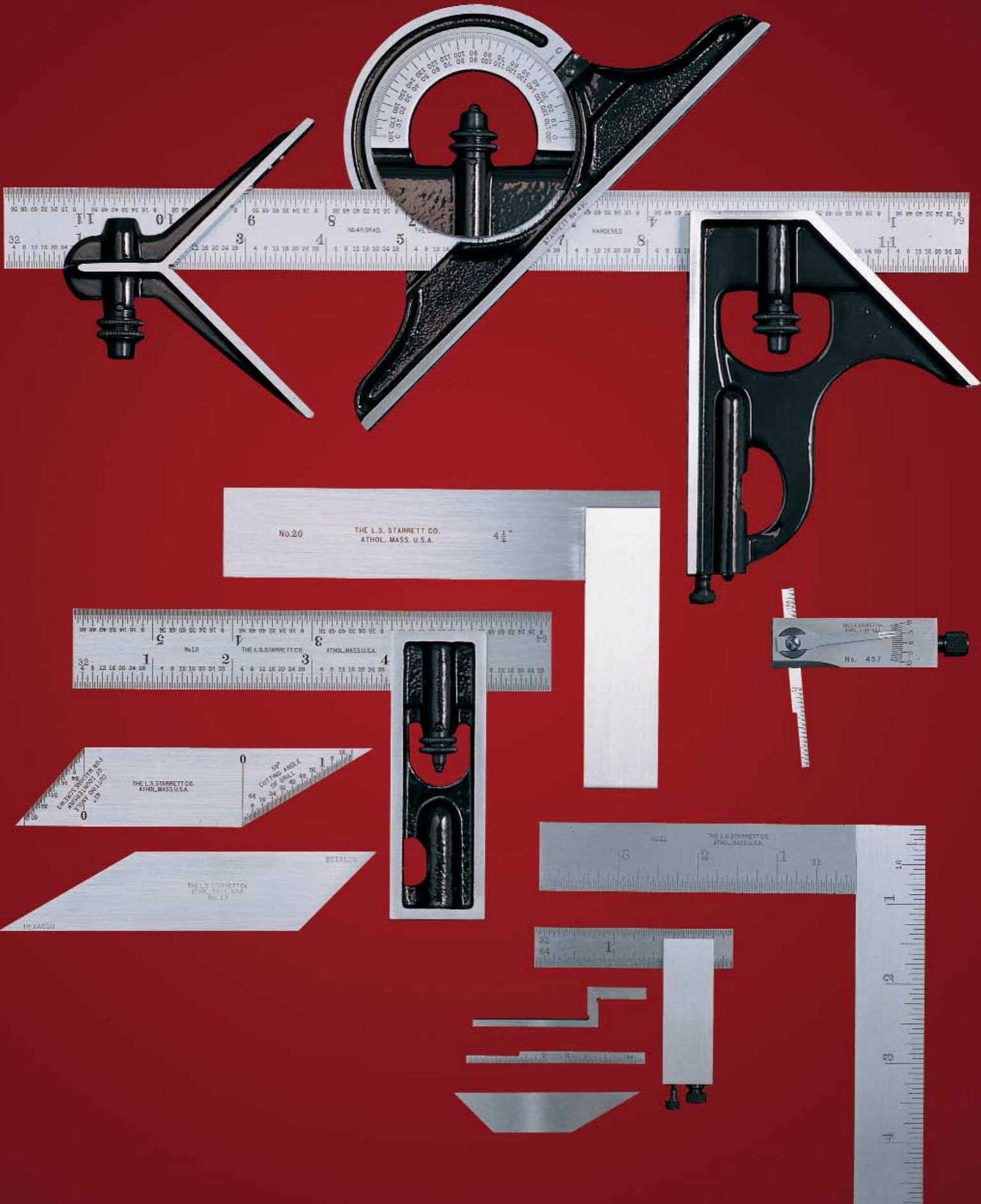
## Single Source Your Complete Gaging System

Since 1958 the Special Gage Division has been fully staffed to design and manufacture gaging systems per customer specifications. Whether mechanical, electro-mechanical, computerized or manually operated we are your one-stop supplier. With over 40 years experience in traditional and emerging technologies, we have the expertise to provide you with cost effective, accurate, and dependable gaging equipment. From bar codes and spreadsheets to SPC and graphics, you can have the information you want, the way you want it. Just call, email or fax your requirements and we will promptly prepare a price and delivery quotation.



Tel: (978) 249-3551 Fax: (978) 249-3699 e-mail: [specialgage@starrett.com](mailto:specialgage@starrett.com)







Starrett squares are offered in a practical variety of styles to suit the needs of the individual, whether it be a toolmaker, mechanic, carpenter, or a “do-it-yourself” homeowner.

The Starrett name has always been associated with squares because our founder, Laroy Starrett, invented the combination square in 1877. The success of this tool led to the beginning of The L.S. Starrett Company in 1880. The combination square is one of the world’s most practical and versatile tool inventions – the basic tool for every builder and craftsman.

## Squares

In this section you will see combination squares, solid test or try squares, and special squares for tool and diemakers and carpenters.

To check squareness at the highest level of accuracy, we recommend our No. TS Series of True Squares. These are available in three styles down to the amazing accuracy of 1/4 second. These are listed in the Gage Block Section of this catalog.

We also offer granite squares which are listed in the Granite Surface Plate Section of this catalog. The main purpose of these squares is for checking the X, Y, and Z axes on CNC machine tools and coordinate measuring machines.

## Starrett Combination Squares Feature:

- ◆ A choice of smooth-finished forged and hardened (longer wearing) steel square head and center head, or a cast iron square head and center head. All bearing surfaces are accurately ground
- ◆ A choice of stable cast iron protractors – reversible or non-reversible style – all nicely finished with a black, durable finish
- ◆ Protractors are furnished as reversible, with shoulders on both sides of the blade, or non-reversible, with a single shoulder on one side of the blade only. All protractors also have a spirit level
- ◆ Protractor heads have revolving turrets with direct-reading double graduations, 0-180° in opposite directions. This permits the direct reading of angles and supplementary angles
- ◆ Most square heads have a handy spirit level and a hardened scriber
- ◆ Square blades and protractor heads come in a choice of regular or Starrett no-glare satin chrome finish
- ◆ A reversible lock bolt allows the blade to be turned over or end-for-end without removing the lock bolt or nut. This ensures true alignment of the blade and heads
- ◆ Square blades feature easy-to-read, sharp graduations and are available in many convenient styles
- ◆ Separate parts and attachments available

## Commonsense Tips for Using Squares and Center Heads

- ◆ **First**, make sure your square is clean and that it is located against a flat surface – burrs on metal or knots and bumps on wood will throw squareness off
- ◆ **Second**, to scribe a line, the steel scriber can be used on any material, but usually on metal. A carpenter’s pencil is normally used on wood, but if finer lines are needed, a light cut with a utility knife may be used. This is also handy when scribing cross grain
- ◆ **Third**, when using a center head on a piece that may not be completely round, it is good practice to scribe more than two intersecting lines





### Combination Squares

Starrett combination squares consist of a machine-divided, hardened and tempered steel rule (or blade) on which is mounted an adjustable square head.

Starrett Combination Square Heads are made of cast iron or forged and hardened steel and are not to be confused with the cheap imitation plastic or die cast heads on the market. The value of Starrett tools is that they are accurate and will last.

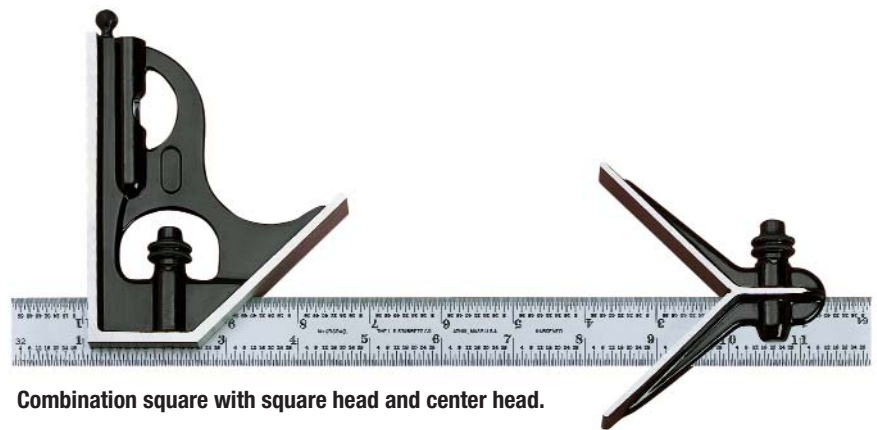
As the name indicates, these tools can be used for many different purposes – a complete substitute for a whole set of common solid try squares, a 45 degree miter, a depth gage, a height gage, a marking or scribing gage, a level, a plumb and, by withdrawing the blade, it can also be used as a precision rule. This saves littering the workbench with too many tools, each being necessary but may be used less. This results in the goal of all good craftsmen – better accuracy and greater efficiency.

The combination square with center head is a basic combination set. The center head is a convenient and accurate way to find the center of round work.

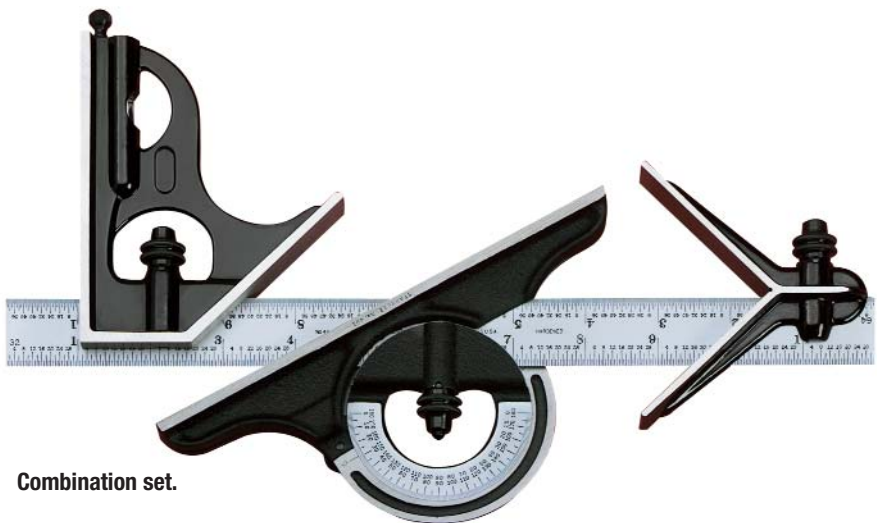
Complete combination sets feature the combination square with a center head and with either a reversible or non-reversible protractor. Details of the protractors are also included in the Protractor and Angle Measurements Section of this catalog.



Combination square with square head only.



Combination square with square head and center head.



Combination set.



Above, model with cast iron head; below, model with smooth, forged and hardened steel head.



### **Combination Squares with square head**

### **Cast Iron Heads: No. 11H Series**

With reversible lock bolt, scribe, spirit level (except 4"), and hardened steel, machine-divided blade with regular or satin chrome finish. Cast iron head with black wrinkle finish.

### **Forged and Hardened Steel Heads: No. 33H Series**

These squares have the same features as the No. 11 Series except that the square heads are forged hardened steel with smooth, black enamel finish.


**Combination Squares with square head**
**No. 11H Series with Cast Iron Heads**
**No. 33H Series with Forged and Hardened Steel Heads**

| 4-24" |  | 11H Series   |   |         | 33H Series  |         |
|-------|--|--------------|---|---------|---|---------|
| Size  | Graduation   | Blade        | Cast Iron Heads with Black Wrinkle Finish |         | Forged and Hardened Steel Heads with Smooth Black Enamel Finish |         |
|       |  |              | Catalog No.                               | EDP No. | Catalog No.   | EDP No. |
| 4"    | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular      | 11H-4-4R                                  | 50049   | 33H-4-4R  | 50203   |
|       |  | Satin Chrome | C11H-4-4R                                 | 56360   | C33H-4-4R   | 56390   |
| 6"    |  | Regular      | 11H-6-4R                                  | 50051   | 33H-6-4R  | 50205   |
|       |  | Satin Chrome | C11H-6-4R                                 | 56362   | C33H-6-4R   | 56392   |
| 6"    | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      | 11H-6-16R                                 | 50053   | 33H-6-16R   | 50207   |
|       |  | Satin Chrome | C11H-6-16R                                | 56364   | C33H-6-16R  | 56394   |
| 12"   |  | Regular      | 11H-12-4R                                 | 50055   | 33H-12-4R   | 50209   |
|       |  | Satin Chrome | C11H-12-4R                                | 56366   | C33H-12-4R  | 56396   |
| 12"   | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      | 11H-12-16R                                | 50057   | 33H-12-16R  | 50211   |
|       |  | Satin Chrome | C11H-12-16R                               | 56368   | C33H-12-16R   | 56398   |
| 18"   |  | Regular      | 11H-18-4R                                 | 50059   | 33H-18-4R   | 50213   |
|       |  | Satin Chrome | C11H-18-4R                                | 56370   | C33H-18-4R  | 56400   |
| 18"   | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      | 11H-18-16R                                | 50061   | 33H-18-16R  | 50215   |
|       |  | Satin Chrome | C11H-18-16R                               | 56372   | C33H-18-16R   | 56402   |
| 24"   |  | Regular      | 11H-24-4R                                 | 50063   | 33H-24-4R   | 50217   |
|       |  | Satin Chrome | C11H-24-4R                                | 56374   | C33H-24-4R  | 56404   |
| 24"   | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      | 11H-24-16R                                | 50065   | 33H-24-16R  | 50219   |
|       |  | Satin Chrome | C11H-24-16R                               | 56376   | C33H-24-16R   | 56406   |

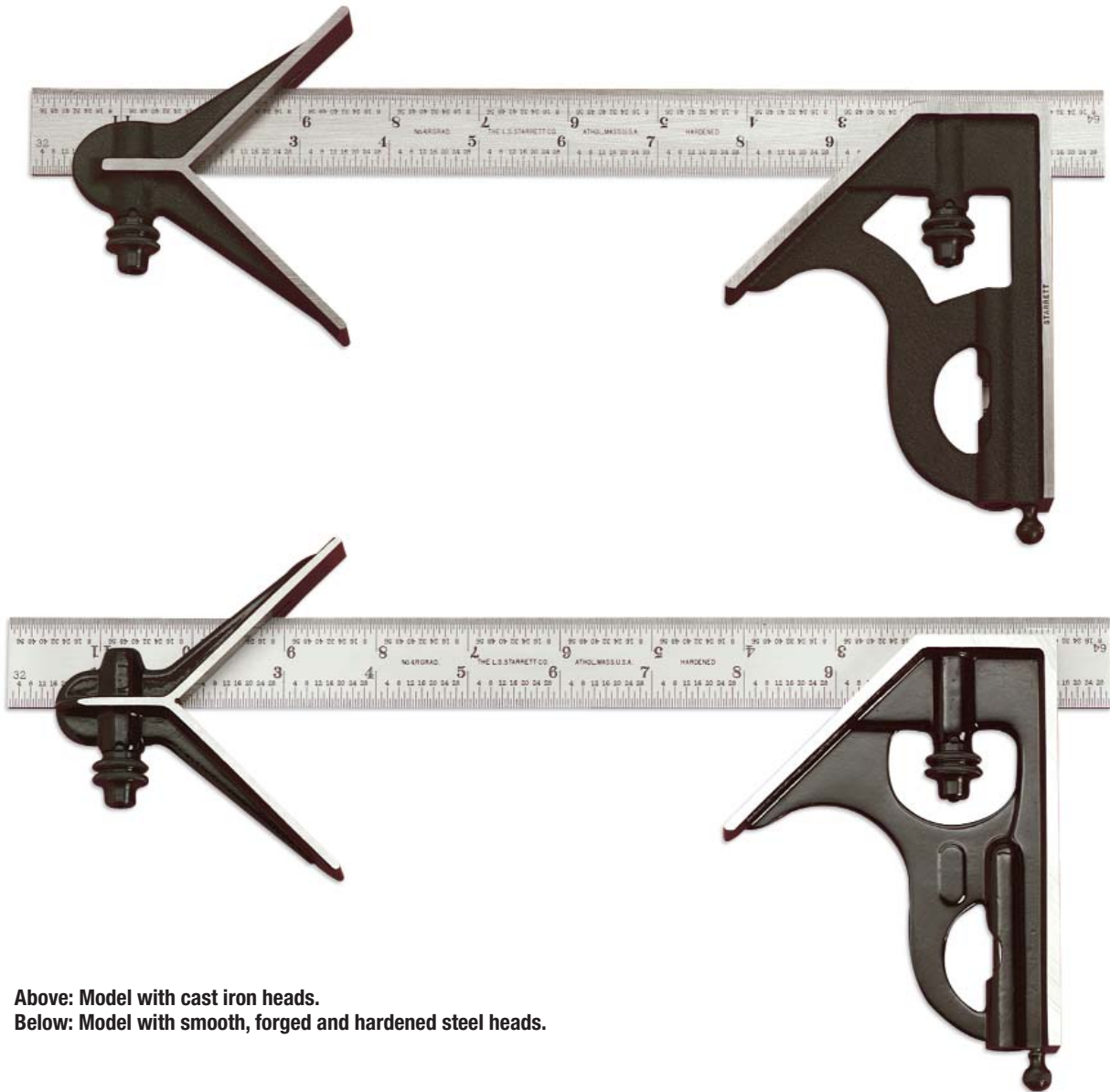
| 150-600mm |                         | 11MH Series  |           |       | 33MH Series |       |
|-----------|-------------------------|--------------|-----------|-------|-------------|-------|
| 150mm     | mm and 1/2mm Both Sides | Regular      | 11MH-150  | 56241 | 33MH-150    | 56247 |
|           |                         | Satin Chrome | C11MH-150 | 56380 | C33MH-150   | 56410 |
| 300mm     |                         | Regular      | 11MH-300  | 56243 | 33MH-300    | 56249 |
|           |                         | Satin Chrome | C11MH-300 | 56382 | C33MH-300   | 56412 |
| 600mm     |                         | Regular      | 11MH-600  | 56245 | 33MH-600    | 56251 |
|           |                         | Satin Chrome | C11MH-600 | 56384 | C33MH-600   | 56414 |

| 300-600mm and 11-3/4 – 23-1/2" |   | 11MEH Series |            |       | 33MEH Series |       |
|--------------------------------|---|--------------|------------|-------|--------------|-------|
| 300mm & 11-3/4"                | 1/2mm and 32nds One Side; mm and 64ths Reverse Side | Regular      | 11MEH-300  | 50067 | 33MEH-300    | 50221 |
|                                |   | Satin Chrome | C11MEH-300 | 56386 | C33MEH-300   | 56416 |
| 600mm & 23-1/2"                |   | Regular      | 11MEH-600  | 56121 | 33MEH-600    | 50237 |
|                                |   | Satin Chrome | C11MEH-600 | 56388 | C33MEH-600   | 56418 |

\*Includes redemption card for Standard Letter of Certification (SLC).

Packed one in a box.





**Above: Model with cast iron heads.  
Below: Model with smooth, forged and hardened steel heads.**

**Combination Squares  
with square head and  
center head**

**Cast Iron Heads:  
No. 11HC Series**

With reversible lock bolts, scribe, spirit level (except 4"), and hardened steel, machine-divided blade with regular or satin chrome finish. Cast iron heads with black wrinkle finish.

**Forged and Hardened  
Steel Heads:  
No. 33HC Series**

These squares have the same features as the No. 11HC Series except that the square heads and center heads are forged hardened steel with smooth, black enamel finish.



**Combination Squares with square head and center head**

**No. 11HC Series with Cast Iron Heads**

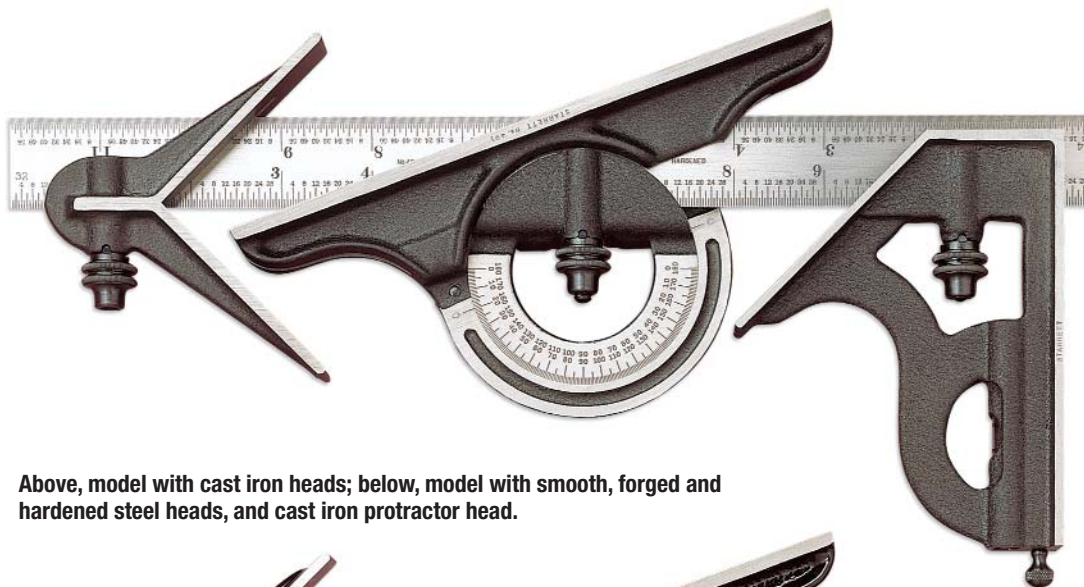
**No. 33HC Series with Forged and Hardened Steel Heads**

| 4-24" |  | 11HC Series  |   |         | 33HC Series   |         |
|-------|--|--------------|---|---------|---|---------|
| Size  | Graduation   | Blade        | Cast Iron Heads with Black Wrinkle Finish |         | Forged and Hardened Steel Heads with Smooth Black Enamel Finish |         |
|       |  |              | Catalog No.                               | EDP No. | Catalog No.   | EDP No. |
| 4"    | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular      | 11HC-4-4R                                 | 50050   | 33HC-4-4R   | 50204   |
|       |  | Satin Chrome | C11HC-4-4R                                | 56361   | C33HC-4-4R  | 56391   |
| 6"    |  | Regular      | 11HC-6-4R                                 | 50052   | 33HC-6-4R   | 50206   |
|       |  | Satin Chrome | C11HC-6-4R                                | 56363   | C33HC-6-4R  | 56393   |
| 6"    | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      | 11HC-6-16R                                | 50054   | 33HC-6-16R  | 50208   |
|       |  | Satin Chrome | C11HC-6-16R                               | 56365   | C33HC-6-16R   | 56395   |
| 12"   | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular      | 11HC-12-4R                                | 50056   | 33HC-12-4R  | 50210   |
|       |  | Satin Chrome | C11HC-12-4R                               | 56367   | C33HC-12-4R   | 56397   |
| 12"   | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      | 11HC-12-16R                               | 50058   | 33HC-12-16R   | 50212   |
|       |  | Satin Chrome | C11HC-12-16R                              | 56369   | C33HC-12-16R  | 56399   |
| 18"   | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular      | 11HC-18-4R                                | 50060   | 33HC-18-4R  | 50214   |
|       |  | Satin Chrome | C11HC-18-4R                               | 56371   | C33HC-18-4R   | 56401   |
| 18"   | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      | 11HC-18-16R                               | 50062   | 33HC-18-16R   | 50216   |
|       |  | Satin Chrome | C11HC-18-16R                              | 56373   | C33HC-18-16R  | 56403   |
| 24"   | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular      | 11HC-24-4R                                | 50064   | 33HC-24-4R  | 50218   |
|       |  | Satin Chrome | C11HC-24-4R                               | 56375   | C33HC-24-4R   | 56405   |
| 24"   | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      | 11HC-24-16R                               | 50066   | 33HC-24-16R   | 50220   |
|       |  | Satin Chrome | C11HC-24-16R                              | 56377   | C33HC-24-16R  | 56407   |

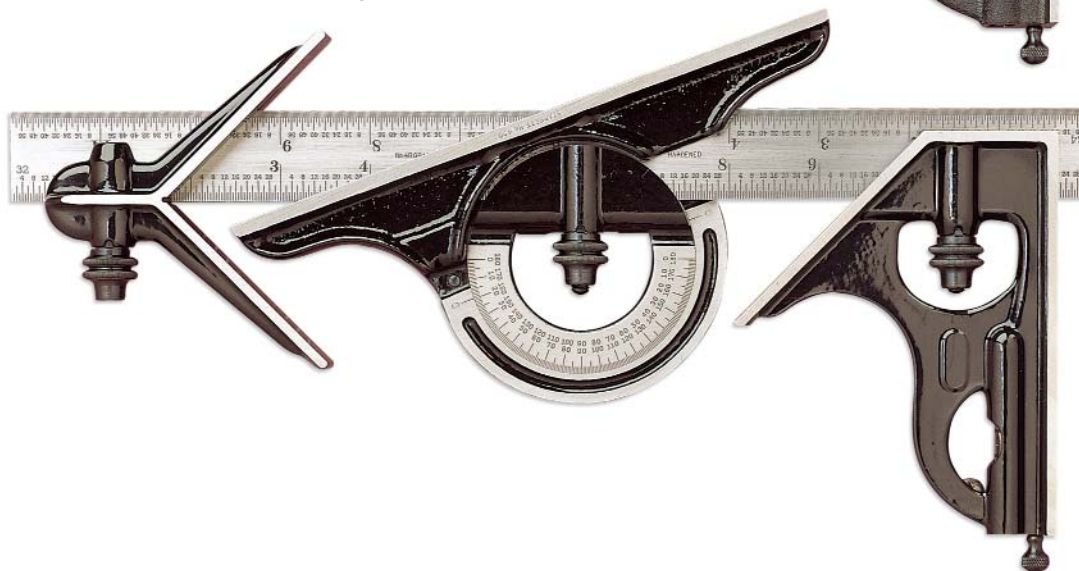
| 150-600mm |                         | 11MHC Series |            | 33MHC Series |            |       |
|-----------|-------------------------|--------------|------------|--------------|------------|-------|
| 150mm     | mm and 1/2mm Both Sides | Regular      | 11MHC-150  | 56242        | 33MHC-150  | 56248 |
|           |                         | Satin Chrome | C11MHC-150 | 56381        | C33MHC-150 | 56411 |
| 300mm     |                         | Regular      | 11MHC-300  | 56244        | 33MHC-300  | 56250 |
|           |                         | Satin Chrome | C11MHC-300 | 56383        | C33MHC-300 | 56413 |
| 600mm     |                         | Regular      | 11MHC-600  | 56246        | 33MHC-600  | 56252 |
|           |                         | Satin Chrome | C11MHC-600 | 56385        | C33MHC-600 | 56415 |

| 300-600mm and 11-3/4 – 23-1/2" |   | 11MEHC Series |             | 33MEHC Series |             |       |
|--------------------------------|---|---------------|-------------|---------------|-------------|-------|
| 300mm & 11-3/4"                | 1/2mm and 32nds One Side; mm and 64ths Reverse Side | Regular       | 11MEHC-300  | 50068         | 33MEHC-300  | 50222 |
|                                |   | Satin Chrome  | C11MEHC-300 | 56387         | C33MEHC-300 | 56417 |
| 600mm & 23-1/2"                |   | Regular       | 11MEHC-600  | 50075         | 33MEHC-600  | 50238 |
|                                |   | Satin Chrome  | C11MEHC-600 | 56389         | C33MEHC-600 | 56419 |

Packed one in a box.



**Above, model with cast iron heads; below, model with smooth, forged and hardened steel heads, and cast iron protractor head.**



**Combination Sets with square head, center head and reversible protractor head and blade**

**Cast Iron Heads:  
No. 435 Series**

With reversible lock bolts, scriber, spirit level in both square head and protractor head, direct reading double 180° protractor scale, hardened steel, machine-divided blade. Cast iron heads with black wrinkle finish. Also available with satin chrome blade and protractor head.

**Forged and Hardened Steel Heads and Center Head, Cast Iron Protractor Head:**

*(The very best sets available)*

**No. 434 Series**

These squares have the same features as the No. 435 Series except that the square heads and center heads are forged, hardened steel with smooth, black enamel finish.





**Combination Sets with square head, center head and reversible protractor head and blade**

**No. 435 Series with Cast Iron Heads**

**No. 434 Series with Forged and Hardened Steel Square Heads and Center Heads, Cast Iron Protractor Heads**

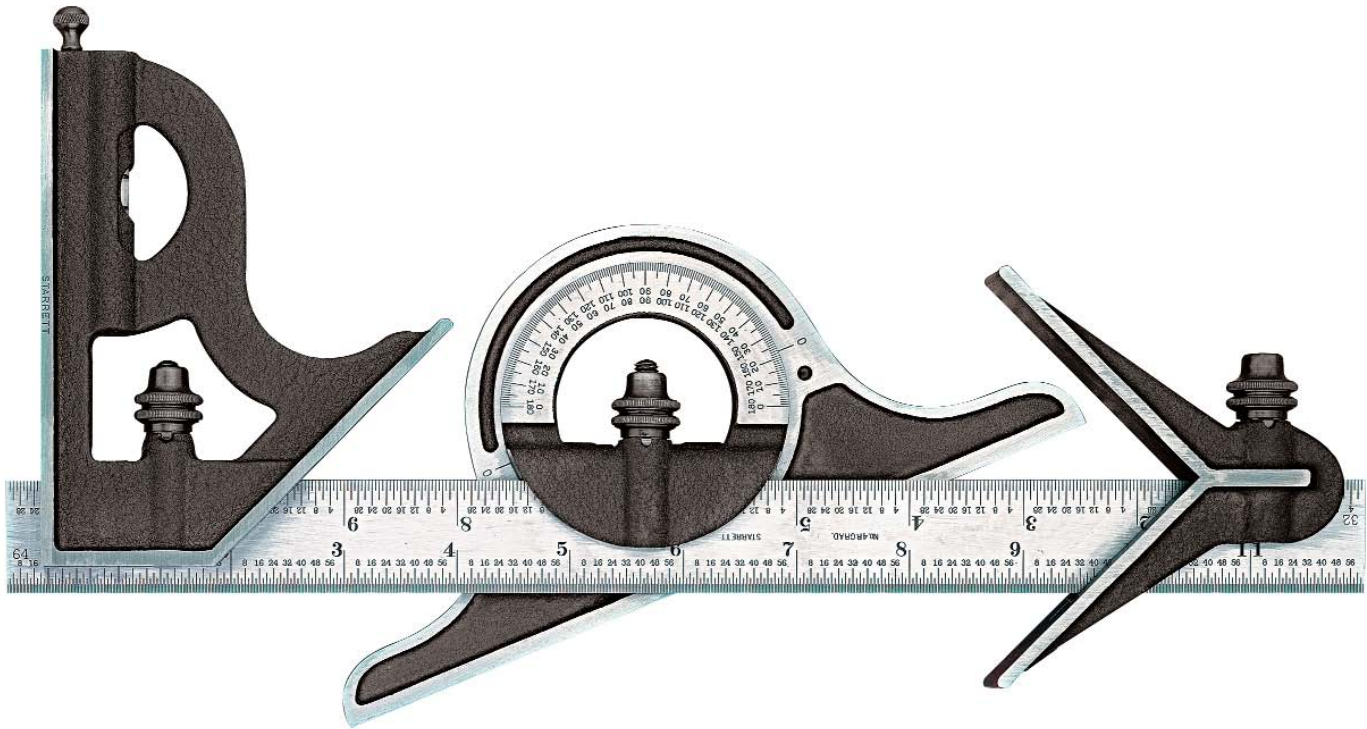
| 12-24" |  | 435 Series   |   |         | 434 Series   |         |
|--------|--|--------------|---|---------|--|---------|
| Size   | Graduation   | Blade        | Cast Iron Heads with Black Wrinkle Finish |         | Forged and Hardened Heads and Center Heads, Cast Iron Protractor Head with Smooth Black Finish |         |
|        |  |              | Catalog No.                               | EDP No. | Catalog No.  | EDP No. |
| 12"    | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular      | 435-12-4R                                 | 51556   | 434-12-4R  | 51542   |
|        |  | Satin Chrome | C435-12-4R                                | 66682   | C434-12-4R   | 51548   |
| 12"    | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      | 435-12-16R                                | 51557   | 434-12-16R   | 51543   |
|        |  | Satin Chrome |   |         | C434-12-16R  | 51549   |
| 18"    | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular      | 435-18-4R                                 | 51558   | 434-18-4R  | 51544   |
|        |  | Satin Chrome |   |         | C434-18-4R   | 51550   |
| 18"    | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      |   |         | 434-18-16R   | 51545   |
|        |  | Satin Chrome |   |         | C434-18-16R  | 51551   |
| 24"    | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular      | 435-24-4R                                 | 51559   | 434-24-4R  | 51546   |
|        |  | Satin Chrome |   |         | C434-24-4R   | 51552   |
| 24"    | No. 16R – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular      |   |         | 434-24-16R   | 51547   |
|        |  | Satin Chrome |   |         | C434-24-16R  | 51553   |

| 300-600mm |                         | 435M Series  |           |       | 434M Series |       |
|-----------|-------------------------|--------------|-----------|-------|-------------|-------|
| 300mm     | mm and 1/2mm Both Sides | Regular      | 435M-300  | 66177 | 434M-300    | 56255 |
|           |                         | Satin Chrome | C435M-300 | 61918 | C434M-300   | 56420 |
| 600mm     |                         | Regular      | 435M-600  | 66681 | 434M-600    | 56256 |
|           |                         | Satin Chrome |           |       | C434M-600   | 56421 |

| 300-600mm and 11-3/4 – 23-1/2" |   | 435ME Series |           |       | 434ME Series |       |
|--------------------------------|---|--------------|-----------|-------|--------------|-------|
| 300mm & 11-3/4"                | 1/2mm and 32nds One Side; mm and 64ths Reverse Side | Regular      | 435ME-300 | 51560 | 434ME-300    | 51554 |
|                                |   | Satin Chrome |           |       | C434ME-300   | 56422 |
| 600mm & 23-1/2"                |   | Regular      | 435ME-600 | 51561 | 434ME-600    | 51555 |
|                                |   | Satin Chrome |           |       | C434ME-600   | 56423 |

\*Includes redemption card for Standard Letter of Certification (SLC).

Packed one in a box.



**Combination Sets with square head, center head and non-reversible protractor head and blade**

**Cast Iron Heads:  
No. 9 Series**

With reversible lock bolts, scribe, spirit level in both square head and protractor head, direct reading double 180° protractor scale, and hardened steel, machine-divided blade. Cast iron heads with black wrinkle finish. Also available with satin chrome blade and protractor head.

**12-24"**

| Size | Graduation  | Blade        | Cast Iron Heads with Black Wrinkle Finish |         |
|------|---|--------------|---|---------|
|      |   |              | Catalog No.                               | EDP No. |
| 12"  | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                            | Regular      | 9-12-4R                                   | 50042   |
|      |   | Satin Chrome | C9-12-4R                                  | 50046   |
| 12"  | No. 16R – Quick Reading 32nds, 64ths, Air Craft Quick Reading 50ths, 100ths | Regular      | 9-12-16R                                  | 50043   |
| 18"  | No. 4R – 8ths, 16ths, Quick Reading 32nds, 64ths                            | Regular      | 9-18-4R                                   | 50044   |
| 24"  |   |              | 9-24-4R                                   | 50045   |

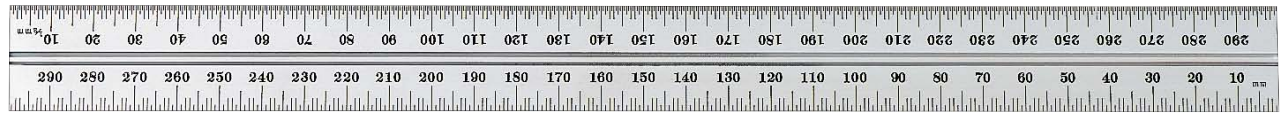
**300-600mm**

|       |                         |         |        |       |
|-------|-------------------------|---------|--------|-------|
| 300mm | mm and 1/2mm Both Sides | Regular | 9M-300 | 56253 |
| 600mm |                         |         | 9M-600 | 56254 |

**300-600mm and 11-3/4 – 23-1/2"**

|                 |   |         |         |       |
|-----------------|---|---------|---------|-------|
| 300mm & 11-3/4" | 1/2mm and 32nds One Side; mm and 64ths Reverse Side | Regular | 9ME-300 | 50047 |
| 600mm & 23-1/2" |   |         | 9ME-600 | 50048 |

Packed one in a box.



**Blades Only for  
combination squares,  
sets and bevel  
protractors**

**Inch, Millimeter and Inch/Millimeter**

The blades listed below fit any head according to the sizes noted in the charts on all combination squares, combination sets and bevel protractors. The 12", 18", 24" and 36" and 300mm and 600mm sizes are interchangeable. Exception: Starrett No. 33J and No. 8 Combination Squares. (For these, see No. 33J and No. 8 listings.)

**Inch Blades**

| Size  | Approx. Width x Thickness | Graduation  | Finish  | Catalog No.   | EDP No.         |
|---|---------------------------|---|---|---|-----------------|
| 4"  | 5/8" x 1/16"              | <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular   | <b>B4-4R</b>  | 50076           |
|   |                           |   | Satin Chrome  | <b>CB4-4R</b>   | 50077           |
|   |                           | <b>No. 16R</b> – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Satin Chrome  | <b>CB4-16R</b>  | 50078           |
| 6"  | 3/4" x 5/64"              | <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular   | <b>B6-4R</b>  | 50079           |
|   |                           |   | Satin Chrome  | <b>CB6-4R</b>   | 50080           |
|   |                           | <b>No. 16R</b> – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular   | <b>B6-16R</b>   | 50081           |
|   |                           |   | Satin Chrome  | <b>CB6-16R</b>  | 50082           |
| 12"   | 1" x 3/32"                | <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular   | <b>B12-4R</b>   | 50083           |
|   |                           |   | Satin Chrome  | <b>CB12-4R</b>  | 50084           |
|   |                           | <b>No. 6R</b> – Aircraft Quick Reading 50ths and 10ths                            | Satin Chrome  | <b>CB12-6R</b>  | 50085           |
|   |                           |   | <b>No. 16R</b> – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular   | <b>B12-16R</b>  |
|   |                           | Satin Chrome  |   | <b>CB12-16R</b>   | 50087           |
|   |                           | 18"   | 1" x 3/32"  | <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths | Stainless Steel |
| <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths                           | Regular                   |   |   |   | <b>B18-4R</b>   |
|   | Satin Chrome              |   |   | <b>CB18-4R</b>  | 50089           |
| <b>No. 16R</b> – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | Regular                   |   |   | <b>B18-16R</b>  | 50090           |
|   | Satin Chrome              | <b>CB18-16R</b>   | 50091   |   |                 |

All sizes packed one in an envelope.

(Continued on next page.)





**Blades Only for combination squares, sets and bevel protractors (continued)**

**Inch Blades (continued)**

| Size         | Approx. Width x Thickness  | Graduation   | Finish   | Catalog No.  | EDP No.         |                |
|--------------|--|--|--|--|-----------------|----------------|
| 24"          | 1" x 3/32"   | <b>No. 4R</b> – 8ths, 16ths, Quick Reading<br>32nds, 64ths | Regular  | <b>B24-4R</b>  | 50092           |                |
|              |  |  | Satin Chrome   | <b>CB24-4R</b>   | 50093           |                |
|              |  | <b>No. 6R</b> – Aircraft Quick Reading 50ths<br>and 10ths  | Satin Chrome   | <b>CB24-6R</b>   | 50094           |                |
|              |  |  | <b>No. 16R</b> – Quick Reading 32nds, 64ths,<br>Aircraft Quick Reading 50ths, 100ths | Regular  | <b>B24-16R</b>  | 50095          |
| Satin Chrome |  | <b>CB24-16R</b>  |  | 50096  |                 |                |
| 36"          |  | 1" x 3/32"   | <b>No. 4R</b> – 8ths, 16ths, Quick Reading<br>32nds, 64ths                           | Satin Chrome   | <b>CB36-4R</b>  | 50097          |
|              | <b>No. 16R</b> – Quick Reading 32nds, 64ths,<br>Aircraft Quick Reading 50ths, 100ths |  |  | Satin Chrome   | <b>CB36-16R</b> | 50098          |
| 48"          |  |  | 1" x 3/32"   | <b>No. 4R</b> – 8ths, 16ths, Quick Reading<br>32nds, 64ths | Satin Chrome    | <b>CB48-4R</b> |

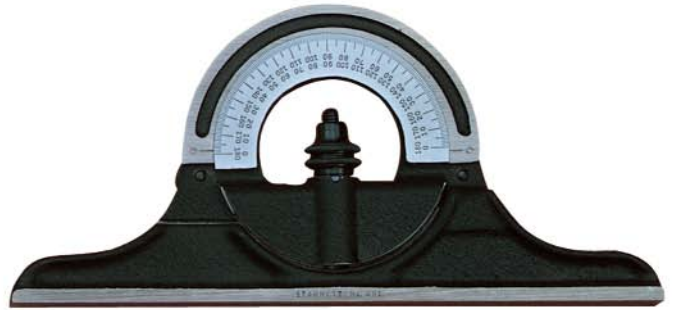
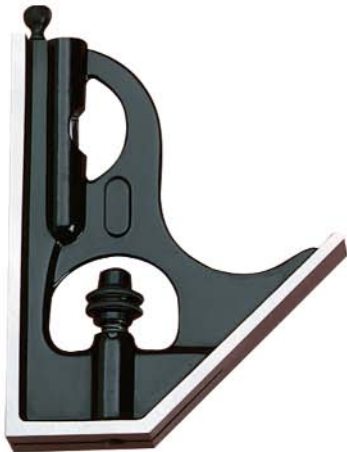
**Millimeter Blades**

|       |              |                         |              |                 |                 |
|-------|--------------|-------------------------|--------------|-----------------|-----------------|
| 150mm | 19mm x 2mm   | mm and 1/2mm Both Sides | Regular      | <b>B150-35</b>  | 55985           |
| 300mm | 25mm x 2.4mm |                         | Satin Chrome | <b>CB150-35</b> | 55988           |
|       |              |                         | Regular      | <b>B300-35</b>  | 55986           |
|       |              |                         | Satin Chrome | <b>CB300-35</b> | 55989           |
|       |              |                         | Regular      | <b>B600-35</b>  | 55987           |
| 600mm |              |                         | 25mm x 2.4mm | Satin Chrome    | <b>CB600-35</b> |

**Inch and Millimeter Blades**

|                    |              |  |              |                 |                 |
|--------------------|--------------|--|--------------|-----------------|-----------------|
| 150mm<br>& 5-3/4"  | 19mm x 2mm   | 1/2mm and 32nds One Side; mm and<br>64ths Reverse Side | Regular      | <b>B150-36</b>  | 55991           |
| 300mm<br>& 11-3/4" | 25mm x 2.4mm |  | Satin Chrome | <b>CB150-36</b> | 55992           |
|                    |              |  | Regular      | <b>B300-36</b>  | 50101           |
|                    |              |  | Satin Chrome | <b>CB300-36</b> | 55993           |
|                    |              |  | Regular      | <b>B600-36</b>  | 50102           |
| 600mm<br>& 23-1/2" |              |  | 25mm x 2.4mm | Satin Chrome    | <b>CB600-36</b> |

All sizes packed one per envelope.



**Square Heads,  
Center Heads and  
Protractor Heads  
Only  
for combination  
squares, combination  
sets and bevel  
protractors**

The heads listed fit any blade according to the sizes noted in the charts on all combination squares, combination sets and bevel protractors. Sizes 12", 18", and 24", and 300mm and 600mm are interchangeable. When ordering, specify complete catalog number and length of blade. Exception: Starrett No. 33J and No. 8 Combination Squares. (For these, see No. 33J and No. 8 listings.)

**Square Heads**

| Fits<br>Blade Size | Cast Iron<br>Black Wrinkle Finish |         | Forged and Hardened Steel<br>with Smooth Black Enamel Finish |         |
|--------------------|-----------------------------------|---------|--|---------|
|                    | Catalog No.                       | EDP No. | Catalog No.  | EDP No. |
| 4"                 | H11-4                             | 50069   | H33-4  | 50223   |
| 6"                 | H11-6                             | 50070   | H33-6  | 50224   |
| 12" (300mm)        | H11-1224                          | 50071   | H33-1224   | 50225   |
| 18"                |                                   |         |  |         |
| 24" (600mm)        |                                   |         |  |         |

**Center Heads**

|             |          |       |          |       |
|-------------|----------|-------|----------|-------|
| 4"          | C11-4    | 50072 | C33-4    | 50226 |
| 6"          | C11-6    | 50073 | C33-6    | 50227 |
| 12" (300mm) | C11-1224 | 50074 | C33-1224 | 50228 |
| 18"         |          |       |          |       |
| 24" (600mm) |          |       |          |       |

**Protractor Heads – Cast Iron (Fits blades 12" and up)**

| Finish                          | Reversible  |         | Nonreversible |         |
|---------------------------------|-------------|---------|---------------|---------|
|                                 | Catalog No. | EDP No. | Catalog No.   | EDP No. |
| Black Wrinkle                   | PR-1224W    | 52525   | PNR-1224W     | 50107   |
| Black Wrinkle, Chrome on Turret | CPR-1224W   | 64601   | CPNR-1224W    | 50108   |
| Black Smooth                    | PR-1224S    | 52515   |               |         |
| Black Smooth, Chrome on Turret  | CPR-1224S   | 52516   |               |         |

**NOTE:** For prices of lock bolts, contact the Parts Department.

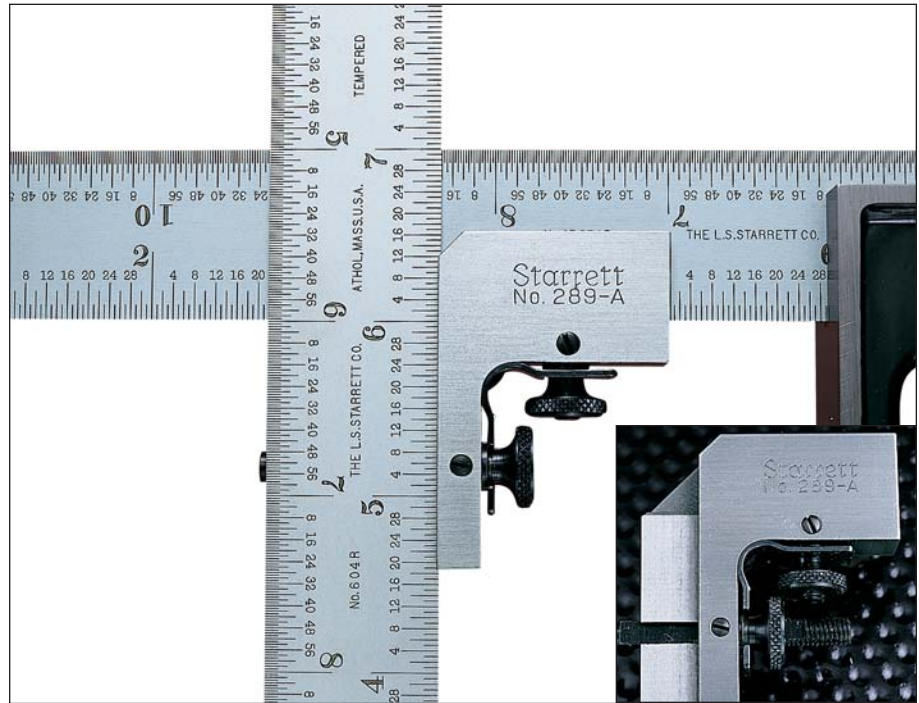
Packed one in a box.



## Attachments for combination squares

### No. 289 Series

These attachments fit combination square blades 1" (25mm) wide and permit attaching rules, blades or thin steel try squares, up to 1" (25mm) wide, at right angles to the blade of the square for laying out key seats, centers, scribing horizontal lines, and measuring diameters. Available in two sizes listed below. Both sizes can also be used with No. 289C Height and Depth Gage Attachment.



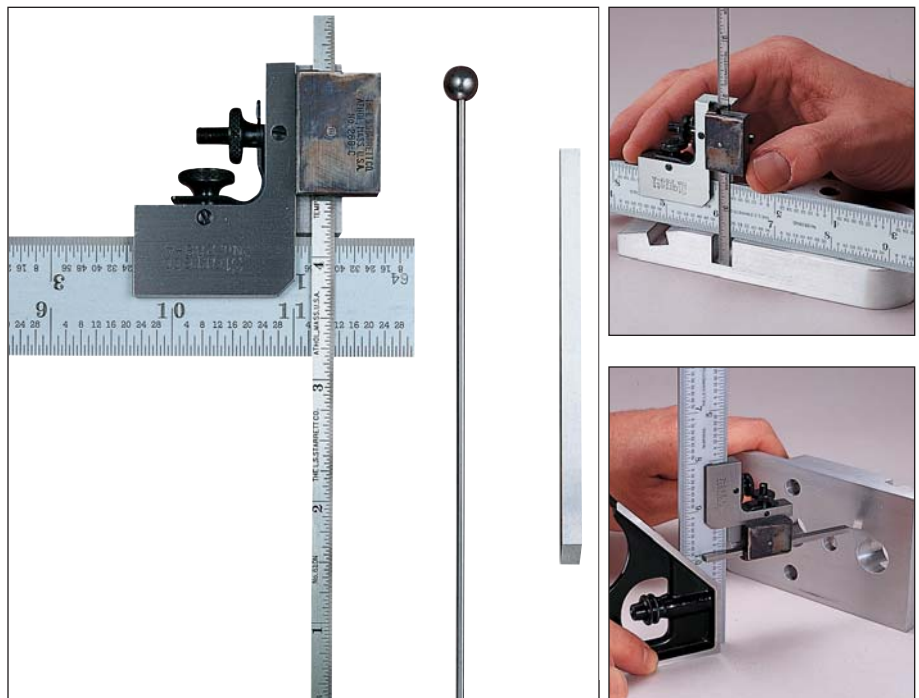
| Range     | Seat Length |                | Catalog No.     | EDP No. |       |
|-----------|-------------|----------------|-----------------|---------|-------|
|           | Blade/Rule  | Blade          |                 |         | Rule  |
| 1" (25mm) |             | 1-9/16" (40mm) | 1-11/16" (43mm) | 289A    | 51322 |
|           |             | 2-3/8" (60mm)  | 2-3/8" (60mm)   | 289B    | 51323 |

## Height and Depth Gage Set for combination squares

### No. 289C

When combined with the Starrett No. 289A or No. 289B Attachments, this set converts any combination square or set having blades up to 1" (25mm) wide into a height gage or depth gage. In addition to a clamp block, the set has a scriber, 6" rule (Starrett No. 610N-6) and a 6" (150mm) rod, any one of which may be inserted in the clamp and locked in position. By applying the scriber, a practical height gage results. Use of the rule converts the tool to a depth gage for measuring in 64ths of an inch. With the rod used as a depth gage, small recesses and holes can also be checked.

| Catalog No. | EDP No. | Description                            |
|-------------|---------|--|
| 289C        | 51324   | Clamp Block with Scriber, Rule and Rod |



Left, No. 289A with the No. 289C Clamp Block and Rule on blade. Rod and scriber shown on right. Top right, measuring depth. Bottom right, measuring height.

Packed one in a box.





**Large Combination Squares**

**No. 8 Series 24"**

Extra large, heavy-duty construction throughout. The square head is 8-3/8" long and the center head has 4-1/4" arms. Furnished with 24" blade, 1-1/2" wide x 1/10" thick, with distinctive, machine-divided graduations. Heads are cast iron and have black wrinkle finish.

- ◆ Reversible lock bolts
- ◆ Accurate spirit level
- ◆ Hardened steel blade

**24" Size**

| Description                      | Graduation                        | Catalog No. | EDP No. |
|----------------------------------|-----------------------------------|-------------|---------|
| With Square Head Only            | No. 4 – 8ths, 16ths, 32nds, 64ths | <b>8H</b>   | 50037   |
| With Square Head and Center Head |                                   | <b>8HC</b>  | 50038   |

**Heads and Blades Only**

|             |                                   |               |       |
|-------------|-----------------------------------|---------------|-------|
| Square Head |                                   | <b>H8</b>     | 50039 |
| Center Head |                                   | <b>C8</b>     | 50040 |
| 24" Blade   | No. 4 – 8ths, 16ths, 32nds, 64ths | <b>B824-4</b> | 50041 |



## Junior Combination Squares

### No. 33J Series 6"

These squares are used by mechanics, toolmakers and patternmakers because of their compact, small size and light weight. Both blade and heads are smaller than on regular squares. Heads are drop forged, hardened steel and have smooth, black enamel finish. Blades 4" long may be ordered individually as listed below. Blades are furnished in regular finish, except where indicated.



| Blade Length | Description                      | Graduation  | Catalog No.        | EDP No. |
|--------------|----------------------------------|---|--------------------|---------|
| 6"           | With Square Head Only            | <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths                           | <b>33JH-6-4R</b>   | 50229   |
|              |                                  | <b>No. 16R</b> – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | <b>33JH-6-16R</b>  | 50231   |
| 6"           | With Square Head and Center Head | <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths                           | <b>33JHC-6-4R</b>  | 50230   |
|              |                                  | <b>No. 16R</b> – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | <b>33JHC-6-16R</b> | 50232   |

### Heads and Blades Only

|    |             |   |                   |       |
|----|-------------|---|-------------------|-------|
|    | Square Head |   | <b>H33-4</b>      | 50223 |
|    | Center Head |   | <b>C33-4</b>      | 50226 |
| 6" | Blade       | <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths                           | <b>B33J-4R</b>    | 50235 |
|    |             | <b>No. 16R</b> – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | <b>CB33J-4R*</b>  | 67100 |
| 6" | Blade       | <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths                           | <b>B33J-16R</b>   | 50236 |
|    |             | <b>No. 16R</b> – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | <b>CB33J-16R*</b> | 67101 |
| 4" | Blade       | <b>No. 4R</b> – 8ths, 16ths, Quick Reading 32nds, 64ths                           | <b>B4-4R</b>      | 50076 |
|    |             | <b>No. 16R</b> – Quick Reading 32nds, 64ths, Aircraft Quick Reading 50ths, 100ths | <b>CB4-4R*</b>    | 50077 |
|    |             |   | <b>CB4-16R*</b>   | 50078 |

**NOTE:** \*Blade in satin chrome finish.

Packed one in a box.

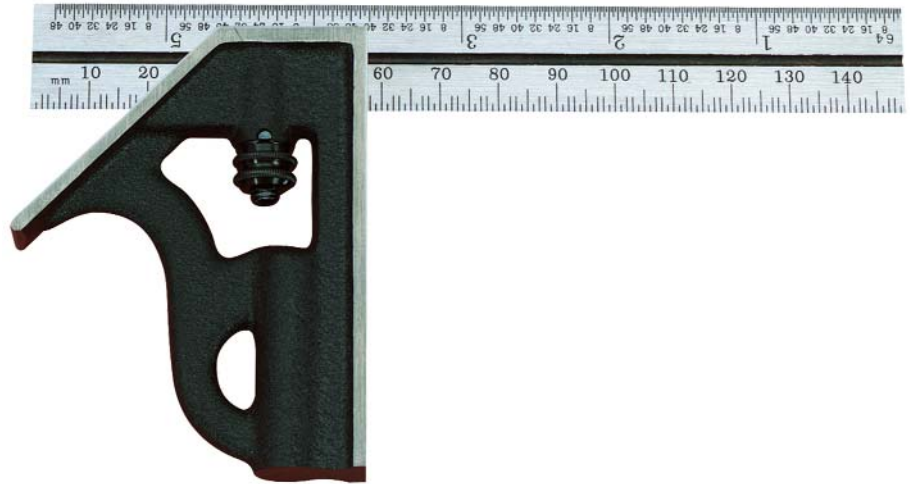


## Student Combination Squares

### No. 10 Series

These tools were designed to train and develop “youngsters” and apprentices to lay out and check their work more efficiently. The combination square is far superior to clumsy, old-style solid workshop-grade squares that are still being used in some vocational schools and apprenticeship programs around the world. The student’s advantages are:

- ◆ Tool is similar to our popular No. 11 Combination Square Series, but is a more economical value
- ◆ A rugged, cast iron square head that will outlast cheap plastic and die-cast imitations
- ◆ An accurate, hardened and tempered square blade offered in inch, millimeter, and inch and millimeter combined
- ◆ Reversible lock bolt allows the blade to be turned over or end-for-end so that all four graduated edges may be used
- ◆ The combination square, as its name indicates, handles many jobs, saving the apprentice from buying more individual tools. This combination square can be used as a try square, 45° miter, a depth gage, a height gage, a layout tool, and as a rule
- ◆ An optional center head is available to increase the versatility of this universal measuring tool



#### Inch

| Size | Graduation  | Catalog No. | EDP No. |
|------|---|-------------|---------|
| 6"   | No. 4R – 8ths, 16ths, Quick Reading<br>32nds, 64ths | 10H-6-4R    | 64942   |

#### Millimeter

|       |                         |          |       |
|-------|-------------------------|----------|-------|
| 150mm | mm and 1/2mm Both Sides | 10MH-150 | 64943 |
|-------|-------------------------|----------|-------|

#### Inch and Millimeter

|                   |   |           |       |
|-------------------|---|-----------|-------|
| 150mm<br>(5-3/4") | 1/2mm and 32nds One Side<br>mm and 64ths Reverse Side | 10MEH-150 | 64944 |
|-------------------|---|-----------|-------|

#### Center Head Only

|  |  |       |       |
|--|--|-------|-------|
|  | Center Head to Fit No. 10 Series Squares | C11-6 | 50073 |
|--|--|-------|-------|

Packed one in a box.



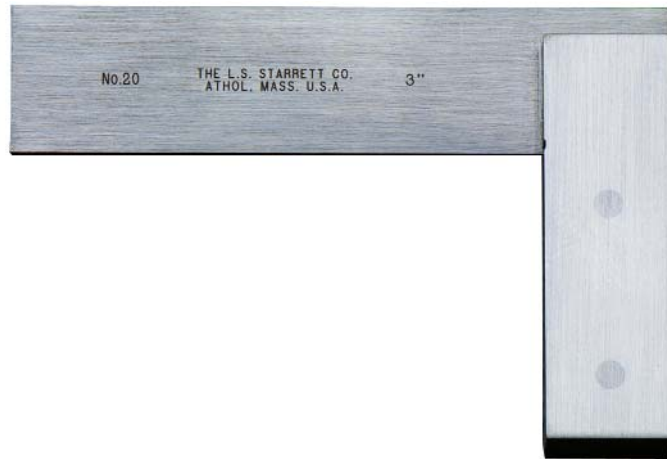


## Master Precision Squares

### No. 20 Series 1 1/2-36" (40-910mm)

The finest precision-checking squares – not graduated. Squareness accuracy to .0001" (0.0025mm) every 6" (150mm)

These hardened steel squares are used when extreme accuracy is required. The beams and blades are hardened, ground, and lapped to insure parallelism and straightness. The beam is grooved at the inner corner for clearance of burr or dirt. Made of high quality tool steel, with the finest of craftsmanship throughout.



\* Length of blade from the inner edge of the beam to the end of the blade.

\*\*36" (910mm) and larger size squares have special screws to secure the blade to the beam.

† Rack-type case.

‡ Includes redemption card for Standard Letter of Certification (SLC).

**NOTE:** Larger squares can be furnished; quoted on application. Sent without case unless otherwise ordered. Packed one in a box.

| Size – Length of Blade* |     | Length of Beam |     | Squares Only        |         | Case Only       |         |
|-------------------------|-----|----------------|-----|---------------------|---------|-----------------|---------|
| Inch                    | mm  | Inch           | mm  | Cat. No.            | EDP No. | Cat. No.        | EDP No. |
| 1-1/2"                  | 40  | 1-1/2"         | 40  | <b>20-1 1/2</b>     | 50128   | <b>916</b>      | 55152   |
| 3"                      | 75  | 2-3/8"         | 60  | <b>20-3</b>         | 50130   | <b>951</b>      | 55153   |
| 4-1/2"                  | 115 | 3 -1/2"        | 90  | <b>20-4 1/2</b>     | 50132   | <b>918</b>      | 55154   |
| 6"                      | 150 | 4-5/16"        | 110 | <b>20-6</b>         | 50134   | <b>919</b>      | 55155   |
|                         |     |                |     | <b>20-6 W/SLC‡</b>  | 66899   |                 |         |
| 12"                     | 300 | 7"             | 180 | <b>20-12</b>        | 50136   | <b>20ZZ-12</b>  | 55156   |
|                         |     |                |     | <b>20-12 W/SLC‡</b> | 66900   |                 |         |
| 24"                     | 600 | 12-5/16"       | 310 | <b>20-24</b>        | 50140   | <b>20ZZ-24†</b> | 55158   |
| 36"                     | 910 | 20"            | 500 | <b>20-36**</b>      | 50142   | <b>20ZZ-36†</b> | 55159   |

## Master Precision Squares with beveled edges

### No. 55 Series 1 1/2-6" (40-150mm)

Starrett No. 55 hardened steel squares are the same as the No. 20 squares described above, except that the blades are beveled on both edges of each side, which provides an excellent visual line contact with the work.



| Size – Length of Blade* |     | Length of Beam |     | Squares Only    |         | Case Only  |         |
|-------------------------|-----|----------------|-----|-----------------|---------|------------|---------|
| Inch                    | mm  | Inch           | mm  | Cat. No.        | EDP No. | Cat. No.   | EDP No. |
| 1-1/2"                  | 40  | 1-1/2"         | 40  | <b>55-1 1/2</b> | 50277   | <b>916</b> | 55152   |
| 3"                      | 75  | 2-3/8"         | 60  | <b>55-3</b>     | 50279   | <b>951</b> | 55153   |
| 4-1/2"                  | 115 | 3-1/2"         | 90  | <b>55-4 1/2</b> | 50281   | <b>918</b> | 55154   |
| 6"                      | 150 | 4-5/16"        | 110 | <b>55-6</b>     | 50283   | <b>919</b> | 55155   |

Sent without case unless otherwise ordered. Packed one in a box.

\*Length of blade from the inner edge of the beam to the end of the blade.



### Toolmakers' Grade Stainless Steel Squares

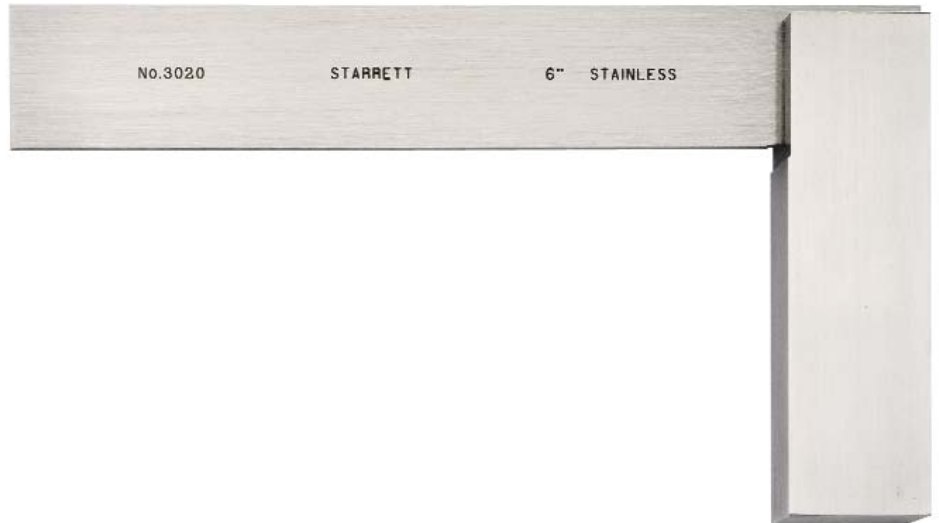
#### No. 3020 Series

2-31/32" - 12-1/32" (50-175mm)

This high quality toolmakers' square is not graduated and offers squareness accuracy to .0002" (0.005mm) for every 6" (150mm).

They feature stainless steel construction on both the blade and the beam. Both blade and beam are hardened, ground and lapped, with the beam machined at the inner corner for clearance of burr or dirt.

3020 Series Squares are available in four sizes, 3" (75mm), 4" (100mm), 6" (150mm), 12" (300mm) and as a set of all four sizes.



| Size – Length of Blade*       |     | Length of Beam |     | Squares Only   |         | Case Only      |         |
|-------------------------------|-----|----------------|-----|----------------|---------|----------------|---------|
| Inch                          | mm  | Inch           | mm  | Cat. No.       | EDP No. | Cat. No.       | EDP No. |
| 2-31/32"                      | 75  | 1-31/32"       | 50  | <b>3020-3</b>  | 12225   | <b>951</b>     | 55153   |
| 3-31/32"                      | 100 | 2-31/32"       | 75  | <b>3020-4</b>  | 12226   | <b>918</b>     | 55154   |
| 5-29/32"                      | 150 | 3-29/32"       | 100 | <b>3020-6</b>  | 12227   | <b>919</b>     | 55155   |
| 12-1/32"                      | 300 | 6-7/8"         | 175 | <b>3020-12</b> | 12228   | <b>20ZZ-12</b> | 55156   |
| Complete Set of all 4 Squares |     |                |     | <b>S3020Z</b>  | 12229   |                |         |

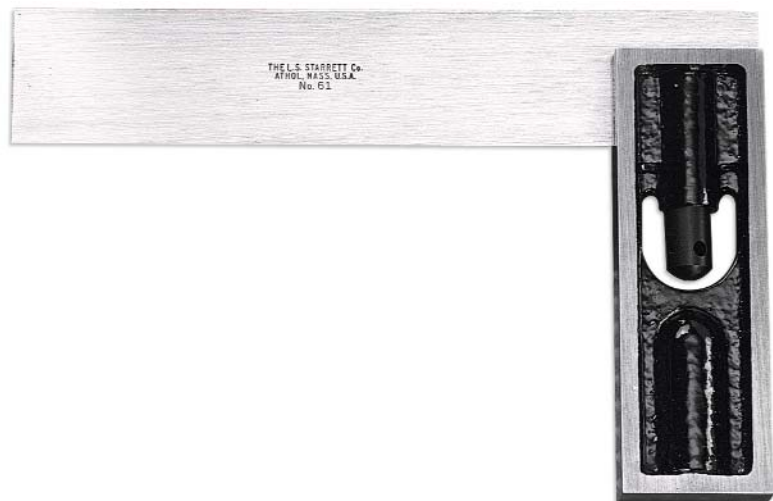
Packed one in a plastic case unless otherwise ordered. 12" square and set of 4 squares shipped in box with fitted foam insert. Wood cases as listed may be purchased separately.

\*Length of blade from the inner edge of the beam to the end of the blade.

### "Reliable" Try Square

#### No. 61 6" (150mm)

A very useful try square – attractively designed, light and convenient. The blade is hardened, not graduated, and is firmly held by a special bolt and nut permitting the tool to be readily taken apart, if desired, for regrinding the blade and stock.



| Catalog No. | EDP No. | Size – Length of Blade | Length of Beam |
|-------------|---------|------------------------|----------------|
| <b>61</b>   | 50303   | 6" (150mm)             | 3-1/2" (90mm)  |

Packed one in a box.



## Double Squares with hardened blades

**No. 13 Series 4-6"**

**No. 13M Series 100-150mm**

These squares are very popular with machinists, toolmakers, and patternmakers. The sliding blades are adjustable making it practical for a wide variety of uses. The faces of the head are ground square, and the 6" (150mm) size has a level.

The bevel blade is available, featuring an octagon angle 45° at one end and a hexagon angle 60° at the other end, clearly marked.

A drill grinding blade, also available for 6" (150mm) squares, is beveled to 59° for drill grinding on one end and 41° (the cutting angle of countersinks for machine screws) at the other. Both ends have quick-reading 64ths grads. and the graduation is located to measure perpendicularly to the axis of the drill. By reading the graduations, the center point can be easily and accurately located.

The 6" square head used with the drill grinding blade is approximately 3-1/2" (90mm) long, and the faces approximately 9/16" (14mm) wide.

Packed one in a box.

**No. 13F Double Square complete with graduated blade, beveled blade, and drill grinding blade.**



### Inch Reading – No. 4 Graduation – 8ths, 16ths, 32nds, 64ths

| Size | Description   | Catalog No. | EDP No. |
|------|---|-------------|---------|
| 4"   | With Graduated Blade Only                                 | <b>13A</b>  | 50109   |
|      | With Graduated and Bevel Blades                           | <b>13B</b>  | 50110   |
| 6"   | With Graduated Blade Only                                 | <b>13C</b>  | 50111   |
|      | With Graduated and Bevel Blades                           | <b>13E</b>  | 50112   |
|      | Complete, with Graduated, Bevel and Drill Grinding Blades | <b>13F</b>  | 50113   |
|      | Drill Grinding Blade Only (for 6"/150mm Squares)          | <b>13D</b>  | 50114   |

### Millimeter Reading – mm Both Edges One Side; mm and 1/2mm Reverse Side

|       |                                 |             |       |
|-------|---------------------------------|-------------|-------|
| 100mm | With Graduated Blade Only       | <b>13MA</b> | 56278 |
|       | With Graduated and Bevel Blades | <b>13MB</b> | 56279 |
| 150mm | With Graduated Blade Only       | <b>13MC</b> | 56280 |
|       | With Graduated and Bevel Blades | <b>13ME</b> | 56263 |

## Double Steel Squares with hardened and ground head and blades

**No. 14 Series 2-1/2"**

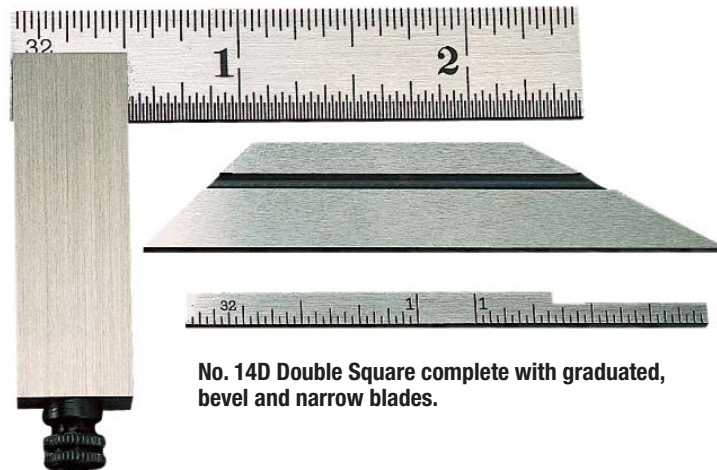
**No. 14M Series 50mm**

Designed for tool and diemakers, these fine precision double steel squares have adjustable blades, ideal for tight fits. A knurled clamping nut accurately locks the blades in any position.

The inch reading blade is graduated on one side, in 32nds and 64ths and the millimeter reading blade is graduated in millimeters and 1/2 millimeters. The blade is beveled 45° on one end and 30° on the other end.

The narrow graduated blade is 2-1/4" (58mm) long with 32nds and 64ths graduations. It is 5/32" (4mm) wide over a length of approximately 1-5/8" (41mm) and cut away at one end to a width of 3/32" (2.4mm). Millimeter blades are millimeter on one side and 1/2 millimeter on the other.

Packed one in a box.



**No. 14D Double Square complete with graduated, bevel and narrow blades.**

### Inch Reading – 32nds, 64ths

| Size   | Graduation   | Description  | Catalog No. | EDP No. |
|--------|--------------|--|-------------|---------|
| 2-1/2" | 32nds, 64ths | With Graduated Blade Only                            | <b>14A</b>  | 50117   |
|        |              | Complete with Graduated Narrow Blade and Bevel Blade | <b>14D</b>  | 50118   |

### Millimeter Reading – mm Both Edges One Side; mm and 1/2mm Reverse Side

|      |           |  |             |       |
|------|-----------|--|-------------|-------|
| 50mm | mm, 1/2mm | With Graduated Blade Only                            | <b>14MA</b> | 56260 |
|      |           | Complete with Graduated Narrow Blade and Bevel Blade | <b>14MD</b> | 56261 |



**Diemakers' Squares  
with angular and sliding  
blade adjustment**

**No. 453 Series 2-1/2"**

**No. 453M Series 50mm**

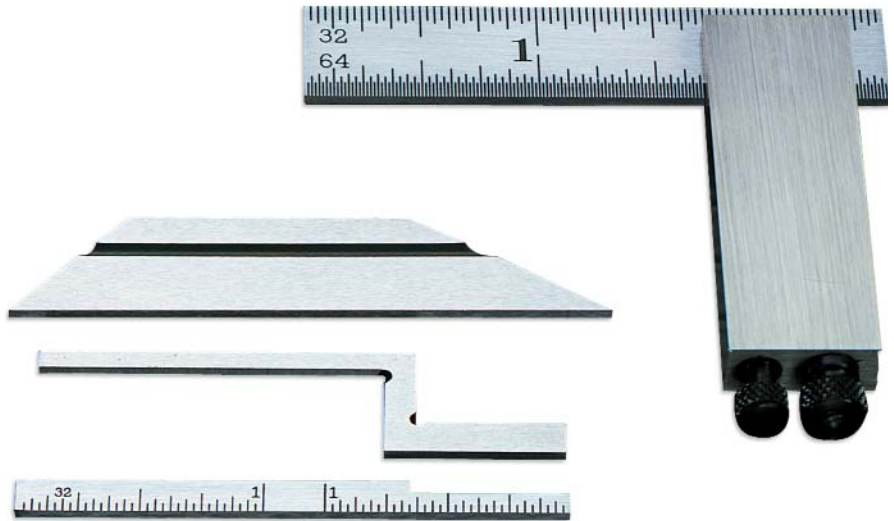
The sliding blades of this tool and diemakers' square can be adjusted at an angle (up to approximately 10°) with the beam for measuring the clearance in dies (see sectional view). The larger knurled thumb screw locks the blades at any position, and the smaller one tilts the blades at an angle. To set the blades at an angle, first release the blade clamp screw, then the blade may be tilted to the desired angle by turning the small knurled screw into the beam. The blade can be held in position by tightening the clamping screw. Head and blades are hardened and ground.

The inch reading blade is graduated on one side, upper edge in 32nds, lower edge in 64ths and the millimeter reading blade is graduated in millimeter and 1/2 millimeter.

The bevel blade is approximately 2-1/2" (63mm) long x 1/2" (12.5mm) wide and is beveled to 30° on one end and 45° on the other.

The narrow graduated blade has 32nds graduation on one side, and 64ths on the other. It is 5/32" (4mm) wide over a length of approximately 1-5/8" (41mm) and cut away at one end to a width of 3/32" (2.4mm).

The offset blade is used where it would be impossible to sight a straight blade. It protrudes from the square about 1-1/2" (38mm) and is 1/8" (3mm) wide. Both sides of each edge are beveled to provide good visual line contact.



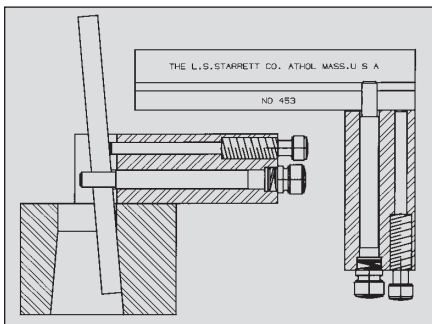
**No. 453E complete with standard, bevel, offset and narrow graduation blades.**

**Inch Reading – Graduation 32nds, 64ths**

| Size   | Description   | Catalog No.  | EDP No. |
|--------|---|--------------|---------|
| 2-1/2" | With Standard Graduated Blade                                   | <b>453A</b>  | 52345   |
|        | With Standard, Narrow Blades                                    | <b>453C</b>  | 52347   |
|        | Complete With Standard, Bevel, Narrow and Offset Blades         | <b>453E</b>  | 52349   |
|        | Complete With Standard, Bevel, Narrow and Offset Blades in Case | <b>453EZ</b> | 52351   |

**Millimeter Reading – Graduation mm and 1/2mm**

|      |   |               |       |
|------|---|---------------|-------|
| 50mm | With Standard Graduated Blade                                   | <b>453MA</b>  | 52346 |
|      | With Metric Standard, Narrow Blades                             | <b>453MC</b>  | 52348 |
|      | Complete With Standard, Bevel, Narrow and Offset Blades         | <b>453ME</b>  | 52350 |
|      | Complete With Standard, Bevel, Narrow and Offset Blades in Case | <b>453MEZ</b> | 52352 |



**Sectional View.**

Packed one in a box.

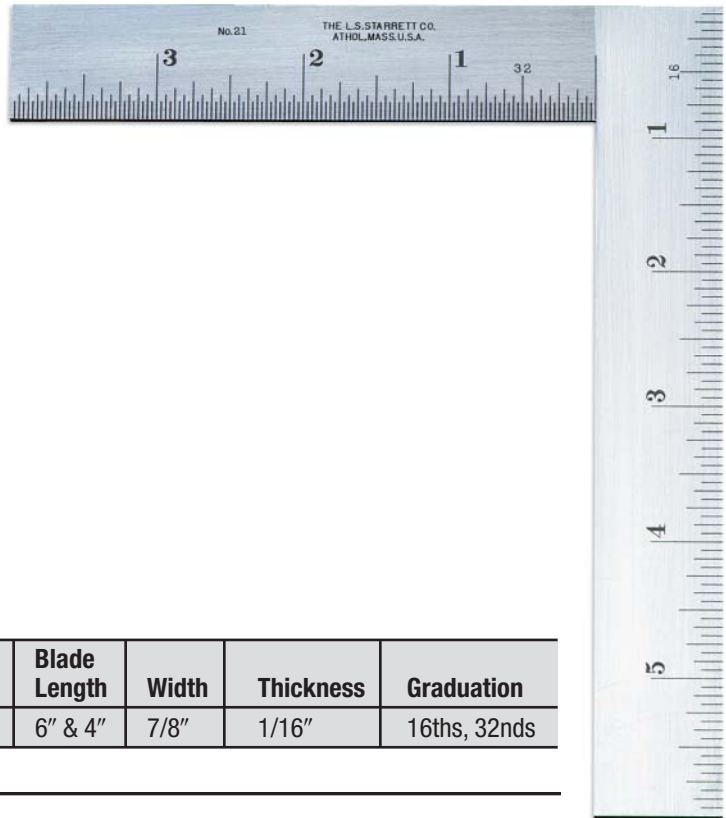




## Thin Steel Try Square

### No. 21 6"

For machinists and draftsmen – both inner and outer edges are accurate for squareness. Machine-divided graduations on both sides and on inner and outer edges in 16ths and 32nds. Blades are 6" and 4" long respectively, 7/8" wide and 1/16" thick.



| Cat. No. | EDP.  | Blade Length | Width | Thickness | Graduation   |
|----------|-------|--------------|-------|-----------|--------------|
| 21       | 50149 | 6" & 4"      | 7/8"  | 1/16"     | 16ths, 32nds |

Packed one in a box.

## Improved Diemakers' Square with angular adjustment

### No. 457 Series 10°-0°-10°

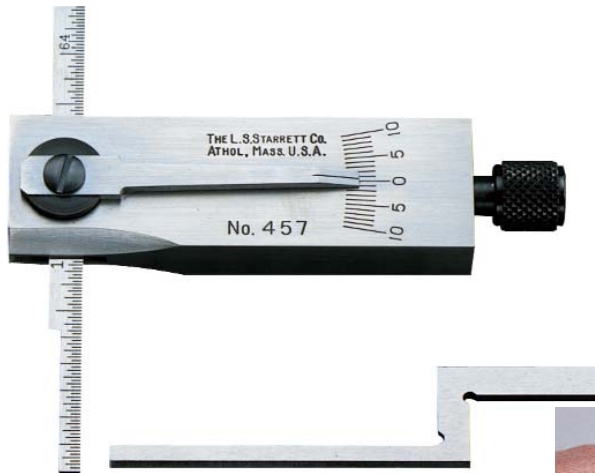
The Starrett No. 457 Improved Diemakers' Square is a highly useful tool for tool and diemakers, especially for measuring die clearances. It is also very handy for patternmakers to check angles and drafts on patterns.

The beam of this square is graduated to show the setting in degrees of the blades. Blades can be set for any angle up to 10°, either side of 0° and the angle is indicated by the line on the pointer.

The graduated blade has 32nds of an inch on one side, and 64ths on the other. It is 5/32" (4mm) wide over a length of approximately 1-5/8" (41mm) and cut away at one end to a width of 3/32" (2.4mm).

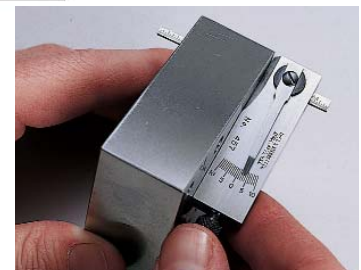
The offset blade, which is used where it would be impossible to insert the straight blade, protrudes from the square about 1-1/2" (38mm). It is 1/8" (3mm) wide and both sides of each edge are beveled to give visual line contact.

Packed one in a box.



**No. 457C complete, with straight and offset blades.**

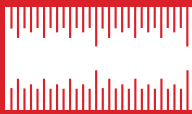
The beam is beveled adjacent to the blade so that the blade is readily visible when checking in holes, slots, etc. Blades and beams are hardened and ground.



**No. 457 Diemakers' Square is used to determine amount of clearance in this die. Movable pointer registers clearance in degrees.**

### Angular Range 10°-0°-10°

| Description                               | Catalog No. | EDP No. |
|---|-------------|---------|
| With Straight Blade Only                  | 457A        | 52428   |
| Complete, With Straight and Offset Blades | 457C        | 52429   |



**Rules** – This section shows our standard line of precision steel rules that range in length up to 144" and 1000mm. They range in styles from full-flexible to semi-flexible, to spring-tempered steel rules (pioneered by Starrett) to heavy spring-tempered rules.

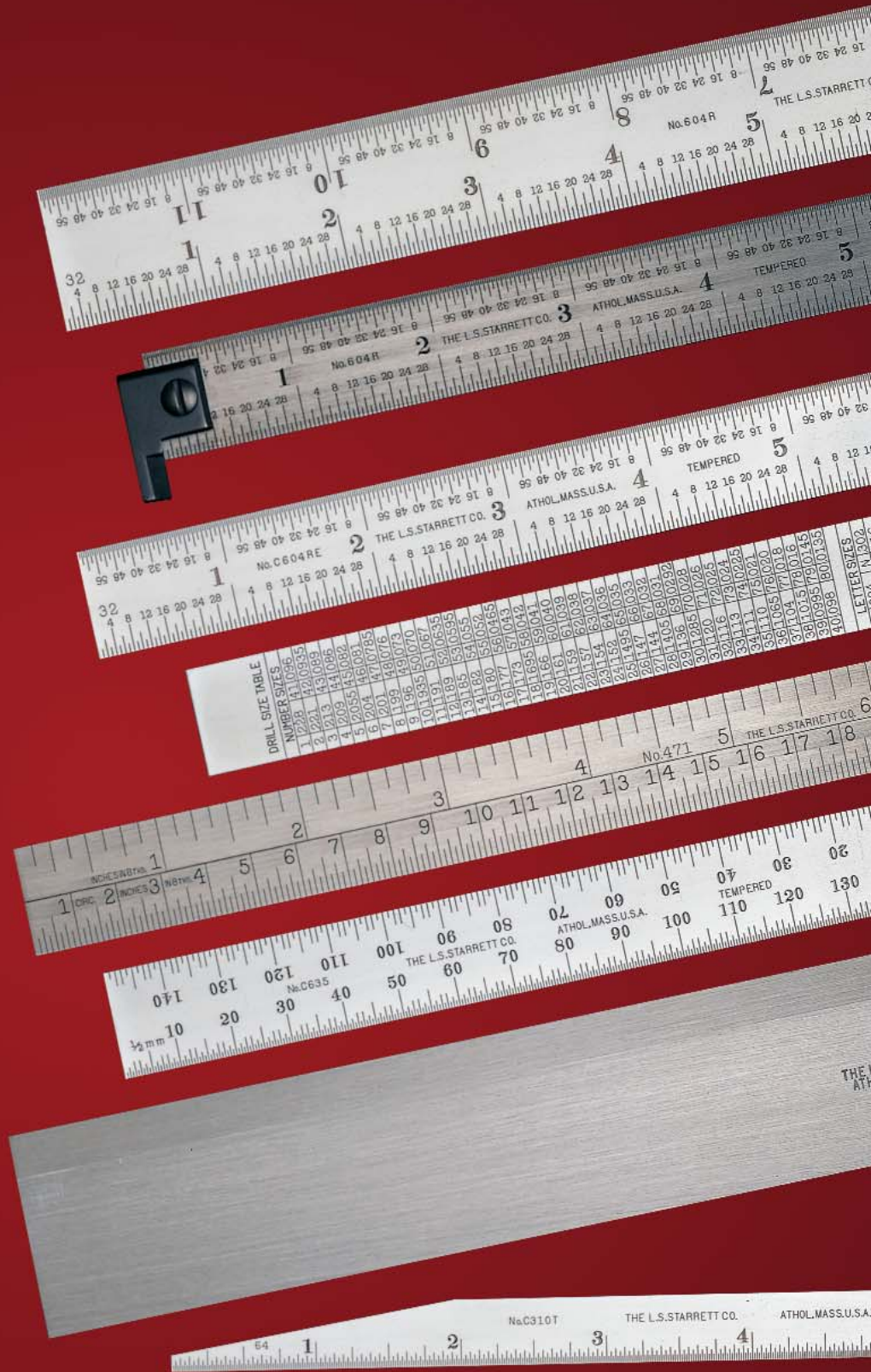
We have a more extensive choice of inch graduated rules because the inch system allows for much coarser graduations (such as 8ths and 16ths) and for much finer graduations such as 64ths and 100ths, than the millimeter system. The millimeter system is limited to mm and 1/2mm graduations.

Additional sizes and variations are available through our Special Order Department.

Starrett also offers a line of carpenters' aluminum rules.

**Steel Straight Edges**—Our straight edges are made of fine tool steel and precision ground to rigid Starrett standards. They are available in 12-72" (300-1800mm). Longer lengths are available through our Special Order Department.

**Parallels** are available in two versions – the 6" (150mm) solid hardened steel, ground to precision tolerances and sets of the very handy adjustable parallels that are made from cast iron and precision ground.

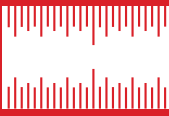


DRILL SIZE TABLE

| NUMBER SIZES | DRILL SIZE |
|--------------|------------|
| 1            | 1.228      |
| 2            | 1.378      |
| 3            | 1.548      |
| 4            | 1.738      |
| 5            | 1.948      |
| 6            | 2.178      |
| 7            | 2.428      |
| 8            | 2.698      |
| 9            | 2.988      |
| 10           | 3.298      |
| 11           | 3.628      |
| 12           | 3.978      |
| 13           | 4.348      |
| 14           | 4.738      |
| 15           | 5.148      |
| 16           | 5.578      |
| 17           | 6.028      |
| 18           | 6.498      |
| 19           | 6.988      |
| 20           | 7.498      |
| 21           | 8.028      |
| 22           | 8.578      |
| 23           | 9.148      |
| 24           | 9.738      |
| 25           | 10.348     |
| 26           | 10.978     |
| 27           | 11.628     |
| 28           | 12.298     |
| 29           | 12.988     |
| 30           | 13.698     |
| 31           | 14.428     |
| 32           | 15.178     |
| 33           | 15.948     |
| 34           | 16.738     |
| 35           | 17.548     |
| 36           | 18.378     |
| 37           | 19.228     |
| 38           | 20.098     |
| 39           | 20.988     |
| 40           | 21.898     |
| 41           | 22.828     |
| 42           | 23.778     |
| 43           | 24.748     |
| 44           | 25.738     |
| 45           | 26.748     |
| 46           | 27.778     |
| 47           | 28.828     |
| 48           | 29.898     |
| 49           | 30.988     |
| 50           | 32.098     |
| 51           | 33.228     |
| 52           | 34.378     |
| 53           | 35.548     |
| 54           | 36.738     |
| 55           | 37.948     |
| 56           | 39.178     |
| 57           | 40.428     |
| 58           | 41.698     |
| 59           | 42.988     |
| 60           | 44.298     |
| 61           | 45.628     |
| 62           | 46.978     |
| 63           | 48.348     |
| 64           | 49.738     |
| 65           | 51.148     |
| 66           | 52.578     |
| 67           | 54.028     |
| 68           | 55.498     |
| 69           | 56.988     |
| 70           | 58.498     |
| 71           | 59.928     |
| 72           | 61.378     |
| 73           | 62.848     |
| 74           | 64.338     |
| 75           | 65.848     |
| 76           | 67.378     |
| 77           | 68.928     |
| 78           | 70.498     |
| 79           | 72.088     |
| 80           | 73.698     |
| 81           | 75.328     |
| 82           | 76.978     |
| 83           | 78.648     |
| 84           | 80.338     |
| 85           | 82.048     |
| 86           | 83.778     |
| 87           | 85.528     |
| 88           | 87.298     |
| 89           | 89.088     |
| 90           | 90.898     |
| 91           | 92.728     |
| 92           | 94.578     |
| 93           | 96.448     |
| 94           | 98.338     |
| 95           | 100.248    |
| 96           | 102.178    |
| 97           | 104.128    |
| 98           | 106.098    |
| 99           | 108.088    |
| 100          | 110.098    |
| 101          | 112.128    |
| 102          | 114.178    |
| 103          | 116.248    |
| 104          | 118.338    |
| 105          | 120.448    |
| 106          | 122.578    |
| 107          | 124.728    |
| 108          | 126.898    |
| 109          | 129.088    |
| 110          | 131.298    |
| 111          | 133.528    |
| 112          | 135.778    |
| 113          | 138.048    |
| 114          | 140.338    |
| 115          | 142.648    |
| 116          | 144.978    |
| 117          | 147.328    |
| 118          | 149.698    |
| 119          | 152.088    |
| 120          | 154.498    |
| 121          | 156.928    |
| 122          | 159.378    |
| 123          | 161.848    |
| 124          | 164.338    |
| 125          | 166.848    |
| 126          | 169.378    |
| 127          | 171.928    |
| 128          | 174.498    |
| 129          | 177.088    |
| 130          | 179.698    |
| 131          | 182.328    |
| 132          | 184.978    |
| 133          | 187.648    |
| 134          | 190.338    |
| 135          | 193.048    |
| 136          | 195.778    |
| 137          | 198.528    |
| 138          | 201.298    |
| 139          | 204.088    |
| 140          | 206.898    |
| 141          | 209.728    |
| 142          | 212.578    |
| 143          | 215.448    |
| 144          | 218.338    |
| 145          | 221.248    |
| 146          | 224.178    |
| 147          | 227.128    |
| 148          | 230.098    |
| 149          | 233.088    |
| 150          | 236.098    |
| 151          | 239.128    |
| 152          | 242.178    |
| 153          | 245.248    |
| 154          | 248.338    |
| 155          | 251.448    |
| 156          | 254.578    |
| 157          | 257.728    |
| 158          | 260.898    |
| 159          | 264.088    |
| 160          | 267.298    |
| 161          | 270.528    |
| 162          | 273.778    |
| 163          | 277.048    |
| 164          | 280.338    |
| 165          | 283.648    |
| 166          | 286.978    |
| 167          | 290.328    |
| 168          | 293.698    |
| 169          | 297.088    |
| 170          | 300.498    |
| 171          | 303.928    |
| 172          | 307.378    |
| 173          | 310.848    |
| 174          | 314.338    |
| 175          | 317.848    |
| 176          | 321.378    |
| 177          | 324.928    |
| 178          | 328.498    |
| 179          | 332.088    |
| 180          | 335.698    |
| 181          | 339.328    |
| 182          | 342.978    |
| 183          | 346.348    |
| 184          | 349.738    |
| 185          | 353.148    |
| 186          | 356.578    |
| 187          | 360.028    |
| 188          | 363.498    |
| 189          | 366.988    |
| 190          | 370.498    |
| 191          | 374.028    |
| 192          | 377.578    |
| 193          | 381.148    |
| 194          | 384.738    |
| 195          | 388.348    |
| 196          | 391.978    |
| 197          | 395.628    |
| 198          | 399.298    |
| 199          | 402.988    |
| 200          | 406.698    |

THE L.S. STARRETT CO.





## Precision Steel Rules

Starrett rules are made from fine quality steel and produced to the highest precision standards, making them the most accurate and readable precision steel rules available. Through over 125 years of experience, we have developed the following versatile features, designs and styles:

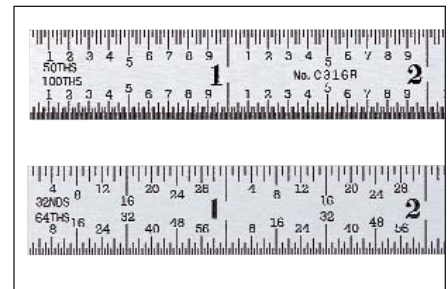
- ◆ Our product line consists of:
  - ◆ **Full-flexible** 1/64" (0.4mm) thick
  - ◆ **Semi-flexible** 1/50-1/40" (0.5-0.6mm) thick
  - ◆ **Spring-tempered** 3/64" (1.2mm) thick
  - ◆ **Heavy spring-tempered** 1/10" (2.5mm) thick
- ◆ Stainless steel 1/64" or 3/64" (0.4 or 1.2mm) thick rules
- ◆ Graduation styles are inch, millimeter, inch and millimeter, shrink, and special graduations
- ◆ All rules are machine-divided and tempered for long life and flexibility

### Accuracy

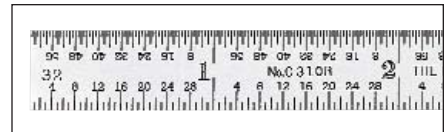
- ◆ All of our precision steel rules are machine-divided, not photoengraved. We inspect to Starrett Master Standards, which are traceable to the National Institute of Standards and Technology
- ◆ **Measuring Tip:** When using a precision rule for very close accuracy, the eye can read better by measuring between two lines rather than from the end of the rule to a line

### Readability Features

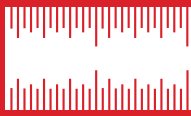
- ◆ Machine-divided rules provide uniformity of line width and depth. Graduations are generally deeper than cheaper, photoengraved rules and will last longer
- ◆ The numbering size and style is distinctive and more readable than ordinary rules
- ◆ Advanced, staggered graduations- When reading lines, it is much easier to count lines of differing lengths than those that resemble a comb. All Starrett graduations are staggered in a height pattern that makes reading easy. For reading very fine graduations such as 50ths (.020") or 100ths (.010") of an inch, Starrett designed an improved pattern of lines called "Aircraft Quick-Reading Graduations" (see photo). The name stems from its extreme popularity in aircraft plants and other shops using decimals. This pattern is also used on some of our millimeter rules
- ◆ Quick-reading figures are furnished with finer graduations for easier counting. Most all inch graduations of 1/32" and finer have subdivisions numbered (see photo)
- ◆ All rules are available in Starrett no-glare satin chrome finish for easier reading and rust resistance
- ◆ There are still some old "D" style rules on the market. These have one square and one rounded end. All Starrett rules are ground square on both ends. This provides better efficiency through the ability to read from either end on all edges



**Rule with Aircraft Quick-Reading Graduations (lower edge).**



**Rule with Quick-Reading Graduations (both edges).**



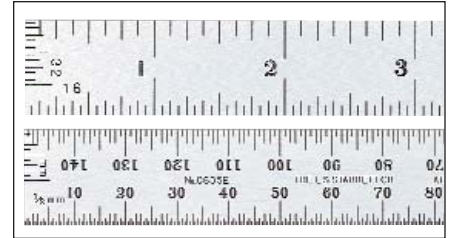
### Useful Variation Features of Our Standard Precision Rules

(See complete listings on the following pages)

#### End Graduations

End graduations are useful for measuring depths, widths of shoulders, recesses,

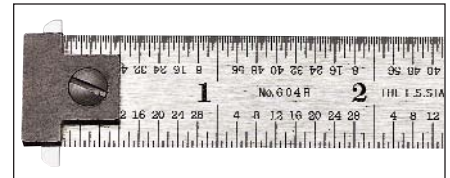
grooves, etc. They are graduated in 32nds of an inch or millimeters on both ends of one side as shown at the right.



#### Adjustable Steel Hook Rules

These improved Hook Rules feature an adjustable double hook that can be shortened or extended on either side in relation to any one of the four graduations on the rule. This allows accurate

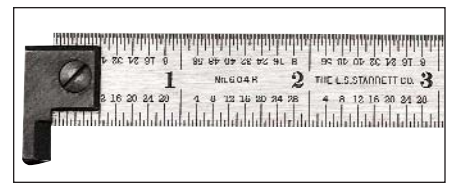
measurements from shallow or deep shoulders and also permits setting inside calipers to any of the graduations. Hooks are hardened and may be adjusted or removed by a slight turn of an eccentric stud.



#### Steel Hook Rules with Reversible Hook

These convenient Hook Rules permit accurate measurements, even when the user cannot see if the rule is aligned with the measuring edge. This is especially

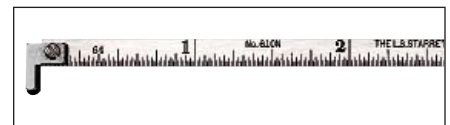
useful for measuring from round corners, through hubs, for setting inside calipers, etc. The single hook is hardened and may be reversed or removed by a slight turn of an eccentric stud.



#### Narrow Hook Rules with Reversible Hook

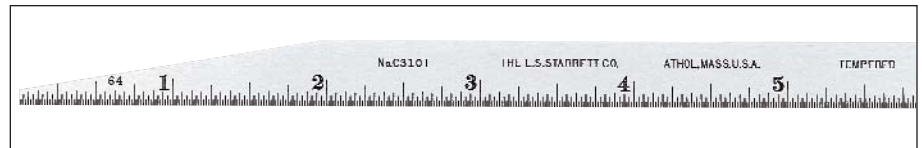
These useful Hook Rules are similar to the Hook Rules described above, but have a narrow blade [only 3/16" (4.8mm) wide]

which permits measurements through holes as small as 7/32" (5.5mm) in diameter. Hooks are hardened and may be reversed or removed by a partial turn of the eccentric stud.



#### Steel Rule with Tapered End

This 6" rule, our No. C310T-6, is a favorite with all mechanics because the tapered end permits measuring insides of small holes, narrow slots, grooves, recesses, etc. The rule has a taper from 1/2" width at the 2" graduation to 1/8" width at the end. Accurate, distinctive, machine-divided graduations in 32nds are on one side and



64ths on the reverse side, with graduations always in a normal, easy-to-read position.

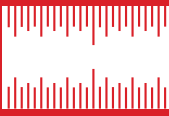
Made of tempered, full-flexible steel with satin chrome finish.

#### Steel Rule with Pocket Clip

This handy 6" rule is designed for frequent use. It is made of tempered, full-flexible steel and has accurate, machine-divided graduations in 32nds on one edge and 64ths on the opposite edge, with satin chrome finish. No. C310K-6.



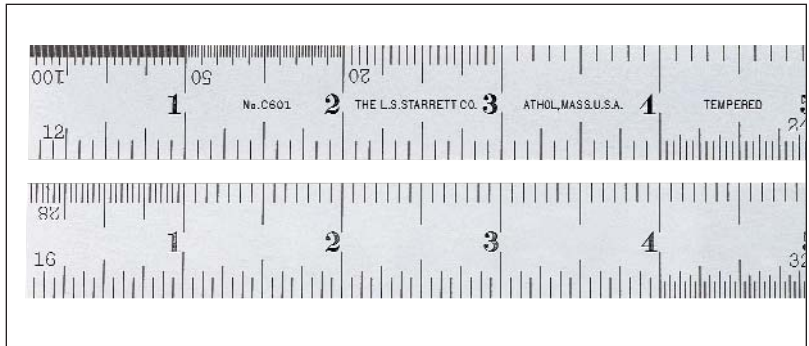




## Inch Graduation Styles

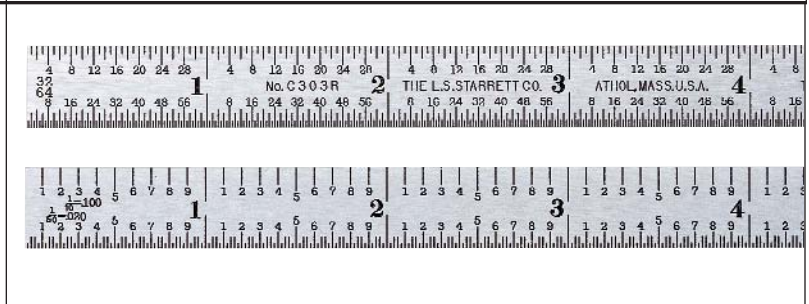
### No. 1

- First Edge: 10ths, 20ths, 50ths, 100ths
- Second Edge: 12ths, 24ths, 48ths
- Fourth Edge: 14ths, 28ths
- Third Edge: 16ths, 32nds, 64ths



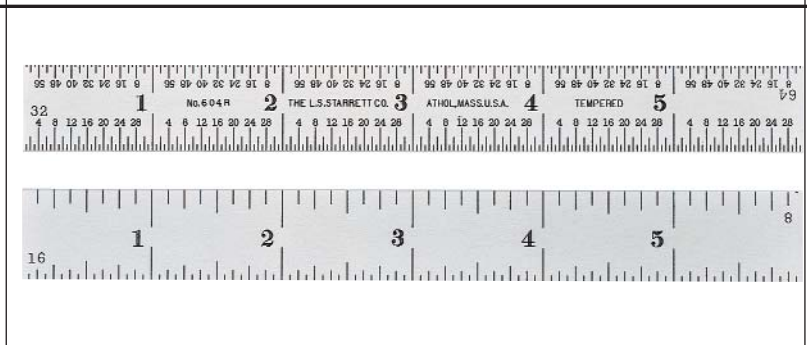
### No. 3R\*

- First Edge: 32nds
- Second Edge: 64ths
- Fourth Edge: 10ths
- Third Edge: 50ths



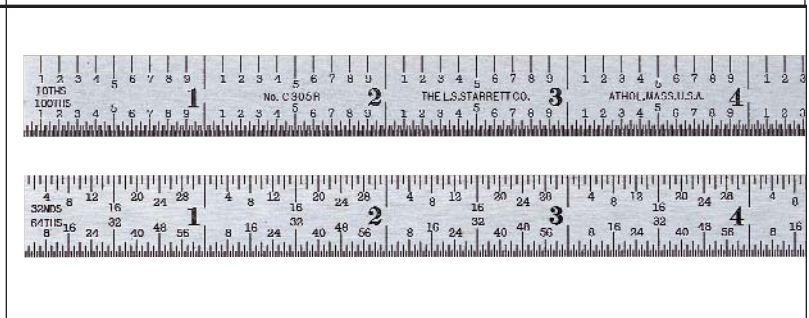
### No. 4R\*

- First Edge: 64ths
- Second Edge: 32nds
- Fourth Edge: 8ths
- Third Edge: 16ths



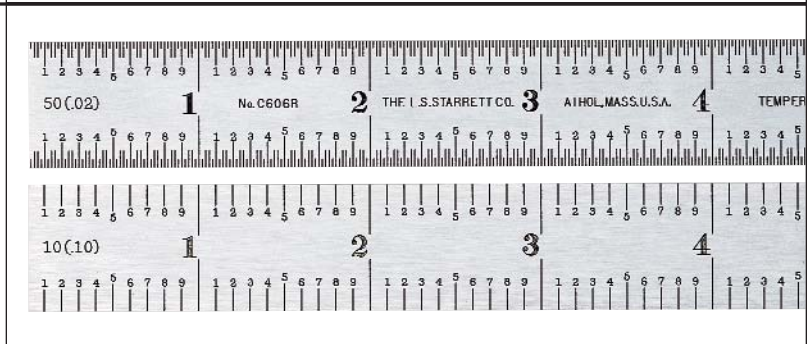
### No. 5R\*

- First Edge: 10ths
- Second Edge: 100ths
- Fourth Edge: 32nds
- Third Edge: 64ths



### No. 6R\*

- First Edge: 50ths
- Second Edge: 50ths
- Fourth Edge: 10ths
- Third Edge: 10ths



\* Suffix "R" designates Quick-Reading graduations

NOTE: All rules under 1" in width have single row of inch figures. Rules 1" and wider have double row of inch figures, and each edge represents the bottom edge reading left to right.



### Inch Graduation Styles (continued)

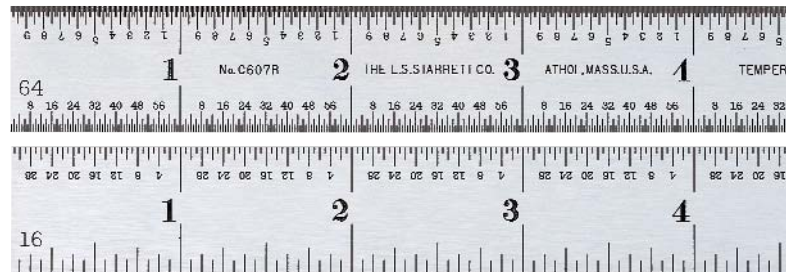
#### No. 7R\*

First Edge: 100ths

Second Edge: 64ths

Fourth Edge: 32nds

Third Edge: 16ths



#### No. 9R\*

First Edge:

Second Edge: 64ths

Fourth Edge: 16ths

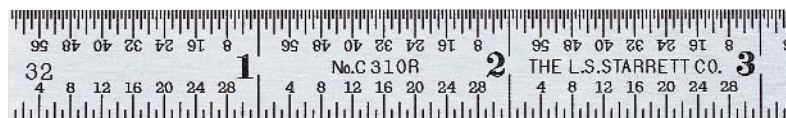
Third Edge: 32nds



#### No. 10R\*

First Edge: 64ths

Second Edge: 32nds



#### No. 11

First Edge:

Second Edge: 100ths

Third Edge:

Fourth Edge: 64ths



#### No. 16R\*

First Edge: 50ths

Second Edge: 100ths

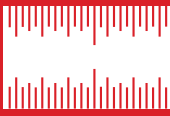
Fourth Edge: 32nds

Third Edge: 64ths



\* Suffix "R" designates Quick-Reading graduations

NOTE: All rules under 1" in width have single row of inch figures. Rules 1" and wider have double row of inch figures, and each edge represents the bottom edge reading left to right.



## Steel Rules with Inch Graduations 1-144"

All rules furnished with Starrett satin chrome finish, except where noted. Additional sizes and variations available on special order.

### Key to Starrett Rule Numbering System:

**Prefixes:**

- C** – Satin Chrome Finish
- DH** – Double Hook
- H** – Single Hook

**Suffixes:**

- E** – End Graduations
- K** – With Pocket Clip
- N** – Narrow-Type Rule
- R** – Quick-Reading
- S** – Semi-Flexible
- T** – Tapered End

**Rules include:**

- ◆ Full-Flexible
- ◆ Semi-Flexible
- ◆ Spring-Tempered
- ◆ Heavy Spring-Tempered



### Cases for 6"/150mm Rules

For added convenience and protection, all 6" and 150mm rules in 1/2" and 3/4" widths (except hook rules) are furnished at no extra cost in this attractive, protective case with see-through front.

### Cases with Clip for 6"/150mm Rules

A leather-like case with pocket clip for 6" (150mm) steel rules. Rounded metal-bound edges prevent pockets from becoming worn and torn by rule corners.

| Description                                 | Catalog No. | EDP No. |
|---|-------------|---------|
| Case with Clip for 1/2" (12.7mm) Wide Rules | 1612        | 55433   |
| Case with Clip for 3/4" (19mm) Wide Rules   | 1634        | 55434   |

### 1-4" Spring-Tempered

| Length | Width x Thickness | Graduations                                      | Feature Remarks | Catalog No. | EDP No. |
|--------|-------------------|--|-----------------|-------------|---------|
| 1"     | 1/2" x 3/64"      | No. 4R – 8ths, 16ths, Quick-Reading 32nds, 64ths |                 | *C604R-1    | 56464   |
| 2"     | 1/2" x 3/64"      |  |                 | *C604R-2    | 56465   |
| 3"     | 9/16" x 3/64"     |  |                 | *C604R-3    | 56466   |
| 4"     | 5/8" x 3/64"      |  |                 | *C604R-4    | 56467   |

### 6" Full-Flexible

|    |              |   |  |          |       |
|----|--------------|---|--|----------|-------|
| 6" | 1/2" x 1/64" | No. 3R – Quick-Reading 10ths, Aircraft Quick-Reading 50ths, 32nds and 64ths                                 |  | *C303R-6 | 51334 |
|    |              | No. 4R – 8ths, 16ths, Quick-Reading 32nds and 64ths   |  | *C304R-6 | 66008 |
|    |              | No. 5R – Quick-Reading 10ths, Aircraft Quick-Reading 100ths, 32nds and 64ths                                | With Standard Letter of Certification† | *C305R-6 | 51347 |
|    |              | No. 6R – One Side Only – Quick-Reading 10ths (.10) Top Edge; Aircraft Quick-Reading 50ths (.02) Bottom Edge |  | *C306R-6 | 51352 |
|    |              | No. 9R – 16ths and Quick-Reading 32nds on One Side; Quick-Reading 64ths on Reverse Side                     |  | *C309R-6 | 51357 |
|    |              | No. 10R – Quick-Reading 32nds, 64ths on One Side Only   |  | *C310R-6 | 51368 |
|    |              | No. 10 – 32nds and 64ths on One Side Only   | With Pocket Clip                       | *C310K-6 | 56701 |
|    |              | No. 10 – 32nds One Side; 64ths on Reverse Side  | With Tapered End                       | *C310T-6 | 56700 |

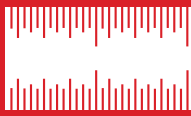
† Includes redemption card for Standard Letter of Certification (SLC).

(Continued on next page.)

**NOTE:** Asterisk (\*) indicates rules with single row of inch figures (all rules under 1" width).

Rules without asterisk have double row of inch figures, and each edge represents the bottom edge reading left to right (rules 1" and wider).





**Steel Rules with Inch Graduations 1-144" (continued)**

All rules furnished with Starrett satin chrome finish, except where noted. Additional sizes and variations available on special order.

**6" Full-Flexible (continued)**

| Length | Width x Thickness | Graduations  | Feature Remarks | Catalog No.     | EDP No. |
|--------|-------------------|--|-----------------|-----------------|---------|
| 6"     | 1/2" x 1/64"      | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths           |                 | <b>*C316R-6</b> | 51374   |
|        |                   | <b>No. 9R</b> – 16ths and Quick-Reading 32nds on One Side; Quick-Reading 64ths on Reverse Side | Stainless Steel | <b>*1309R-6</b> | 53204   |

**6" Semi-Flexible**

|    |              |  |                 |                   |       |
|----|--------------|--|-----------------|-------------------|-------|
| 6" | 3/4" x 1/50" | <b>No. 3R</b> – Quick-Reading 10ths, Aircraft Quick-Reading 50ths, 32nds and 64ths                       |                 | <b>*C303SR-6</b>  | 51335 |
|    |              | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths; End Graduations in 32nds Both Ends, One Side | End Graduations | <b>*C304SRE-6</b> | 51343 |

**6" Spring-Tempered**

|  |   |  |  |                       |       |
|--|---|--|--|-----------------------|-------|
| 6"   | 3/4" x 3/64"  | <b>No. 1</b> – 10ths, 20ths, 50ths, 100ths; 12ths, 24ths, 48ths; 16ths, 32nds, 64ths; 14ths, 28ths                                       | See Below **   | <b>*C601-6</b>        | 52639 |
|  |   | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths   | Regular Steel Finish                                   | <b>*604R-6</b>        | 52645 |
|  |   |  | With Standard Letter of Certification†                 | <b>*C604R-6</b>       | 52678 |
|  |   |  | End Graduations  | <b>*C604R-6 W/SLC</b> | 66884 |
|  |   | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths<br>End Graduations in 32nds Both Ends, One Side                               | End Graduations  | <b>*C604RE-6</b>      | 52660 |
|  |   | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths   | Regular Steel Finish<br>With Reversible Hook           | <b>*H604R-6</b>       | 52667 |
|  |   |  | With Reversible Hook                                   | <b>*CH604R-6</b>      | 52673 |
|  |   |  | Regular Steel Finish<br>With Adjustable<br>Double Hook | <b>*DH604R-6</b>      | 52662 |
|  |   |  | With Adjustable<br>Double Hook                         | <b>*CD604R-6</b>      | 52665 |
|  |   | <b>No. 6R</b> – Both Sides – Aircraft Quick-Reading 50ths (.02) Both Edges One Side, Quick-Reading 10ths (.10) Both Edges, Opposite Side |  | <b>*C606R-6</b>       | 52652 |
|  | <b>No. 7R</b> – 16ths, Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 100ths  |  | <b>*C607R-6</b>  | 52688                 |       |
|  | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths, 100ths |  | <b>*C616R-6</b>  | 52701                 |       |
|  | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                        | Stainless Steel  | <b>*1604R-6</b>  | 53210                 |       |
|  | 3/16" x 3/64"   | <b>No. 10</b> – 32nds One Side and 64ths on Reverse Side   | Regular Steel Finish;<br>Narrow Rule                   | <b>*610N-6</b>        | 52694 |
|  |   |  | Narrow Rule  | <b>*C610N-6</b>       | 52696 |
| <b>No. 11</b> – 64ths on One Side and 100ths on Reverse Side |   | Regular Steel Finish;<br>Narrow Rule with Hook   | <b>*H610N-6</b>  | 52697                 |       |
|  |   | Narrow Rule with Hook  | <b>*CH610N-6</b>                                       | 52699                 |       |
|  |   | Regular Steel Finish;<br>Narrow Rule   | <b>*611N-6</b>   | 52700                 |       |

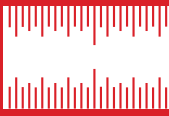
† Includes redemption card for Standard Letter of Certification (SLC).

**NOTE:** Asterisk (\*) indicates rules with single row of inch figures (all rules under 1" width). Rules without asterisk have double row of inch figures, and each edge represents the bottom edge reading left to right (rules 1" and wider).

\*\* No. 1 pattern has 12 different grads., many that are not found on usual rules. This allows the rule to be used for various purposes like laying out and cutting gear teeth (not generally used today).

**(Continued on next page.)**





**Steel Rules with Inch Graduations 1-144" (continued)**

All rules furnished with Starrett satin chrome finish, except where noted. Additional sizes and variations available on special order.

**12" Full-Flexible**

| Length | Width x Thickness | Graduations  | Feature Remarks                        | Catalog No.     | EDP No. |
|--------|-------------------|--|--|-----------------|---------|
| 12"    | 1/2" x 1/64"      | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths   | With Standard Letter of Certification† | *C304R-12       | 66009   |
|        |                   | <b>No. 5R</b> – Quick-Reading 10ths, Aircraft Quick-Reading 100ths, 32nds and 64ths                                |  | *C305R-12       | 51348   |
|        |                   | <b>No. 6R</b> – One Side Only – Quick-Reading 10ths (.10) Top Edge; Aircraft Quick-Reading 50ths (.02) Bottom Edge |  | *C305R-12 W/SLC | 66881   |
|        |                   | <b>No. 10R</b> – Quick-Reading 32nds and 64ths One Side Only   |  | *C306R-12       | 51353   |
|        |                   | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths                               |  | *C310R-12       | 56429   |
|        |                   |  |  | *C316R-12       | 51375   |

**12" Semi-Flexible**

|     |            |  |                 |            |       |
|-----|------------|--|-----------------|------------|-------|
| 12" | 1" x 1/40" | <b>No. 3R</b> – Quick-Reading 10ths, Aircraft Quick-Reading 50ths, 32nds and 64ths                       |                 | C303SR-12  | 51336 |
|     |            | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths; End Graduations in 32nds Both Ends, One Side | End Graduations | C304SRE-12 | 51344 |

**12" Spring-Tempered**

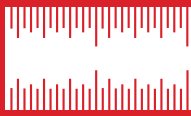
|   |   |   |  |                |       |
|---|---|---|--|----------------|-------|
| 12"   | 1" x 3/64"  | <b>No. 1</b> – 10ths, 20ths, 50ths, 100ths; 12ths, 24ths, 48ths; 16ths, 32nds, 64ths; 14ths, 28ths  | See Note on Previous Page**                      | C601-12        | 52640 |
|   |   | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths  | Regular Steel Finish                             | 604R-12        | 52647 |
|   |   |   |  | C604R-12       | 52679 |
|   |   |   | With Standard Letter of Certification†           | C604R-12 W/SLC | 66885 |
|   |   | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths; End Graduations in 32nds Both Ends, One Side                                  | End Graduations                                  | C604RE-12      | 52661 |
|   |   | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths  | Regular Steel Finish With Reversible Hook        | H604R-12       | 52669 |
|   |   |   | With Reversible Hook                             | CH604R-12      | 52674 |
|   |   |   | Regular Steel Finish With Adjustable Double Hook | DH604R-12      | 52664 |
|   |   |   | With Adjustable Double Hook                      | CD604R-12      | 52666 |
|   |   | <b>No. 6R</b> – Both Sides – Aircraft Quick-Reading 50ths (.02) Both Edges, One Side; Quick-Reading 10ths (.10) Both Edges, Opposite Side |  | C606R-12       | 52653 |
|   | <b>No. 7R</b> – 16ths, Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 100ths  |   | C607R-12   | 52689          |       |
|   | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths, 100ths |   | C616R-12   | 52702          |       |
|   | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                        | Stainless Steel   | 1604R-12   | 53211          |       |
|   | 3/16" x 3/64"   | <b>No. 10</b> – 32nds One Side and 64ths on Reverse Side  | Regular Steel Finish; Narrow Rule                | *610N-12       | 52695 |
| Narrow Rule                                 |   |   | *C610N-12  | 67103          |       |
| Regular Steel Finish; Narrow Rule with Hook |   |   | *H610N-12  | 52698          |       |

† Includes redemption card for Standard Letter of Certification (SLC).

(Continued on next page.)

**NOTE:** Asterisk (\*) indicates rules with single row of inch figures (all rules under 1" width).

Rules without asterisk have double row of inch figures, and each edge represents the bottom edge reading left to right (rules 1" and wider).



## Steel Rules with Inch Graduations 1-144" (continued)

All rules furnished with Starrett satin chrome finish, except where noted. Additional sizes and variations available on special order.

### 18" Full-Flexible

| Length | Width x Thickness | Graduations   | Feature Remarks | Catalog No. | EDP No. |
|--------|-------------------|---|-----------------|-------------|---------|
| 18"    | 3/4" x 1/50"      | No. 5R – Quick-Reading 10ths, Aircraft Quick-Reading 100ths, 32nds and 64ths  |                 | *C305R-18   | 51349   |
|        |                   | No. 16R – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths |                 | *C316R-18   | 51376   |

### 18" Spring-Tempered

|     |                |   |  |                |       |
|-----|----------------|---|--|----------------|-------|
| 18" | 1-1/8" x 3/64" | No. 4R – 8ths, 16ths, Quick-Reading 32nds and 64ths |  | C604R-18       | 52680 |
|     |                |   | With Standard Letter of Certification† | C604R-18 W/SLC | 66886 |
|     |                |   | With Hook                              | CH604R-18      | 52675 |

### 24" Full-Flexible

|     |              |   |  |           |       |
|-----|--------------|---|--|-----------|-------|
| 24" | 3/4" x 1/50" | No. 4R – 8ths, 16ths, Quick-Reading 32nds and 64ths                           |  | C304R-24  | 56645 |
|     |              | No. 5R – Quick-Reading 10ths, Aircraft Quick-Reading 100ths, 32nds and 64ths  |  | *C305R-24 | 51350 |
|     |              | No. 16R – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths |  | *C316R-24 | 51377 |

### 24" Semi-Flexible

|     |            |   |  |           |       |
|-----|------------|---|--|-----------|-------|
| 24" | 1" x 1/40" | No. 3R – Quick-Reading 10ths, Aircraft Quick-Reading 50ths, 32nds and 64ths |  | C303SR-24 | 51338 |
|-----|------------|---|--|-----------|-------|

### 24" Spring-Tempered

|     |                |   |  |                |       |
|-----|----------------|---|--|----------------|-------|
| 24" | 1-1/4" x 3/64" | No. 4R – 8ths, 16ths, Quick-Reading 32nds and 64ths                       |  | C604R-24       | 52681 |
|     |                |   | With Standard Letter of Certification† | C604R-24 W/SLC | 66887 |
|     |                |   | With Hook                              | CH604R-24      | 52676 |
|     |                | No. 7R – 16ths, Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 100ths |  | C607R-24       | 52691 |

### 24" Heavy Spring-Tempered

|     |                |   |           |           |       |
|-----|----------------|---|-----------|-----------|-------|
| 24" | 1-1/4" x 1/10" | No. 4R – 8ths, 16ths, Quick-Reading 32nds and 64ths                           |           | C404R-24  | 51484 |
|     |                |   | With Hook | CH404R-24 | 51494 |
|     |                | No. 16R – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths |           | C416R-24  | 51509 |
|     |                |   | With Hook | CH416R-24 | 51519 |

### 36" Full-Flexible

|     |              |   |  |           |       |
|-----|--------------|---|--|-----------|-------|
| 36" | 3/4" x 1/50" | No. 5R – Quick-Reading 10ths, Aircraft Quick-Reading 100ths, 32nds and 64ths  |  | *C305R-36 | 51351 |
|     |              | No. 16R – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths |  | *C316R-36 | 51378 |

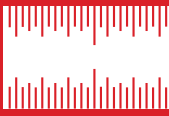
† Includes redemption card for Standard Letter of Certification (SLC).

(Continued on next page.)

**NOTE:** All No. C404R and C416R Rules furnished with hole in end for hanging.

**NOTE:** Asterisk (\*) indicates rules with single row of inch figures (all rules under 1" width).

Rules without asterisk have double row of inch figures, and each edge represents the bottom edge reading left to right (rules 1" and wider).



**Steel Rules with Inch Graduations 1-144" (continued)**

All rules furnished with Starrett satin chrome finish, except where noted. Additional sizes and variations available on special order.

**36" Spring-Tempered**

| Length | Width x Thickness | Graduations  | Feature Remarks | Catalog No.      | EDP No. |
|--------|-------------------|--|-----------------|------------------|---------|
| 36"    | 1-1/4" x 3/64"    | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                       |                 | <b>C604R-36</b>  | 52682   |
|        |                   |  | With Hook       | <b>CH604R-36</b> | 52677   |
|        |                   | <b>No. 7R</b> – 16ths, Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 100ths |                 | <b>C607R-36</b>  | 56436   |

**36" Heavy Spring-Tempered**

|     |                |  |  |                       |       |
|-----|----------------|--|--|-----------------------|-------|
| 36" | 1-1/2" x 1/10" | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                           |  | <b>C404R-36</b>       | 51485 |
|     |                |  | With Standard Letter of Certification† | <b>C404R-36 W/SLC</b> | 66888 |
|     |                | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths | With Hook                              | <b>CH404R-36</b>      | 51495 |
|     |                |  | With Hook                              | <b>C416R-36</b>       | 51510 |
|     |                | With Hook  | <b>CH416R-36</b>                       | 51520                 |       |

**48" Spring-Tempered**

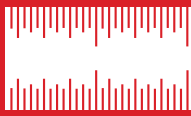
|     |                |  |  |                 |       |
|-----|----------------|--|--|-----------------|-------|
| 48" | 1-1/4" x 3/64" | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                       |  | <b>C604R-48</b> | 52683 |
|     |                | <b>No. 7R</b> – 16ths, Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 100ths |  | <b>C607R-48</b> | 56437 |

**48-144" Heavy Spring-Tempered**

|      |                |  |  |                       |       |
|------|----------------|--|--|-----------------------|-------|
| 48"  | 1-1/2" x 1/10" | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                           |  | <b>C404R-48</b>       | 51486 |
|      |                |  | With Standard Letter of Certification† | <b>C404R-48 W/SLC</b> | 66889 |
|      |                | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths | With Hook                              | <b>CH404R-48</b>      | 51496 |
|      |                |  | With Hook                              | <b>C416R-48</b>       | 51511 |
| 72"  | 1-1/2" x 1/10" | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                           |  | <b>C404R-72</b>       | 51488 |
|      |                |  | With Hook                              | <b>CH404R-72</b>      | 51498 |
|      |                | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths |  | <b>C416R-72</b>       | 51513 |
|      |                |  | With Hook                              | <b>CH416R-72</b>      | 51523 |
| 96"  | 1-1/2" x 1/10" | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                           |  | <b>C404R-96</b>       | 56191 |
|      |                |  | With Hook                              | <b>CH404R-96</b>      | 56474 |
|      |                | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths |  | <b>C416R-96</b>       | 56197 |
|      |                |  | With Hook                              | <b>CH416R-96</b>      | 56477 |
| 120" | 1-1/2" x 1/10" | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                           |  | <b>C404R-120</b>      | 56192 |
|      |                |  | With Hook                              | <b>CH404R-120</b>     | 56475 |
|      |                | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths |  | <b>C416R-120</b>      | 56198 |
|      |                |  | With Hook                              | <b>CH416R-120</b>     | 56478 |
| 144" | 1-1/2" x 1/10" | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds and 64ths                           |  | <b>C404R-144</b>      | 56193 |
|      |                |  | With Hook                              | <b>CH404R-144</b>     | 56476 |
|      |                | <b>No. 16R</b> – Quick-Reading 32nds, 64ths, Aircraft Quick-Reading 50ths and 100ths |  | <b>C416R-144</b>      | 56199 |
|      |                |  | With Hook                              | <b>CH416R-144</b>     | 56479 |

† Includes redemption card for Standard Letter of Certification (SLC).

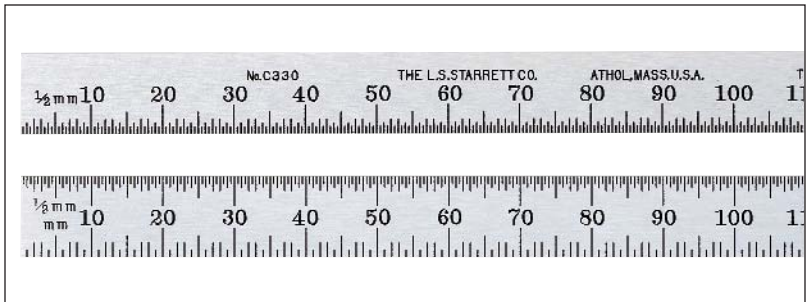
**NOTE:** All No. C404R and C416R Rules furnished with hole in end for hanging.



### Millimeter Graduation Styles

#### No. 30

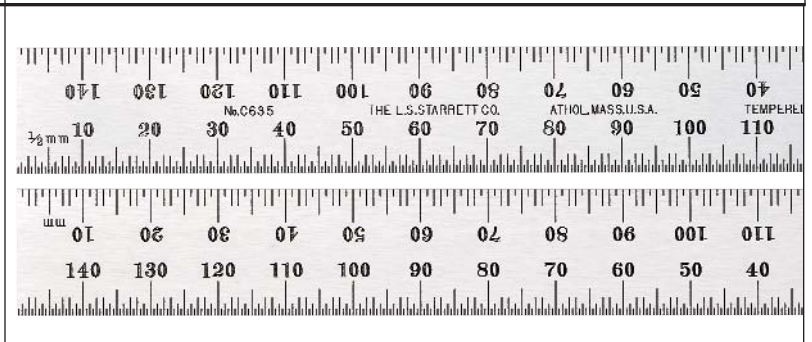
First Edge:  
Second Edge: 1/2mm  
Fourth Edge: 1/2mm  
Third Edge: mm



#### No. 35

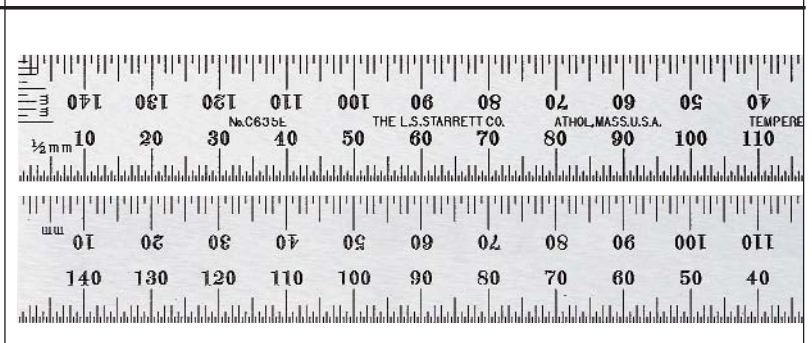
Reads both left-to-right and right-to-left  
A Starrett original feature

First Edge: mm  
Second Edge: 1/2mm  
Fourth Edge: mm  
Third Edge: 1/2mm



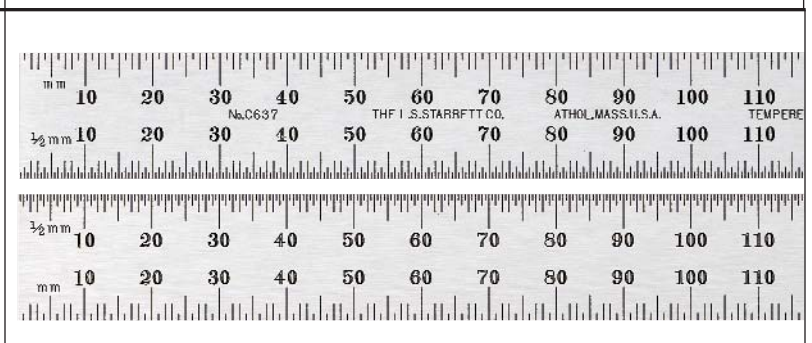
#### No. 35E

End Graduations: mm  
First Edge: mm  
Second Edge: 1/2mm  
Fourth Edge: mm  
Third Edge: 1/2mm



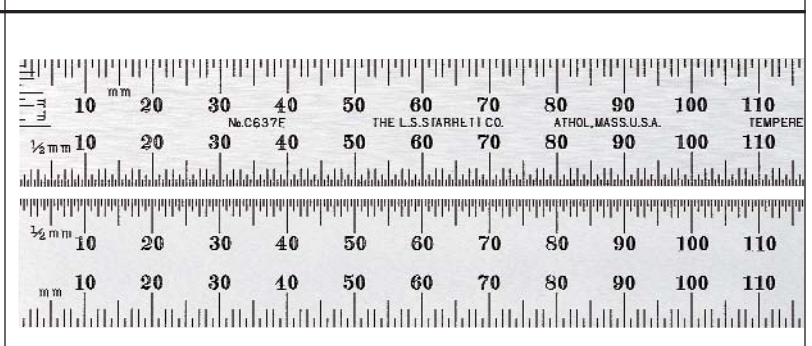
#### No. 37

First Edge: mm  
Second Edge: 1/2mm  
Fourth Edge: 1/2mm  
Third Edge: mm



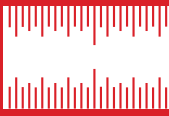
#### No. 37E

End Graduations: mm  
First Edge: mm  
Second Edge: 1/2mm  
Fourth Edge: 1/2mm  
Third Edge: mm



**NOTE:** All rules under 25mm in width have single row of millimeter figures. Rules 25mm and wider have double row of millimeter figures, and each edge represents the bottom edge reading left to right.





**Steel Rules with Millimeter Graduations 150-1800mm**

All rules furnished with Starrett satin chrome finish, except where noted. Additional sizes and variations available on special order.

**Catalog Number Legend:**

**Prefixes:**

**C** – Satin Chrome Finish

**Suffixes:**

**E** – End Graduations  
**N** – Narrow-Type Rule  
**S** – Semi-Flexible

**Rules include:**

- ◆ Full-Flexible
- ◆ Semi-Flexible
- ◆ Spring-Tempered
- ◆ Heavy Spring-Tempered

**150mm Full-Flexible**

| Length | Width x Thickness | Graduations   | Feature Remarks                         | Catalog No.            | EDP No. |
|--------|-------------------|---|---|------------------------|---------|
| 150mm  | 12.7 x 0.4mm      | <b>No. 30</b> – 1/2mm One Side; mm and 1/2mm on Reverse |   | <b>*C330-150</b>       | 51329   |
|        |                   |   | With Standard Letter of Certification** | <b>*C330-150 W/SLC</b> | 66882   |

**150mm Spring-Tempered**

|            |  |   |   |                       |       |
|------------|--|---|---|-----------------------|-------|
| 150mm      | 19 x 1.2mm   | <b>No. 35</b> – mm and 1/2mm Both Sides                   |   | <b>C635-150</b>       | 52630 |
|            |  |   | With Standard Letter of Certification** | <b>C635-150 W/SLC</b> | 66893 |
|            | <b>No. 35E</b> – mm and 1/2mm Both Sides; mm on Both Ends One Side | End Graduations   | <b>C635E-150</b>                        | 55968                 |       |
|            | 4.8 x 1.2mm  | <b>No. 35</b> – mm One Edge and 1/2mm One Edge on Reverse | Narrow Rule, Regular Steel Finish       | <b>635N-150</b>       | 70164 |
| 19 x 1.2mm | <b>No. 37</b> – mm and 1/2mm Both Sides                            |   | <b>C637-150</b>                         | 56049                 |       |
|            | <b>No. 37E</b> – mm and 1/2mm Both Sides; mm on Both Ends One Side | End Graduations   | <b>C637E-150</b>                        | 55969                 |       |

**300mm Full-Flexible**

|       |              |   |   |                        |       |
|-------|--------------|---|---|------------------------|-------|
| 300mm | 12.7 x 0.4mm | <b>No. 30</b> – 1/2mm One Side; mm and 1/2mm on Reverse |   | <b>*C330-300</b>       | 51330 |
|       |              |   | With Standard Letter of Certification** | <b>*C330-300 W/SLC</b> | 66883 |

**300mm Semi-Flexible**

|       |              |   |  |                  |       |
|-------|--------------|---|--|------------------|-------|
| 300mm | 25.4 x 0.5mm | <b>No. 35</b> – mm and 1/2mm Both Sides |  | <b>C335S-300</b> | 56048 |
|-------|--------------|---|--|------------------|-------|

**300mm Spring-Tempered**

|       |              |   |   |                       |       |
|-------|--------------|---|---|-----------------------|-------|
| 300mm | 25.4 x 1.2mm | <b>No. 35</b> – mm and 1/2mm Both Sides |   | <b>C635-300</b>       | 52631 |
|       |              |   | With Standard Letter of Certification** | <b>C635-300 W/SLC</b> | 66894 |

**500mm Spring-Tempered**

|       |            |   |  |                 |       |
|-------|------------|---|--|-----------------|-------|
| 500mm | 29 x 1.2mm | <b>No. 35</b> – mm and 1/2mm Both Sides |  | <b>C635-500</b> | 52632 |
|-------|------------|---|--|-----------------|-------|

**1000mm Spring-Tempered**

|        |            |   |  |                  |       |
|--------|------------|---|--|------------------|-------|
| 1000mm | 32 x 1.2mm | <b>No. 35</b> – mm and 1/2mm Both Sides |  | <b>C635-1000</b> | 52633 |
|--------|------------|---|--|------------------|-------|

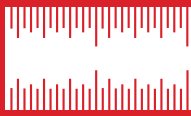
**1800mm Heavy Spring-Tempered**

|        |            |   |  |                    |       |
|--------|------------|---|--|--------------------|-------|
| 1800mm | 38 x 2.5mm | <b>No. 35</b> – mm and 1/2mm Both Sides |  | <b>C635-1800MM</b> | 64299 |
|--------|------------|---|--|--------------------|-------|

\*\* Includes redemption card for Standard Letter of Certification (SLC).

**NOTE:** Asterisk (\*) indicates rules with single row of millimeter figures (all rules under 25mm width).

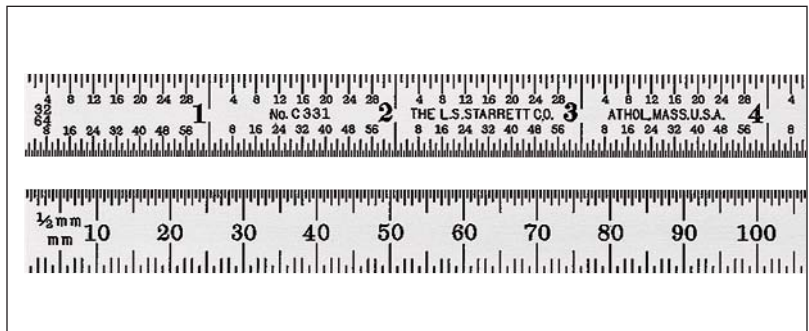
Rules without asterisk have double row of millimeter figures, and each edge represents the bottom edge reading left to right (rules 25mm and wider).



### Millimeter and Inch Graduation Styles

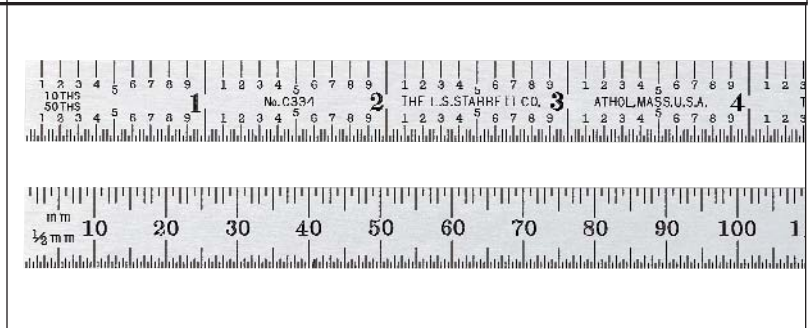
**No. 31**

First Edge: 32nds  
 Second Edge: 64ths  
 Fourth Edge: 1/2mm  
 Third Edge: mm



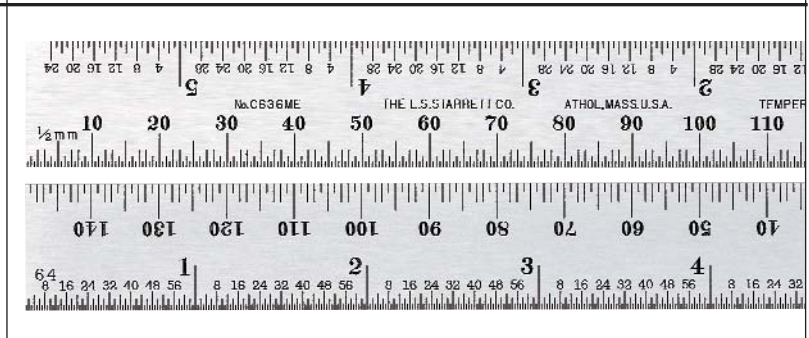
**No. 34**

First Edge: 10ths  
 Second Edge: 50ths  
 Fourth Edge: mm  
 Third Edge: 1/2mm

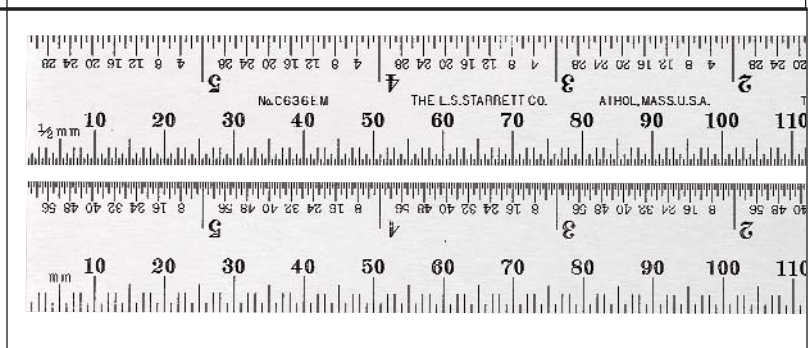


**No. 36\***

First Edge: 32nds  
 Second Edge: 1/2mm  
 Fourth Edge: mm  
 Third Edge: 64ths



**Catalog No. C636EM-6**



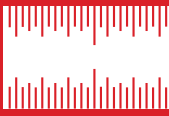
#### No. 31, 34, and 36\* Styles are graduated as follows:

- ◆ 150mm end-to-end on mm edges and to 5-3/4" with a blank end on the inch edges
- ◆ 300mm end-to-end on mm edges and to 11-3/4" with a blank end on the inch edges
- ◆ 500mm end-to-end on mm edges and to 19-1/2" with a blank end on the inch edges
- ◆ 1000mm end-to-end on mm edges and to 39-1/4" with a blank end on the inch edges

#### Catalog No. C636EM-6 is graduated as follows:

- ◆ 6" end-to-end on the inch edges and to 150mm with a blank end on the mm edges

**NOTE:** \* Millimeter/Inch scale with emphasis on millimeter. Overall length is 150mm (5.905").  
 Inch graduations stop at 5-3/4" to avoid confusion.



## Steel Rules with Millimeter and Inch Graduations

All rules are full millimeter lengths, except where noted. Additional sizes and variations available on special order.

### Key to Starrett Rule Numbering System:

**Prefixes:**

**C** – Satin Chrome Finish

**Suffixes:**

**EM** – English/Metric

**ME** – Metric/English

**Rules include:**

◆ Full-Flexible

◆ Spring-Tempered

### 150mm - 5-3/4" Full-Flexible

| Length | Width x Thickness | Graduations   | Feature Remarks | Catalog No.     | EDP No. |
|--------|-------------------|---|-----------------|-----------------|---------|
| 150mm  | 12 x 0.4mm        | <b>No. 31</b> – 32nds and 64ths on One Side; mm and 1/2mm on Reverse. All Four Edges Graduated from Same End          |                 | <b>C331-150</b> | 51331   |
| 5-3/4" |                   | <b>No. 34</b> – mm and 1/2mm on One Side; Quick-Reading 10ths (.10) and Aircraft Quick-Reading 50ths (.02) on Reverse |                 | <b>C334-150</b> | 56262   |

### 150mm - 6" Spring-Tempered

|             |            |  |  |                         |       |
|-------------|------------|--|--|-------------------------|-------|
| 150mm       | 19 x 1.2mm | <b>No. 36</b> – 32nds and 1/2mm on One Side; 64ths and mm on Reverse |  | <b>C636ME-150</b>       | 52634 |
| 5-3/4"      |            |  | With Standard Letter of Certification*                     | <b>C636ME-150 W/SLC</b> | 66890 |
| 150mm<br>6" |            |  | Full 6" with Millimeter Reading to 150mm; plus a Blank End | <b>C636EM-6</b>         | 57064 |

### 300mm - 11-3/4" Full-Flexible

|         |              |  |  |                 |       |
|---------|--------------|--|--|-----------------|-------|
| 300mm   | 12.7 x 0.4mm | <b>No. 31</b> – 32nds and 64ths on One Side; mm and 1/2mm on Reverse. All Four Edges Graduated from Same End |  | <b>C331-300</b> | 51332 |
| 11-3/4" |              |  | <b>No. 34</b> – mm and 1/2mm One Side; Quick-Reading 10ths (.10) and Aircraft Quick-Reading 50ths (.02) on Reverse | <b>C334-300</b> | 56696 |

### 300mm - 11-3/4" Spring-Tempered

|         |              |  |  |                       |       |
|---------|--------------|--|--|-----------------------|-------|
| 300mm   | 25.4 x 1.2mm | <b>No. 36</b> – 32nds and 1/2mm on One Side; 64ths and mm on Reverse |  | <b>C636-300</b>       | 52635 |
| 11-3/4" |              |  | With Standard Letter of Certification* | <b>C636-300 W/SLC</b> | 66891 |

### 500mm - 19-1/2" Full-Flexible

|         |            |   |  |                 |       |
|---------|------------|---|--|-----------------|-------|
| 500mm   | 19 x 0.5mm | <b>No. 34</b> – mm and 1/2mm on One Side; Quick-Reading 10ths (.10) and Aircraft Quick-Reading 50ths (.02) on Reverse |  | <b>C334-500</b> | 56697 |
| 19-1/2" |            |   |  |                 |       |

### 500mm - 19-1/2" Spring-Tempered

|         |            |  |  |                 |       |
|---------|------------|--|--|-----------------|-------|
| 500mm   | 29 x 1.2mm | <b>No. 36</b> – 32nds and 1/2mm on One Side; 64ths and mm on Reverse |  | <b>C636-500</b> | 52636 |
| 19-1/2" |            |  |  |                 |       |

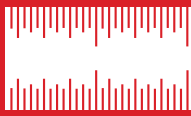
### 1000mm - 39-1/4" Full-Flexible

|         |            |   |  |                  |       |
|---------|------------|---|--|------------------|-------|
| 1000mm  | 19 x 0.5mm | <b>No. 34</b> – mm and 1/2mm on One Side; Quick-Reading 10ths (.10) and Aircraft Quick-Reading 50ths (.02) on Reverse |  | <b>C334-1000</b> | 56698 |
| 39-1/4" |            |   |  |                  |       |

### 1000mm - 39-1/4" Spring-Tempered

|         |            |  |  |                        |       |
|---------|------------|--|--|------------------------|-------|
| 1000mm  | 32 x 1.2mm | <b>No. 36</b> – 32nds and 1/2mm on One Side; 64ths and mm on Reverse |  | <b>C636-1000</b>       | 52637 |
| 39-1/4" |            |  | With Standard Letter of Certification* | <b>C636-1000 W/SLC</b> | 66892 |

\* Includes redemption card for Standard Letter of Certification (SLC).



### Steel Rules with Shrink Graduations 12", 24"

These spring-tempered, satin chrome finished shrink rules are for laying out wood and metal patterns and core boxes for casting metals. Graduated to give shrink allowances directly, they come in 12" and 24" lengths with shrinks from 1/16-3/8" per foot.

**NOTE:** Also see No. 62 Rule Holder. A very useful tool for patternmakers.

The average shrinkage figures are for metals cast with uniform sections under normal conditions (see table). When using, be sure that the size and shape of castings are considered, since thick castings have less shrink and thin castings more shrink than the figures shown.

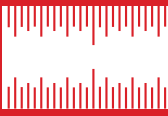
### Average Shrinkage of Castings (Inches per Foot)

|                |       |
|----------------|-------|
| Cast Iron      | 1/8"  |
| Malleable Iron | 1/8"  |
| Steel          | 1/4"  |
| Brass          | 3/16" |
| Copper         | 3/16" |
| Aluminum       | 3/16" |
| Lead           | 5/16" |
| Zinc           | 5/16" |
| Britannia      | 1/32" |
| Tin Alloys     | 1/12" |



| Length | Width x Thickness | Shrink Per Foot | Graduation   | Catalog No.     | EDP No. |
|--------|-------------------|-----------------|--|-----------------|---------|
| 12"    | 1" x 3/64"        | 1/16"           | <b>No. 6R</b> – Aircraft Quick-Reading 50ths (.02) Both Edges One Side; Quick-Reading 10ths (.10) Both Edges Opposite Side | <b>C100A-12</b> | 50452   |
|        |                   | 1/10"           | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds, 64ths  | <b>C374-12</b>  | 51430   |
|        |                   | 1/8"            |  | <b>C370-12</b>  | 51428   |
|        |                   | 5/32"           | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds, 64ths  | <b>C389-12</b>  | 51473   |
|        |                   | 3/16"           | <b>No. 6R</b> – Aircraft Quick-Reading 50ths (.02) Both Edges One Side; Quick-Reading 10ths (.10) Both Edges Opposite Side | <b>C100F-12</b> | 50458   |
|        |                   | 3/16"           | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds, 64ths  | <b>C375-12</b>  | 51432   |
|        |                   | 7/32"           |  | <b>C376-12</b>  | 51434   |
|        |                   | 1/4"            | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds, 64ths  | <b>C377-12</b>  | 51435   |
|        |                   | 9/32"           | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds, 64ths  | <b>C378-12</b>  | 51437   |
|        |                   | 5/16"           |  | <b>C368-12</b>  | 51424   |
| 3/8"   | <b>C369-12</b>    | 51426           |  |                 |         |
| 24"    | 1-1/4" x 3/64"    | 1/16"           | <b>No. 6R</b> – Aircraft Quick-Reading 50ths (.02) Both Edges One Side; Quick-Reading 10ths (.10) Both Edges Opposite Side | <b>C100A-24</b> | 50453   |
|        |                   | 1/10"           | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds, 64ths  | <b>C374-24</b>  | 51431   |
|        |                   | 1/8"            |  | <b>C370-24</b>  | 51429   |
|        |                   | 5/32"           | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds, 64ths  | <b>C389-24</b>  | 51474   |
|        |                   | 3/16"           | <b>No. 6R</b> – Aircraft Quick-Reading 50ths (.02) Both Edges One Side; Quick-Reading 10ths (.10) Both Edges Opposite Side | <b>C100F-24</b> | 50459   |
|        |                   | 3/16"           | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds, 64ths  | <b>C375-24</b>  | 51433   |
|        |                   | 1/4"            |  | <b>C377-24</b>  | 51436   |
|        |                   | 5/16"           | <b>No. 4R</b> – 8ths, 16ths, Quick-Reading 32nds, 64ths  | <b>C368-24</b>  | 51425   |
| 3/8"   | <b>C369-24</b>    | 51427           |  |                 |         |





## Steel Rule with Decimal Equivalents

### No. C622R-6 6"

One side of this handy rule has accurate, machine-divided, distinctive graduations in

both Quick-Reading 32nds and 64ths. The reverse side has a legible table of fractions and decimal equivalents. Made of finest spring-tempered steel with no-glare satin chrome finish.



| DECIMAL EQUIVALENTS |        |
|---------------------|--------|
| 1/64                | 0.0156 |
| 2/64                | 0.0312 |
| 3/64                | 0.0469 |
| 4/64                | 0.0625 |
| 5/64                | 0.0781 |
| 6/64                | 0.0938 |
| 7/64                | 0.1094 |
| 8/64                | 0.1250 |
| 9/64                | 0.1406 |
| 10/64               | 0.1562 |
| 11/64               | 0.1719 |
| 12/64               | 0.1875 |
| 13/64               | 0.2031 |
| 14/64               | 0.2188 |
| 15/64               | 0.2344 |
| 16/64               | 0.2500 |
| 17/64               | 0.2656 |
| 18/64               | 0.2812 |
| 19/64               | 0.2969 |
| 20/64               | 0.3125 |
| 21/64               | 0.3281 |
| 22/64               | 0.3438 |
| 23/64               | 0.3594 |
| 24/64               | 0.3750 |
| 25/64               | 0.3906 |
| 26/64               | 0.4062 |
| 27/64               | 0.4219 |
| 28/64               | 0.4375 |
| 29/64               | 0.4531 |
| 30/64               | 0.4688 |
| 31/64               | 0.4844 |
| 32/64               | 0.5000 |
| 33/64               | 0.5156 |
| 34/64               | 0.5312 |
| 35/64               | 0.5469 |
| 36/64               | 0.5625 |
| 37/64               | 0.5781 |
| 38/64               | 0.5938 |
| 39/64               | 0.6094 |
| 40/64               | 0.6250 |
| 41/64               | 0.6406 |
| 42/64               | 0.6562 |
| 43/64               | 0.6719 |
| 44/64               | 0.6875 |
| 45/64               | 0.7031 |
| 46/64               | 0.7188 |
| 47/64               | 0.7344 |
| 48/64               | 0.7500 |
| 49/64               | 0.7656 |
| 50/64               | 0.7812 |
| 51/64               | 0.7969 |
| 52/64               | 0.8125 |
| 53/64               | 0.8281 |
| 54/64               | 0.8438 |
| 55/64               | 0.8594 |
| 56/64               | 0.8750 |
| 57/64               | 0.8906 |
| 58/64               | 0.9062 |
| 59/64               | 0.9219 |
| 60/64               | 0.9375 |
| 61/64               | 0.9531 |
| 62/64               | 0.9688 |
| 63/64               | 0.9844 |
| 64/64               | 1.0000 |

### 6" Length

| Width x Thickness | Graduation   | Catalog No. | EDP No. |
|-------------------|--|-------------|---------|
| 3/4" x 3/64"      | No. 10R – Quick-Reading 32nds and 64ths One Side and Decimal Equivalents on Reverse Side | C622R-6     | 56660   |

## Steel Rule with Letter and Number Drill Sizes

### No. C623R-6 6"

This practical shop rule has accurate, machine-divided graduations in 32nds and 64ths with Quick-Reading figures on one side. The reverse side has letter sizes

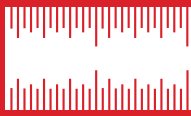
of drills from A to Z with corresponding diameters in thousandths and also number sizes from 1 to 80 with corresponding diameters in thousandths. Made of fine spring-tempered steel with no-glare satin chrome finish.



| DRILL SIZE TABLE |     |
|------------------|-----|
| 1                | 228 |
| 2                | 221 |
| 3                | 213 |
| 4                | 209 |
| 5                | 205 |
| 6                | 204 |
| 7                | 201 |
| 8                | 199 |
| 9                | 196 |
| 10               | 193 |
| 11               | 191 |
| 12               | 189 |
| 13               | 185 |
| 14               | 182 |
| 15               | 180 |
| 16               | 177 |
| 17               | 173 |
| 18               | 169 |
| 19               | 166 |
| 20               | 161 |
| 21               | 159 |
| 22               | 154 |
| 23               | 152 |
| 24               | 149 |
| 25               | 147 |
| 26               | 144 |
| 27               | 140 |
| 28               | 136 |
| 29               | 133 |
| 30               | 128 |
| 31               | 120 |
| 32               | 116 |
| 33               | 113 |
| 34               | 111 |
| 35               | 110 |
| 36               | 106 |
| 37               | 104 |
| 38               | 101 |
| 39               | 99  |
| 40               | 98  |
| A                | 234 |
| B                | 238 |
| C                | 242 |
| D                | 246 |
| E                | 250 |
| F                | 257 |
| G                | 261 |
| H                | 266 |
| I                | 272 |
| J                | 277 |
| K                | 281 |
| L                | 290 |
| M                | 295 |

### 6" Length

| Width x Thickness | Graduation   | Catalog No. | EDP No. |
|-------------------|--|-------------|---------|
| 3/4" x 3/64"      | No. 10R – Quick-Reading 32nds and 64ths One Side and Letter and Number Drill Sizes on Reverse Side | C623R-6     | 56661   |

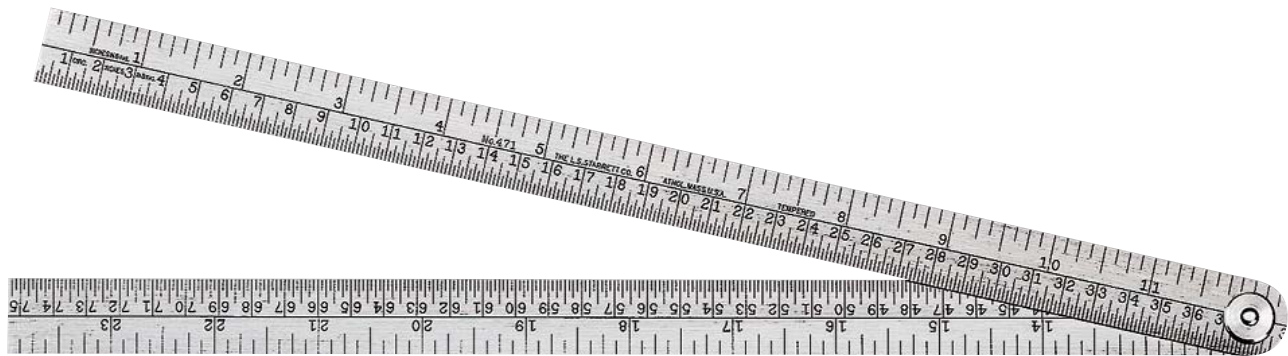


**Steel Folding-Rule with Circumference Measurement**

**No. 471 24"**

Tinsmiths and other mechanics appreciate this rule because it measures diameters up to 24" as well as the equivalent circumference measurement in direct-reading circumference inches, up to 75".

Entirely eliminates the need for circumference calculations. Made of fine, spring-tempered steel and jointed at the center with two 12" folds. Machine-divided graduations.



**24" Length**

| Width x Thickness | Graduation   | Catalog No. | EDP No. |
|-------------------|--|-------------|---------|
| 3/4" x 1/32"      | 8ths and Circumference 8ths on One Side; 16ths on Reverse Side | 471         | 52483   |

**Steel General Utility Rules – English Pattern**

**No. 414 Series 12-72"**

These tempered steel rules are designed to meet the general-utility measuring needs of schools and shops, woodworkers, tinsmiths, metalworkers, benchwork, etc. Graduations are heavier than conventional machine-divided rules and

easy to read. The two edges on both sides are graduated with the upper edges in 8ths and the lower edges in 16ths of an inch. A 1/4" hang-hole is on one end.



| Length | Width x Thickness | Graduation                         | Catalog No. | EDP No. |
|--------|-------------------|------------------------------------|-------------|---------|
| 12"    | 1-1/4" x 1/16"    | 8ths, 16ths of an Inch, Both Sides | 414-1       | 51499   |
| 24"    |                   |                                    | 414-2       | 51500   |
| 36"    |                   |                                    | 414-3       | 51501   |
| 48"    |                   |                                    | 414-4       | 51502   |
| 72"    |                   |                                    | 414-6       | 51503   |



## Key Seat Clamps

### No. 298

These key seat clamps convert steel rules, combination square blades and straight edges into key seat rules for laying out keyways and scribing parallel lines on round work. They can be easily attached or removed. Made of steel, case hardened, and accurately ground, they are 1" long x 7/16" wide (25 x 11mm) and have a 7/64" (2.8mm) slot width. Available in pairs only.

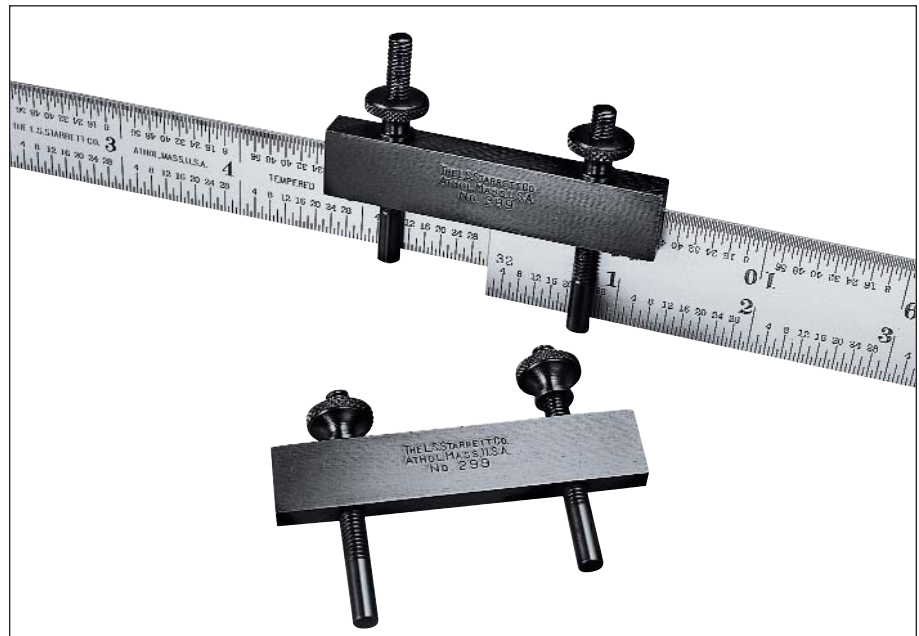


| Catalog No. | EDP No. | Description             |
|-------------|---------|-------------------------|
| 298         | 51327   | Pair of Key Seat Clamps |

## Rule Clamp

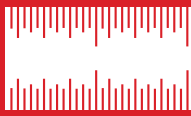
### No. 299

This useful tool is for clamping two steel rules together, end to end, making one long rule for measuring longer lengths than a single rule. Since the clamp bolts have independent adjustment, the rule clamp will hold rules of the same or different widths up to 1-1/4" (32mm). This clamp is handy for mechanics whose tool chests will not hold rules over 12" (300mm) long.



| Catalog No. | EDP No. | Description |
|-------------|---------|-------------|
| 299         | 51328   | Rule Clamp  |



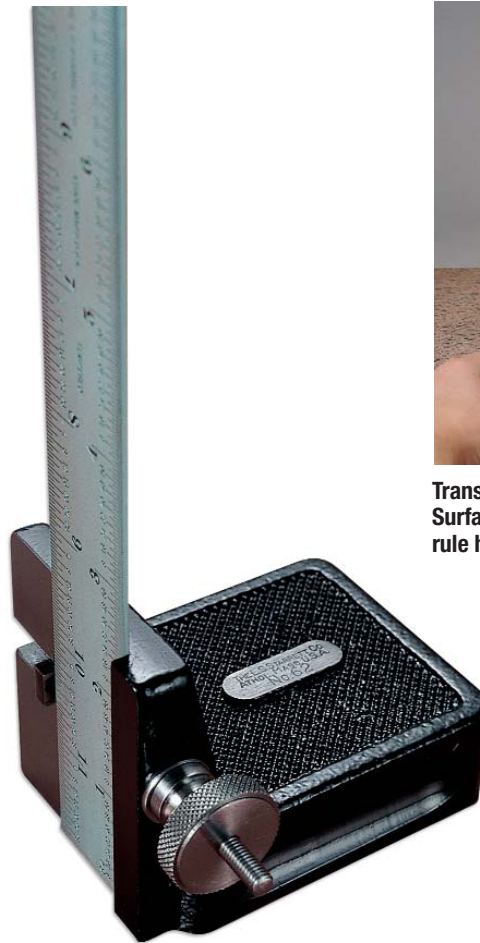


## Rule Holder

### No. 62 / EDP 50304

The Starrett No. 62 Rule Holder is designed primarily for patternmakers, toolmakers and machinists. It will hold any rule or combination square blade from 3/4 – 1-9/16" (19-40mm) wide in an upright position for use in transferring measurements with surface gages, etc. It is also handy for use as a depth gage. A large knurled clamp nut securely locks the rule in the holder.

The base is approximately 3-1/8" long and 2 1/2" wide (80 x 60mm). There is a depression on each side for thumb and fingers for handling convenience.



Transferring measurements with a Starrett Surface Gage used in conjunction with rule and rule holder.

## Small Steel Rules with Holder

### No. 423 Series

1/4, 3/8, 1/2, 3/4, 1"

This set of five small rules is extremely useful for measurements in confined or hard-to-reach locations. They are especially suitable for measuring grooves, short shoulders, recesses, keyways, and in tool and die work.

The 4" long holder is well balanced. The rules are easily inserted in the slotted end of the holder and are rigidly clamped in place by a slight turn of a knurled nut. Two slots are provided, so the rules can be held at 30° or 45°, either square in a slot or tipped to one side.

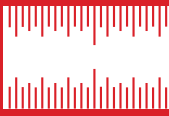
Thicknesses up to 1/16" can be clamped in either slot. Rules are made of thin, spring-tempered steel, with bright finish and highly accurate, machine-divided graduations. Each rule is graduated in 32nds of an inch on one side and 64ths on the reverse.



Holder with 1" blade attached and 1/4, 3/8, 1/2, 3/4 blades.

| Description   | Catalog No.    | EDP No. |
|---|----------------|---------|
| Set of 5 Rules with Holder in Attractive, Protective Case | <b>S423Z</b>   | 51524   |
| 1/4" Rule Only  | <b>423-1/4</b> | 70634   |
| 3/8" Rule Only  | <b>423-3/8</b> | 70635   |
| 1/2" Rule Only  | <b>423-1/2</b> | 70636   |
| 3/4" Rule Only  | <b>423-3/4</b> | 70637   |
| 1" Rule Only  | <b>423-1</b>   | 70638   |
| Holder Only   | <b>110</b>     | 50475   |





## Steel Straight Edges

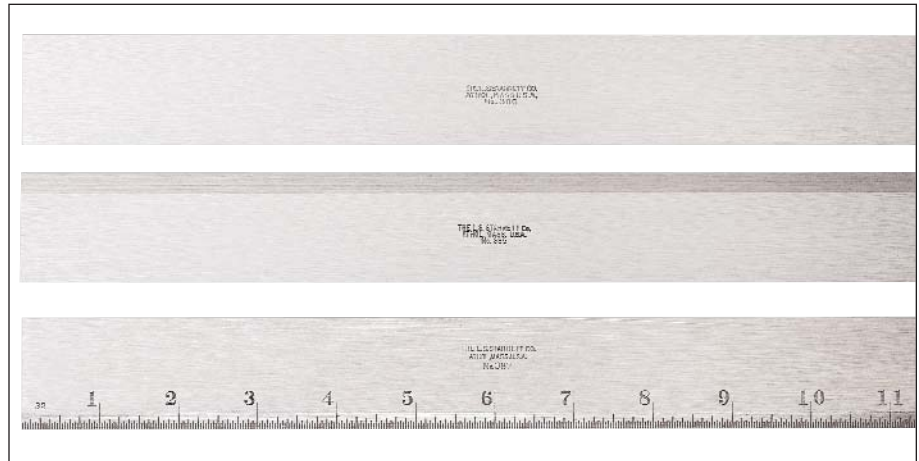
**No. 380 Series**  
12-72" (300-1800mm)

**No. 385 Series with bevel edge**  
12-72" (300-1800mm)

**No. 387 Series with bevel and graduated edge**  
12-48" (300-1200mm)

These straight edges are precision ground and nicely finished to rigid Starrett standards. They are unexcelled for drawing or scribing straight lines and checking surfaces for straightness. Their thickness and design permit them to retain shape and accuracy, but still be portable and easy to handle.

The No. 380 Series are not beveled or graduated. The No. 385 Series are beveled one edge, but not graduated. The No. 387 Series have one edge that is both beveled and graduated in 32nds of an inch.



Top, No. 380-12; middle, No. 385-12; bottom, No. 387-12.

The No. 380 and No. 385 Series in sizes 36" and longer are marked with arrows at two suspension points. If the straight edges are brought to the work and used on edge, they should be suspended at these two points to minimize deflection.

Most jobs involve the use of straight edges in the flat position – and it is in this position that we check most stringently.

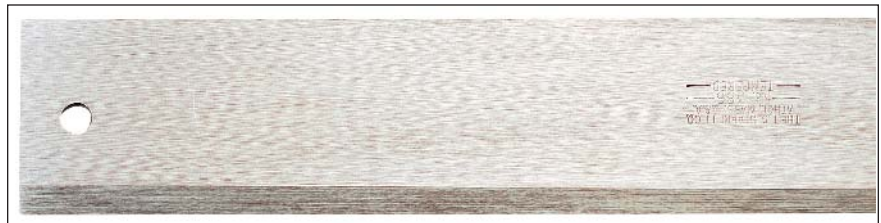
| Length |      | Width x Thickness |            | No. 380 Series       |         | No. 385 Series with Bevel |         | No. 387 Series with Bevel, Graduations |         |
|--------|------|-------------------|------------|----------------------|---------|---------------------------|---------|--|---------|
| Inch   | mm   | Inch              | mm         | Catalog No.          | EDP No. | Catalog No.               | EDP No. | Catalog No.                            | EDP No. |
| 12"    | 300  | 1-13/32" x 11/64" | 36 x 4.4mm | <b>380-12</b>        | 51438   | <b>385-12</b>             | 51455   | <b>387-12</b>                          | 51468   |
| 18"    | 450  |                   |            | <b>380-18</b>        | 51439   | <b>385-18</b>             | 51456   | <b>387-18</b>                          | 51469   |
| 24"    | 600  |                   |            | <b>380-24</b>        | 51440   | <b>385-24</b>             | 51457   | <b>387-24</b>                          | 51470   |
|        |      |                   |            | <b>380-24 W/SLC*</b> | 66895   |                           |         |  |         |
| 36"    | 900  | 2-13/32" x 7/32"  | 60 x 5.5mm | <b>380-36</b>        | 51441   | <b>385-36</b>             | 51458   | <b>387-36</b>                          | 51471   |
| 48"    | 1200 |                   |            | <b>380-48</b>        | 51442   | <b>385-48</b>             | 51459   | <b>387-48</b>                          | 51472   |
| 72"    | 1800 |                   |            | <b>380-72</b>        | 51444   | <b>385-72</b>             | 51461   |  |         |

\*Includes redemption card for Standard Letter of Certification (SLC).

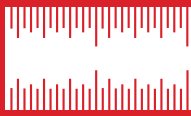
## Draftsmen's Steel Straight Edges with bevel edge

**No. 386 Series**  
12-72" (300-1800mm)

These straight edges are thinner than our No. 385 Series (3/32" or 2.4mm) making them easier for draftsmen to use. Available in lengths up to 72" long. They have an attractive nickel plated finish, are beveled on one edge, and have a convenient hang-hole on one end.



| Length |      | Width x Thickness |            | Catalog No.   | EDP No. |
|--------|------|-------------------|------------|---------------|---------|
| Inch   | mm   | Inch              | mm         |               |         |
| 12"    | 300  | 1-9/16" x 3/32"   | 40 x 2.4mm | <b>386-12</b> | 51462   |
| 24"    | 600  |                   |            | <b>386-24</b> | 51463   |
| 36"    | 900  |                   |            | <b>386-36</b> | 51464   |
| 48"    | 1200 | 2-1/8" x 3/32"    | 54 x 2.4mm | <b>386-48</b> | 51465   |
| 72"    | 1800 | 2-5/8" x 7/64"    | 66 x 2.8mm | <b>386-72</b> | 51467   |



### Steel Parallels

#### No. 384 Series

1/8" x 1" - 1/2" x 1-1/4"  
(3 x 25mm - 13 x 31mm)

Starrett No. 384 Steel Parallels are hardened and ground to close limits. They are indispensable for inspection and layout work or for various setups on drill presses, milling and grinding machines, shapers, etc. Furnished in pairs, 6" length, they are made from a special grade of tool steel, hardened and accurately ground on the four sides. In tool rooms or machine shops, several pairs of these parallels will be of great value.

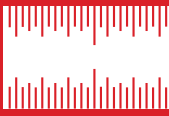


#### 6" (150mm) Length

| Thickness |      | Width  |      | Pairs       | EDP No. |
|-----------|------|--------|------|-------------|---------|
| Inch      | mm   | Inch   | mm   | Catalog No. |         |
| 1/8"      | 3mm  | 1"     | 25mm | <b>384A</b> | 51445   |
| 3/16"     | 5mm  | 7/8"   | 22mm | <b>384C</b> | 51447   |
| 1/4"      | 6mm  | 3/4"   | 19mm | <b>384E</b> | 51449   |
|           |      | 1"     | 25mm | <b>384F</b> | 51450   |
| 3/8"      | 10mm | 1/2"   | 13mm | <b>384G</b> | 51451   |
|           |      | 3/4"   | 19mm | <b>384H</b> | 51452   |
| 1/4"      | 6mm  | 3/8"   | 10mm | <b>384M</b> | 63645   |
|           |      | 1/2"   | 13mm | <b>384N</b> | 63646   |
|           |      | 5/8"   | 16mm | <b>384P</b> | 63647   |
| 3/8"      | 10mm | 1"     | 25mm | <b>384R</b> | 63648   |
| 1/2"      | 13mm | 5/8"   | 16mm | <b>384S</b> | 63649   |
|           |      | 3/4"   | 19mm | <b>384T</b> | 63650   |
|           |      | 1"     | 25mm | <b>384W</b> | 63651   |
|           |      | 1-1/8" | 28mm | <b>384X</b> | 63652   |
|           |      | 1-1/4" | 31mm | <b>384Y</b> | 63653   |

#### Sets

| Description                                       | Catalog No.    | EDP No. |
|---|----------------|---------|
| Set of 4 Pairs – Sizes A, C, E, G – In Case       | <b>S384JZ</b>  | 51453   |
| Set of 4 Pairs – Sizes N, M, P, F – In Case       | <b>S384-1Z</b> | 63676   |
| Set of 4 Pairs – Sizes G, H, R, M – In Case       | <b>S384-2Z</b> | 63677   |
| Set of 5 Pairs – Sizes S, T, W, X and Y – In Case | <b>S384-3Z</b> | 63678   |



## Adjustable Parallels

### No. 154 Series 3/8 – 2-1/4" (9.5-57mm)

Starrett adjustable parallels provide a wide range of use in layout, gaging, inspection work and for setups on various machine tools. Their adjustable feature makes it possible to adjust them to exact size by micrometer measurement and also permits use in place of several solid-type parallels.

These parallels are useful as gages in checking the size of slots and openings. They are also convenient for use in machine vises, for leveling or adjusting work on setups of milling and grinding machines, shapers, planers, drill presses and for many other applications.

Parallels slide smoothly and can be easily adjusted. The smaller sizes A, B, and C, are locked by one screw while the larger sizes, D, E, and F, have two lock screws. All parallels are 9/32" (7mm) thick.



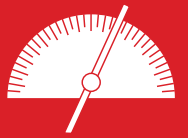
**Top: Set No. S154LZ with No. 154E in foreground. Right: Checking inside measurement of slot with parallel and outside micrometer.**

| Range           |             | Length   |         | Catalog No. | EDP No. |
|-----------------|-------------|----------|---------|-------------|---------|
| Inch            | mm          | Inch     | mm      |             |         |
| 3/8 – 1/2"      | 9.5-12.7mm  | 1-3/4"   | (45mm)  | <b>154A</b> | 50578   |
| 1/2 – 11/16"    | 12.7-17.5mm | 2-1/8"   | (55mm)  | <b>154B</b> | 50579   |
| 11/16 – 15/16"  | 17.5-24mm   | 2-11/16" | (70mm)  | <b>154C</b> | 50580   |
| 15/16 – 1-5/16" | 24-33mm     | 3-9/16"  | (90mm)  | <b>154D</b> | 50581   |
| 1-5/16 – 1-3/4" | 33-44mm     | 4-3/16"  | (105mm) | <b>154E</b> | 50582   |
| 1-3/4 – 2-1/4"  | 44-57mm     | 5-1/16"  | (130mm) | <b>154F</b> | 50583   |

#### Sets

| Description   | Catalog No.    | EDP No. |
|---|----------------|---------|
| Set of 4 Parallels – Sizes A, B, C, D – In Case       | <b>S154SZ</b>  | 50584   |
| Set of 6 Parallels – Sizes A, B, C, D, E, F – In Case | <b>S154LZ</b>  | 50586   |
| Case Only for Set of 4                                | <b>S154SZZ</b> | 55194   |
| Case Only for Set of 6                                | <b>S154LZZ</b> | 55195   |





Starrett angular measuring tools range from vernier protractors reading to 5 minutes of a degree, to regular protractors reading to a degree and easily being able to estimate to 30 minutes.

There are also special purpose angular measuring gages such as cutter clearance gages, draftsman protractors, drill point gages and also a combination protractor and depth gage series.

All of our angular measurements are in degrees and minutes. When setting up and comparing true angles to the highest degree of accuracy, we recommend using Starrett-Webber Angle Gage Blocks (see Gage Block section). These are available in two styles, down to an amazing 1/4-second accuracy. What Starrett-Webber Master Gage Blocks are to length measurement, these blocks are to angle measurement.

There has been an effort by some in the international community to have angles be described by the use of radians. The radian is the plane angle between two radii of a circle, which cut off on the circumference an arc equal in length to the radius.

The formula is:  $180^\circ = \pi$  radians

Therefore, 1 radian is equal to 57.2958°, or 1 degree is equal to .017 radians.

We do not find any problems with measuring angles by using the traditional standard of degrees, minutes, and seconds, and find this to be accepted worldwide.







**Precision  
Universal Bevel  
Vernier Protractors**

**No. 359 Series  
with fine adjustment  
Graduations in degrees thru 360°**

These tools are designed for precision measuring and for laying out angles. The protractor is one of the most valuable and useful tools for the kit of every good toolmaker, inspector or machinist.

**Readability Features**

- ◆ Satin chrome finish on all reading surfaces – eliminates glare and resists rust
- ◆ Sharp, machine-divided graduations

**Ease-of-Handling Features**

- ◆ Available with hardened 7" (175mm) or 12" (300mm) blades which can be rotated to the desired angle and adjusted to the desired length
- ◆ Both the dial and the blade can be locked independently
- ◆ An acute angle attachment is available
- ◆ Flush surfaces on the base permits use on height gages
- ◆ One side of the tool is flat so it can be laid on paper or on the work

**Accuracy Features**

- ◆ Machine-divided graduations read to 5 minutes (1/12 of a degree) and accuracy is finer than can be read
- ◆ The most convenient, ultra-sensitive fine adjustment for precision setting



No. 359 checking angles on fixture.

Measuring obtuse angle.

Measuring acute angle.

**Graduations in degrees through 360°**

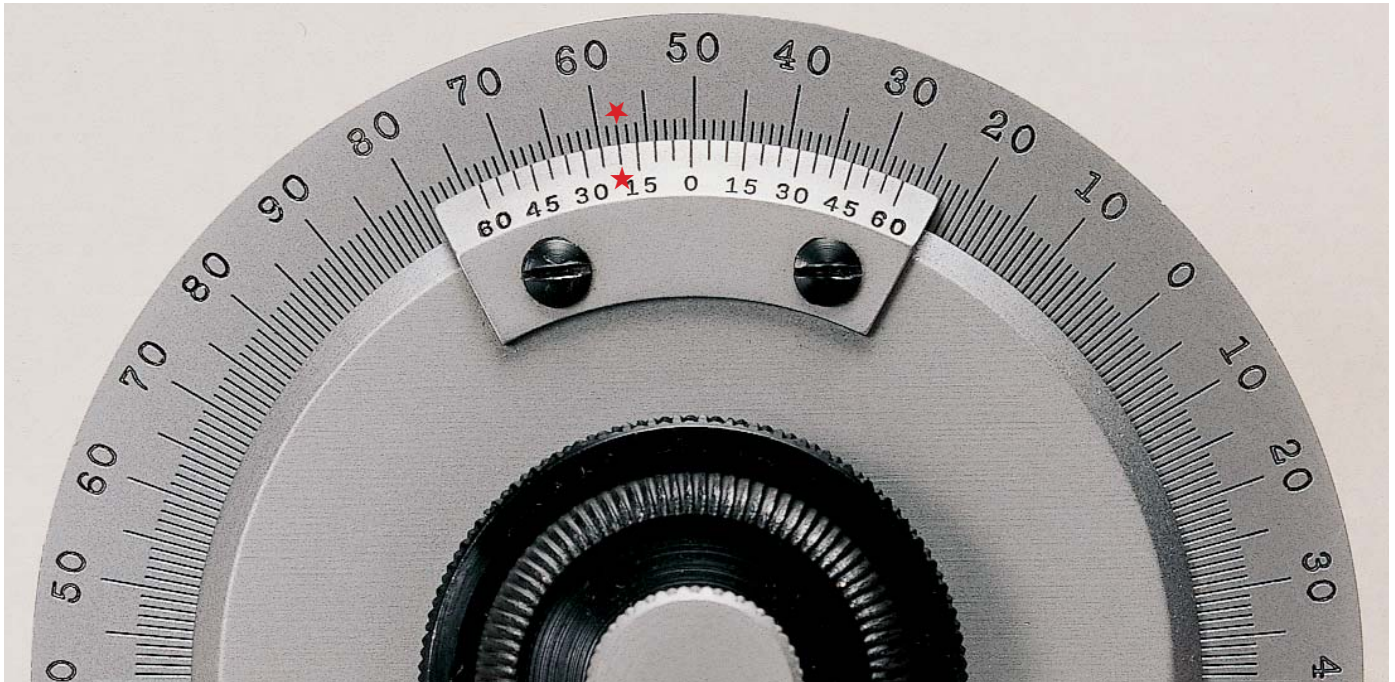
| Blade Size | Graduation               | In Case       |         |
|------------|--------------------------|---------------|---------|
|            |                          | Catalog No.   | EDP No. |
| 7"         | 5 min. or<br>1/12 degree | C359BZ        | 51394   |
| 12"        |                          | C359DZ        | 51396   |
| 7" & 12"   |                          | C359FZ        | 51398   |
|            |                          | C359FZ W/SLC* | 66929   |

**Accessories**

| Description                 | Catalog No. | EDP No. |
|-----------------------------|-------------|---------|
| 7" Blade Only               | PT04780     | 70538   |
| 12" Blade Only              | PT04781     | 70539   |
| Acute Angle Attachment Only | PT99329     | 51392   |

Packed one in a box.

\* Includes redemption card for Standard Letter of Certification (SLC).



### How to Read a Vernier on Universal Bevel Protractors

Starrett Universal Bevel Protractors with Vernier can be accurately read to 5 minutes (5') or  $1/12$  of a degree. The dial of the protractor is graduated both to the right and left of zero up to 90 degrees. The Vernier scale is also graduated to the right and left of zero up to 60 minutes (60'), each of the 12 Vernier graduations representing 5 minutes. Any angle can be measured, and remember that the Vernier reading must be read in the same direction from zero as the protractor, either left or right.

Since 12 graduations on the Vernier scale occupy the same space as 23 graduations or 23 degrees on the protractor dial, each Vernier graduation is  $1/12$  degree or 5 minutes shorter than 2 graduations on the protractor dial. Therefore, if the zero graduation on the Vernier scale coincides with a graduation on the protractor dial, the reading is in exact degrees, but if some other graduation on the

Vernier scale coincides with a protractor graduation, the number of Vernier graduations multiplied by 5 minutes must be added to the number of degrees read between the zeros on the protractor dial and Vernier scale.

#### Example:

★ In the illustration above, the zero on the Vernier scale lies between the "50" and "51" on the protractor dial to the left of the zero, indicating 50 whole degrees. Also reading to the left, the 4th line on the Vernier scale coincides with a graduation on the protractor dial as indicated by the stars and therefore  $4 \times 5$  minutes or 20 minutes are to be added to the number of degrees. The reading of the protractor therefore, is 50 degrees and 20 minutes ( $50^\circ 20'$ ).



## Cutter Clearance Gage

### No. 459 0-30° Range

This is a special gage that makes it possible to accurately and quickly determine correct clearance angles for maximum in cutter efficiency.

#### Benefits

- ◆ Eliminates guesswork and elaborate gaging equipment
- ◆ Highly versatile – this tool will measure clearance angles up to 30° on helical, straight, side or inserted tooth milling cutters, straight or helical end mills, T-slot cutters, metal cutting saws, and broaches
- ◆ Can be used on cutters from 2-30" (50-760mm) diameter and also on cutters and end mills from 1/2-2" (12.7-50mm) if teeth are evenly spaced
- ◆ Hardened for long life

#### Use

- ◆ This gage is made of the finest tool steel, hardened for long life, and is extremely easy to use. It consists of a frame graduated from 0-30° and having a fixed foot, an adjustable sliding foot on the beam extension of the frame, and a blade which is adjustable angularly and perpendicularly to contact the clearance angle of any cutter tooth
- ◆ To use the gage, the feet are positioned on two alternate teeth of the cutter with the gage at right angles to the cutter axis and the adjustable blade, which is set at the correct clearance angle. This shows at a glance when the cutter tooth is ground to the desired angle (see photo)



| Catalog No. | EDP No. | Range            |                 |
|-------------|---------|------------------|-----------------|
|             |         | Clearance Angles | Cutter Diameter |
| 459Z        | 52430   | 0-30°            | Up to 30"       |

Furnished in attractive, protective case. Packed one in a box.



**Steel Protractors**

**No. C19** 0-180°

**No. C183** 0-180°

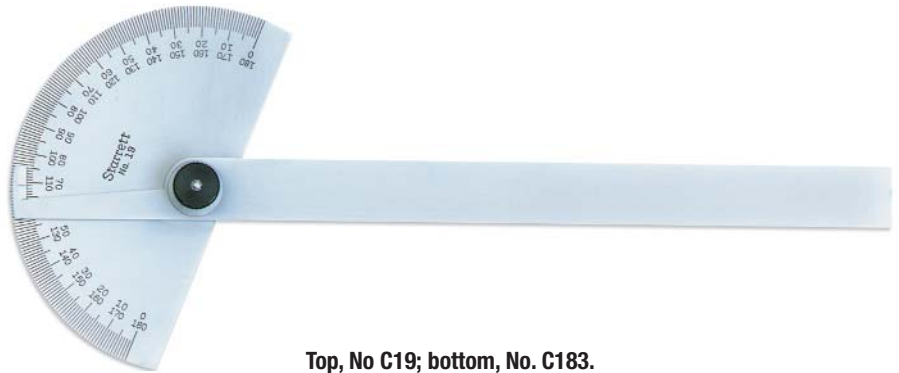
**No. C19**

This is a highly useful and accurate tool for setting levels, transferring angles, small squaring tasks, checking cutter clearances within certain limits, and many other applications.

- ◆ Double graduations from 0-180° in opposite directions permitting the direct reading of angles and supplementary angles
- ◆ The back of the tool is flat for ease of use
- ◆ The blade can be locked firmly at any angle by the lock nut
- ◆ Satin chrome finish for ease of reading and resistance to rust

**No. C183**

This protractor is exactly the same as the No. C19, except that it has a rectangular head, thus providing four convenient working edges.



Top, No C19; bottom, No. C183.



| Blade Length | Range  | Catalog No.        | EDP No. |
|--------------|--------|--------------------|---------|
| 6"           | 0-180° | <b>C19</b>         | 50127   |
|              |        | <b>C183</b>        | 50672   |
|              |        | <b>C183 W/SLC*</b> | 66930   |

\* Includes redemption card for Standard Letter of Certification (SLC).

Packed one in a box.





## Steel Protractor

### No. C182 0-180°

This protractor has the same type of head as our No. 19 but it is designed for draftsmen, civil engineers, and others who need a protractor that will allow the drawing of any number of radial lines at any angle through a common center. This is especially useful for someone in the field who can only carry a minimum of equipment. Weight is approximately 3 ounces.

To use the protractor, the fulcrum point is pressed into the drawing at the required center. This is done by removing the fulcrum point from the hub, pressing it in the drawing, and then placing the protractor hub over the fulcrum point. The desired angles can then be laid out.

The fulcrum point can be left in the tool. Press the whole tool down so that the point penetrates the drawing. (However, this will make it harder to find the center.)

- ◆ When not in use, the fulcrum point can be drawn back into the hub and frictionally held in a safe position
- ◆ Satin chrome finish for ease of reading and resistance to rust
- ◆ Furnished with one needle point and one cone point

Packed one in a box.



Side view of protractor with fulcrum point in place.

| Catalog No. | EDP No. | Blade Length | Range  |
|-------------|---------|--------------|--------|
| C182        | 64361   | 6"           | 0-180° |

## Steel Protractor

### No. 193 0-180°

This protractor can be used with the No. 47 and No. 49 Universal Bevels by setting them against the revolving stud, which quickly and economically converts them into Bevel Protractors. Protractor has double graduations from 0-180° in opposite directions.



| Catalog No. | EDP No. | Range  |
|-------------|---------|--------|
| 193         | 50696   | 0-180° |



## Universal Bevel

### No. 47 6" / 150mm

This improved Universal Bevel has both offset and straight slots in the blade, in combination with straight slots in the stock that allow for a wide variety of adjustment and angle settings that are impossible to obtain with many ordinary bevels.

Length of the blade is 6" (150mm), and the stock, 3-1/2" (90mm). The stock lies flat on the work or paper since the head of the clamping bolt is recessed. This tool can be set to duplicate an angle from a master, or it may be easily converted into a Bevel Protractor by using this tool with the No. 193 Protractor.



| Catalog No. | EDP No. | Blade Length |
|-------------|---------|--------------|
| 47          | 50266   | 6"           |

Packed one in a box.

## Combination Bevel

### No. 49 4" / 100mm

Any angle may be easily transferred from one surface to another with the No. 49 Combination Bevel. This tool has a slotted blade which swings on a stud on the stock to any angle desired, and is locked in position by a knurled thumb nut.

An auxiliary blade, also furnished, may be easily attached to the slotted blade and is clamped at any angle by a knurled nut. The stock is square at one end and is beveled 45° at the other. The auxiliary blade is beveled to 30° and 60° at opposite ends. Stock and blades are approximately 4" (100mm) long. The tool lies flat on the work. It may also be used with No. 193 Protractor.



| Catalog No. | EDP No. | Blade Length |
|-------------|---------|--------------|
| 49          | 50267   | 4" (approx.) |

Packed one in a box.



## Protractor and Depth Gages

### No. 493 Series 0-180°

The ability to measure angles and depths is combined in these convenient tools.

#### No. C493

- ◆ Angular measurement is from 0-180° in opposite directions allowing the direct reading of angles and supplementary angles
- ◆ Depths are measured from a 6" (150mm) blade (our No. C610N)
- ◆ Both tools have a flat surface on the back of the head permitting laying the tool flat on paper or work
- ◆ No-glare satin chrome finish
- ◆ The No. C493 has a semicircular head

#### No. C493B

This gage is exactly the same as the No. C493, except that it has a rectangular protractor head which provides four convenient working edges.



Left, No. C493; right, No. C493B.

| Blade Length | Blade Graduations | Range  | Catalog No. | EDP No. |
|--------------|-------------------|--------|-------------|---------|
| 6"           | 32nds, 64ths      | 0-180° | C493        | 52532   |
|              |                   |        | C493B       | 52534   |

## Special Dial Protractor Heads

We make dial protractor heads for special applications that permit rapid angular measurements over a 90° range, in increments of 5 minutes.

These special tools are similar to AGD Group-2 Dial Indicators. They have a rear-mounted rotary input shaft attached to a movable arm that measures the angle in relation to a fixed arm.

They are available with continuous or balanced dials and with clockwise or counterclockwise reading.

(See our Special Gage Division section for more information.)



Packed one in a box.



## Drill Point Gage

### No. 22C 59°

This gage was designed specifically for use in drill grinding. It provides a quick, accurate way for determining the **correct drill point angle of 59°** and the **correct length of drill lips** necessary for clean-cut drilling at maximum feeds and speeds.

- ◆ The sliding head may be adjusted to any position along the rule and locked by a thumb nut
- ◆ The head is beveled to 59° (the correct drill point angle), and is also graduated in 32nds along the 59° face for measuring the drill lips which should be of equal lengths
- ◆ The hook rule has accurate, machine-divided graduations in 8ths, 16ths, quick-reading 32nds and 64ths
- ◆ Hook is adjustable and can be shortened or extended on either side of the rule, and may also be removed if desired
- ◆ Tool can also be used as a Plain Rule, Hook Rule, Depth Gage, and Slide Caliper. The No. 22D Head-only will fit all steel rules 3/4" wide by 3/64" thick



| Catalog No. | EDP No. | Head              |             | Hook Rule |   |
|-------------|---------|-------------------|-------------|-----------|---|
|             |         | Bevel             | Graduations | Length    | Graduations                             |
| 22C         | 50150   | 59°               | 32nds       | 6"        | 8ths, 16ths; Quick-Reading 32nds, 64ths |
| 22D         | 50151   | Sliding Head Only |             |           |   |

Packed one in a box.





**Bevel Protractors**

**Nos. 490, 491 Series**

**Reversible 0-180°**

**No. 12 Series**

**Non-reversible 0-180°**

**Readability Features**

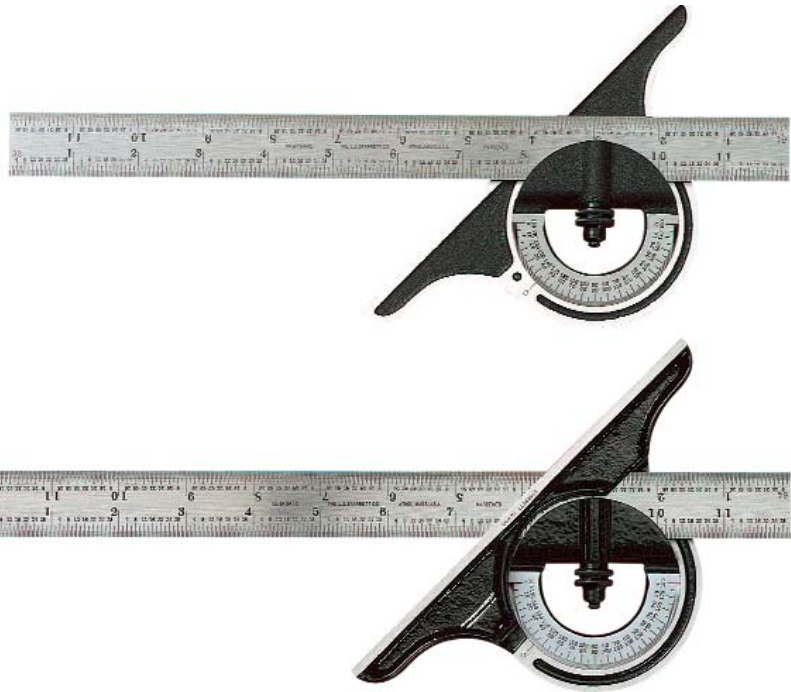
- ◆ Starrett satin chrome blades and protractor heads for easier reading are available (on 12" sizes)
- ◆ Direct reading 0-180° in opposite directions, permitting the direct reading of angles and supplementary angles

**Ease-of-Handling Features**

- ◆ Reversible lock bolt allows choice of which graduated side of the blade faces the operator
- ◆ The No. 12 is non-reversible, meaning the blade is on the outside of the frame, so the frame stays on the same side of the workpiece
- ◆ The No. 490 and No. 491 are reversible, meaning there is a shoulder on both sides of the blade, allowing the tool to be reversed so the same angle can be scribed or measured left and right

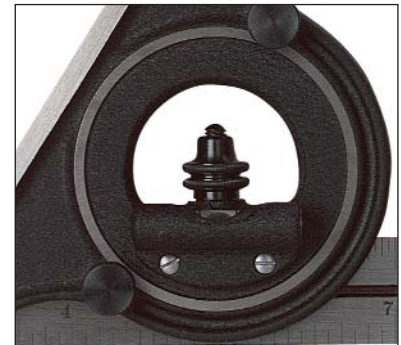
**Long-Life and Accuracy Features**

- ◆ Protractor heads are made of stable cast iron and finished with a choice of attractive black wrinkle finish or smooth black finish



**Above, non-reversible protractor with black wrinkle finish; below, reversible with smooth finish; inset, close-up of spirit level on back side of protractor.**

- ◆ Tempered steel blades with accurate, machine-divided graduations
- ◆ A spirit level indicates when the base reference surface is level – a feature not usually available on comparable protractors



| Size            | Blade Finish | Graduation                                       | Reversible                                       |           |                     |           | Non-reversible       |          |       |
|-----------------|--------------|--|--|-----------|---------------------|-----------|----------------------|----------|-------|
|                 |              |  | Black Wrinkle Finish                             |           | Black Smooth Finish |           | Black Wrinkle Finish |          |       |
|                 |              |  | Cat. No.   | EDP No.   | Cat. No.            | EDP No.   | Cat. No.             | EDP No.  |       |
| 12"             | Satin Chrome | No. 4R: 8ths, 16ths, Quick Reading, 32nds, 64ths | C491-12-4R                                       | 64602     | C490-12-4R          | 52514     | C12-12-4R            | 64290    |       |
|                 |              |  | 491-12-4R  | 52521     | 490-12-4R           | 52511     | C12-12-4R W/SLC*     | 66931    |       |
|                 | 18"          |  | Regular  | 491-18-4R | 52522               | 490-18-4R | 52512                | 12-18-4R | 50103 |
| 24"             | 491-24-4R    |  |  | 52523     | 490-24-4R           | 52513     | 12-24-4R             | 50104    |       |
| 300mm & 11-3/4" | Regular      |  | 1/2mm & 32nds one side; mm & 64ths, reverse side | 491ME-300 | 52524               |           |                      | 12ME-300 | 50105 |
|                 |              |  |  |           |                     |           |                      |          | 50106 |

\* Includes redemption card for Standard Letter of Certification (SLC).

**NOTE:** Since the protractor heads and blades are furnished with combination square sets, individual protractor heads or blades can be ordered separately. See the Squares section for information and catalog numbers.

Packed one in a box.



This section concerns so-called “skill” tools. A pair of calipers (in common terms, one caliper) is one of the oldest types of comparison measuring tools. They depend on “feel” to measure a part, transfer the dimension to a precision rule, micrometer or slide caliper, and get a good reading. This involves skill and experience. If used properly, calipers can measure to at least .004” or 0.01mm.

Measuring with a caliper requires as light a touch as possible because most comparisons are made with rules, where the caliper is laid against the graduations, without the contacts touching anything.

Calipers and dividers are offered in two general designs: spring-type and firm-joint. Spring-type calipers are tensioned against the screw adjustment, while the firm-joint is held by friction.

Caliper sizes refer to the distance from the fulcrum to the end of the leg. The measuring capability of spring-type calipers and dividers is approximately the same as the size. The measuring capability of firm-joint and lock-joint calipers is approximately one-third more than the size.

Caliper points are not hardened because they only compare measurements. The contact points can be easily shaped in whatever manner desired. All divider points however, are hardened.

Dividers and trammels are usually set to rule graduations and can be set more accurately than calipers.



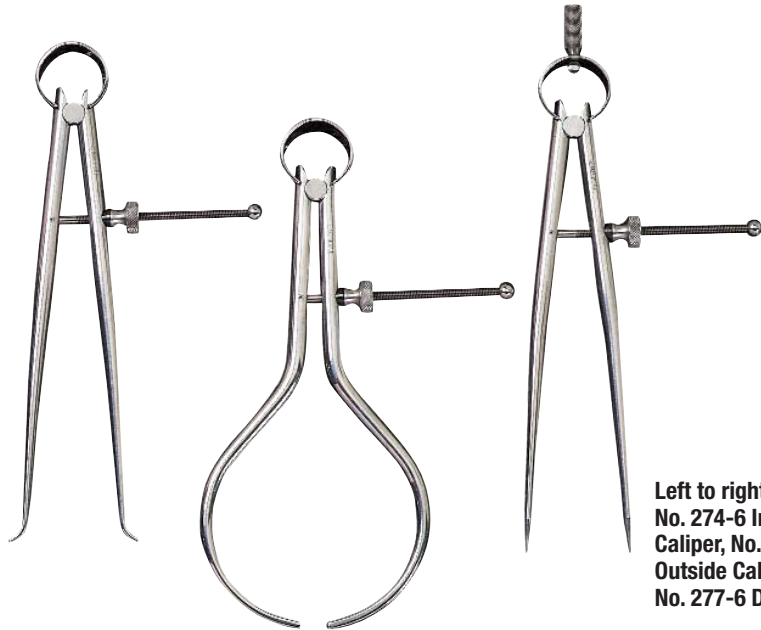


**Toolmakers' Spring-Type Calipers and Dividers with round legs and solid nut**

**Nos. 274, 275, 277 Series**  
3, 6" (75, 150mm)

Starrett Toolmakers' Calipers and Dividers are the finest tools of their type. Designed for toolmakers and all good mechanics who require finer adjustment and better balance so a more sensitive "feel" can be obtained. Precision made to rigid Starrett standards throughout.

The fulcrum stud is hardened and the bearing surfaces of the legs are large enough to prevent any side deflection. The bow spring is strong and flexible, and the adjustment is centrally located in the legs to assure smooth action.



Left to right:  
No. 274-6 Inside Caliper, No. 275-6, Outside Caliper and No. 277-6 Divider.

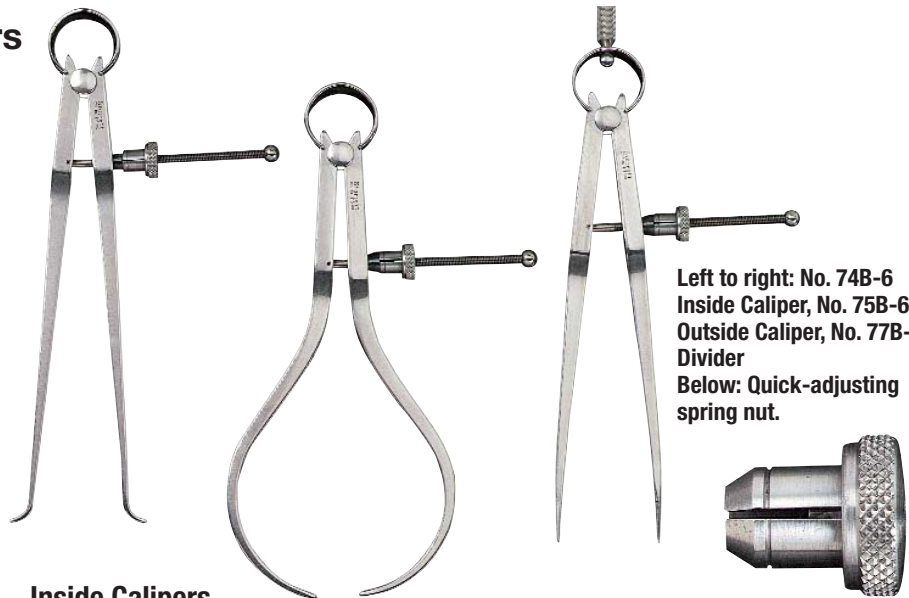
| Size and Approx. Capacity |       | Inside Calipers |         | Outside Calipers |         | Dividers    |         |
|---------------------------|-------|-----------------|---------|------------------|---------|-------------|---------|
| Inch                      | mm    | Catalog No.     | EDP No. | Catalog No.      | EDP No. | Catalog No. | EDP No. |
| 3"                        | 75mm  | 274-3           | 51301   | 275-3            | 51305   | 277-3       | 51309   |
| 6"                        | 150mm | 274-6           | 51303   | 275-6            | 51307   | 277-6       | 51311   |

**"Fay" Spring-Type Calipers and Dividers with heavy square legs and quick-spring or solid nut**

**Nos. 74, 75, 77 Series**  
6" (150mm)

Starrett "Fay" Calipers and Dividers feature exceptionally rugged construction. The legs are made from heavy square stock, machined to a smooth taper. The fulcrum stud is hardened and has a large bearing surface to prevent side deflection of the legs. The bow spring is both strong and flexible, and the adjustment screw is centrally located in the legs to assure smooth action. Furnished in either spring nut or solid nut models.

The Starrett quick-adjusting automatic-closing spring nut is designed for making quick, positive adjustments. The threads of the nut firmly engage the screw at the slightest pressure from the leg. When the pressure is withdrawn, the nut automatically releases itself, sliding freely over the screw.



Left to right: No. 74B-6 Inside Caliper, No. 75B-6 Outside Caliper, No. 77B-6 Divider  
Below: Quick-adjusting spring nut.

**Inside Calipers**

| Size and Approx. Capacity |       | Solid Nut   |         | Quick-Spring Nut |         |
|---------------------------|-------|-------------|---------|------------------|---------|
| Inch                      | mm    | Catalog No. | EDP No. | Catalog No.      | EDP No. |
| 6"                        | 150mm | 74A-6       | 50349   | 74B-6            | 50348   |

**Outside Calipers**

|    |       |       |       |       |       |
|----|-------|-------|-------|-------|-------|
| 6" | 150mm | 75A-6 | 50355 | 75B-6 | 50354 |
|----|-------|-------|-------|-------|-------|

**Dividers**

|    |       |       |       |       |       |
|----|-------|-------|-------|-------|-------|
| 6" | 150mm | 77A-6 | 50361 | 77B-6 | 50360 |
|----|-------|-------|-------|-------|-------|



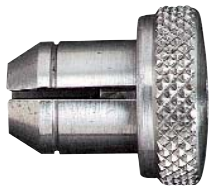


### “Yankee” Spring-Type Calipers and Dividers with flat legs and quick-spring or solid nut

**Nos. 73, 79, 83 Series**  
4, 6, 8, 12” (100, 150, 200, 300mm)

Starrett “Yankee” Calipers and Dividers are made from a high-grade steel and well-finished. The legs are made of flat stock and are very durable. The fulcrum stud is hardened and has a smooth bearing surface. The bow spring, although flexible, is exceedingly strong to assure reliability.

All sizes are available with either spring nut or solid nut. The Starrett quick-adjusting automatic-closing spring nut is designed for making fast, positive adjustments. The threads of the nut firmly engage the screw at the slightest pressure from the leg. When the pressure is withdrawn, the nut automatically releases itself, sliding freely over the screw. This feature saves time in opening and closing.



Quick-adjusting  
spring nut  
makes fast,  
accurate  
settings.



Left to right: No. 73B-6 Inside Caliper, No. 79A-6 Outside Caliper and No. 83A-6 Divider.

#### Inside Calipers

| Size and Approx. Capacity |       | Solid Nut   |         | Quick-Spring Nut |         |
|---------------------------|-------|-------------|---------|------------------|---------|
| Inch                      | mm    | Catalog No. | EDP No. | Catalog No.      | EDP No. |
| 4”                        | 100mm | 73A-4       | 50334   | 73B-4            | 50335   |
| 6”                        | 150mm | 73A-6       | 50336   | 73B-6            | 50337   |
| 8”                        | 200mm | 73A-8       | 50338   | 73B-8            | 50339   |
| 12”                       | 300mm | 73A-12      | 50342   | 73B-12           | 50343   |

#### Outside Calipers

|     |       |        |       |        |       |
|-----|-------|--------|-------|--------|-------|
| 4”  | 100mm | 79A-4  | 50364 | 79B-4  | 50365 |
| 6”  | 150mm | 79A-6  | 50366 | 79B-6  | 50367 |
| 8”  | 200mm | 79A-8  | 50368 | 79B-8  | 50369 |
| 12” | 300mm | 79A-12 | 50372 | 79B-12 | 50373 |

#### Dividers

|     |       |        |       |        |       |
|-----|-------|--------|-------|--------|-------|
| 4”  | 100mm | 83A-4  | 50376 | 83B-4  | 50377 |
| 6”  | 150mm | 83A-6  | 50378 | 83B-6  | 50379 |
| 8”  | 200mm | 83A-8  | 50380 | 83B-8  | 50381 |
| 12” | 300mm | 83A-12 | 50384 | 83B-12 | 50385 |





**“Yankee” Spring-Type  
Hermaphrodite Calipers  
with quick-spring or  
solid nut**

**No. 43 Series 6” (150mm)**

These calipers have the same overall design and finish features as our “Yankee” calipers.

One leg is bowed for clearance and capacity. The fine-adjustment screw allows for close setting accuracy. This tool will scribe lines parallel to outside edges easily and consistently.



**Quick-adjusting  
spring nut  
makes fast,  
accurate  
settings.**



**No. 43A-6 with solid nut.**

| Size and Approx. Capacity |       | Solid Nut   |         | Quick-Spring Nut |         |
|---------------------------|-------|-------------|---------|------------------|---------|
| Inch                      | mm    | Catalog No. | EDP No. | Catalog No.      | EDP No. |
| 6”                        | 150mm | 43A-6       | 66575   | 43B-6            | 66576   |

**Thread Calipers**

**Nos. 179 and 184  
6” (150mm)**

Starrett Thread Calipers are designed for measuring screw threads. The points of the No. 179 are tapered for measuring outside threads, and the points of No. 184 are shaped for inside threads. These calipers are made from a high-grade steel and well-finished. The fulcrum stud is hardened and has a smooth bearing surface. The bow spring, although flexible, is exceedingly strong to assure reliability. Furnished with solid nut only.



**Left, Outside Thread Caliper No. 179-6; right, Inside Thread Caliper No. 184-6.**

| Size and Approx. Capacity |       | Inside Caliper |         | Outside Caliper |         |
|---------------------------|-------|----------------|---------|-----------------|---------|
| Inch                      | mm    | Catalog No.    | EDP No. | Catalog No.     | EDP No. |
| 6”                        | 150mm | 184-6          | 50674   | 179-6           | 50669   |



**Firm-Joint  
Hermaphrodite Calipers**

Starrett Hermaphrodite Calipers are used in layout work for locating and testing centers, laying off distances from an edge, etc. We offer a complete choice from which machinists and toolmakers can select to best suit their requirements. The rugged, properly shaped legs are made of finely finished, high-grade steel. Sizes listed are the lengths of the legs. Actual measuring capacity is approximately one-third greater than the leg size.

**No. 243 6" (150mm)**

This caliper features a round, adjustable leg and an improved firm-joint, which allows the joint to be adjusted at any tension. The leg that holds the adjustable point is offset.



Left, reverse side of No. 243-6; right, front side.

\*NOTE: Actual capacity is one-third greater than the listed size.

| Size* |       | Catalog No. | EDP No. |
|-------|-------|-------------|---------|
| Inch  | mm    |             |         |
| 6"    | 150mm | 243-6       | 51143   |

**Hermaphrodite Calipers**

**Firm-Joint  
No. 563 6" (150mm)**

**Lock-Joint with  
fine-adjustment**

**No. 42 Series  
6, 8" (150, 200mm)**

**No. 563**  
This caliper has a round, adjustable point held by a straight leg. An improved, firm-joint feature permits the joint to be adjusted at any desired tension.

**No. 42 Series**  
These calipers have an adjustable point, locking joint and fine-adjustment feature for close measurements. After the legs have been set to approximate size and the joint locked, the final adjustment is made by a few turns of the knurled adjusting nut.



Left, No. 563-6 Firm-Joint. To the right, No. 42-6 front side (left) and reverse side (right).

**No. 563 Firm-Joint**

| Size* |       | Catalog No. | EDP No. |
|-------|-------|-------------|---------|
| Inch  | mm    |             |         |
| 6"    | 150mm | 563-6       | 52572   |

**No. 42 Series Lock-Joint**

|    |       |      |       |
|----|-------|------|-------|
| 6" | 150mm | 42-6 | 50263 |
| 8" | 200mm | 42-8 | 50264 |

\*NOTE: Actual capacity is one-third greater than the listed size.



## Improved Firm-Joint Calipers

**No. 26 Series (Outside)**  
6-36" (150-900mm)

**No. 27 Series (Inside)**  
6-24" (150-600mm)

Starrett Firm-Joint Calipers have an improved joint designed so the tension can be adjusted as desired. After adjustment has been made, the tension will not change with the opening and closing of the legs.

The legs are made from a high-grade steel, are ruggedly constructed and are well-finished.

The sizes listed are the lengths of the legs. Their actual measuring capacity is about one-third greater than the given size of the legs; for example, the 36" size will caliper a 46" diameter.



Left, No. 26-6 outside model; right, No. 27-6 inside model.

### No. 26 Series Outside Calipers

| Size* |       | Catalog No.  | EDP No. |
|-------|-------|--------------|---------|
| Inch  | mm    |              |         |
| 6"    | 150mm | <b>26-6</b>  | 50186   |
| 12"   | 300mm | <b>26-12</b> | 50189   |
| 18"   | 450mm | <b>26-18</b> | 50190   |
| 24"   | 600mm | <b>26-24</b> | 50191   |
| 36"   | 900mm | <b>26-36</b> | 50192   |

### No. 27 Series Inside Calipers

| Size* |       | Catalog No.  | EDP No. |
|-------|-------|--------------|---------|
| Inch  | mm    |              |         |
| 6"    | 150mm | <b>27-6</b>  | 50193   |
| 12"   | 300mm | <b>27-12</b> | 50196   |
| 18"   | 450mm | <b>27-18</b> | 50197   |
| 24"   | 600mm | <b>27-24</b> | 50198   |

\*NOTE: Actual capacity is one-third greater than the listed size.



**Lock-Joint Calipers  
with fine-adjustment**

**No. 38 Series (Outside)**  
6-24" (150-600mm)

**No. 39 Series (Inside)**  
6-24" (150-600mm)

These calipers feature a joint that can be quickly and firmly locked by a partial turn of the large knurled disc. A spring washer under the disc maintains proper tension of the legs when the joint is unlocked.

These calipers are also provided with an adjusting screw to permit fine-adjustments for close measurements. After the legs have been set to approximate size and the joint locked, the final adjustment is made by a few turns of the knurled adjusting nut.

The legs are made of a high-grade steel and well shaped. They are ruggedly constructed and nicely finished.

The sizes listed are leg lengths. Their actual measuring capacity is about one-third greater than the given size of the legs.



Left, No. 38-6 outside model; right, No. 39-6 inside model.

**No. 38 Series Outside Calipers**

| Size* |       | Catalog No.  | EDP No. |
|-------|-------|--------------|---------|
| Inch  | mm    |              |         |
| 6"    | 150mm | <b>38-6</b>  | 50253   |
| 12"   | 300mm | <b>38-12</b> | 50254   |
| 24"   | 600mm | <b>38-24</b> | 50256   |

**No. 39 Series Inside Calipers**

| Size* |       | Catalog No.  | EDP No. |
|-------|-------|--------------|---------|
| Inch  | mm    |              |         |
| 6"    | 150mm | <b>39-6</b>  | 50257   |
| 12"   | 300mm | <b>39-12</b> | 50258   |
| 24"   | 600mm | <b>39-24</b> | 50260   |

\*NOTE: Actual capacity is one-third greater than the listed size.





## Lock-Joint Transfer Type Calipers with fine-adjustment

**No. 36 Series (Outside)**  
6-24" (150-600mm)

**No. 37 Series (Inside)**  
6-24" (150-600mm)

One of the handiest and most versatile calipers ever made ... Starrett Lock-Joint Transfer Calipers have three key features... a transfer arm, fine-adjustment screw, and locking joint.

The transfer arm makes it possible to transfer measurements from the inside of chambered cavities, over flanges and other places where it is necessary to move the legs after they have been set to size. Simply lock the joint, loosen the transfer arm binding nut and swing the leg out or in to clear the obstruction. Then move it back against the transfer arm stop and the exact size can then be transferred to a rule or gage.

The adjusting screw permits close adjustments for fine measurements. After the legs have been set to approximate size and the joint locked, the final adjustment is made by a few turns of the knurled adjusting nut. The joint can be quickly and firmly locked by a partial turn of the large knurled disc. A spring washer under the disc maintains proper tension of the legs when the joint is loosened.

The legs are made from a high-grade steel and are well-shaped. They are ruggedly constructed and nicely finished.

The sizes listed are the length of the legs. Their actual measuring capacity is about one-third greater than the size of the legs.



Left, No. 36-6 outside model; right, No. 37-6 inside model.



Measuring outside dimension.



Checking inside groove.

### No. 36 Series Outside Calipers

| Size* |       | Catalog No. | EDP No. |
|-------|-------|-------------|---------|
| Inch  | mm    |             |         |
| 6"    | 150mm | 36-6        | 50245   |
| 12"   | 300mm | 36-12       | 50246   |
| 24"   | 600mm | 36-24       | 50248   |

### No. 37 Series Inside Calipers

| Size* |       | Catalog No. | EDP No. |
|-------|-------|-------------|---------|
| Inch  | mm    |             |         |
| 6"    | 150mm | 37-6        | 50249   |
| 12"   | 300mm | 37-12       | 50250   |
| 24"   | 600mm | 37-24       | 50252   |

\*NOTE: Actual capacity is one-third greater than the listed size.



**Divider Ball Points  
with holder**

**No. 88 Series**

4", 7x1/2" (100, 188mm)

These accessories are used with dividers and trammels when it is necessary to use a hole as a center point for layout, scribing and measuring. The ball point is placed in the hole and bears against the edge, forming a seat for the divider leg or tram. The set consists of either a 4" or 7-1/2" (100 or 188mm) holder with four balls. They are not recommended for exceptionally close work because it is impossible to keep them exactly in the center of the hole.



Complete set No. 88A including holder and four balls.

**Complete Sets**

| Holder |       | Balls                |      | Fits Starrett Dividers          | Catalog No. | EDP No. |
|--------|-------|----------------------|------|---------------------------------|-------------|---------|
| Inch   | mm    | Inch                 | mm   |                                 |             |         |
| 4"     | 100mm | <b>Four:</b><br>1/2" | 13mm | Nos. 85A, 85C,<br>No. 92 Series | <b>88A</b>  | 50410   |
|        |       | 3/4"                 | 19mm |                                 |             |         |
| 7-1/2" | 188mm | 1"                   | 25mm | Nos. 85B, 85D,<br>85E, 85F      | <b>88B</b>  | 50411   |
|        |       | 1-9/16"              | 40mm |                                 |             |         |

**Individual Balls/holders**

| Size    |       | Description | Fits Starrett Dividers          | Catalog No. | EDP No. |
|---------|-------|-------------|---------------------------------|-------------|---------|
| Inch    | mm    |             |                                 |             |         |
| 1/2"    | 13mm  | Ball Only   | Nos. 85A, 85C,<br>No. 92 Series | <b>88C</b>  | 72005   |
| 3/4"    | 19mm  |             |                                 | <b>88D</b>  | 72006   |
| 1"      | 25mm  |             |                                 | <b>88E</b>  | 72007   |
| 1-9/16" | 40mm  |             |                                 | <b>88F</b>  | 72008   |
| 4"      | 100mm | Holder Only | Nos. 85B, 85D,<br>85E, 85F      | <b>88G</b>  | 72009   |
| 7-1/2"  | 188mm |             |                                 | <b>88H</b>  | 72010   |



**Improved Trammel  
Heads with divider  
points, pencil socket**

**No. 50 Series**

Used to measure the distance between points that are too great to be reached with dividers. The heads are die cast with black wrinkle finish and have hardened, forged steel divider points. The points screw into the heads, and the pencil socket accompanying each set of trammel heads can be used in place of either point. No. 50A has an adjustable point. Longer points (5"/125mm) are also available. A beam is not furnished with these trammels. The heads will accommodate a beam up to 3/8" (9.5mm) thick and 3/4" (19mm) wide.



No. 50A Trammel Heads with points (adjustable point capability on right side head) mounted on beam (not furnished) for demonstration purposes. Pencil socket (lower left) can screw into a head in place of points if drawing (instead of scribing) is desired.

**Trammel Heads**

| Point Size |          | Description  | Catalog No. | EDP No. |
|------------|----------|--|-------------|---------|
| Inch       | mm       |  |             |         |
| 3, 2-1/2"  | 75, 63mm | (Adjustable) Includes 2 Heads, 2 Points, Pencil Socket | <b>50A</b>  | 50268   |
| 3"         | 75mm     | Includes 2 Heads, 2 Points, Pencil Socket              | <b>50B</b>  | 50269   |

**(Longer) Points Only**

|           |            |  |             |       |
|-----------|------------|--|-------------|-------|
| 5, 4-1/2" | 125, 113mm | 2 Adjustable Points for Starrett No. 50A | <b>50CA</b> | 50270 |
| 5"        | 125mm      | 2 Points for Starrett No. 50B            | <b>50CB</b> | 50271 |



**Trammel Heads, Divider Points, Attachments**

**No. 59 Series**

The No. 59 Series is very useful for laying out and scribing circles beyond the capacity of ordinary dividers. The trammel heads have a clamping device that firmly holds various attachments.

The attachments consist of two sizes of caliper legs, 6", 9-1/2" (150, 238mm), two sizes of divider points 6", 9" (150, 225mm) which are eccentric for close settings, and a set of four ball points with holder. The ball points with 6" (150mm) holder are for scribing circles from the center of any hole up to 1-1/2" (38 mm) in diameter. One of the large caliper legs features a joint operated by an eccentric thumb piece for fine adjustments. A pencil may be clamped in either head in place of the caliper legs or divider points.

The heads will accommodate any size beam from 3/4 – 1-1/2" (19-38mm) in width. Since beam length requirements vary widely, and they are easy for the user to fashion, we do not furnish a beam.



**No. 59F Set, complete (beam not furnished).**

| Description                                 | Catalog No. | EDP No. |
|---|-------------|---------|
| 2 Trammel Heads, 2 Small Points (6"/150mm)  | <b>59A</b>  | 50297   |
| Set of 4 Ball Points and One Holder Only    | <b>59B</b>  | 50298   |
| Pair Small Caliper Legs Only (6"/150mm)     | <b>59C</b>  | 50299   |
| Pair Large Caliper Legs Only (9-1/2"/228mm) | <b>59D</b>  | 50300   |
| Large Points Only (9"/225mm)                | <b>59E</b>  | 50301   |
| Complete Set: Nos. 59A, B, C, D, E          | <b>59F</b>  | 50302   |





## Steel Beam Trammels and Attachments

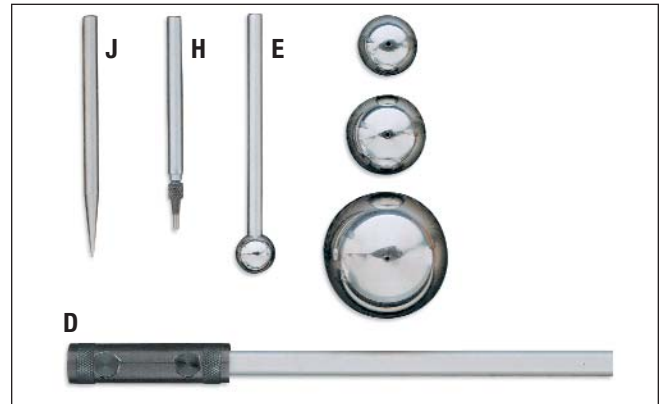
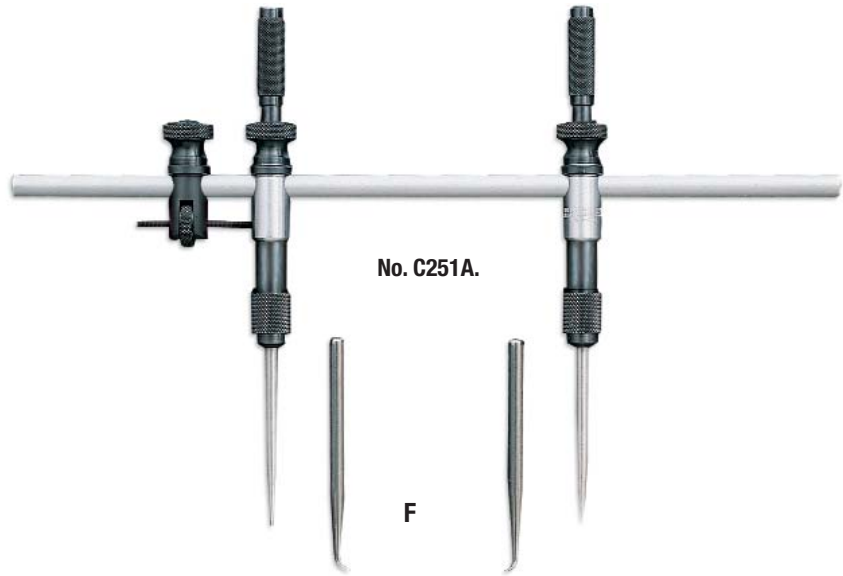
### No. C251 Series

10-1/2 – 20" (260 - 500mm) Beams

A rigid, well-designed trammel for layout, scribing, and measuring distances and circles. The top of the beam is flattened so that when the trams are clamped in position, they will not turn from pressure on the points. The trams are held in place by spring friction, which prevents them from sliding when the nuts are loosened for setting. One tram has a fine-adjusting screw for the points.

Each tram has a knurled swivel grip at the top that turns freely, making it very convenient to swing the tool when scribing circles. The 3" (75mm) points may be adjusted for length in the spring chucks and can be easily replaced with caliper legs or other attachments listed. The ball points with 3" (75mm) holder permit working from holes up to 1-1/2" (38mm) in diameter. A pair of 3" (75mm) caliper points is included with each trammel.

- ◆ Ideal for draftsmen, engineers, metalworkers for layout work, scribing and measuring
- ◆ Furnished with rigid steel beam – 10-1/2" (263mm), 14-1/2" (360mm) or 20" (500mm) sizes
- ◆ Bright chrome finish for longer life, resistance to corrosion
- ◆ Highly versatile – handy attachments available to extend range and measure



Attachments; D, E, J, H.

#### Trammels

| Max. Dividing Range |       | Max. Circle Scribing Diameter Range |       | Beam Size |       | Catalog No.  | EDP No. |
|---------------------|-------|-------------------------------------|-------|-----------|-------|--------------|---------|
| Inch                | mm    | Inch                                | mm    | Inch      | mm    |              |         |
| 9"                  | 225mm | 18"                                 | 450mm | 10-1/2"   | 263mm | <b>C251A</b> | 51205   |
| 13-1/2"             | 338mm | 26"                                 | 650mm | 14-1/2"   | 363mm | <b>C251B</b> | 51207   |
| 18"                 | 450mm | 36"                                 | 900mm | 20"       | 500mm | <b>C251C</b> | 51209   |

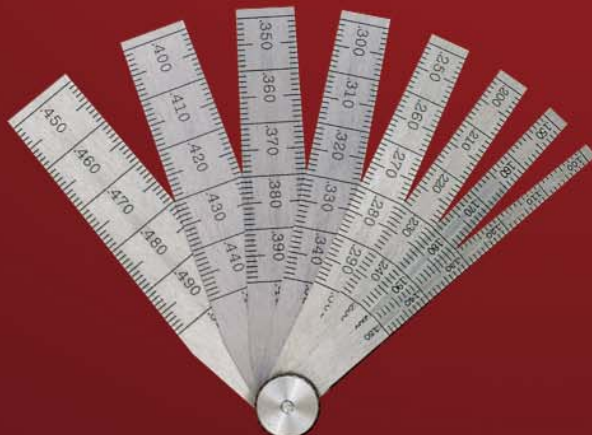
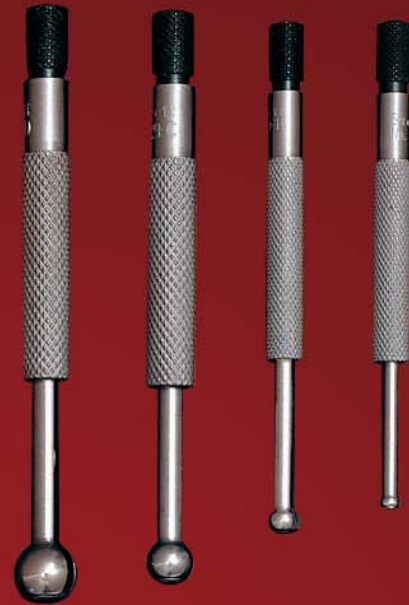
#### Individual Attachments Only

| Description   | Photo Key | Catalog No.  | EDP No. |
|---|-----------|--------------|---------|
| Coupling, with Extra 20" (600mm) Beam (When used with No. C251C will scribe circle 72" [1800mm] diameter) | D         | <b>C251D</b> | 51211   |
| Ball Points and Holder  | E         | <b>C251E</b> | 51212   |
| Extra Caliper Points, Pair  | F         | <b>251F</b>  | 51213   |
| Steel Point and Socket (One) (Has .076" [1.9mm] hole diameter to hold leads)                              | H         | <b>C251H</b> | 51214   |
| Needle Point (Chrome not available) (One)   | J         | <b>251J</b>  | 51203   |

Packed one in a box. Attractive, protective cases are available for trammels Nos. C251A, B, C. To order a **case only**, add "ZZ" to catalog number. (Example: C251AZZ).



Tools in this section are used for measuring holes, slots, and recesses. They are very convenient, relatively inexpensive, and cover a wide range of sizes for a variety of applications.





## Small Hole Gages

These small hole gages are well balanced tools that are ideal for accurately measuring small holes, slots, grooves, and recesses in all kinds of work. They all feature:

- ◆ Hardened-ball measuring surface with two-point contact
- ◆ Radius on each gage is less than the minimum diameter to be measured, which provides the two-point contact necessary for maximum accuracy
- ◆ Smooth, sensitive adjustment for better feel, giving more accurate measurements
- ◆ The adjustment of the gage beyond their range is restricted by a safety stop that prevents breakage

Accurate measurements are obtained by slightly “rocking” these gages in the hole to be measured. This will guarantee contact at the true diameter. The final size is then obtained by measuring over the ball contacts with a micrometer.

### No. 829 Series .125-.500" (3.2-12.7mm)

These full-ball gages are used for general work.



Measuring a small hole.

Packed one in a box – individually or sets.



Left-to-right: Nos. 829A, B, C, D.



No. S829EZ set of four sizes in protective pouch.

### .125-.500" (3.2-12.7mm) range

| Range      |             | Approx. Length |      | Catalog No. | EDP No. |
|------------|-------------|----------------|------|-------------|---------|
| Inch       | mm          | Inch           | mm   |             |         |
| .125-.200" | 3.2-5.1mm   | 2-7/8"         | 75mm | 829A        | 53070   |
| .200-.300" | 5.1-7.6mm   | 3"             | 80mm | 829B        | 53071   |
| .300-.400" | 7.6-10.2mm  | 3-3/8"         | 85mm | 829C        | 53072   |
| .400-.500" | 10.2-12.7mm | 3-1/2"         | 90mm | 829D        | 53073   |

### Set

|                  |               |       |
|------------------|---------------|-------|
| Set of 4 in Case | <b>S829EZ</b> | 53074 |
|------------------|---------------|-------|





**Small Hole Gages**

**No. 831 Series**  
.125-.500" (3.2-12.7mm)

These gages are exactly the same as the No. 829 Series except that the gaging surface is a half-ball with a flat bottom. This permits use in even the most shallow holes, slots, and recesses.



No. S831EZ set of four sizes in protective pouch.



Left-to-right: Nos. 831A, B, C, D.

**.125-.500" (3.2-12.7mm) range**

| Range      |             | Approx. Length |      | Catalog No. | EDP No. |
|------------|-------------|----------------|------|-------------|---------|
| Inch       | mm          | Inch           | mm   |             |         |
| .125-.200" | 3.2-5.1mm   | 2-13/16"       | 70mm | <b>831A</b> | 53083   |
| .200-.300" | 5.1-7.6mm   | 3-1/8"         | 80mm | <b>831B</b> | 53084   |
| .300-.400" | 7.6-10.2mm  | 3-3/8"         | 85mm | <b>831C</b> | 53085   |
| .400-.500" | 10.2-12.7mm | 3-1/2"         | 90mm | <b>831D</b> | 53086   |

**Set**

| Description      | Catalog No.   | EDP No. |
|------------------|---------------|---------|
| Set of 4 in Case | <b>S831EZ</b> | 53087   |

Packed one in a box – individually or sets.





**Small Hole Gages**

**No. 830 Series  
.125-.500" (3.2-12.7mm)**

These gages are exactly the same as the No. 831 Series except that all gages are only 2" (50mm) long, making them convenient to use in close quarters.



Measuring hole inside of coupling.



Left-to-right: Nos. 830A, B, C, D, E.



No. S830FZ set of five sizes in protective pouch.

**.125-.500" (3.2-12.7mm) range**

| Range      |             | Approx. Length |      | Catalog No. | EDP No. |
|------------|-------------|----------------|------|-------------|---------|
| Inch       | mm          | Inch           | mm   |             |         |
| .125-.150" | 3.2-3.8mm   | 2"             | 50mm | 830A        | 53076   |
| .150-.200" | 3.8-5.1mm   |                |      | 830B        | 53077   |
| .200-.300" | 5.1-7.6mm   |                |      | 830C        | 53078   |
| .300-.400" | 7.6-10.2mm  |                |      | 830D        | 53079   |
| .400-.500" | 10.2-12.7mm |                |      | 830E        | 53080   |

**Set**

| Description      | Catalog No. | EDP No. |
|------------------|-------------|---------|
| Set of 5 in Case | S830FZ      | 53081   |

Packed one in a box – individually or sets.



## Telescoping Gages

Starrett telescoping gages are used for determining the true size of holes, slots, and recesses up to 6" (150mm). The ends of both contacts are hardened and ground to a radius to allow proper clearance on the smallest hole the gage will enter. These tools must be slightly "rocked" in the hole being measured to ensure that the tool is on the proper diameter before it is locked and withdrawn. The final hole size is obtained by measuring over the gage contacts with a micrometer.

### No. 229 Series with one telescoping arm 1/2-6" (13-150mm)

Each of these gages feature a handle, one rigid contact arm and one spring-tensioned telescoping contact arm.



Checking a small hole.



Left-to-right: Nos. 229A, B, C, D, E.



No. S229GZ set of 5 gages in protective pouch.

### 1/2-6" (13-150mm) range

| Range          |          | Handle Length |      | Catalog No. | EDP No. |
|----------------|----------|---------------|------|-------------|---------|
| Inch           | mm       | Inch          | mm   |             |         |
| 1/2 – 3/4"     | 13-19mm  | 2-3/8"        | 60mm | <b>229A</b> | 50923   |
| 3/4 – 1-1/4"   | 19-32mm  |               |      | <b>229B</b> | 50924   |
| 1-1/4 – 2-1/8" | 32-54mm  |               |      | <b>229C</b> | 50925   |
| 2-1/8 – 3-1/2" | 54-89mm  |               |      | <b>229D</b> | 50926   |
| 3-1/2 – 6"     | 89-150mm | 3-1/4"        | 82mm | <b>229E</b> | 50927   |

### Sets

| Description                             | Catalog No.   | EDP No. |
|---|---------------|---------|
| Set of 3, Nos. 229A, B, C in Case       | <b>S229FZ</b> | 50928   |
| Set of 5, Nos. 229A, B, C, D, E in Case | <b>S229GZ</b> | 50929   |

**NOTE:** Handles can be individually ordered and/or ordered in larger sizes such as 8", 12" or longer, similar to No. 579 Series listing, upon request.

Packed one in a box – individually or sets.



## Telescoping Gages

### No. 579 Series self-centering with two telescoping arms 5/16-6" (8-150mm)

The No. 579 Series is similar to the No. 229 Series except that it has a slightly greater range, and the handles are rigidly attached to the contact plungers and are automatically self-centering. Also, the No. 579 gages have two telescoping contacts.

Constant spring tension gives uniform contact pressure and both plungers are easily locked at any desired setting.



Left-to-right: Nos. 579A, B, C, D, E, F.



No. S579HZ set of 6 gages in protective case.



Accurate size measurements are ensured with the No. 579 Telescoping Gage. Handle is automatically self-centering.

### 5/16-6" (8-150mm) range

| Range          |          | Handle Length |       | Catalog No.    | EDP No. |
|----------------|----------|---------------|-------|----------------|---------|
| Inch           | mm       | Inch          | mm    |                |         |
| 5/16 – 1/2"    | 8-13mm   | 2-3/8"        | 60mm  | <b>579A</b>    | 52610   |
|                |          | 8"            | 200mm | <b>579A-8</b>  | 63192   |
|                |          | 12"           | 300mm | <b>579A-12</b> | 63195   |
| 1/2 – 3/4"     | 13-19mm  | 2-3/8"        | 60mm  | <b>579B</b>    | 52611   |
|                |          | 8"            | 200mm | <b>579B-8</b>  | 63193   |
|                |          | 12"           | 300mm | <b>579B-12</b> | 63196   |
| 3/4 – 1-1/4"   | 19-32mm  | 2-3/8"        | 60mm  | <b>579C</b>    | 52612   |
|                |          | 8"            | 200mm | <b>579C-8</b>  | 63194   |
|                |          | 12"           | 300mm | <b>579C-12</b> | 63197   |
| 1-1/4 – 2-1/8" | 32-54mm  | 2-3/8"        | 60mm  | <b>579D</b>    | 52613   |
|                |          | 8"            | 200mm | <b>579D-8</b>  | 67114   |
|                |          | 12"           | 300mm | <b>579D-12</b> | 63198   |
| 2-1/8 – 3-1/2" | 54-89mm  | 2-3/8"        | 60mm  | <b>579E</b>    | 52614   |
|                |          | 8"            | 200mm | <b>579E-8</b>  | 67115   |
|                |          | 12"           | 300mm | <b>579E-12</b> | 63199   |
| 3-1/2 – 6"     | 89-150mm | 3-1/4"        | 82mm  | <b>579F</b>    | 52615   |
|                |          | 8"            | 200mm | <b>579F-8</b>  | 67116   |
|                |          | 12"           | 300mm | <b>579F-12</b> | 63200   |

### Sets

| Description                                | Catalog No.   | EDP No. |
|--|---------------|---------|
| Set of 4, Nos. 579A, B, C, D in Case       | <b>S579GZ</b> | 52616   |
| Set of 6, Nos. 579A, B, C, D, E, F in Case | <b>S579HZ</b> | 52617   |

Packed one in a box – individually or sets.

**NOTE:** Handles can be individually ordered. Handles longer than 12" (300mm) are available on special order.



## Taper Gages

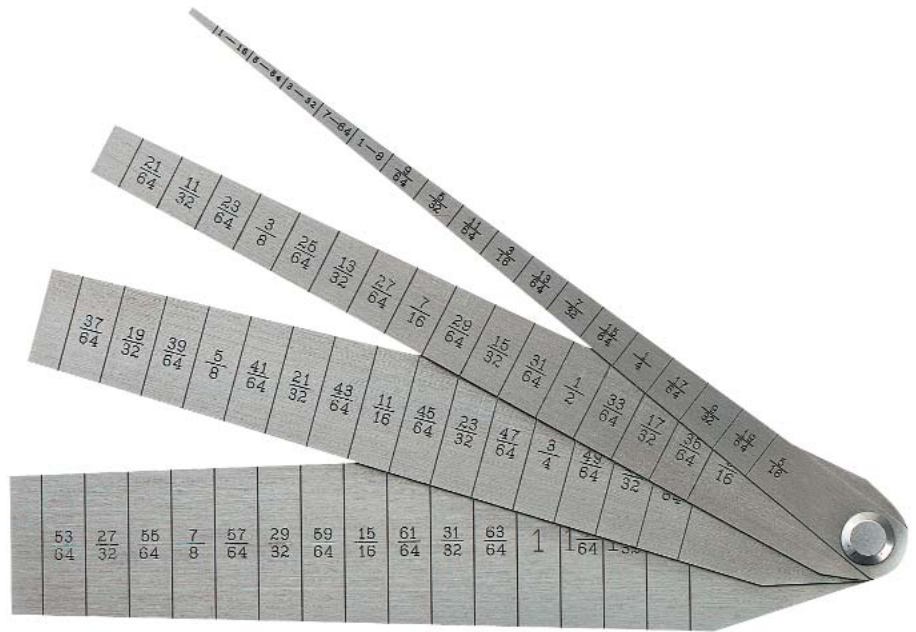
These are named “taper” gages only because of their shape. They do not measure taper, but they do measure hole and slot sizes. They are quick to use, very accurate, and are a convenient size.

### Taper Gage

#### No. 267 1/16 – 1-1/16”

This gage is specially designed for rapid, accurate checking of inside diameters of tubing. Also very useful for general gaging of slot widths, hole sizes, setting calipers, etc.

This gage has thin, tapered leaves graduated to measure inside diameters or widths from 1/16” to 1-1/16” in 64ths of an inch. They are made of nicely finished spring-tempered steel, approximately 1” wide by 5-1/4” long.



#### 1/16 – 1-1/16” range

| Description | Catalog No. | EDP No. |
|-------------|-------------|---------|
| Taper Gage  | 267         | 51286   |



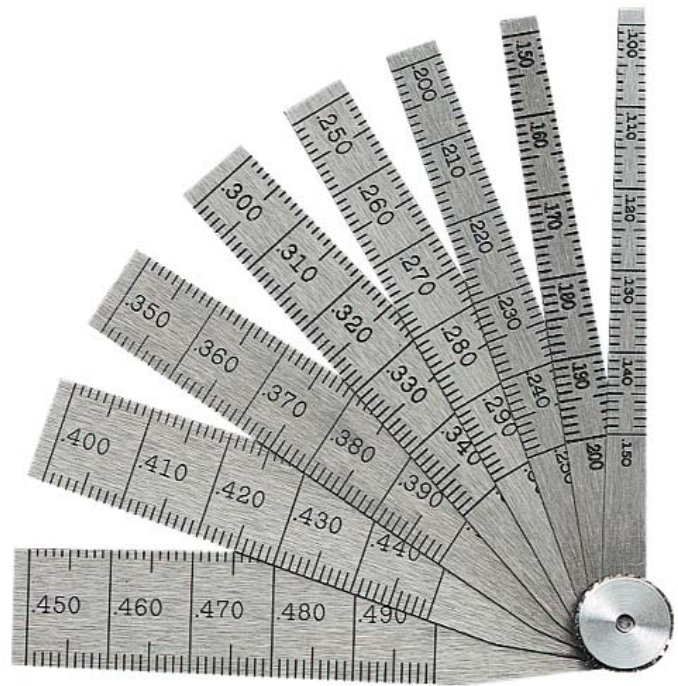


**Taper Gages**

**No. 269 Series .100-1"**

**No. 269M Series 2-25mm**

These gages are for determining hole sizes in dies and all kinds of other work. They read in thousandths of an inch or 0.02mm. Made of tempered steel with a locking device for fixing any leaf in position for use.



No. 269A.

**Graduation .001"**

| Range      |    | Length | No. Leaves | Catalog No. | EDP No. |
|------------|----|--------|------------|-------------|---------|
| Inch       | mm |        |            |             |         |
| .100-.500" |    | 2-1/2" | 8          | 269A        | 51290   |
| .500-1"    |    | 2-3/4" | 10         | 269B        | 51291   |

**Graduation 0.02mm**

|  |         |      |    |       |       |
|--|---------|------|----|-------|-------|
|  | 2-12mm  | 64mm | 10 | 269MA | 56031 |
|  | 12-25mm | 70mm | 13 | 269MB | 56032 |

Furnished in protective pouch. Packed one in a box.

**Taper Gage**

**No. 270**

**.010-.150" / 0.3-4mm**

The Starrett No. 270 Taper Gage is a very useful tool, especially for bearing work and for gaging slots.

The gage is made of quality tool steel 7/16" (11mm) wide by 6-1/4" (160mm) long and is accurately tapered throughout its entire length for quick and convenient measuring of slot widths, etc.

Although a bit expensive, this tool can be and has been used as a precision shim.

One side is graduated from .010" to .150" in thousandths of an inch and the reverse side from 0.3mm to 4mm in one-twentieth of a mm (0.05mm).

Packed one in a box.



**No. 270 Taper Gage: Top view is front side with inch measurement. Middle view shows tapered angle. Bottom view is back side with millimeter measurement.**

**.010-.150" / 0.3-4mm range**

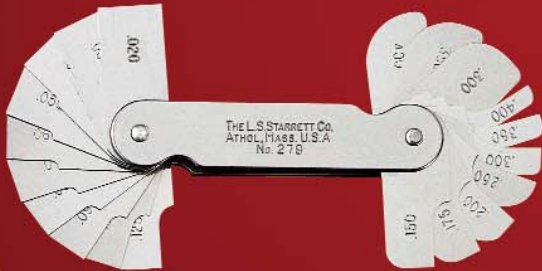
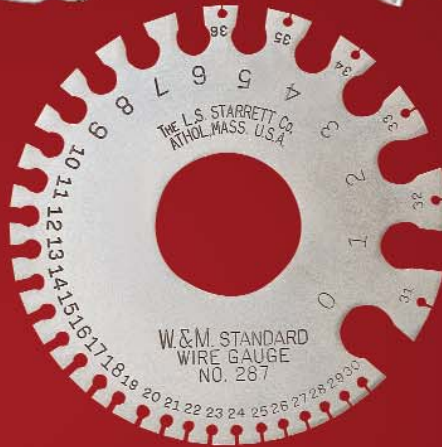
| Description | Catalog No. | EDP No. |
|-------------|-------------|---------|
| Taper Gage  | 270         | 51292   |



This section is made up of standard gages that quickly check various dimensions that skilled workers need to measure in the course of their work.

**Products include:**

- ◆ Pin gages
- ◆ Drill gages
- ◆ Sheet and wire gages
- ◆ Center gages
- ◆ Screw pitch gages
- ◆ Radius gages
- ◆ Ball and diameter gages
- ◆ Angle gages
- ◆ Thickness gages



No. 185  
**Starrett**  
TIME SAVER  
DRILL & WIRE GAUGE CHART  
FOR MACHINE SCREW TAPS

| DECIMAL EQUIVALENTS |      | BODY DRILL | TAP DRILL | TAP SIZE |
|---------------------|------|------------|-----------|----------|
| .60                 | .136 | 1          |           |          |
| .59                 | .140 | 2          |           |          |
| .58                 | .144 | 3          |           |          |
| .57                 | .147 | 4          |           |          |
| .56                 | .149 | 5          |           |          |
| .55                 | .152 | 6          |           |          |
| .54                 | .154 | 7          |           |          |
| .53                 | .157 | 8          |           |          |
| .52                 | .159 | 9          |           |          |
| .51                 | .161 | 10         |           |          |
| .50                 | .166 | 11         |           |          |
| .49                 | .169 | 12         |           |          |
| .48                 | .173 | 13         |           |          |
| .47                 | .177 | 14         |           |          |
| .46                 | .180 | 15         |           |          |
| .45                 | .182 | 16         |           |          |
| .44                 | .185 | 17         |           |          |
| .43                 | .188 | 18         |           |          |
| .42                 | .191 | 19         |           |          |
| .41                 | .193 | 20         |           |          |
| .40                 | .196 | 21         |           |          |
| .39                 | .199 | 22         |           |          |
| .38                 | .201 | 23         |           |          |
| .37                 | .204 | 24         |           |          |
| .36                 | .205 | 25         |           |          |
| .35                 | .209 | 26         |           |          |
| .34                 | .213 | 27         |           |          |
| .33                 | .221 | 28         |           |          |
| .32                 | .228 | 29         |           |          |
| .31                 | .236 | 30         |           |          |
| .30                 | .244 | 31         |           |          |
| .29                 | .252 | 32         |           |          |
| .28                 | .260 | 33         |           |          |
| .27                 | .268 | 34         |           |          |
| .26                 | .276 | 35         |           |          |
| .25                 | .284 | 36         |           |          |
| .24                 | .292 | 37         |           |          |
| .23                 | .300 | 38         |           |          |
| .22                 | .308 | 39         |           |          |
| .21                 | .316 | 40         |           |          |
| .20                 | .324 | 41         |           |          |
| .19                 | .332 | 42         |           |          |
| .18                 | .340 | 43         |           |          |
| .17                 | .348 | 44         |           |          |
| .16                 | .356 | 45         |           |          |
| .15                 | .364 | 46         |           |          |
| .14                 | .372 | 47         |           |          |
| .13                 | .380 | 48         |           |          |
| .12                 | .388 | 49         |           |          |
| .11                 | .396 | 50         |           |          |
| .10                 | .404 | 51         |           |          |
| .09                 | .412 | 52         |           |          |
| .08                 | .420 | 53         |           |          |
| .07                 | .428 | 54         |           |          |
| .06                 | .436 | 55         |           |          |
| .05                 | .444 | 56         |           |          |
| .04                 | .452 | 57         |           |          |
| .03                 | .460 | 58         |           |          |
| .02                 | .468 | 59         |           |          |
| .01                 | .476 | 60         |           |          |
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## Precision Steel Pin Gage Sets

### No. S4000 Series (.011-1.000")

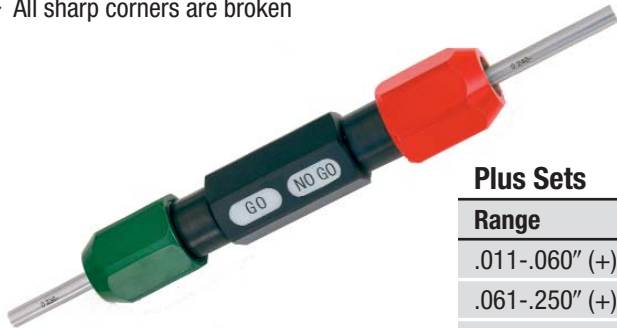
Precision gage pins are used to determine small hole sizes, for gaging slots, and finding hole distances.

#### Features:

- ◆ Color coded, fully adjustable Go/No-Go gage handle furnished with each set
- ◆ Sets are supplied in rugged, high impact protective cases with each space marked for the appropriate gage
- ◆ Inspection certificate with every set
- ◆ All Starrett pin gages are manufactured to a 0.0002" tolerance
- ◆ Plus and minus tolerance sets and individual pins available
- ◆ Offered in 0.001" increments
- ◆ Each pin is centerless lapped and is clearly etched with the stated size
- ◆ All gages are 2 inches long and hardened to RC 60/64
- ◆ All sharp corners are broken



No. S4002-250 190-piece set.



#### Plus Sets

| Range           | No. of Gages | Cat. No.         | EDP No. |
|-----------------|--------------|------------------|---------|
| .011-.060" (+)  | 50           | <b>S4000-060</b> | 67480   |
| .061-.250" (+)  | 190          | <b>S4002-250</b> | 67482   |
| .251-.500" (+)  | 250          | <b>S4004-500</b> | 67484   |
| .501-.625" (+)  | 125          | <b>S4006-625</b> | 67486   |
| .626-.750" (+)  | 125          | <b>S4008-750</b> | 67488   |
| .751-.832" (+)  | 82           | <b>S4010-832</b> | 67490   |
| .833-.916" (+)  | 84           | <b>S4012-916</b> | 67492   |
| .917-1.000" (+) | 84           | <b>S4014-1</b>   | 67494   |

#### Minus Sets

|                 |     |                  |       |
|-----------------|-----|------------------|-------|
| .011-.060" (-)  | 50  | <b>S4001-060</b> | 67481 |
| .061-.250" (-)  | 190 | <b>S4003-250</b> | 67483 |
| .251-.500" (-)  | 250 | <b>S4005-500</b> | 67485 |
| .501-.625" (-)  | 125 | <b>S4007-625</b> | 67487 |
| .626-.750" (-)  | 125 | <b>S4009-750</b> | 67489 |
| .751-.832" (-)  | 82  | <b>S4011-832</b> | 67491 |
| .833-.916" (-)  | 84  | <b>S4013-916</b> | 67493 |
| .917-1.000" (-) | 84  | <b>S4015-1</b>   | 67495 |

**NOTE:** Individual gage pins are available from 0.011" to 1.000".



### Standard Letter Size Drill Gage – hardened

**No. 198 A-Z**  
(.234-.413" Dia.)

Letter size drills can be quickly and conveniently checked with this gage. Twenty-six holes are provided, giving corresponding drill sizes from "A" through "Z" with decimal equivalents from .234" diameter through .413" diameter.

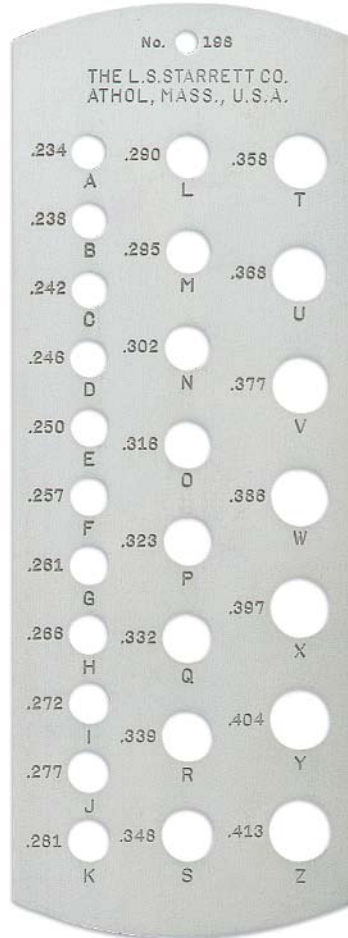
The gage is approximately 5/64" thick by 2-5/16" wide and 6-1/4" long, is hardened, and has a satin finish. Thoroughly tested after hardening.

### Time Saver® Tap and Drill Gage – hardened

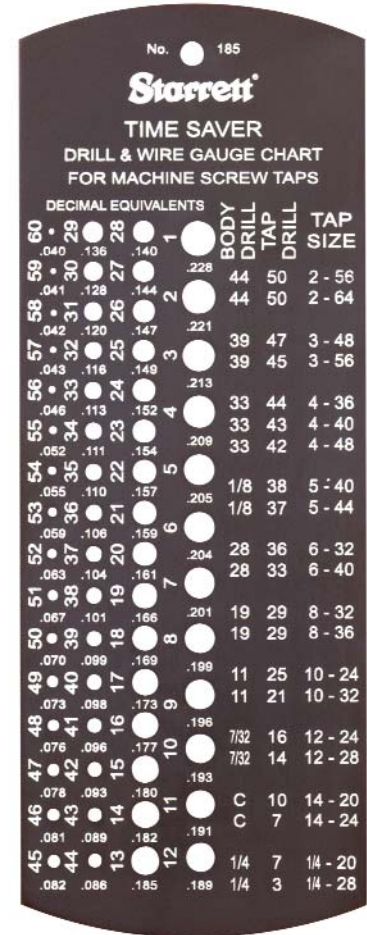
**No. 185 Nos. 1-60**  
(.228-.040")

This highly useful gage shows at a glance the correct size tap drill for any common size machine screw tap in "NF" National Fine or "NC" National Coarse Thread Series, that will leave the right amount of stock for approximately 65% full thread. The gage also shows the correct body size drill to use. In addition, there are 60 holes marked with the number size and decimal equivalent of the drill that fits each hole. Example: a size 2-56 tap (No. 2 tap with 56 pitch) calls for a No. 50 tap drill and a No. 44 body drill.

The gage has a black matte finish with information steel stamped on one side and white marked on the reverse side for quick, clear reading. The gage is thoroughly tested for accuracy after hardening. Approximate size, 5/64" thick by 2-5/16" wide by 6-1/4" long.



Above: No. 198 Letter Size Drill Gage.  
Right: No. 185 Tap and Drill Gage.



#### A-Z range

| Catalog No. | EDP No. | Description                   |
|-------------|---------|-------------------------------|
| 198         | 50718   | A to Z Letter Size Drill Gage |

#### Nos. 1-60 (.228-.040") range

| Catalog No. | EDP No. | Range          |           |            |
|-------------|---------|----------------|-----------|------------|
|             |         | Tap Size       | Tap Drill | Body Drill |
| 185         | 50675   | 2-56 to 1/4-28 | 50 to 3   | 44 to 1/4  |





**Drill and Steel Wire Gage – hardened**

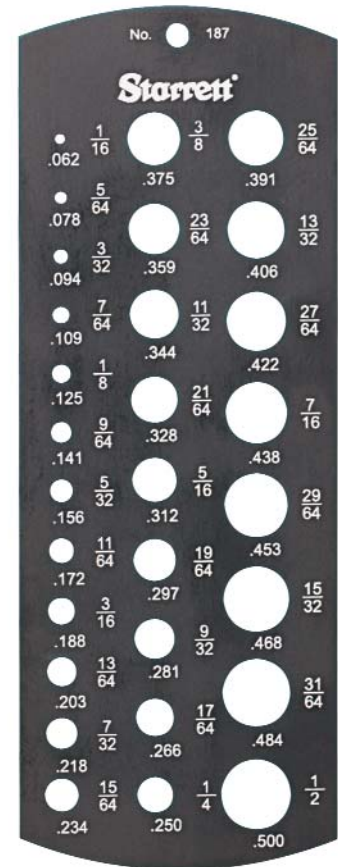
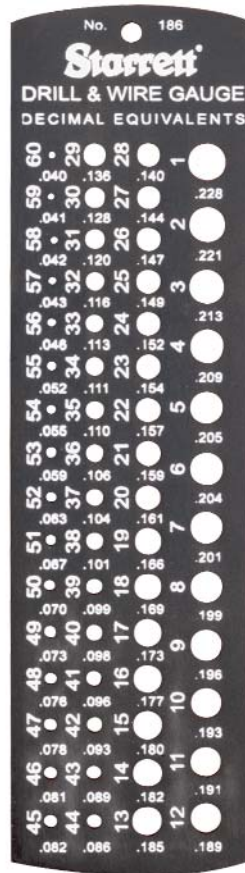
**No. 186** Nos. 1-60  
(.228-.040")

Another handy Starrett gage widely used by mechanics for selecting the correct size of twist drills and steel drill rod. Gage is similar to our No. 185, but without the tap and drill information. Has 60 holes for gaging drills from No. 1 to 60 and each hole is marked with the number size and decimal equivalent of the drill that fits each hole. The gage is thoroughly tested for accuracy after hardening. This gage has a black matte finish. Gage information is steel stamped on one side and white marked on the reverse side for quick, clear reading. Approximate size, 5/64" thick, 1-1/2" wide and 5-1/2" long.

**Jobbers' Drill Gage – hardened**

**No. 187** 1/16-1/2"

Using this gage, the size of any twist drill from 1/16-1/2" by 64ths can be quickly determined. The gage has a total of 29 holes, each marked with the drill size in inches and the decimal equivalent. Gage is rigidly tested after hardening and has a black matte finish. Gage information is steel stamped on one side and white marked on the reverse side for quick, clear reading. Approximately 5/64" thick by 2-5/16" wide by 6-1/4" long.



Above: No. 186 Drill and Steel Wire Gage.  
Right: No. 187 Jobbers' Drill Gage.

**Nos. 1-60 (.228-.040") range**

| Catalog No. | EDP No. | Description               |
|-------------|---------|---------------------------|
| 186         | 50676   | Drill and Steel Wire Gage |

**1/16-1/2" range**

|     |       |                     |
|-----|-------|---------------------|
| 187 | 50677 | Jobbers' Drill Gage |
|-----|-------|---------------------|

**Drill and Steel Wire Gage – hardened**

**No. 286** Nos. 61-80  
(.039-.0135")

This gage is for selecting the correct size of twist drills and steel drill rod in smaller sizes ranging from Nos. 61 to 80. For convenience, each hole is marked with the size number and the corresponding decimal equivalent. Like other Starrett gages, this tool is carefully tested for accuracy after hardening. Attractive satin finish. Small compact size, approximately 1/16" thick, 3/4" wide and 2" long.



**Nos. 61-80 (.039-.0135") range**

| Catalog No. | EDP No. | Description               |
|-------------|---------|---------------------------|
| 286         | 51320   | Drill and Steel Wire Gage |



**English Standard Wire Gage – hardened**  
(Birmingham or Stubs' Iron Wire Gage)

**No. 188** Nos. 1-36 (.300-.004")

This gage is popular for gaging iron wire, hot and cold rolled sheet steel, and in some cases, sheet iron by the English Standard Wire system also known as Birmingham or Stubs.

Gage has convenient decimal equivalents of each number on the reverse side. Satin finish. Carefully tested after hardening.



**Nos. 1-36 (.300-.004") range**

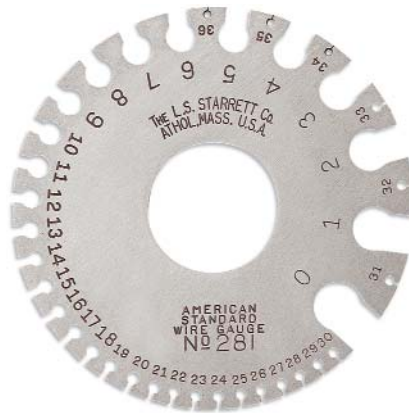
| Catalog No. | EDP No. | Description                |
|-------------|---------|----------------------------|
| 188         | 50678   | English Standard Wire Gage |

**American Standard Wire Gage – hardened**  
(or B.&S.) for non-ferrous metals

**No. 281** Nos. 0-36 (.325-.005")

This gage is the generally accepted standard for non-ferrous metals as adopted by brass manufacturers. It is especially useful for electricians and others to gage sheet, plate and wire made of non-ferrous metals like copper, brass, aluminum, etc. Screw slotting cutters are also made to this gage.

Gage has decimal equivalents on the reverse side. Satin finish. Completely tested after hardening.



**Nos. 0-36 (.325-.005") range**

| Catalog No. | EDP No. | Description                 |
|-------------|---------|-----------------------------|
| 281         | 51316   | American Standard Wire Gage |

**Steel Wire Gage – hardened**  
American Steel & Wire Co.  
(Washburn & Moen) Standard

**No. 287**  
Nos. 0-36 (.3065-.009")

This gage is designed for gaging steel wire and drill rod to the American Steel & Wire Co. (Washburn & Moen) Standard and checks sizes from 0-36. (Also known as United States Steel Wire Gage.) Decimal equivalents are given on the back. Satin finish. Carefully tested for accuracy after hardening.



**Nos. 0-36 (.3065-.009") range**

| Catalog No. | EDP No. | Description     |
|-------------|---------|-----------------|
| 287         | 51321   | Steel Wire Gage |



## Piano Tuners' Gage – hardened American Steel and Wire Co. Standard

**No. 280**  
Nos. 12-28 (.029-.071")

The No. 280 Gage is designed for gaging steel music wire and has a range from No. 12 to 28. Convenient decimal equivalents on reverse side. Diameter of the gage is 1-9/16" and it has a satin finish. Carefully tested after hardening.



**Nos. 12-28 (.029-.071") range**

| Catalog No. | EDP No. | Description        |
|-------------|---------|--------------------|
| 280         | 51315   | Piano Tuners' Gage |

## U.S. Standard Gage – hardened Sheet, Plate Iron and Steel Gage

**No. 283**  
Nos. 0-36 (.3125-.007")

This gage is made to the United States Standard for uncoated sheet, plate iron and steel, and is based on weights in ounces per square foot. The gage has a satin finish and decimal equivalents on the reverse side. Carefully tested after hardening.



**Nos. 0-36 (.3125-.007") range**

| Catalog No. | EDP No. | Description        |
|-------------|---------|--------------------|
| 283         | 51318   | U.S. Standard Gage |

## Acme Standard Screw Thread Gage – hardened

**No. 284 29°**

This gage is a standard for grinding and setting tools when cutting Acme threads. Acme threads have the same depth as square threads but the sides of the threads are at an inclination of 14-1/2° (29° included angle). This form of thread is used extensively and has in many instances replaced the square thread in machine construction. The advantages of the Acme thread are its strength and the ease by which it can be cut compared with square threads. The angles and edges of this gage are hardened, ground and carefully tested.

In use, the angle on the thread cutting tool is checked on the large precision-ground V at



the end of the gage. The tool is then ground on the end to the width of the slot of

whatever pitch is being turned. It is then set in the lathe using the half angle.

**1-10 threads per inch**

| Catalog No. | EDP No. | Description                     |
|-------------|---------|---------------------------------|
| 284         | 51319   | Acme Standard Screw Thread Gage |

**NOTE:** Also see Table of Thread Dimensions in Reference Tables.




**Standards for Sheet and Wire Gages with corresponding Starrett Gages**
**Dimensions of Sizes in Decimal Parts of an Inch**

| Starrett Sheet and Wire Gage Cat. Nos. | No. 281                    | No. 188 No. 245                | No. 287                          | No. 280                                |                   | No. 283   |
|--|----------------------------|--------------------------------|----------------------------------|--|-------------------|---|
| Number of Wire Gage                    | American or Brown & Sharpe | Birmingham or Stubs' Iron Wire | Washburn & Moen, (Worcester, MA) | American S. & W. Co's. Music Wire Gage | Stubs' Steel Wire | U.S. Standard Gage for Sheet and Plate Iron and Steel |
| 00000000                               | .731429                    | —                              | —                                | —                                      | —                 | —   |
| 0000000                                | .651356                    | —                              | —                                | —                                      | —                 | —   |
| 000000                                 | .580049                    | —                              | —                                | .004                                   | —                 | .46875  |
| 00000                                  | .516549                    | —                              | —                                | .005                                   | —                 | .4375   |
| 0000                                   | .460000                    | .454                           | .3938                            | .006                                   | —                 | .40625  |
| 000                                    | .409642                    | .425                           | .3625                            | .007                                   | —                 | .375  |
| 00                                     | .364797                    | .380                           | .3310                            | .008                                   | —                 | .34375  |
| 0                                      | .324861                    | .340                           | .3065                            | .009                                   | —                 | .3125   |
| 1                                      | .289279                    | .300                           | .2830                            | .010                                   | .227              | .28125  |
| 2                                      | .257626                    | .284                           | .2625                            | .011                                   | .219              | .265625   |
| 3                                      | .229423                    | .259                           | .2437                            | .012                                   | .212              | .250  |
| 4                                      | .204307                    | .238                           | .2253                            | .013                                   | .207              | .234375   |
| 5                                      | .181941                    | .220                           | .2070                            | .014                                   | .204              | .21875  |
| 6                                      | .162023                    | .203                           | .1920                            | .016                                   | .201              | .203125   |
| 7                                      | .144285                    | .180                           | .1770                            | .018                                   | .199              | .1875   |
| 8                                      | .128490                    | .165                           | .1620                            | .020                                   | .197              | .171875   |
| 9                                      | .114424                    | .148                           | .1483                            | .022                                   | .194              | .15625  |
| 10                                     | .101897                    | .134                           | .1350                            | .024                                   | .191              | .140625   |
| 11                                     | .090742                    | .120                           | .1205                            | .026                                   | .188              | .125  |
| 12                                     | .080808                    | .109                           | .1055                            | .029                                   | .185              | .109375   |
| 13                                     | .071962                    | .095                           | .0915                            | .031                                   | .182              | .09375  |
| 14                                     | .064084                    | .083                           | .0800                            | .033                                   | .180              | .078125   |
| 15                                     | .057068                    | .072                           | .0720                            | .035                                   | .178              | .0703125  |
| 16                                     | .050821                    | .065                           | .0625                            | .037                                   | .175              | .0625   |
| 17                                     | .045257                    | .058                           | .0540                            | .039                                   | .172              | .05625  |
| 18                                     | .040303                    | .049                           | .0475                            | .041                                   | .168              | .050  |
| 19                                     | .035891                    | .042                           | .0410                            | .043                                   | .164              | .04375  |
| 20                                     | .031961                    | .035                           | .0348                            | .045                                   | .161              | .0375   |
| 21                                     | .028462                    | .032                           | .03175                           | .047                                   | .157              | .034375   |
| 22                                     | .025347                    | .028                           | .0286                            | .049                                   | .155              | .03125  |
| 23                                     | .022572                    | .025                           | .0258                            | .051                                   | .153              | .028125   |
| 24                                     | .020101                    | .022                           | .0230                            | .055                                   | .151              | .025  |
| 25                                     | .017900                    | .020                           | .0204                            | .059                                   | .148              | .021875   |
| 26                                     | .015941                    | .018                           | .0181                            | .063                                   | .146              | .01875  |
| 27                                     | .014196                    | .016                           | .0173                            | .067                                   | .143              | .0171875  |
| 28                                     | .012641                    | .014                           | .0162                            | .071                                   | .139              | .015625   |
| 29                                     | .011258                    | .013                           | .0150                            | .075                                   | .134              | .0140625  |
| 30                                     | .010025                    | .012                           | .0140                            | .080                                   | .127              | .0125   |
| 31                                     | .008928                    | .010                           | .0132                            | .085                                   | .120              | .0109375  |
| 32                                     | .007950                    | .009                           | .0128                            | .090                                   | .115              | .01015625   |
| 33                                     | .007080                    | .008                           | .0118                            | .095                                   | .112              | .009375   |
| 34                                     | .006305                    | .007                           | .0104                            | —                                      | .110              | .00859375   |
| 35                                     | .005615                    | .005                           | .0095                            | —                                      | .108              | .0078125  |
| 36                                     | .005000                    | .004                           | .0090                            | —                                      | .106              | .00703125   |
| 37                                     | .004453                    | —                              | —                                | —                                      | .103              | .006640625  |
| 38                                     | .003965                    | —                              | —                                | —                                      | .101              | .00625  |
| 39                                     | .003531                    | —                              | —                                | —                                      | .099              | —   |
| 40                                     | .003145                    | —                              | —                                | —                                      | .097              | —   |





## Center Gages

### No. C391

60° American National

### No. C396

55° Whitworth or English

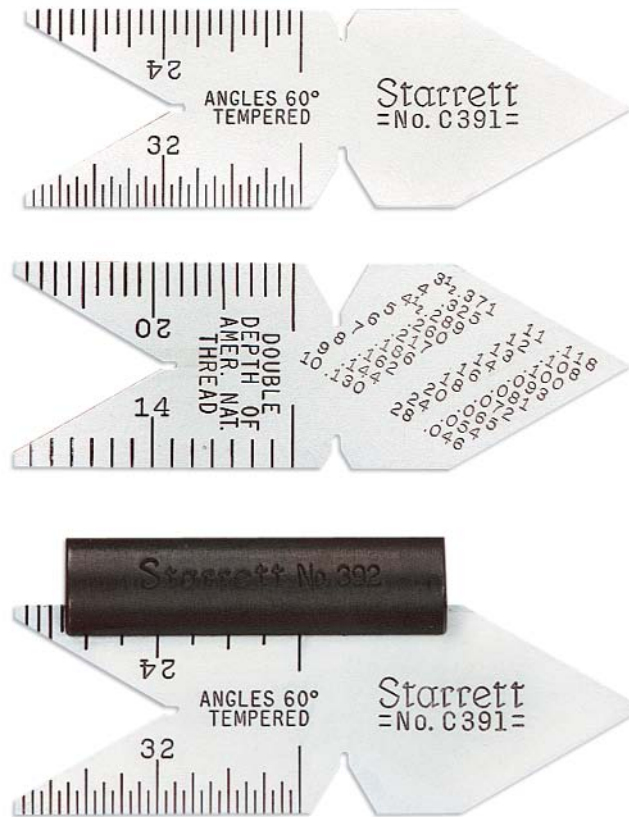
### No. C398M

60° Metric

Extremely handy for use in grinding and setting screw cutting tools, these gages meet the following standards: American National or U.S. 60°, Whitworth or English 55°, and Metric 60°.

They also have a very useful scale for finding the number of threads per inch through graduations in 14ths, 20ths, 24ths and 32nds of an inch on No. C391 and No. C396. Graduations on No. C398M are in mm and 1/2mm. The No. C391 Gage also has a table of double depths of threads for determining size of tap drills.

Made of spring-tempered steel with satin chrome finish. Gaging surfaces ground.



## Center Gage Attachment

### No. 392

This attachment is useful for holding Starrett center gages firmly against the lathe arbor or faceplate when setting both internal and external screw cutting tools. A slot containing a flat spring holds the gage and a V groove in the other side permits locating the attachment against the lathe arbor.

No. C391 Center Gage. Top view, front 60° angle side; middle view, back with double depths of threads gage; bottom view, same gage with center gage attachment.

### Inch Graduations

| Catalog No. | EDP No. | Description                             |
|-------------|---------|---|
| C391        | 51475   | American Unified National Standard, 60° |
| C396        | 51477   | Whitworth or English Standard, 55°      |

### Millimeter Graduations

|       |       |                      |
|-------|-------|----------------------|
| C398M | 51478 | Metric Standard, 60° |
|-------|-------|----------------------|

### Center Gage Attachment

|     |       |                        |
|-----|-------|------------------------|
| 392 | 51476 | Center Gage Attachment |
|-----|-------|------------------------|



### Starrett English and Metric Screw Pitch Gages

2 1/4-84 Pitches (Inch)

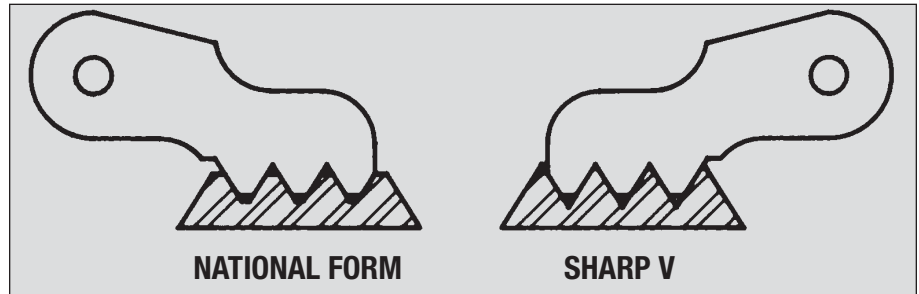
0.25-11.5 Pitches (Millimeter)

Starrett screw pitch gages are among the most useful tools in any mechanics' tool box. They quickly determine the pitch of various threads. These gages consist of a substantial steel case with a number of folding leaves at both ends, each leaf having teeth corresponding to a definite pitch, marked on each leaf.

Starrett screw pitch gages are available in a wide range of sizes with different numbers of leaves in various pitch ranges with which to gage.

- ◆ **V, Unified, American National 60° threads**
- ◆ **Whitworth Standard 55° threads**
- ◆ **International Metric Standard 60° threads**

English and metric threads are similar in form, but English threads are described in



Starrett Screw Pitch Gages have the tops of the teeth flattened, permitting use of a single gage for either National Form threads or Sharp V threads.

threads per inch and metric threads by the distance from one crest to the next.

All Starrett screw pitch gages (except Nos. 473 and 476, which have a positive stop design) feature a locking device at both ends of the case, so leaves can be securely locked in position for use. Leaves on most gages have a special narrow design, permitting checking internal threads in nuts, etc., as well as external threads.

Various types of Starrett screw pitch gages are illustrated on the following pages, with complete specifications.

#### Formulas

$$\text{Am. Nat.} \\ d = D - \frac{1.299}{N}$$

$$\text{V Thread} \\ d = D - \frac{1.732}{N}$$

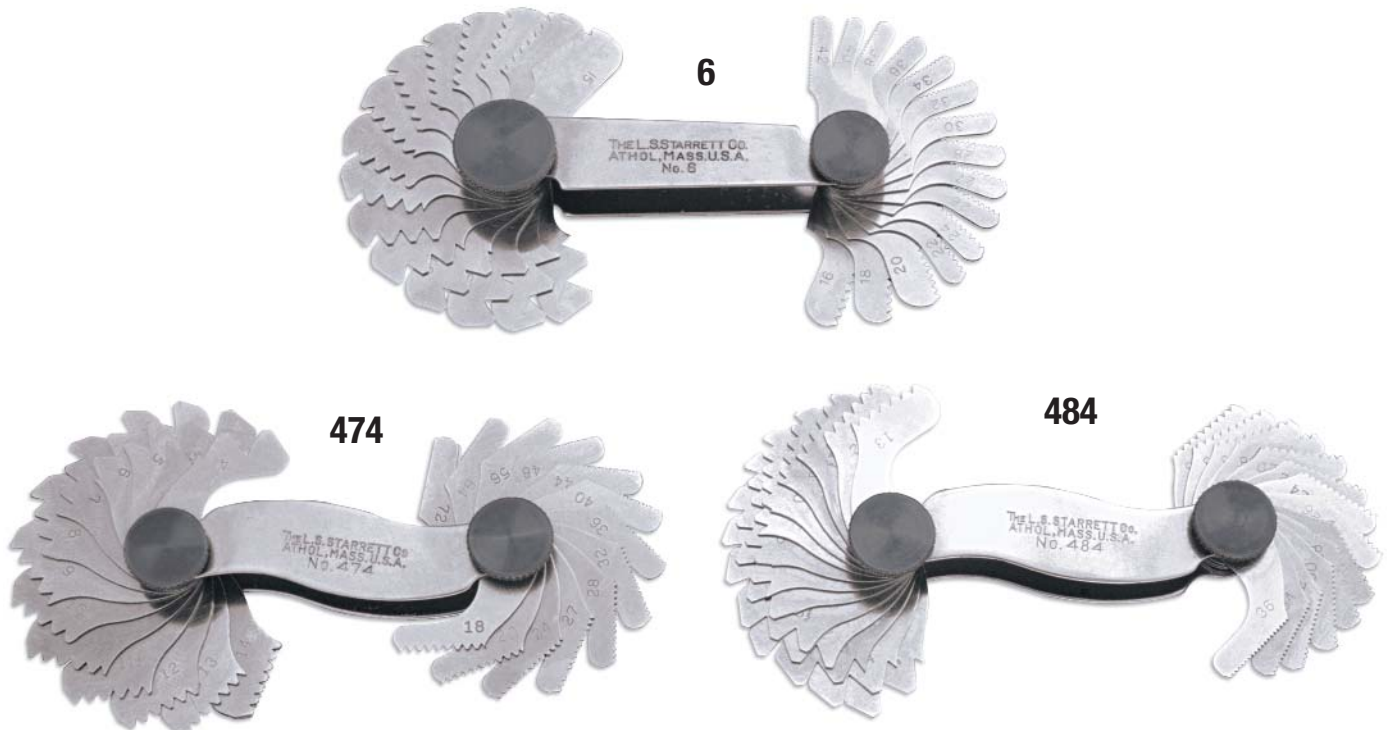
D = Outside diameter of tap

d = Bottom diameter of tap

N = Number of threads per inch

See following pages for specifications.

### V, Unified, American National – 60° Threads





**V, Unified, American National – 60° Threads (continued)**



| Catalog No. | EDP No. | No. of Leaves | TPI Range | Threads per Inch (TPI)   | Description   |
|-------------|---------|---------------|-----------|--|---|
| 155         | 50588   | 27            | 2-1/4–28  | 2-1/4, 2-3/8, 2-1/2, 2-5/8, 2-3/4, 2-7/8, 3, 3-1/4, 3-1/2, 4, 4-1/2, 5, 5-1/2, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, 24, 28  | With Locking Device and 60° Center Gage                   |
| 484         | 67447   | 28            | 3-1/2–36  | 3-1/2, 4, 4-1/2, 5, 5-1/2, 6, 7, 8, 9, 10, 11, 11-1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36  | With Locking Device                                       |
| 6           | 50035   | 30            | 4–42      | 4, 4-1/2, 5, 5-1/2, 6, 7, 8, 9, 10, 11, 11-1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42   |   |
| 474         | 52486   | 28            | 4–80      | 4, 4-1/2, 5, 6, 7, 8, 9, 10, 11, 11-1/2, 12, 13, 14, 16, 18, 20, 24, 27, 28, 32, 36, 40, 44, 48, 56, 64, 72, 80  | With Locking Device and 11-1/2 and 27 Pipe Thread Pitches |
| 472         | 52484   | 51            | 4–84      | <b>First Corner 17 Leaves:</b> 4, 4-1/2, 5, 5-1/2, 6, 7, 8, 9, 10, 11, 11-1/2, 12, 13, 14, 15, 16, 18<br><b>Second Corner 17 Leaves:</b> 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50<br><b>Third Corner 17 Leaves:</b> 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84 |   |
| 473         | 52485   | 30            | 6–60      | 6, 7, 8, 9, 10, 11, 11-1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42, 48, 50, 56, 60   | With Positive Stop and 11-1/2 and 27 Pipe Thread Pitches  |

Packed one in a box.



### Screw Pitch Gages

#### Whitworth Standard

55° Threads

**No. 476** 3 1/2-60 TPI (Inch)



| Catalog No. | EDP No. | No. of Leaves | TPI Range | Threads per Inch (TPI)   | Description        |
|-------------|---------|---------------|-----------|--|--------------------|
| 476         | 52488   | 30            | 3-1/2-60  | 3-1/2, 4, 4-1/2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 36, 40, 44, 48, 50, 60 | With Positive Stop |

Packed one in a box.

### Screw Pitch Gages

#### International Metric Standard 60° Threads

**Nos. 156M, 159M**



| Catalog No. | EDP No. | No. of Leaves | Range of Pitches | Pitches in Millimeters   | Description                             |
|-------------|---------|---------------|------------------|--|---|
| 156M        | 50589   | 28            | 0.25-2.50mm      | 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90, 1, 1.10, 1.20, 1.25, 1.30, 1.40, 1.50, 1.60, 1.70, 1.75, 1.80, 1.90, 2, 2.50 | With Locking Device                     |
| 159M        | 50591   | 28            | 0.5-11.5mm       | 0.5, 0.75, 1, 1.10, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 10.5, 11, 11.5  | With Locking Device and 60° Center Gage |

Packed one in a box.





### Radius Gages

**No. 167 Series**  
1/64-1/2"

**No. 167M Series**  
0.5-15mm

**Nos. PT22958-PT22983**  
.010-.500

**No. 110 Gage Holder**

**S167 Series Sets**  
1/64-1/2"

**S167M Series Sets**  
0.5-15mm

**SD167 Series Sets**  
.010-.500

Radii or fillets can be checked or laid out easier, faster, and more accurately with Starrett No. 167 Radius Gages. They are available individually and in sets, in fractional sizes 1/64-1/2" and decimal sizes .010-.500" and in millimeters from 0.5-15mm.

For maximum convenience, these fine gages are offered in many different sets. Each set is furnished in an attractive case which provides complete protection and easy, instant selection of the right gage size for the job.

#### Gage Features

- ◆ Made of satin finish stainless steel – rust and stain resistant
- ◆ Each gage is clearly marked with its radius
- ◆ Each gage has five different gaging surfaces for both convex and concave radii
- ◆ All gages have precision finished radii with extra smooth, accurate edges



Left: No. S167CHZ Radius Gage Set with 25 gages and holder in case.  
Above: Holder No. 110 with No. 167-3/16 attached.  
Below: Gaging radii using gage with holder.



#### Gage Holder Features

- ◆ Any gage can be used with the Starrett No. 110 holder which is especially useful for checking radii in confined or hard-to-reach locations
- ◆ Two slots are provided in the holder permitting gages to be held at 30° or 45°, either square in the slot or tipped to one side
- ◆ The holder is 4" (100mm) long, providing good reach and balance

#### Five Different Gaging Surfaces – Ideal for Checking Convex and Concave Radii of All Types

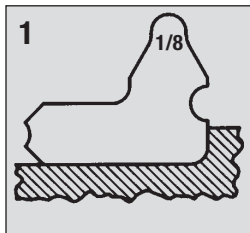


Fig 1. Checking concave (internal) radius with 90° arc. Also checks if sides are tangent to radius and 90° to each other.

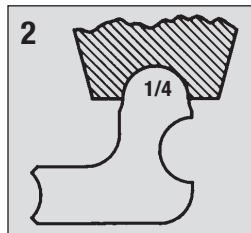


Fig 2. Checking concave (internal) radius with arc up to 180°. Also will check radius shown in fig. 1 but not relationship of sides.

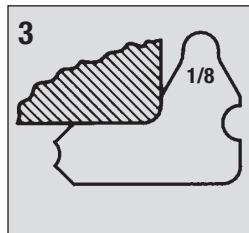


Fig 3. Checking convex (external) radius with 90° arc. Also checks if sides are tangent to radius and 90° to each other.

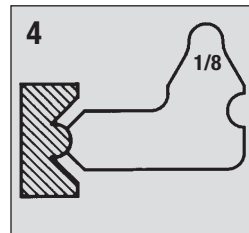


Fig 4. Checking convex (external) radius with arc of 90° or greater, or radii with sides as shown which would interfere with gage used as in fig. 3.

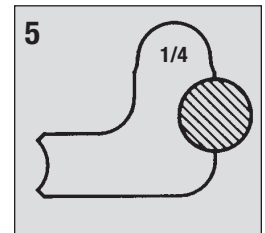


Fig 5. Checking convex (external) radius with arc of 180°; also less than 180° if sides of radius offer no interference.



### No. S167 Radius Gage Sets – Inch

| Radii Range              | Increments     | Gages | Description  | Catalog No.          | EDP   |
|--------------------------|----------------|-------|--|----------------------|-------|
| 1/32-17/64"              | 64ths          | 16    | Without Holder   | <b>S167AZ</b>        | 50615 |
| 1/64-17/64"              | 64ths          | 17    | With Holder  | <b>S167AHZ</b>       | 50616 |
| 9/32-1/2"                | 32nds          | 8     | Without Holder   | <b>S167BZ</b>        | 50617 |
| 1/32-17/64"<br>9/32-1/2" | 64ths<br>32nds | 24    | Sets 167A and S167B<br>Combined, Without Holder                                  | <b>S167CZ</b>        | 50618 |
| 1/64-17/64"<br>9/32-1/2" | 64ths<br>32nds | 25    | Sets 167AH and S167B<br>Combined, With Holder                                    | <b>S167CHZ</b>       | 50619 |
|                          |                |       | Sets 167AH and S167B Combined, With<br>Holder, Standard Letter of Certification* | <b>S167CHZ W/SLC</b> | 66876 |
| 1/32-1/2"                | 32nds          | 16    | Without Holder   | <b>S167DZ</b>        | 50620 |

### No. S167M Radius Gage Sets – Millimeter

|                   |              |    |  |                 |       |
|-------------------|--------------|----|--|-----------------|-------|
| 1-7mm             | 0.5mm        | 13 | Without Holder                                     | <b>S167MAZ</b>  | 55817 |
| 0.5-7mm           | 0.5mm        | 14 | With Holder  | <b>S167MAHZ</b> | 55818 |
| 8-15mm            | 1mm          | 8  | Without Holder                                     | <b>S167MBZ</b>  | 55819 |
| 1-7mm<br>8-15mm   | 0.5mm<br>1mm | 21 | Sets S167MA and S167MB<br>Combined, Without Holder | <b>S167MCZ</b>  | 55820 |
| 0.5-7mm<br>8-15mm | 0.5mm<br>1mm | 22 | Sets 167MB and S167MAH<br>Combined, With Holder    | <b>S167MCHZ</b> | 55821 |
| 1-15mm            | 1mm          | 15 | Without Holder                                     | <b>S167MDZ</b>  | 55822 |

### No. SD167 Radius Gage Sets – Decimal-Inch

|  |                              |    |                |                 |       |
|--|------------------------------|----|----------------|-----------------|-------|
| .020-.300<br>.350-.500                           | .020<br>.050                 | 19 | Without Holder | <b>SD167FZ</b>  | 63464 |
|  |                              |    | With Holder    | <b>SD167FHZ</b> | 63460 |
| .010-.025<br>.030-.100<br>.120-.300<br>.350-.500 | .005<br>.010<br>.020<br>.050 | 26 | Without Holder | <b>SD167GZ</b>  | 63433 |
|  |                              |    | With Holder    | <b>SD167GHZ</b> | 63463 |
|  |                              |    | Holder Only    | <b>110</b>      | 50475 |

\* Includes redemption card for Standard Letter of Certification (SLC).

## Individual Radius Gages Specifications

#### No. 167 Series – Inch

| Radius | Cat. No.         | EDP   |
|--------|------------------|-------|
| 1/64"  | <b>167-1/64</b>  | 50646 |
| 1/32"  | <b>167-1/32</b>  | 50622 |
| 3/64"  | <b>167-3/64</b>  | 50623 |
| 1/16"  | <b>167-1/16</b>  | 50624 |
| 5/64"  | <b>167-5/64</b>  | 50625 |
| 3/32"  | <b>167-3/32</b>  | 50626 |
| 7/64"  | <b>167-7/64</b>  | 50627 |
| 1/8"   | <b>167-1/8</b>   | 50628 |
| 9/64"  | <b>167-9/64</b>  | 50629 |
| 5/32"  | <b>167-5/32</b>  | 50630 |
| 11/64" | <b>167-11/64</b> | 50631 |
| 3/16"  | <b>167-3/16</b>  | 50632 |
| 13/64" | <b>167-13/64</b> | 50633 |

#### 167 Series - (continued)

| Radius | Cat. No.         | EDP   |
|--------|------------------|-------|
| 7/32"  | <b>167-7/32</b>  | 50634 |
| 15/64" | <b>167-15/64</b> | 50635 |
| 1/4"   | <b>167-1/4</b>   | 50636 |
| 17/64" | <b>167-17/64</b> | 50637 |
| 9/32"  | <b>167-9/32</b>  | 50638 |
| 5/16"  | <b>167-5/16</b>  | 50639 |
| 11/32" | <b>167-11/32</b> | 50640 |
| 3/8"   | <b>167-3/8</b>   | 50641 |
| 13/32" | <b>167-13/32</b> | 50642 |
| 7/16"  | <b>167-7/16</b>  | 50643 |
| 15/32" | <b>167-15/32</b> | 50644 |
| 1/2"   | <b>167-1/2</b>   | 50645 |

#### No. 167M Series – MM

| Radius | Cat. No.          | EDP   |
|--------|-------------------|-------|
| 0.5mm  | <b>167M-1/2</b>   | 55795 |
| 1mm    | <b>167M-1</b>     | 55796 |
| 1.5mm  | <b>167M-1 1/2</b> | 55797 |
| 2mm    | <b>167M-2</b>     | 55798 |
| 2.5mm  | <b>167M-2 1/2</b> | 55799 |
| 3mm    | <b>167M-3</b>     | 55800 |
| 3.5mm  | <b>167M-3 1/2</b> | 55801 |
| 4mm    | <b>167M-4</b>     | 55802 |
| 4.5mm  | <b>167M-4 1/2</b> | 55803 |
| 5mm    | <b>167M-5</b>     | 55804 |
| 5.5mm  | <b>167M-5 1/2</b> | 55805 |
| 6mm    | <b>167M-6</b>     | 55806 |
| 6.5mm  | <b>167M-6 1/2</b> | 55807 |
| 7mm    | <b>167M-7</b>     | 55808 |

### Individual Radius Gages Specifications - continued

#### 167M Series – (continued)

| Radius | Cat. No.       | EDP   |
|--------|----------------|-------|
| 8mm    | <b>167M-8</b>  | 55809 |
| 9mm    | <b>167M-9</b>  | 55810 |
| 10mm   | <b>167M-10</b> | 55811 |
| 11mm   | <b>167M-11</b> | 55812 |
| 12mm   | <b>167M-12</b> | 55813 |
| 13mm   | <b>167M-13</b> | 55814 |
| 14mm   | <b>167M-14</b> | 55815 |
| 15mm   | <b>167M-15</b> | 55816 |

#### No. 167 Series - Decimal-Inch

| Radius | Cat. No.       | EDP   |
|--------|----------------|-------|
| .010   | <b>167-010</b> | 63434 |
| .015   | <b>167-015</b> | 63435 |
| .020   | <b>167-020</b> | 63436 |
| .025   | <b>167-025</b> | 63437 |
| .030   | <b>167-030</b> | 63438 |
| .040   | <b>167-040</b> | 63439 |
| .050   | <b>167-050</b> | 63440 |
| .060   | <b>167-060</b> | 63441 |
| .070   | <b>167-070</b> | 63442 |
| .080   | <b>167-080</b> | 63443 |
| .090   | <b>167-090</b> | 63444 |
| .100   | <b>167-100</b> | 63445 |
| .120   | <b>167-120</b> | 63446 |
| .140   | <b>167-140</b> | 63447 |
| .160   | <b>167-160</b> | 63448 |
| .180   | <b>167-180</b> | 63449 |
| .200   | <b>167-200</b> | 63450 |
| .220   | <b>167-220</b> | 63451 |
| .240   | <b>167-240</b> | 63452 |
| .260   | <b>167-260</b> | 63453 |
| .280   | <b>167-280</b> | 63454 |
| .300   | <b>167-300</b> | 63455 |
| .350   | <b>167-350</b> | 63456 |
| .400   | <b>167-400</b> | 63457 |
| .450   | <b>167-450</b> | 63458 |
| .500   | <b>167-500</b> | 63459 |



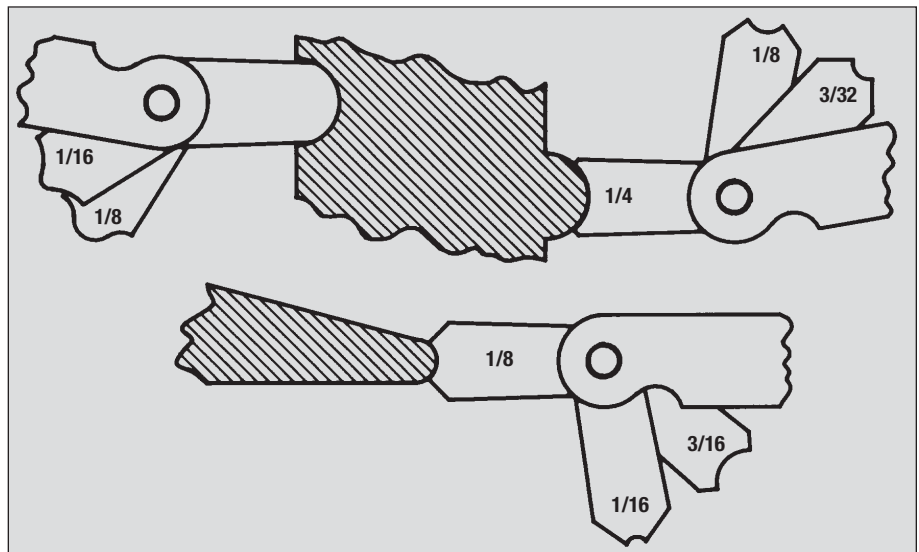
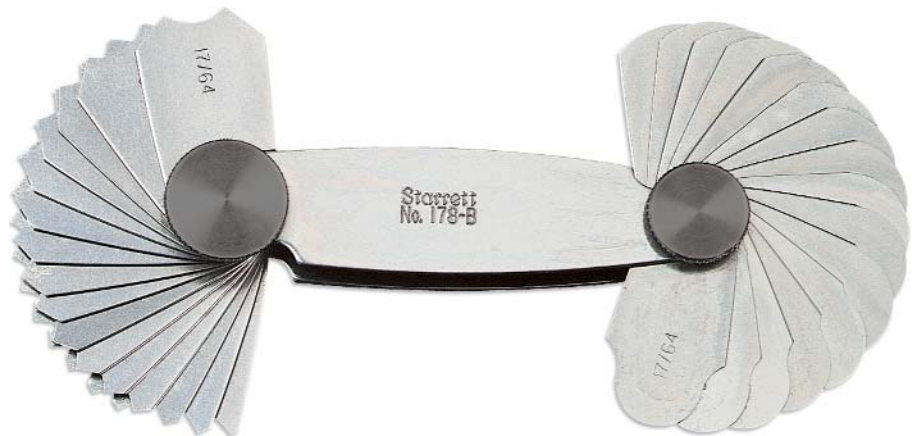
**Fillet or Radius Gages with locking device**

**No. 178 Series** 1/32-1/2"

**No. 178M Series** 1-15mm

These gages are very useful for tool and diemakers, machinists, screw machine operators, patternmakers and other mechanics to lay out and check radii of tools, dies, patterns, etc.

Made in two inch sizes and two millimeter sizes as listed below, each gage has leaves for measuring both concave and convex radii, with each leaf stamped with the radius size. Any one of the leaves can be securely locked in position by a locking device. Made of nicely finished, high quality steel.



**Inch reading**

| Range (Concave and Convex) | Increments | No. Leaves | Catalog No. | EDP No. |
|----------------------------|------------|------------|-------------|---------|
| 1/32-1/4"                  | 64ths      | 30         | <b>178A</b> | 50664   |
| 17/64-1/2"                 |            | 32         | <b>178B</b> | 50666   |

**Millimeter reading**

|          |        |    |              |       |
|----------|--------|----|--------------|-------|
| 1-3mm    | 0.25mm | 34 | <b>178MA</b> | 50665 |
| 3-7mm    | 0.5mm  |    |              |       |
| 7.5-15mm | 0.5mm  | 32 | <b>178MB</b> | 50667 |

Packed one in a box.



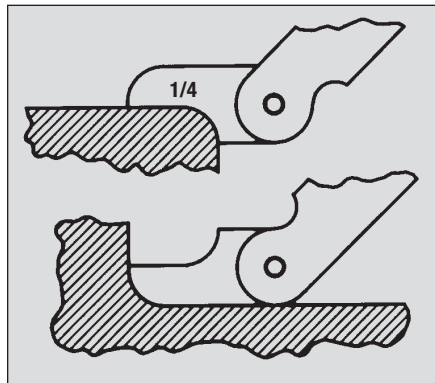


**Fillet or Radius Gages**

**No. 272** 1/32-33/64"

**No. 272M** 0.75-13mm

An external and internal radius on each leaf permits both concave and convex surfaces to be measured. The leaves are specially shaped for use in any position at any angle to measure fillets and radii in corners or against shoulders. Each leaf is stamped with the radius size and has an eccentric mounting for clearance between the leaf and the case when the gage is opened.



**Inch Reading**

| Range (Concave and Convex) | Increments | No. Leaves | Catalog No. | EDP No. |
|----------------------------|------------|------------|-------------|---------|
| 1/32-17/64"                | 64ths      | 16         | <b>272A</b> | 51296   |
| 9/32-33/64"                |            |            | <b>272B</b> | 51298   |

**Millimeter Reading**

|          |        |    |              |       |
|----------|--------|----|--------------|-------|
| 0.75-5mm | 0.25mm | 18 | <b>272MA</b> | 51297 |
| 5.5-13mm | 0.5mm  | 16 | <b>272MB</b> | 51299 |

Packed one in a box.

**Fillet or Radius Gage**

**No. 279** .020-.400"

This gage is similar to our No. 272, except that it has twenty leaves with radii from .020-.400" inclusive. Nine leaves have concave and convex radii from .020-.100 inclusive by .010", four leaves with concave and convex radii from .125-.200 inclusive by .025", one leaf with concave and convex radii of .250", three leaves with concave radii only from .300-.400 inclusive by .050" and three leaves with convex radii only from .300-.400 by .050".



**Inch Reading**

| Range (Concave and Convex) | No. Leaves | Catalog No. | EDP No. |
|----------------------------|------------|-------------|---------|
| .020-.400"                 | 20         | <b>279</b>  | 51314   |

Packed one in a box.





## Ball and Diameter Gage

### No. 710 1/8-1"

This gage is used by tool and diemakers to check roughing and finishing cutters. Covers almost the entire range of diesinkers' requirements and measures 29 full diameters from 1/8-1" in steps of 32nds of an inch. Made of tough steel with bright finish. Diameters clearly marked. Approximate size, .050" thick, 1-3/8" wide and 11-3/8" long.



| Range  | Increments | No. Diameters | Catalog No. | EDP No. |
|--------|------------|---------------|-------------|---------|
| 1/8-1" | 32nds      | 29            | 710         | 52917   |

Packed one in a box.

## Angle Gage

### No. 466 1-45°

A convenient, timesaving tool for inspectors, toolmakers, and diesinkers when checking angles. Tool also replaces a protractor in many instances. The gage has 18 leaves, each with a different angle including 14-1/2° (1/2 the Acme Standard of 29°). Leaves are made of the finest spring-tempered steel and both the angle edge and two sides are ground. Approximately 9/32" thick, 1-1/16" wide and 4-3/16" long.



| Range | No. Leaves | Angles Available   | Catalog No. | EDP No. |
|-------|------------|--|-------------|---------|
| 1-45° | 18         | 1°, 2°, 3°, 4°, 5°, 7°, 8°, 9°, 10°, 12°, 14°, 14-1/2°, 15°, 20°, 25°, 30°, 35°, 45° | 466         | 52463   |

Packed one in a box.

**English and Metric Thickness Gages**

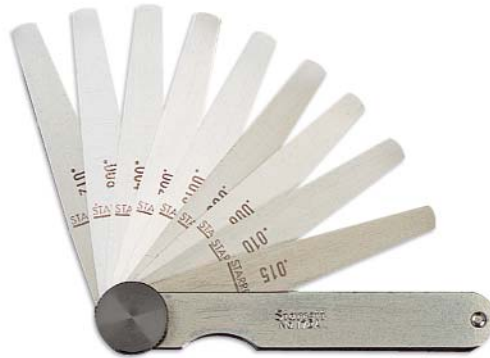
**.0015-.200" (0.03-5mm)**

These gages are used in automotive, aviation, diesel and farm equipment manufacture and service and also in jig, fixture, gage and experimental work. Especially useful in adjusting tappets, spark plugs, distributor points, checking bearing clearances and gear play, fitting pistons, rings and pins and gaging narrow slots. Made in a wide range of types and sizes, each having from 6 up to 26 leaves ranging in thickness from .0015-.200" and 0.03-5mm thick straight or tapered.

- ◆ Leaves made of finest tempered-steel, carefully finished to correct thickness, individually tested and marked with thickness
- ◆ Locking device on most gages— permits securely locking one or more leaves in position
- ◆ Leaves easily removed or replaced
- ◆ Rugged, substantial steel case protects leaves



**172AT**



**172MB**



**172A**



**66**



See listing next page.



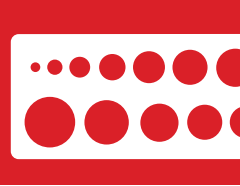
**Thickness Gages (continued)**



**Inch Reading Thickness Gages with Straight Leaves**

| Catalog No. | EDP No. | No. of Leaves | Size Leaves   | (Range)<br>Leaf Thickness (Inches)   | Description/Remarks                           |
|-------------|---------|---------------|---------------|--|---|
| 172A        | 50649   | 9             |               | .0015, .002, .003, .004, .006, .008, .010, .012, .015  |   |
| 66          | 50314   | 26            | 1/2 x 3-1/32" | .0015, .002, .0025, .003, .004, .005, .006, .007, .008, .009, .010, .011, .012, .013, .014, .015, .016, .017, .018, .019, .020, .021, .022, .023, .024, .025   | With Locking Device                           |
| 66B         | 57097   | 31            |               | .0015, .002, .0025, .003, .004, .005, .006, .007, .008, .009, .010, .011, .012, .013, .014, .015, .016, .017, .018, .019, .020, .021, .022, .023, .024, .025, .026, .028, .030, .032, .035                 |   |
| 467         | 52464   | 13            | 1/2 x 4-1/2"  | .0015, .002, .003, .004, .006, .008, .010, .020, .030, .040, .075, .100, .200  |   |
| 172E        | 50654   | 8             | 1/2 x 12"     | .002, .003, .004, .005, .006, .008, .010, .015   |   |
| 572A        | 57098   | 22            | 1/2 x 3-1/32" | .0015, .002, .0025, .003, .004, .005, .006, .007, .008, .009, .010, .012, .013, .014, .015, .016, .018, .020, .022, .025, .030, .035<br><b>6 Spark Plug Wire Gages:</b> .025, .030, .034, .035, .040, .045 | With Locking Device and Spark Plug Wire Gages |
| 572B        | 57099   |               |               | .0015, .002, .0025, .003, .004, .005, .006, .007, .008, .009, .010, .012, .013, .014, .015, .016, .018, .020, .022, .025, .030, .035   | With Locking Device                           |

(Continued on next page.)


**Thickness Gages (continued)**
**Inch Reading Thickness Gages with Tapered Leaves**

| Catalog No. | EDP No. | No. of Leaves | Size Leaves       | (Range)<br>Leaf Thickness (Inches)   | Description/Remarks |
|-------------|---------|---------------|-------------------|--|---------------------|
| 66T         | 50315   | 26            | 1/2-1/4 x 3-1/32" | .0015, .002, .0025, .003, .004, .005, .006, .007, .008, .009, .010, .011, .012, .013, .014, .015, .016, .017, .018, .019, .020, .021, .022, .023, .024, .025 | With Locking Device |
| 172AT       | 50650   | 9             |                   | .0015, .002, .003, .004, .006, .008, .010, .012, .015  |                     |
| 172CT       | 50652   | 8             | 1/2-1/4 x 6"      | .002, .003, .004, .006, .008, .010, .012, .015   |                     |

**Millimeter Reading Thickness Gages with Straight Leaves**

| Catalog No. | EDP No. | No. of Leaves | Size Leaves  | (Range)<br>Leaf Thickness (Millimeters)   | Description/Remarks |
|-------------|---------|---------------|--------------|---|---------------------|
| 66MA        | 55974   | 20            | 12.7 x 77mm  | 0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90, 0.95, 1.0 | With Locking Device |
| 173MA       | 57086   | 13            |              | 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.10, 0.15, 0.20, 0.30, 0.40, 0.50  |                     |
| 467M        | 52465   |               | 12.7 x 114mm | 0.04, 0.05, 0.06, 0.07, 0.08, 0.10, 0.15, 0.20, 0.30, 1.0, 2.0, 3.0, 5.0  |                     |

**Millimeter Reading Thickness Gages with Tapered Leaves**

|        |       |    |                |  |                     |
|--------|-------|----|----------------|--|---------------------|
| 172MBT | 50656 | 9  | 12.7-7 x 114mm | 0.04, 0.05, 0.06, 0.07, 0.08, 0.10, 0.15, 0.20, 0.30                         | With Locking Device |
| 173MAT | 57087 | 13 | 12.7-7 x 77mm  | 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.10, 0.15, 0.20, 0.30, 0.40, 0.50 |                     |
| 173MCT | 57088 |    | 12.7-7 x 152mm |  |                     |





**Thickness Gages or  
“Feeler” Stock**

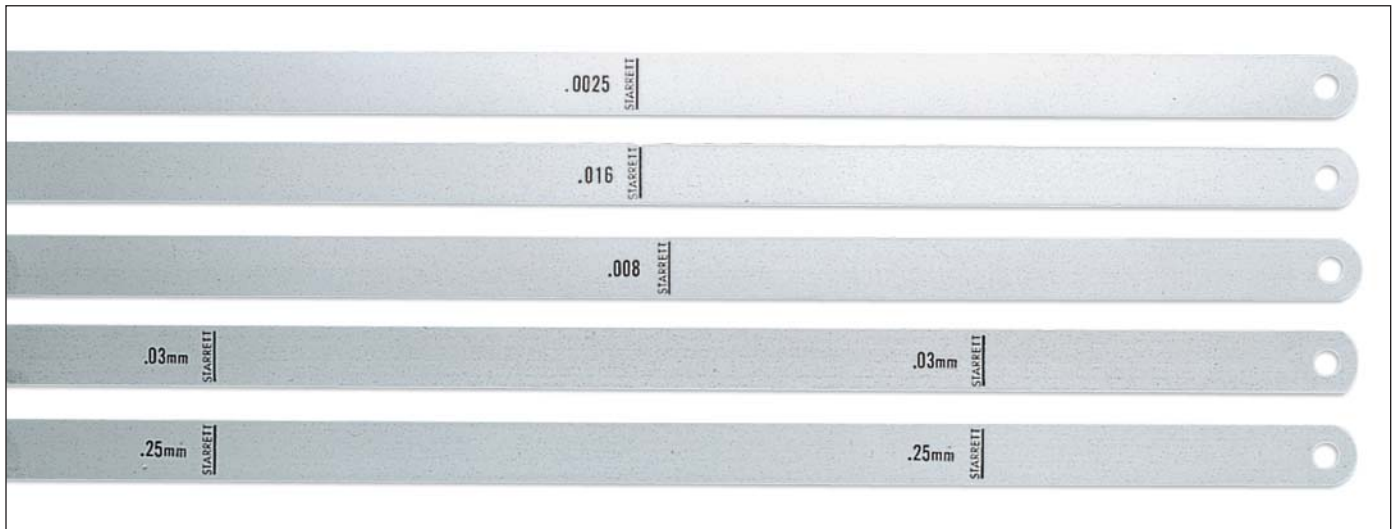
**No. 667 Series**  
.0005-.030”

**No. 667M Series**  
0.03-0.50mm

These gages are widely used in automotive, aviation, diesel and farm equipment manufacture and service and also in jig, fixture, gage and experimental work.

- ◆ Inch sizes are 12” long, 1/2” wide and furnished in 33 different thicknesses ranging from .0005-.030”
- ◆ Millimeter sizes are furnished in 300mm lengths, 12.7mm wide in 14 different thicknesses ranging from 0.03-0.50mm

- ◆ Rounded ends – no ragged edges make stock easier to work with
- ◆ Made of the finest tempered steel
- ◆ Each piece marked every 6” with thickness (exception No. 667-1/2) and in individual envelope
- ◆ With convenient 3/16” (5mm) hole punched in the end for hanging



English and Metric Thickness Gages.

**Inch Gages – 12” lengths**

| Thickness | Catalog No. | EDP No. |
|-----------|-------------|---------|
| .0005”    | 667-1/2     | 64209   |
| .001”     | 667-1       | 52837   |
| .0015”    | 667-1 1/2   | 52838   |
| .002”     | 667-2       | 52839   |
| .0025”    | 667-2 1/2   | 52840   |
| .003”     | 667-3       | 52841   |
| .004”     | 667-4       | 52842   |
| .005”     | 667-5       | 52843   |
| .006”     | 667-6       | 52844   |
| .007”     | 667-7       | 52845   |
| .008”     | 667-8       | 52846   |
| .009”     | 667-9       | 52847   |
| .010”     | 667-10      | 52848   |
| .011”     | 667-11      | 52849   |
| .012”     | 667-12      | 52850   |
| .013”     | 667-13      | 52851   |
| .014”     | 667-14      | 52852   |

**Inch Gages – 12” lengths (cont.)**

| Thickness | Catalog No. | EDP No. |
|-----------|-------------|---------|
| .015”     | 667-15      | 52853   |
| .016”     | 667-16      | 52854   |
| .017”     | 667-17      | 52855   |
| .018”     | 667-18      | 52856   |
| .019”     | 667-19      | 52857   |
| .020”     | 667-20      | 52858   |
| .021”     | 667-21      | 52859   |
| .022”     | 667-22      | 52860   |
| .023”     | 667-23      | 52861   |
| .024”     | 667-24      | 52862   |
| .025”     | 667-25      | 52863   |
| .026”     | 667-26      | 52864   |
| .027”     | 667-27      | 52865   |
| .028”     | 667-28      | 52866   |
| .029”     | 667-29      | 52867   |
| .030”     | 667-30      | 52868   |

**Millimeter Gages –  
300mm lengths**

| Thickness | Catalog No. | EDP No. |
|-----------|-------------|---------|
| 0.03mm    | 667M-3      | 52869   |
| 0.04mm    | 667M-4      | 52870   |
| 0.05mm    | 667M-5      | 52871   |
| 0.06mm    | 667M-6      | 52872   |
| 0.08mm    | 667M-8      | 52873   |
| 0.10mm    | 667M-10     | 52874   |
| 0.15mm    | 667M-15     | 52875   |
| 0.20mm    | 667M-20     | 52876   |
| 0.25mm    | 667M-25     | 52877   |
| 0.30mm    | 667M-30     | 52878   |
| 0.35mm    | 667M-35     | 52879   |
| 0.40mm    | 667M-40     | 52880   |
| 0.45mm    | 667M-45     | 52881   |
| 0.50mm    | 667M-50     | 52882   |



**Thickness Gage or “Feeler” Stock Assortments**

**No. S667A** .001-.030”

**No. S667MA** 0.03-0.50mm

**No. S667D** .0015-.015”

**Individual Assortments**

Two complete, handy thickness gage assortments:

**No. S667A (Inch)**

The inch set consists of one each of 32 different pieces, 1/2” x 12” long from .001” through .030” thick (the entire individual range, with exception of the .0005” thickness, as listed on previous page).

**No. S667MA (Millimeter)**

The mm set consists of one each of 14 different pieces, 12.5mm x 300mm long from 0.03mm through 0.50mm thick (complete range, as on previous page).

**No. S667D Bulk Assortment**

This inch-reading assortment consists of 108 pieces, 1/2” x 12”, in nine different thicknesses from .0015” to .015” thick. Twelve pieces of a size are packed in a box and each piece in an individual envelope. The nine boxes, together with an extra box for holding odd pieces, are packed in a convenient storage carton.



**Nos. S667A and S667D Assortments.**

**Individual Assortments**

| Catalog No.   | EDP No. | Description   |
|---------------|---------|---|
| <b>S667A</b>  | 63274   | Complete Starrett Inch Thickness Gage Assortment – One Each, 32 Different Sizes       |
| <b>S667MA</b> | 64949   | Complete Starrett Millimeter Thickness Gage Assortment – One Each, 14 Different Sizes |

**Bulk Assortment**

|              |       |   |
|--------------|-------|---|
| <b>S667D</b> | 52883 | Bulk Quantity Assortment: 108 Pieces in Nine Thickness Sizes; 12 Pieces of a Size per Box; .0015, .002, .003, .004, .006, .008, .010, .012, .015” |
|--------------|-------|---|

Packed 12 pieces of a size in a box; each piece in individual envelope; 9 boxes in a carton.



**Thickness Gage or “Feeler” Stock in Rolls**

**No. 666 Series**

25' Dispenser Cases .001-.015"  
20', 25' Cardboard Boxes .0005-.025"

**No. 666M Series**

7.6m Dispenser Cases 0.03-0.35mm  
6.1m Cardboard Boxes 0.40-0.50mm

This handy product includes No. 667 Series thickness stock, housed in convenient rewindable dispenser rolls. Having the thickness stock in a case makes it very useful for cutting off the required length for adjusting tappets, spark plugs, distributor points, checking bearing clearances and gear play, fitting pistons, rings and pins, gaging narrow slots, etc. This stock is also useful for shimming in fixturing and die work.



**No. 666-1 Inch Reading Roll.**

- ◆ Handy 25' and 7.6m rolls 1/2" and 12.7mm wide, in a compact, sturdy plastic rewindable dispenser case. This case handles stock up to .015" and 0.35mm only
- ◆ Rewind feature permits retracting thinner feeler stock into the case, preventing damage

- ◆ Roll stock in thicknesses of .016" or 0.40mm and over is furnished in 20' or 6m (nondispensable) rolls in a cardboard box. Also, the .0005", 25' size is furnished in a cardboard box.
- ◆ Made of the finest tempered steel

- ◆ Marked every 6" or 150mm with a line, thickness in thousandths of an inch or in hundredths of a mm (exception No. 666-1/2)
- ◆ Case provides the ability to snip off the desired length without any waste

**Inch Reading Rolls – Dispenser Case**

| Thickness | Length        | Catalog No.      | EDP No. |
|-----------|---------------|------------------|---------|
| .001"     | 25'           | <b>666-1</b>     | 52796   |
| .0015"    |               | <b>666-1 1/2</b> | 52797   |
| .002"     |               | <b>666-2</b>     | 52798   |
| .0025"    |               | <b>666-2 1/2</b> | 52799   |
| .003"     |               | <b>666-3</b>     | 52800   |
| .004"     |               | <b>666-4</b>     | 52801   |
| .005"     |               | <b>666-5</b>     | 52802   |
| .006"     |               | <b>666-6</b>     | 52803   |
| .007"     |               | <b>666-7</b>     | 52804   |
| .008"     |               | <b>666-8</b>     | 52805   |
| .009"     |               | <b>666-9</b>     | 52806   |
| .010"     |               | <b>666-10</b>    | 52807   |
| .011"     |               | <b>666-11</b>    | 52808   |
| .012"     |               | <b>666-12</b>    | 52809   |
| .013"     |               | <b>666-13</b>    | 52810   |
| .014"     | <b>666-14</b> | 52811            |         |
| .015"     | <b>666-15</b> | 52812            |         |

**Inch Reading Rolls – Cardboard Box**

| Thickness | Length | Catalog No.    | EDP No. |
|-----------|--------|----------------|---------|
| .0005"    | 25'    | <b>666-1/2</b> | 64210   |
| .016"     | 20'    | <b>666-16</b>  | 52813   |
| .017"     |        | <b>666-17</b>  | 52814   |
| .018"     |        | <b>666-18</b>  | 52815   |
| .019"     |        | <b>666-19</b>  | 52816   |
| .020"     |        | <b>666-20</b>  | 52817   |
| .021"     |        | <b>666-21</b>  | 52818   |
| .022"     |        | <b>666-22</b>  | 52819   |
| .023"     |        | <b>666-23</b>  | 52820   |
| .024"     |        | <b>666-24</b>  | 52821   |
| .025"     |        | <b>666-25</b>  | 52822   |

(Continued on next page.)



### Millimeter Reading Rolls – Dispenser Case

| Thickness | Length | Catalog No.    | EDP No. |
|-----------|--------|----------------|---------|
| 0.03mm    | 7.6m   | <b>666M-3</b>  | 52823   |
| 0.04 mm   |        | <b>666M-4</b>  | 52824   |
| 0.05mm    |        | <b>666M-5</b>  | 52825   |
| 0.06mm    |        | <b>666M-6</b>  | 52826   |
| 0.08mm    |        | <b>666M-8</b>  | 52827   |
| 0.10mm    |        | <b>666M-10</b> | 52828   |
| 0.15mm    |        | <b>666M-15</b> | 52829   |
| 0.20mm    |        | <b>666M-20</b> | 52830   |
| 0.25mm    |        | <b>666M-25</b> | 52831   |
| 0.30mm    |        | <b>666M-30</b> | 52832   |
| 0.35mm    |        | <b>666M-35</b> | 52833   |

### Millimeter Reading Rolls – Cardboard Box

| Thickness | Length | Catalog No.    | EDP No. |
|-----------|--------|----------------|---------|
| 0.40mm    | 6.1m   | <b>666M-40</b> | 52834   |
| 0.45mm    |        | <b>666M-45</b> | 52835   |
| 0.50mm    |        | <b>666M-50</b> | 52836   |

## Thickness Gage or “Feeler” Stock Holders

**No. 806** Clamp at One End

**No. 806D** Clamp at Both Ends

Starrett No. 806 thickness gage holders provide a handy, convenient means of rigidly holding single leaves or strips of thickness gage stock of any thickness from .001-.025” (0.03-0.5mm).

Stock up to 6” (150mm) long is easily inserted in the holder and firmly gripped in the desired position by a cam lock. This permits all of the stock to be used, because as it wears from use, the defective end can be snipped off and new stock pulled out until entirely used up.

Available in two types as listed in the chart on the right, either to clamp stock at one end or both ends. Dull nickel finish. Size approximately 3/32” thick x 9/16” wide x 5-1/4” long (2.4 x 14 x 130mm). No. 806D clamps have contrasting finish to eliminate the possible confusion on which end holds the thicker or thinner stock.



**Top: No. 806 with stock clamped on one end. Bottom: No.806D with stock clamped on both ends.**

| Catalog No. | EDP No. | Description                             |
|-------------|---------|---|
| <b>806</b>  | 53039   | Holder Only - Clamps Stock at One End   |
| <b>806D</b> | 53040   | Holder Only - Clamps Stock at Both Ends |





## Engineers' Combination Taper, Wire and Thickness Gage

**No. 245** Inch

**No. 245M** Millimeter

Consists of a wire gage, a taper gage for measuring slot widths, and an assortment of thickness gage leaves, all folding within a compact steel case. The gage measures 1/2" wide x 4-3/4" long (12.7 x 120mm) and has a locking device to lock any leaf or leaves in position.

Both No. 245 and No. 245M have an English Standard wire gage leaf similar to our No. 188, but with shorter range, sizes numbered from 19-36 (.042-.004"), plus two additional sizes, 1/16" and 1/8". The reverse side has decimal equivalents in thousandths.

No. 245 has a taper gage leaf for measuring slot widths from 1/64-3/16" in 64ths of an inch, the reverse side having a 3" scale graduated in 8ths and 16ths. It has nine thickness or feeler leaves as follows: .002, .003, .004, .006, .008, .010, .012, .015 and 1/16".

No. 245M has a taper gage leaf for measuring slot widths from 0.5-5mm in 0.5mm, the reverse side having an 80mm scale graduated in mm and 1/2mm. It has eleven thickness or feeler leaves as follows: 0.04, 0.05, 0.06, 0.07, 0.08, 0.10, 0.15, 0.20, 0.30, 1 and 2mm.



**No. 245.**

### Inch Reading

| Catalog No. | EDP No. | Description  |
|-------------|---------|--|
| 245         | 51170   | With Taper Gage, English Standard Wire Gage and 9 Inch Reading Thickness Gage Leaves |

### Millimeter Reading

|      |       |  |
|------|-------|--|
| 245M | 51171 | With Taper Gage, English Standard Wire Gage and 11mm Reading Thickness Gage Leaves |
|------|-------|--|

Packed one in a box.



This section shows the many and varied regular and special hand tools that every toolmaker, mechanic, and craftsman will need in his work at one time or another.

They are shown in this section in the following order:

- ◆ Surface gages, snugs and scribes
- ◆ Hand cutting tools – cut nippers and hacksaw frames
- ◆ All-purpose lubricant, tool oil and layout dye
- ◆ Positioning tools – edge and center finders, 1-2-3 blocks and “Little Giant” jack screws
- ◆ Toolmakers’ hammer and bench blocks
- ◆ Tap wrenches
- ◆ Punches and nail sets
- ◆ Screwdrivers
- ◆ Pin vises
- ◆ Tool Pads
- ◆ V blocks
- ◆ Angle plates, hold downs, vises and clamps





## Surface Gages

Starrett Surface Gages are designed for a wide variety of uses. This is a basic tool for machinists and toolmakers. The main uses are for accurately scribing lines, transferring measurements and for probing surfaces in inspection work.

Lines can be scribed to heights and depths. Lines can also be scribed on horizontal surfaces referenced from gage pins on the tool. Scribes are usually set in relation to rule graduations (our No. 62 Rule Holder is valuable in this respect) or height gages.

Marrying one of these tools with one of our test indicators makes easy work of checking flatness, parallelism, height and depth.

### Features common to all Starrett Surface Gages:

- ◆ Ground bases for accurate reference surfaces
- ◆ V groove in the base for cylindrical work
- ◆ V groove on the front end which allows the spindle to adjust to any angle above or below the base
- ◆ A very positive fine adjustment through a rocker arm that makes for smooth and accurate settings
- ◆ Grooves on the side of the base for a sure and easy grip
- ◆ Nicely tapered scribes, so that you can see what you are doing
- ◆ Scriber and spindle holes are in permanent alignment

## Small Surface Gages with hardened steel base

### No. 56 Series

This tool has a smaller base and spindle than other surface gages and is designed for lighter work. There are two frictionally held gage pins in the hardened steel base which can be pushed down and used against the edge of a surface plate or T-slot for linear work.

The gage weighs only ten ounces (.28kg.) and takes up very little space in a toolbox. It is only 1-3/8" (35mm) high, including the lower sleeve in the rocker arm.

The scriber has a 3/32" (2.4mm) diameter and is 3-1/4" (82mm) long.



| Spindle        |               | Base        |           | Catalog No. | EDP No. |
|----------------|---------------|-------------|-----------|-------------|---------|
| Inch           | mm            | Inch        | mm        |             |         |
| 4"             |               |             |           | <b>56A</b>  | 50289   |
| Two, 4" and 7" | 100 and 175mm | 2" x 1-1/2" | 50 x 38mm | <b>56B</b>  | 50290   |
| 7"             |               |             |           | <b>56C</b>  | 50291   |

Packed one in a box.





### Full-sized Surface Gages

#### No. 57 Series (Cast Iron Base)

This is a full-size surface gage that has polished or attractive black wrinkle finish on all nonbearing surfaces. The base is ground flat and there are two gage pins, frictionally held, which can be pushed down and referenced against the edge of a surface plate or T-slot for linear work.

#### No. 257 Series (Hardened Steel Base)

This is our finest full-size surface gage. The stable steel base is fully hardened, ground and nicely finished. There are four gage pins, frictionally held, that add versatility for referencing the tool.

#### Snugs for Both Nos. 57, 257 Series

The new style snug at the top of the spindle comes standard with these tools. It will hold scribers, rods, or indicator stems ranging from 3/32-1/4" (2.4-6.35mm) and allows use with these test indicators:

|          |          |          |
|----------|----------|----------|
| No. 196  | No. 651  | No. 711* |
| No. 564* | No. 708* | No. 811* |
| No. 650  | No. 709* |          |

Also available are two special Universal Snugs that will fit all No. 57 and No. 257 Surface Gages and will hold all of the above Starrett test indicators. These are the No. 57S and No. 58S pictured on the next page.



Left, No. 57A; right, No. 257A.

#### No. 57 Series

| Spindle Length          | Base L x W     | Catalog No. | EDP No. |
|-------------------------|----------------|-------------|---------|
| 9" (225mm)              | 3 x 2-9/16"    | <b>57A</b>  | 50292   |
| 9" & 12" (225 & 300mm)  | (75 x 65mm)    | <b>57B</b>  | 50293   |
| 12" (300mm)             | 3-3/4 x 3-3/8" | <b>57C</b>  | 50294   |
| 12" & 18" (300 & 450mm) | (95 x 85mm)    | <b>57D</b>  | 50295   |

#### No. 257 Series

|                         |                 |             |       |
|-------------------------|-----------------|-------------|-------|
| 9" (225mm)              | 2-7/8 x 2-3/8"  | <b>257A</b> | 51240 |
| 9" & 12" (225 & 300mm)  | (72 x 60mm)     | <b>257B</b> | 51241 |
| 12" (300mm)             | 3-1/2 x 3-3/16" | <b>257C</b> | 51242 |
| 12" & 18" (300 & 450mm) | (90 x 80mm)     | <b>257D</b> | 51243 |

#### Spindles, Scribes and Standard Snugs for Both No. 57 and No. 257 Series

| Fits                  | Spindles                                     | Scribers                     | Snugs  |
|-----------------------|--|------------------------------|--|
| <b>A&amp;B Series</b> | 5/16 x 9" and 12"<br>(8mm x 225 and 300mm)   | 9/64 x 6"<br>(3.6 x 150mm)   | <b>PT18718</b> (EDP 50709) with 5/16" post hole†       |
| <b>C&amp;D Series</b> | 3/8 x 12" and 18"<br>(9.5mm x 300 and 450mm) | 5/32 x 8-1/2"<br>(4 x 216mm) | <b>PT18724</b> (EDP 50710) with 3/8" (9.5mm) post hole |

† For snug with 8mm post hole diameter, order PT27171, EDP 66457.

\* Snugs must be used with the proper indicator holder.

All items packed one in a box.







**Universal Snugs  
for surface gages,  
indicators and  
accessories**

**Nos. 57S, 58S**

These universal snugs (sometimes called sleeves) provide a convenient means of attaching scribers and test indicator shanks to surface gages, Starrett No. 657 Series Magnetic Bases, indicator tool post holders and gage rods. These snugs will fit all Starrett No. 57 and No. 257 Surface Gages and all test indicator clamps and tool post holders.

No. 57S has two hole diameters for spindle and posts and four specific clamping hole diameters.

The No. 58S is an advanced new style that is less expensive and more versatile, having the capability of accepting three different spindles or post diameters. It will also handle an unlimited number of shank diameters between 3/32" and 1/4" (2.4-6.35mm).

Both of these snugs permit the use of all of our test indicators: Nos. 196, 564\*, 650, 651, 708\*, 709\*, 711\*, and 811\*.



Left, No. 57S; right, No. 58S.

**No. 57S**

| Spindle Hole Diameters |          | Gripping Hole Diameters      |                        | Catalog No. | EDP No. |
|------------------------|----------|------------------------------|------------------------|-------------|---------|
| Inch                   | mm       | Inch                         | mm                     |             |         |
| 5/16", 3/8"            | 8, 9.5mm | 9/64", 5/32",<br>3/16", 1/4" | 3.5, 4, 4.8,<br>6.35mm | <b>57S</b>  | 50296   |

**No. 58S**

| Inch                 | mm                | Range from | Range from | Catalog No. | EDP No. |
|----------------------|-------------------|------------|------------|-------------|---------|
| 1/4", 5/16",<br>3/8" | 6.35, 8,<br>9.5mm | 3/32-1/4"  | 2.4-6.35mm |             |         |

\*Snugs must be used with the proper indicator holder.



## Scratch Gage

### No. 29

This tool is extremely useful for scribing lines parallel to a given surface. It is made of steel and the head is hardened. The gage is securely locked by a knurled clamp screw and split bushing in the head.

The marker is a square piece of thin tempered-steel firmly held against the edge of the beam by a screw. The beam is graduated a full 6" by 64ths of an inch, and fine adjustments may be made by a slight rotating movement of the head.



| Size Beam  | Graduation | Catalog No. | EDP No. |
|------------|------------|-------------|---------|
| 6" (150mm) | 64ths      | 29B         | 50201   |

**NOTE:** Two extra cutters sent with each gage.

## Pocket Scribes

Carbide or Hardened Steel Points

### No. 70 Series

The handle is of steel, knurled, and nickel plated. The scriber point is steel, properly hardened and finely tapered so that the location of the point is not obscured.

The scriber is held firmly in the handle by a knurled chuck and when not in use can be reversed, telescoped into the handle, and locked by the chuck. The hexagon-shaped head prevents rolling.



#### Scribers

| Point   | Point Length |      | Handle Diameter |       | Catalog No. | EDP No. |
|---------|--------------|------|-----------------|-------|-------------|---------|
|         | Inch         | mm   | Inch            | mm    |             |         |
| Steel   | 2-3/8"       | 60mm | 1/4"            | 6.4mm | 70A         | 50323   |
|         | 2-7/8"       | 72mm | 3/8"            | 9.5mm | 70B         | 50324   |
| Carbide | 2-3/8"       | 60mm | 1/4"            | 6.4mm | 70AX        | 50327   |
|         | 2-7/8"       | 72mm | 3/8"            | 9.5mm | 70BX        | 56092   |

#### Points Only

| Point   | For Starrett Scriber No. | Part No. | EDP No. |
|---------|--------------------------|----------|---------|
| Steel   | 70A                      | PT02355A | 70332   |
|         | 70B                      | PT02355B | 70333   |
| Carbide | 70AX                     | PT14398  | 71527   |
|         | 70BX                     | PT19306  | 72049   |

**NOTE:** Blades of Starrett No. 553 Screwdrivers will fit handles of No. 70 Scribes.



## Improved Scriber No. 67 Series

Scribers are steel, properly tempered and well finished. The points are finely tapered so that the scriber point can be easily seen on the work. The handle, as well as the points, has a knurled grip. Several points are furnished.

The long bent point is handy for reaching through holes. The length of the scriber with the short point is 9" (225mm) and with the long bent point, 12" (300mm). Points screw into the handle and fit either end. The knurled handle is nickel-plated.



**No. 67A.**

### Scribers

| Catalog No. | EDP No. | Description  |
|-------------|---------|--|
| <b>67A</b>  | 50316   | Complete with 3 Points (1 Straight, 1 Short Bent, 1 Long Bent) |
| <b>67B</b>  | 50317   | With 2 Points (1 Straight, 1 Short Bent)                       |

### Points Only

| Part No.       | EDP No. | Description            |
|----------------|---------|------------------------|
| <b>PT16584</b> | 71555   | Extra Straight Point   |
| <b>PT16585</b> | 71556   | Extra Short Bent Point |
| <b>PT16586</b> | 71557   | Extra Long Bent Point  |

## Adjustable Sleeve Scriber No. 68 Series

A very handy scriber with a point 8" (200mm) in length that is held by an adjustable knurled sleeve. The adjustable sleeve may be clamped near to or away from the working point.

The sleeve is nickel-plated. Available with or without knife point. Patternmakers find the knife point useful.



**No. 68A.**

| Catalog No. | EDP No. | Description         |
|-------------|---------|---------------------|
| <b>68A</b>  | 50322   | With Knife Point    |
| <b>68B</b>  | 50321   | Without Knife Point |



### Adjustable-Jaw Cut Nippers

#### No. 1 Series No. 233X Series

Starrett No. 1 and No. 233X Series Cut Nippers are especially recommended for all applications involving wire cutting. Both of these tools can be adjusted for wider jaw openings to easily cut tile and mosaics.

Their special design provides powerful leverage for efficient and clean cutting.

The unmatched power and features of these tools are:

- ◆ Heat-treated steel frames for strength
- ◆ Red vinyl coated handles for a firm, comfortable grip
- ◆ All jaws can be detached and replaced, or resharpened. Jaws should be ground in pairs and referenced from the serrations
- ◆ Jaws can be adjusted on the frames. Each jaw has an allowance of about 1/4" (6.4mm) for opening to cut tile or to adjust after resharpening.
- ◆ A stud and stop screw on the handles can be adjusted for proper jaw closure, thereby preventing excess pressure on the jaws, which could damage them
- ◆ A flat safety spring below the cutting edges of the jaws form a yielding seat for the end of the wire to press against while being cut



Left: No. 1-5 1/2. Right: No. 233X-7.

- ◆ No. 1 Series has a classic design and is available with either hardened steel or carbide jaws for extra long life
- ◆ No. 233X Series has a new, modified style with a slimmer design for entry into smaller areas. The handles are ergonomically designed for a firm but comfortable grip. The No. 233X Series is only available with carbide jaws

#### No. 1 Series

| Size   |       | Capacity (Max. Wire Dia.) |       | Jaw Width |        | Jaws           | Catalog No.    | EDP No. | Jaws Only (Pair) |         |
|--------|-------|---------------------------|-------|-----------|--------|----------------|----------------|---------|------------------|---------|
| Inch   | mm    | Inch                      | mm    | Inch      | mm     |                |                |         | Part No.         | EDP No. |
| 5-1/2" | 138mm | .050"                     | 1.3mm | 21/32"    | 16.5mm | Hardened Steel | <b>1-5 1/2</b> | 50000   | <b>PT01931</b>   | 50002   |
|        |       |                           |       |           |        | Carbide Tipped |                |         |                  |         |
| 7"     | 175mm | .080"                     | 2mm   | 13/16"    | 21mm   | Hardened Steel | <b>1-7</b>     | 50001   | <b>PT01932</b>   | 50003   |
|        |       |                           |       |           |        | Carbide Tipped |                |         |                  |         |

#### No. 233X Series

|        |       |       |       |      |      |                |                   |       |                |       |
|--------|-------|-------|-------|------|------|----------------|-------------------|-------|----------------|-------|
| 5-1/2" | 138mm | .050" | 1.3mm | 1/2" | 13mm | Carbide Tipped | <b>233X-5 1/2</b> | 64127 | <b>PT23894</b> | 64129 |
| 7"     | 175mm | .080" | 2mm   | 5/8" | 16mm |                | <b>233X-7</b>     | 64128 | <b>PT23528</b> | 64130 |





## Heavy-Duty High-Tension Hacksaw Frame No. K145

This high-tension frame has an easy-to-use adjusting lever requiring minimal turns to tension the blade up to 28,000 p.s.i. (2,000 kgs/cm<sup>2</sup>). High-tension prevents twisting and binding of the blade when bearing down.

When tensioning, make about six turns (360°) after first meeting resistance for Starrett Bi-Metal Unique™ Bluestripe® blades.

Rugged, yet lightweight frame is made of cast aluminum with an extra-thick tubular steel bar for added strength. Furnished with a Starrett bi-metal unique® Bluestripe® blade. We recommend bi-metal unique® Bluestripe blades for use with this frame.

Four permanently angled mounting pins allow for both straight and angle cutting. Mounting pins keep the blade in place even when tension is relieved.

## Adjustable Frames Nos. K151, K152

Nos. K151 and K152 are heavy-duty frames that accept 8, 10 or 12" (200, 250 or 300mm) blades, which can be mounted in any one of four cutting directions, tensioned by a single wing nut. Red handles are easy to see on a crowded workbench. Nos. K151 and K152 furnished with one high-speed steel blade.

## Non Adjustable Frame No. K140

The K140 is a light-weight closed grip non-adjustable frame that accepts 12" (300mm) blades. It includes a Starrett bi-metal unique® Bluestripe blade.



Top to bottom, Nos. K145, K151, K152 and K140.

### Hacksaw Frames

| Description  | Throat Depth   | Catalog No. | EDP No. |
|--|----------------|-------------|---------|
| 12" (300mm) Heavy-Duty, High-Tension (Closed Grip) | 4-3/8" (110mm) | <b>K145</b> | 67818   |
| Heavy-Duty Adjustable (Open Grip)                  | 3-3/4" (95mm)  | <b>K151</b> | 60133   |
| Heavy-Duty Adjustable (Closed Grip)                |                | <b>K152</b> | 60134   |
| Light-Duty Non Adjustable (Closed Grip)            | 3-1/2" (83mm)  | <b>K140</b> | 12184   |

### Hacksaws and Blades

In addition to the hacksaw frames shown here, we also offer a full line of rugged hand hacksaw blades, including our exclusive, faster-cutting, longer-lasting bi-metal unique® blades.

See the Hand Saws and Blades section near the back of this catalog.

NEW

NEW



### Kleenscribe™ Layout Dye

#### No. 1610 Series

Kleenscribe is a deep blue dye specially prepared for brushing or spraying onto clean, dry metal surfaces. It dries quickly, providing an opaque blue background that makes scribed lines stand out sharp and clear.

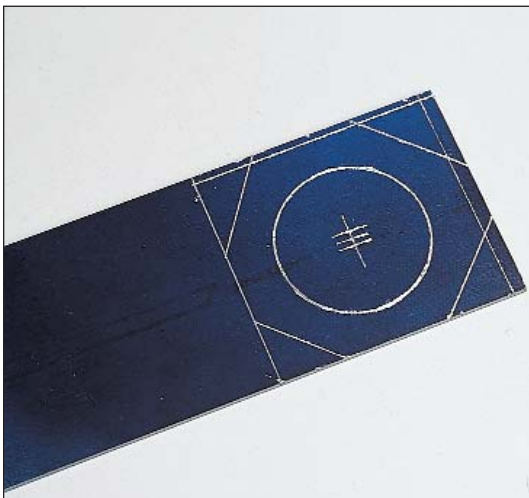
Kleenscribe will not rub off on hands or clothing or flake away, nor is it affected by cutting lubricants and heat generated during machining.

Apply with handy brush in the cap on the small plastic bottle, or shake the aerosol can thoroughly and spray a thin, even coating at a distance of about 12" (300mm) from the working surface, keeping the can in motion. To remove Kleenscribe, use a rag or wiper, moistened with denatured alcohol.



#### Ideal For Numerous Applications:

- ◆ Laying out dies, cams, templates, jigs, fixtures, patterns, castings
- ◆ Touching cutting tool to work before setting machine for cut
- ◆ Identifying tools, parts, bar stock and other shop metals
- ◆ Checking alignment of gears and wearing parts



| Size/Description                   | Catalog No. | EDP No. |
|------------------------------------|-------------|---------|
| 4 oz. (0.1 liter) Plastic Bottle   | 1610-4      | 53212   |
| 16 oz. (0.5 liter) Plastic Bottle  | 1610-16     | 53213   |
| 32 oz. (1 liter) Plastic Bottle    | 1610-32     | 53214   |
| 11-1/2 oz. (0.3 liter) Aerosol Can | 1611        | 55896   |



## M1® Industrial Quality All-Purpose Lubricant

M1® is the “modern one” – the superior alternative. It dries and will not attract dirt, dust or other contaminants as other leading lubricants do.

The Starrett Company is a leader in precision measuring tools. We use M1® in our manufacturing areas and it works. M1® will work for you too. The best lubricant value for your money.

- ◆ M1 produces a micro-thin, airtight coating/film that simultaneously dries as it protects, avoiding dirt, grime, etc., that other “wet” lubricants actually attract
- ◆ The can will spray upside down in awkward places without losing propellant power
- ◆ **Lubricates:** M1 is free of silicone, making it an excellent lubricant. Its ability to stand up to extreme temperatures makes it ideal year-round
- ◆ **Penetrates:** Deep-down penetration works quickly to free frozen nuts, bolts, and metal parts. Actually gets under caked-on dirt to clean the metal for removal
- ◆ **Prevents Rust:** Protects metal against rust and corrosion damage by providing a molecular shield that locks to the metal
- ◆ **Cleans:** Actually removes grease, tar, and grime from metal parts and painted surfaces. Cleans and polishes for lasting protection
- ◆ **Stops Squeaks:** Has instant lubrication properties that spread into those hard-to-reach metal parts to stop squeaking and sticking
- ◆ **Displaces Moisture:** M1 is not soluble in water, so it gets under moisture to lift it away from the surface to be protected
- ◆ **Nonconductive:** Prevents short circuits in high moisture environments, halts electrical leakage from wet ignition wires



Above right: 12 oz. (.3L) Aerosol Can. Above: 1 pt. (.5L) Spray bottle sold empty for refilling from bulk container.

Right: M1 Aerosol Cans spray upside down and in awkward places. Spray wand (shown) is included with each aerosol can.



See specifications on next page.





### M1® All-Purpose Lubricant (continued)

#### Industrial Applications

Applications for industry are equally endless. Protect working surfaces of machinery; use in dip tanks to protect production parts in process, or apply on tools when stored. M1 is also ideal in highly corrosive situations that destroy metal equipment like rollers, racks, conveyors, etc. used in marine environments.

#### Universal Applications

Use to dry wet automotive ignition systems. Great on ski bindings and prevents snow from sticking to shovels. Ideal on sticky drawer slides and window frames. Removes tar from car bumpers and painted surfaces. Can also be easily removed to prepare surfaces for painting. Use on tools, hinges, appliances, guns, knives, bicycles, mowers, fishing gear, locks, and on and on...

#### Bulk Containers

Larger size containers of M1 make economical sense. You can also use and refill the handy spray dispenser bottle that saves you money and prevents the unwanted waste and disposal of empty cans.

#### Bulk Containers



1 Gallon Can (3.75 liters).



5 Gallon Pail (19 liters).



53 Gallon Drum (200 liters).

M1 is available in bulk for industrial applications in 1 Gallon (3.75 liters) Cans, 5 Gallon (19 liter) Pails, and 53 Gallon (200 liter) Drums.

#### Specifications

|  |   |
|--|---|
| <b>Color</b> .....                     | amber (clear)   |
| <b>Odor</b> .....                      | pleasant  |
| <b>Specific Gravity</b> .....          | .80 @ 60° F (15.5° C)   |
| <b>Viscosity</b> .....                 | 2.2 cSt (centiStokes) converts to 10.5 SUS (seconds universal Saybolt) at 72° F (22.2° C) |
| <b>Lubrication</b> .....               | 1500 lbs. (680.4 kg) of pressure (independent testing)                                    |
| <b>Flash Point</b> .....               | 152° F (67° C) T.O.C. (Toledo open cup)   |
| <b>Percent Non-Volatile</b> .....      | 15% by weight   |
| <b>Percent Volatile, Maximum</b> ..... | 85% by weight petroleum distillate  |
| <b>Pour Point</b> .....                | -100° F (-73° C) excellent low temperature stability                                      |
| <b>Evaporation Rate</b> .....          | .7 (water = 1)  |
| <b>Coverage</b> .....                  | 3500 to 4000 sq. ft. (72-82 sq. meters) per U.S. Gal. (4.5 liters)                        |
| <b>Boiling Point, Initial</b> .....    | 370 - 470° F (187.8 - 243.3° C)   |
| <b>Weight, Applied Coating</b> .....   | 1.7 x 10 <sup>-3</sup> lbs. per sq. ft.   |
| <b>Film Thickness</b> .....            | .0004" (0.010mm) average  |
| <b>Dielectric Strength</b> .....       | 18,000 v with .100" (2.54mm) gap  |
| <b>Humidity</b> .....                  | meets and exceeds ASTM-D655 zero rust after 1000 hours                                    |
| <b>Salt Spray</b> .....                | meets and exceeds ASTM-B117 zero rust after 48 hours                                      |
|  | Indoor protection lasts up to a year.   |
|  | Outdoor protection – reapply as needed.   |

NSF registered No. 124332

**Category Code H2** ..... Acceptable as a lubricant, release agent or anti-rust film on equipment and machinery parts in and around food processing areas where there is no possibility of direct food contact

**NOTE:** Most plastics, rubber and painted materials show no visible effects when coated with M1.

| Description                                | Catalog No.     | EDP No. |
|--|-----------------|---------|
| Case of 12/12 oz. (0.3 liter) Aerosol Cans | <b>M1 95173</b> | 95173   |

#### Bulk Containers

| Description                      | Catalog No.   | EDP No. |
|----------------------------------|---------------|---------|
| 4/1 Gal. (3.75 liter) Containers | <b>M-1.01</b> | 93221   |
| 5 Gal. (19 liters) Pail          | <b>M-1.05</b> | 93227   |
| 53 Gal. (200 liters) Drum        | <b>M-1.53</b> | 93233   |

#### Spray Dispenser

| Description                                     | Catalog No.   | EDP No. |
|---|---------------|---------|
| Case of 4 1 Pint (0.5 liter) Empty Spray Bottle | <b>M-1.15</b> | 93251   |





## Tool and Instrument Oil No. 1620

**For mechanics, homeowners, sportsmen...** This oil is the same extra-fine lubricant made to our specifications and used in our factory to lubricate and protect our precision measuring tools and instruments. It is also perfect for all mechanics, homeowners, hobbyists and sportsmen who require the finest all-purpose oil.

Special high-refining makes Starrett Tool and Instrument Oil colorless, ensures thorough lubrication of close-fitting parts at high temperatures and below zero and provides a strong lasting film over all areas requiring protection against rust. This oil has not been adulterated by additives for color and odor.

- ◆ Ideal in the shop for maximum protection and lubrication of measuring tools, precision instruments and light machinery; to guard highly finished tools, parts, machine surfaces against rust
- ◆ Around the home for lubricating sewing machines, vacuum cleaners, kitchen appliances, electric fans, bicycles, lawnmowers ... for cleaning bright metals, polishing furniture
- ◆ On firearms, fishing tackle and other sporting equipment for maximum protection and to keep working parts in perfect condition
- ◆ Starrett Oil can also be used for typewriters, automobile generators, starters, hinges, locks, and springs

**Lubricating the slide on a No. 123 Vernier Caliper assures maximum protection and lubrication of working parts.**



| Description                          | Catalog No. | EDP No. |
|--------------------------------------|-------------|---------|
| 4 fl. oz. (0.1 liter) Plastic Bottle | 1620        | 53216   |



**Inspection Blocks**

**No. 706 Series** 1 x 2 x 3"

**No. 706M Series**  
25 x 50 x 75mm

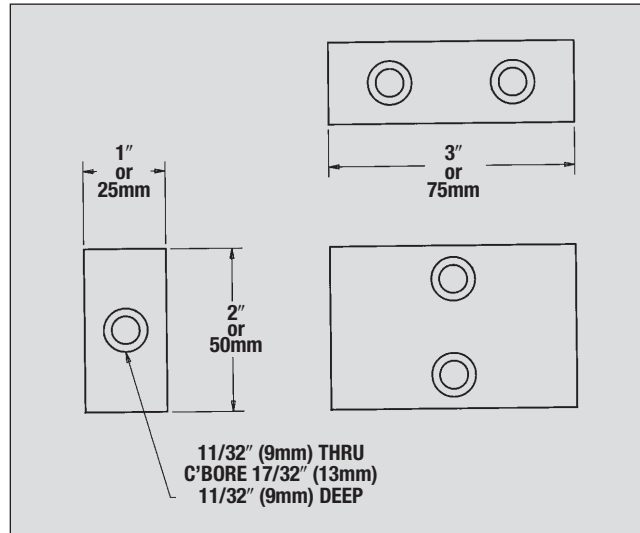
Starrett 1 x 2 x 3 Blocks are manufactured to precision tolerances, and are of great value for all inspection laboratories and in-shop setups where positioning is important.

- ◆ High accuracy
- ◆ Hardened steel, ground and lapped
- ◆ Matched pair available



**Specifications**

|                  |                                |
|------------------|--------------------------------|
| Block Dimensions | 1 x 2 x 3"<br>(25 x 50 x 75mm) |
| Parallelism      | .0001" (0.003mm)               |
| Squareness       | .0001 IN/IN<br>(0.003mm/25mm)  |
| Hardness         | RC 63-65                       |
| Flatness         | .0001" (0.003mm)               |



**Inch Blocks**

| Description                    | Catalog No.  | EDP No. |
|--------------------------------|--------------|---------|
| Single 1 x 2 x 3 Block in Case | <b>706AZ</b> | 57121   |
| Matched Pair Blocks in Case    | <b>706BZ</b> | 57122   |

**Millimeter Blocks**

|                                   |               |       |
|-----------------------------------|---------------|-------|
| Single 25 x 50 x 75 Block in Case | <b>706MAZ</b> | 64968 |
| Matched Pair in Case              | <b>706MBZ</b> | 64969 |



## Wiggler or Center Finder with attachments

### No. 828 Series

**Wiggler/Center Finder No. S828** and four different attachments adapt to countless applications and are readily interchangeable. The attachments are snapped in the chuck without removing the collet nut and are clamped by a ball swivel-joint which permits adjustment to an angular position or true concentricity.

**With Pointed Shank No. 828A**, working centers can be quickly and accurately located. Spring tension on the ball of the point permits guiding the point to true concentricity so that the work can be brought into perfect alignment with the machine spindle.

**Ball Contact No. 828B** is useful in locating work by first bringing the contact (ball diameter .250" or 6.35mm) against the work, a slot, hole, shoulder, or end, and indexing the work to the desired position relative to the spindle.

**Disc Contact No. 828C**, which has a small disc at the end (.100"/2.54mm) diameter, permits use in more confined areas such as slots or shallow holes.

**Offset Indicator Holder No. 828D** With Starrett Last Word Test Indicators, the user can sweep holes or O.D.s for checking run-out or concentricity, establish center distances, check straightness or alignment of flat surfaces.



**Complete set with case includes left-to-right: No. S828 Wiggler/Center Finder (No. PT09186 Pointed Shank attached), No. 828B Ball Contact, No. 828C Disc Contact, and No. 828D Offset Indicator Holder.**

| Description   | Catalog No.    | EDP No. |
|---|----------------|---------|
| Wiggler/Center Finder, Complete With Case and 4 Attachments, Nos. 828B, C, D, PT09186                   | <b>S828HZ</b>  | 53064   |
| Wiggler/Center Finder with 3 Attachments, Nos. 828B, C, PT09186, Without Indicator Holder, Without Case | <b>S828</b>    | 53065   |
| Wiggler/Center Finder with Pointed Shank  | <b>828A</b>    | 53066   |
| Pointed Shank Only  | <b>PT09186</b> | 71164   |
| Ball Contact Only (.250"/6.35mm Ball)   | <b>828B</b>    | 53067   |
| Disc Contact Only (.100"/2.54mm Disc)   | <b>828C</b>    | 53068   |
| Offset Indicator Holder Only  | <b>828D</b>    | 53069   |

Packed one in a box; complete or individual parts.



## Edge Finders

*For fast, accurate work location*

### No. 827 Series

.375", .500" and 10mm  
Body Diameters

Work surfaces may be located easily, quickly and accurately with these edge finders. Work with flat, straight edges, shoulders, grooves, round work, studs, dowels or center points and scribed lines – all can be accurately located with this handy tool. Body and contacts are made of tool steel, hardened, ground and lapped to close tolerances for diameter and concentricity.

#### How To Use:

Edge finders are easy to use. They are placed in a collet or chuck. The worktable is then traversed to obtain contact between



Locating the center with No. 827B.

Furnished in attractive, protective case. Packed one in a box.



Above: No. 827B with double end.

Below: No. 827MA single end.



the rotating edge finder and the work. Contact will shift to concentric position relative to the body and with very slight additional table adjustment, will move off center with a decided wobble. At this point, the center of the finder is exactly one-half the diameter of the contact from the work edge, permitting accurate location for other machining operations relative to the edge.

For locating center points and scribed lines, the pointed contact is used by putting a pencil or rule against the center point and making it run concentrically. Then the point is brought down to the center point or intersection of scribed lines and the table is

adjusted so that when the tool barely touches the work, the lineup with the point in question can be ascertained.



No. 827A locating the edge of a part.

| Description | Body Diameter | Contact Diameter          | Catalog No.  | EDP No. |
|-------------|---------------|---------------------------|--------------|---------|
| Single End  | .375"         | .200"                     | <b>827A</b>  | 53062   |
| Double End  | .500"         | .200" and pointed contact | <b>827B</b>  | 53063   |
| Single End  | 10mm          | 6mm                       | <b>827MA</b> | 56041   |
| Double End  | 10mm          | 6mm and pointed contact   | <b>827MB</b> | 66452   |

## Collet Adaptor

This is a timesaving accessory for our 827 Series edge finders. It allows quick installation and removal of the edge finder, eliminating the need for collet changes on Bridgeports and similar machines.

It can also be used with any other attachment with a 3/8" post.

The progressive steps are: 1/4", 5/16", 3/8", 1/2", 5/8", 3/4" and 1". Step depths vary from .100" to .200".



No. 827 with collet adaptor.



| Description    | Catalog No.    | EDP No. |
|----------------|----------------|---------|
| Collet Adaptor | <b>PT28314</b> | 68846   |





## “Little Giant” Jack Screws

**No. 190 Series**  
2-1/4”–3-3/8” (57-85mm)

**No. 191 Series**  
1-1/2”–2-1/4” (38-57mm)

“Little Giant” Jack Screws are very handy for leveling work on planer beds, upright drills, setting up machinery, and for general use in the toolroom or machine shop.

No. 190 and No. 191 have 20-pitch screws and for those who desire a finer adjustment, the No. F190 has a 40-pitch screw.

An auxiliary pointed screw (D) is supplied, to be used in place of the screw with swivel cap. Extension base (E) is furnished for places where it is not possible to obtain a bearing on a flat surface. Extension V base (F) is for use against a cylindrical form.



**No. SF190 “Little Giant” Jack Screw set complete with all attachments.**

| Specifications                  | No. 190 Series |         | No. 191 Series |         |
|---------------------------------|----------------|---------|----------------|---------|
|                                 | Inch           | mm      | Inch           | mm      |
| Range                           | 2-1/4–3-3/8”   | 57-85mm | 1-1/2–2-1/4”   | 38-57mm |
| Maximum Height with Attachments | 6-3/8”         | 162mm   | 3-3/4”         | 95mm    |
| Jack (A) Base Diameter          | 1-1/4”         | 32mm    | 1”             | 25mm    |
| Extension (B)                   | 2”             | 50mm    | 1”             | 25mm    |
| Extension (C)                   | 1”             | 25mm    | 1/2”           | 13mm    |

| Photo Key | Description   | Catalog No.  | EDP No. | Catalog No. | EDP No. |
|-----------|---|--------------|---------|-------------|---------|
|           | Set Complete, with Fine-Adjusting Screw and All Attachments | <b>SF190</b> | 64622   |             |         |
|           | Set Complete with All Attachments                           | <b>S190</b>  | 50680   | <b>S191</b> | 50687   |
| <b>A</b>  | Jack Only, with Fine-Adjusting Screw                        | <b>F190A</b> | 64623   |             |         |
|           | Jack Only   | <b>190A</b>  | 50681   | <b>191A</b> | 50688   |
| <b>B</b>  | Extension Base  | <b>190B</b>  | 50682   | <b>191B</b> | 50689   |
| <b>C</b>  | Extension Base  | <b>190C</b>  | 50683   | <b>191C</b> | 50690   |
| <b>D</b>  | Auxiliary Pointed Screw with Fine-Adjusting Screw           | <b>F190D</b> | 64624   |             |         |
|           | Auxiliary Pointed Screw                                     | <b>190D</b>  | 50684   | <b>191D</b> | 50691   |
| <b>E</b>  | Extension Base  | <b>190E</b>  | 50685   | <b>191E</b> | 50692   |
| <b>F</b>  | Extension V Base  | <b>190F</b>  | 50686   | <b>191F</b> | 50693   |

Packed one in a box.



## Toolmakers' Hammer with built-in magnifying lens

*A practical tool – makes a great gift too!*

### No. 815

This is a very practical tool that is just as much at home on a toolmaker's bench as it is on a businessman's desk.

Faster, easier and more accurate spotting and punching of centerlines and intersections is now possible with the Starrett hammer for toolmakers and diemakers.

A magnifying lens built into the head of the hammer eliminates the usual fumbling and looking away involved when a separate glass and hammer are used. High-power magnification makes it easy to spot the punch and strike without once removing the eyes from the work. (See photo.)

The hammer is light – weighing only four ounces (113 grams) – but it is made of a steel forging for strength and rigidity. It has a highly attractive chromium plated finish.

Packed one in a box.



Locating hole center on a workpiece with Starrett No. 816 Prick Punch and No. 815 Toolmakers' Hammer.



Both flat and ball peen heads are hardened and are offset for use in corners or close to obstructions. The lens is mounted in rubber for shock resistance. Handle has hole for hanging.

The 815 Hammer is also useful as a portable gavel or paperweight, and for light tacking, magnifying a sliver and more.

| Description                         | Catalog No. | EDP No. |
|-------------------------------------|-------------|---------|
| Hammer Only                         | <b>815</b>  | 53041   |
| Personalized (Specify Name Clearly) | <b>815P</b> | 53042   |

## Bench Blocks

### No. 129

The Starrett No. 129 Bench Block is useful for holding work when driving pins, drilling, etc. The block is made from steel and is hardened and ground. A V-groove across the face accommodates round and odd-shaped stock. The smooth finish helps preserve the finish of the work being held.

The knurled side provides a good gripping surface, making it easier to handle. The base is recessed to make it lighter, yet sufficiently strong to withstand hard usage.

### No. 119

The Starrett No. 119 Bench Block is a good choice for all-around machine shop and toolroom use when a larger, heavy-duty block is required. This block weighs five pounds (2.3kg). The base is hex-shaped, so the block to be held rigidly in a vise. It is made from alloy steel, hardened, and ground, top and bottom.

Packed one in a box.



Left: No. 129. Right: No. 119.

| Size/Description   | Catalog No. | EDP No. |
|--|-------------|---------|
| 3" (75mm) Diameter x 1-1/2" (38mm) High with Oversize Holes from 1/8-5/8" (3-16mm) Diameter and One V-Groove                           | <b>129</b>  | 50559   |
| 4-7/8" (120mm) Diameter x 1-1/2" (38mm) High with Ten Oversize Holes from 1/8-7/8" (3-22mm) Diameter and Two V-Grooves at Right Angles | <b>119</b>  | 50491   |



## Punches and Nail Sets for machinists, builders and carpenters

These punches and nail sets are universally used, but most often by machinists and carpenters.

Starrett punches and nail sets are well-proportioned featuring nicely knurled finger grips for ease of handling and use.

They are made from specially selected tool steel, hardened and tempered utilizing a special process so the head is less likely to fracture from a hard, off-center blow.

**IMPORTANT:** Always wear safety glasses when using striking and struck tools.

## Automatic Center Punch with adjustable stroke

### No. 818

This punch is similar to our No. 18C, except that it has a lightweight, knurled aluminum handle for a positive grip and easy handling. No hammer is required! Just hold the punch in an upright position, press the handle down, and a built-in mechanism strikes a perfect center mark every time. The force of the blow can be adjusted by turning the knurled cap.



All working parts are made of tool steel, properly hardened. Hardened tool steel point may easily be removed for reshaping or replacement. (Replacement Point No. PT22256.) Works on metal, plastics, wood and other machinable materials.



Easy one-hand precision center punching.

| Length        | Diameter       | Catalog No. | EDP No. |
|---------------|----------------|-------------|---------|
| 5"<br>(125mm) | 5/8"<br>(16mm) | <b>818</b>  | 53048   |

Packed one in a box.

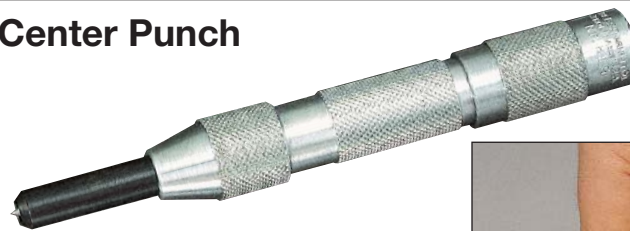
## Hinge-Locating Automatic Center Punch with adjustable stroke

### No. 819

This is the tool that carpenters, cabinetmakers, metalworkers, and home craftsmen have been waiting for. This automatic centering punch combines all the features of our No. 818 lightweight aluminum punch with an exclusive self-centering locating sleeve.

The locating sleeve automatically centers starter holes for screws through butt hinges and all other types of builders' and cabinet hardware items.

The punch works as follows. Engage the beveled edge of the sleeve with the countersunk hole in the hinge. Press down on the handle until the built-in mechanism



strikes a blow. By this simple process you obtain truly concentric starting holes every time. This eliminates the risk of drilling off center, causing screws to pull hinges or hardware off center. To draw hinges, etc., sideways, tilt the punch slightly in the opposite direction.

Punch can be adjusted for striking light or heavy impressions by turning the knurled cap. In addition, the point removes easily for replacement or reshaping. (Replacement Point No. PT09966.)



Automatically locates and centers countersunk holes and starting holes for screws, through hinges, latches, catches, etc.

| Length |       | Diameter |      | Catalog No. | EDP No. |
|--------|-------|----------|------|-------------|---------|
| Inch   | mm    | Inch     | mm   |             |         |
| 5"     | 125mm | 5/8"     | 16mm | <b>819</b>  | 53049   |

Packed one in a box.





## Automatic Center Punch with adjustable stroke

### No. 18 Series

Rugged automatic punches have all-steel handles and parts. These punches have a mechanism that automatically strikes a blow when downward pressure is applied. No hammer is required, making one hand always free to steady the work.

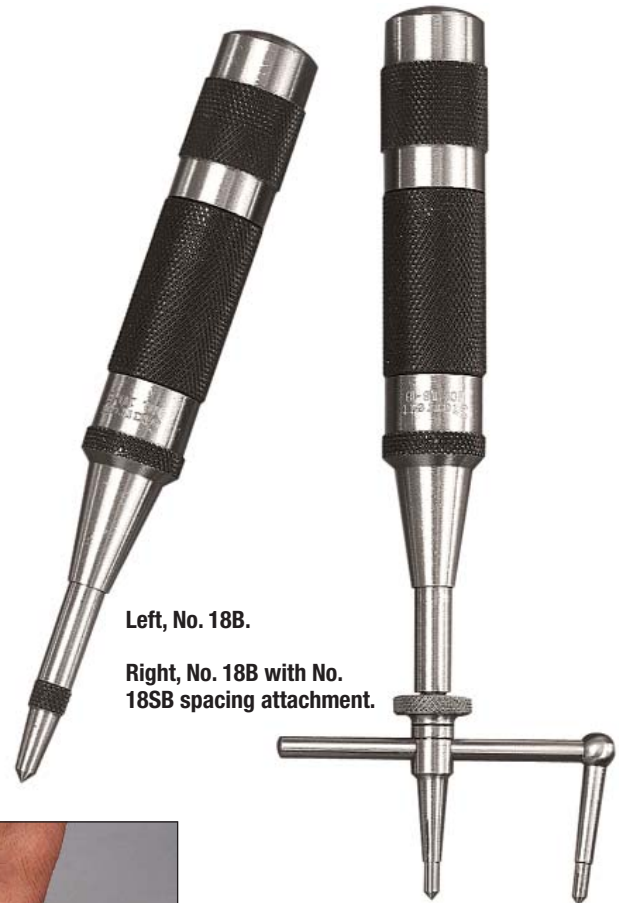
The adjustable knurled cap regulates the force of the blow. Should a heavy mark be required, the cap is screwed down. Progressively lighter marks are obtained by turning the cap upward. The tension of the spring, which regulates the blow, is constant so marks made by the point are uniform in depth and size for each setting. The point can be easily removed for regrinding and/or replacement. All sizes are identical in style, differing only in the striking power.

The heavy-duty No. 18C model is capable of striking a much heavier blow than the other sizes and has a one-piece point and shank which may also be easily resharpened or replaced.

## Spacing Attachment for Starrett No. 18B Center Punch

### No. 18SB

This handy attachment is used with our No. 18B Automatic Center Punch for accurately spacing center distances. It can be instantly screwed into the No. 18B Punch shank in place of the regular point. It quickly spaces distances within its range. The locating point is frictionally held and easily replaced. Range is 1/8–1-3/4" (3-44mm).



Left, No. 18B.

Right, No. 18B with No. 18SB spacing attachment.



Above: Locating equidistant centers with No. 18B Automatic Center Punch and No. 18SB Spacing Attachment.

| Description                                 | Length |       | Diameter |      | Catalog/Part No. | EDP No. |
|---|--------|-------|----------|------|------------------|---------|
|   | Inch   | mm    | Inch     | mm   |                  |         |
| Punch                                       | 4"     | 100mm | 7/16"    | 11mm | <b>18AA</b>      | 50119   |
|   | 5"     | 125mm | 9/16"    | 14mm | <b>18A</b>       | 50120   |
|   | 5-1/4" | 130mm | 11/16"   | 17mm | <b>18B</b>       | 50121   |
| Punch, Heavy-Duty                           | 5-1/4" | 130mm | 11/16"   | 17mm | <b>18C</b>       | 56757   |
| Point Only for Nos. 18AA and 18A            |        |       |          |      | <b>PT02947</b>   | 70380   |
| Point Only for No. 18B                      |        |       |          |      | <b>PT02948</b>   | 70381   |
| Spacing Attachment for No. 18B Center Punch |        |       |          |      | <b>18SB</b>      | 50126   |

**NOTES:** Special points for stamping numbers, letters, special symbols, etc. can be furnished. Contact the Special Order Department.

Packed one in a box.





## Center Punches with Round Shanks

### No. 117 Series

Starrett No. 117 Center Punches are made of specially selected steel, hardened and properly tempered. They are well proportioned, nicely finished and have a knurled finger grip.

The points are ground at the proper angle to give maximum service, and the tips are accurately centered.



Left to right: No. 117 Series Punches, Nos. 117AA, A, B, C, D, E.

| Length   |       | Dia. at Top of Tapered Point |       | Catalog No.   | EDP No. |
|--|-------|------------------------------|-------|---------------|---------|
| Inch   | mm    | Inch                         | mm    |               |         |
| 3"   | 75mm  | 1/16"                        | 1.5mm | <b>117AA</b>  | 50482   |
| 4"   | 100mm | 5/64"                        | 2mm   | <b>117A</b>   | 50483   |
|  |       | 3/32"                        | 2.5mm | <b>117B</b>   | 50484   |
|  |       | 1/8"                         | 3mm   | <b>117C</b>   | 50485   |
|  |       | 5/32"                        | 4mm   | <b>117D</b>   | 50486   |
| 5"   | 125mm | 1/4"                         | 6.5mm | <b>117E</b>   | 50487   |
| Set of 5, Nos. 117AA, A, B, C, D in Plastic Case |       |                              |       | <b>S117PC</b> | 50488   |



## Center Punches with Square Shanks

### No. 264 Series

These center punches have a square knurled grip and will not roll when laid down. They are hardened and properly tempered. The tips are accurately centered and ground at the proper angle to give maximum service.



Left-to-right: Nos. 264A, B, C, D, E, F, G.

No. S264WB, set of all 7 sizes in round red plastic box.

| Length   |       | Diameter at Top of Tapered Point |       | Square Thickness |       | Catalog No.   | EDP No. |
|--|-------|----------------------------------|-------|------------------|-------|---------------|---------|
| Inch   | mm    | Inch                             | mm    | Inch             | mm    |               |         |
| 3"   | 75mm  | 1/16"                            | 1.5mm | 3/8"             | 9.5mm | <b>264A</b>   | 51278   |
| 3-1/2"   | 88mm  | 5/64"                            | 2mm   |                  |       | <b>264B</b>   | 51279   |
| 3-3/4"   | 95mm  | 3/32"                            | 2.5mm |                  |       | <b>264C</b>   | 51280   |
| 4"   | 100mm | 1/8"                             | 3mm   |                  |       | <b>264D</b>   | 51281   |
| 4-1/4"   | 108mm | 5/32"                            | 4mm   | 7/16"            | 11mm  | <b>264E</b>   | 51282   |
| 4-1/2"   | 114mm | 3/16"                            | 5mm   |                  |       | <b>264F</b>   | 51283   |
| 5"   | 125mm | 1/4"                             | 6mm   |                  |       | <b>264G</b>   | 51284   |
| Set of 7, Nos. 264A, B, C, D, E, F, G in Round Red Plastic Box |       |                                  |       |                  |       | <b>S264WB</b> | 51285   |



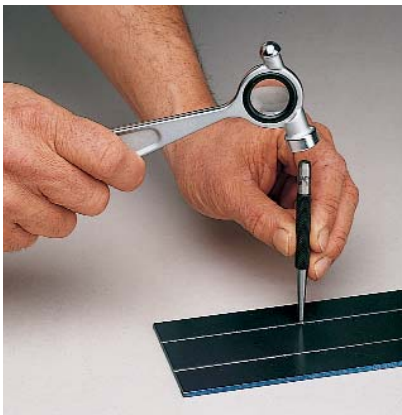
## Prick Punches No. 816 Series

When precise positioning of a point or an intersection of lines is required, these are the punches to use. The points are carefully ground to the correct taper, which is sharper than the normal center punch.

This allows exact placement of the point, providing sharp impressions. These punches are properly hardened, tempered, and nicely finished.



Punch set consisting of (left-to-right) models Nos. 117AA, 117B, 816A, 816B, 816D.



Locating hole center on a workpiece with Starrett No. 816 Prick Punch and No. 815 Toolmakers' Hammer.

| Length  |       | Diameter at Top of Tapered Point |     | Catalog No.   | EDP No. |
|---|-------|----------------------------------|-----|---------------|---------|
| Inch  | mm    | Inch                             | mm  |               |         |
| 4"  | 100mm | 5/64"                            | 2mm | <b>816A</b>   | 53043   |
|   |       | 1/8"                             | 3mm | <b>816B</b>   | 53044   |
|   |       | 5/32"                            | 4mm | <b>816D</b>   | 53046   |
| Combination Starrett Punch Set in Plastic Case. One Each Nos. 816A, B, D Prick Punches, and Two Center Punches Nos. 117AA, B. |       |                                  |     | <b>S816PC</b> | 57078   |



## Drive Pin Punches

### No. 565 Series

Starrett No. 565 Drive Pin Punches are well proportioned, hardened, properly tempered, nicely finished, and have a knurled finger grip. Each punch has the size stamped on the head.



Left to right: Nos. 565A, B, C, D, E, F, G, H.

No. S565WB, set of all 8 sizes in round red plastic box.

| Length   |       | Diameter Punch |       | Catalog No.   | EDP No. |
|--|-------|----------------|-------|---------------|---------|
| Inch   | mm    | Inch           | mm    |               |         |
| 4"   | 100mm | 1/16"          | 1.5mm | <b>565A</b>   | 52578   |
|  |       | 3/32"          | 2.5mm | <b>565B</b>   | 52579   |
|  |       | 1/8"           | 3mm   | <b>565C</b>   | 52580   |
|  |       | 5/32"          | 4mm   | <b>565D</b>   | 52581   |
|  |       | 3/16"          | 5mm   | <b>565E</b>   | 52582   |
|  |       | 7/32"          | 5.5mm | <b>565F</b>   | 52583   |
|  |       | 1/4"           | 6mm   | <b>565G</b>   | 52584   |
|  |       | 5/16"          | 8mm   | <b>565H</b>   | 52585   |
| Set of 8 Punches (1 of Each Size) in Round Red Plastic Box |       |                |       | <b>S565WB</b> | 52586   |
| Set of 8 Punches (1 of Each Size) in Protective Vinyl Case |       |                |       | <b>S565PC</b> | 52587   |





## Square-Head Nail Sets No. 800 Series

Starrett No. 800 Nail Sets have a round, knurled grip and a large, square head that provides a large striking surface, prevents the tool from rolling, and makes them easier to find among nails or other small tools in the pocket.

The end is beveled to prevent breakage and the punch surface is cupped to follow the nail without sliding off. The punch diameter is clearly marked on the head. Tools are made of hardened and tempered steel.

Left to right: Nos. 800A, B, C, D, E.



| Length  |       | Punch Diameter |       | Cat. No.      | EDP   |
|---|-------|----------------|-------|---------------|-------|
| Inch  | mm    | Inch           | mm    |               |       |
| 4"  | 100mm | 1/32"          | 0.8mm | <b>800A</b>   | 53029 |
|   |       | 1/16"          | 1.5mm | <b>800B</b>   | 53030 |
|   |       | 3/32"          | 2.5mm | <b>800C</b>   | 53031 |
|   |       | 1/8"           | 3mm   | <b>800D</b>   | 53032 |
|   |       | 5/32"          | 4mm   | <b>800E</b>   | 53033 |
| Set of 5 in Protective Plastic Case.<br>One Each of Nos. 800A, B, C, D, E |       |                |       | <b>S800PC</b> | 64131 |

## Drive Pin Punches for machine shop and motor service work

### No. 248 Series

Starrett No. 248 Drive Pin Punches are extra-long, measuring 8" (200mm). The bodies are 4-1/2" (115mm) and the drive pin sections are 3-1/2" (90mm) long. They are well-proportioned, hardened, properly tempered, and have a knurled grip. They are designed to withstand hard use

and provide a most satisfactory punch for machine shop and motor service work. Just the punch to follow long cotter pins and the like into holes without hindrance. The diameters of the punches are slightly under the sizes listed below.

Left to right: Nos. 248A, B, C, D, E.



| Length   |       | Diameter Punch |       | Catalog No.   | EDP No. |
|--|-------|----------------|-------|---------------|---------|
| Inch   | mm    | Inch           | mm    |               |         |
| 8"   | 200mm | 1/8"           | 3mm   | <b>248A</b>   | 51181   |
|  |       | 3/16"          | 5mm   | <b>248B</b>   | 51182   |
|  |       | 1/4"           | 6mm   | <b>248C</b>   | 51183   |
|  |       | 5/16"          | 8mm   | <b>248D</b>   | 51184   |
|  |       | 3/8"           | 9.5mm | <b>248E</b>   | 51185   |
| Set of 5 Punches (1 of Each Size) in Protective Vinyl Case |       |                |       | <b>S248PC</b> | 51186   |
| Set of 5 Punches (1 of Each Size) in Plain Box             |       |                |       | <b>S248</b>   | 51187   |



### Starrett Screwdrivers

Starrett screwdrivers are made for relatively small and very delicate work. The common features of all our screwdrivers are:

- ◆ The bodies are made from steel, nicely knurled and nickel-plated
- ◆ The blades are made from the best quality steel, properly tempered and nickel-plated
- ◆ All blades are replaceable - a slight turn of the knurled chucks securely locks the blade so it will not turn or come out
- ◆ When not in use, the blades can be reversed into the screwdriver body and safely carried in a pocket



Left to right: Nos. 555AA, A, B, C, D, E, F.

### Jewelers' Screwdrivers No. 555 Series

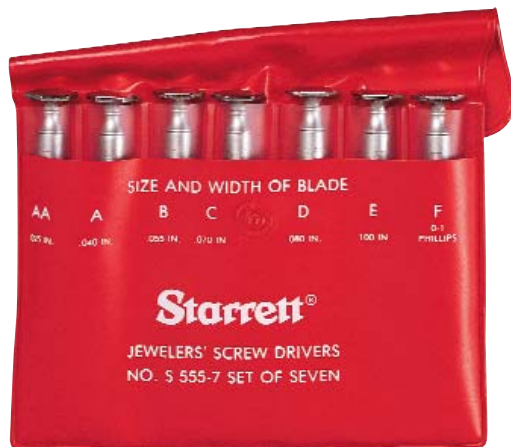
Watch and clockmakers, jewelers, opticians, toolmakers and others will find these screwdrivers especially adaptable for fine, delicate work. The swivel knobs are concave to fit the finger and are hexagonal in shape to prevent rolling. Screwdrivers are available individually or in sets, as listed at right. Blades vary in width from .025-.100" (0.6-2.5mm). There is also a blade available for No. 0 Phillips head screws. Overall length of screwdrivers is approximately 3-3/4" (95mm).

| Blade Width<br>Inch/mm | Phillips Blade No. | Complete Screwdriver |         | Blade Only |         |
|------------------------|--------------------|----------------------|---------|------------|---------|
|                        |                    | Catalog No.          | EDP No. | Part No.   | EDP No. |
| .025" (0.6mm)          |                    | 555AA                | 52549   | PT02449AA  | 70361   |
| .040" (1mm)            |                    | 555A                 | 52550   | PT02449A   | 70362   |
| .055" (1.4mm)          |                    | 555B                 | 52551   | PT02449B   | 70363   |
| .070" (1.8mm)          |                    | 555C                 | 52552   | PT02449C   | 70364   |
| .080" (2mm)            |                    | 555D                 | 52553   | PT02449D   | 70365   |
| .100" (2.5mm)          |                    | 555E                 | 52554   | PT02449E   | 70366   |
|                        | #0                 | 555F                 | 52561   | PT14443    | 71534   |

#### Screwdriver Sets

| Description                                       | Catalog No. | EDP No. |
|---|-------------|---------|
| Set of 6 – Nos. 555AA, A, B, C, D, E – In Case    | S555Z-6     | 52564   |
| Set of 7 – Nos. 555AA, A, B, C, D, E, F – In Case | S555Z-7     | 52566   |

Below: Set No. S555Z-7, all 7 sizes in protective vinyl case.





## Precision Screwdrivers No. 551 Series

The Starrett No. 551 Screwdrivers with soft-touch handle are lightweight and have a very ergonomic design, making them easy to work with.

Yet the No. 551 is a rugged product. The blade/contacts are made of chrome-vanadium, molybdenum steel, hardened and chrome-plated, allowing them to hold up well in the toughest applications.

### Features

- ◆ Precision-machined tips for top quality and exact fit
- ◆ Vapor-chromed non-slip tips
- ◆ Hardened for maximum durability
- ◆ Tapered handles are proportioned to blade and allow rapid rotation
- ◆ Spin-free finger control cap for precise turning and control



Left-to-right: Nos. 551A, B, C, D, E, F, G.



Above: Set of seven screwdrivers with case, No. S551Z-7.

| Blade Width<br>Inch/mm | Phillips Blade No. | Complete Screwdriver |         |
|------------------------|--------------------|----------------------|---------|
|                        |                    | Catalog No.          | EDP No. |
| .060" (1.5mm)          |                    | 551A                 | 67195   |
| .080" (2.0mm)          |                    | 551B                 | 67196   |
| .100" (2.5mm)          |                    | 551C                 | 67197   |
| .120" (3.0mm)          |                    | 551D                 | 67198   |
|                        | #00                | 551E                 | 67199   |
|                        | #0                 | 551F                 | 67200   |
|                        | #1                 | 551G                 | 67201   |

### Screwdriver Sets

| Description  | Catalog No. | EDP No. |
|--|-------------|---------|
| Set of 7 – Nos. 551A, B, C, D, E, F, G – With Case | S551Z-7     | 67203   |
| Case Only  | S551ZZ      | 67204   |



## Pocket Screwdrivers

### No. 553 Series

Screwdrivers feature a hexagonally shaped head to prevent them from rolling.

When not in use, the blade can be reversed into the screwdriver body for conveniently and safely carrying them in pockets. Size takes no more room than a penknife.

Overall length with blade: No. 553A, 4-1/4" (110mm); No. 553B, 5 5/8" (140mm).

Handy steel and carbide scriber points are also available to fit these handles, including 70 Series scriber points.

| Blade Width<br>Inch/mm | Blade Length<br>Inch/mm | Catalog No. | EDP No. | Blade Only      |         |
|------------------------|-------------------------|-------------|---------|-----------------|---------|
|                        |                         |             |         | Part No.        | EDP No. |
| .100" (2.5mm)          | 1-7/8" (48mm)           | <b>553A</b> | 52543   | <b>PT02351A</b> | 70330   |
| .150" (3.8mm)          | 3" (75mm)               | <b>553B</b> | 52544   | <b>PT02351B</b> | 70331   |

#### Scriber Points Only

| Fits Model  | Steel           |         | Carbide        |         |
|-------------|-----------------|---------|----------------|---------|
|             | Catalog No.     | EDP No. | Catalog No.    | EDP No. |
| <b>553A</b> | <b>PT02355A</b> | 70332   | <b>PT14398</b> | 71527   |
| <b>553B</b> | <b>PT02355B</b> | 70333   | <b>PT19306</b> | 72049   |



Left, No. 553A; right, No. 553B.

## Pocket Screwdrivers with wood handle

### No. 559 Series

These screwdrivers are very similar to our No. 553 listed above, except that they have a good feeling wood handle.

There are many small, inexpensive screwdrivers on the market, but these were designed for superior quality and strength.

Steel parts are nickel-plated. Blades are reversible, telescoping into the handle. Overall length with blade: No. 559A, 4" (100mm); No. 559B, 6" (150mm).

Handy steel and carbide scriber points are also available to fit these handles, including 70 Series scriber points.

| Blade Width<br>Inch/mm | Blade Length<br>Inch/mm | Catalog No. | EDP No. | Blade Only      |         |
|------------------------|-------------------------|-------------|---------|-----------------|---------|
|                        |                         |             |         | Part No.        | EDP No. |
| .100" (2.5mm)          | 1-7/8" (48mm)           | <b>559A</b> | 52567   | <b>PT02351A</b> | 70330   |
| .150" (3.8mm)          | 3" (75mm)               | <b>559B</b> | 52568   | <b>PT02351B</b> | 70331   |

#### Scriber Points Only

| Fits Model  | Steel           |         | Carbide        |         |
|-------------|-----------------|---------|----------------|---------|
|             | Catalog No.     | EDP No. | Catalog No.    | EDP No. |
| <b>559A</b> | <b>PT02355A</b> | 70332   | <b>PT14398</b> | 71527   |
| <b>559B</b> | <b>PT02355B</b> | 70333   | <b>PT19306</b> | 72049   |



Left, No. 559A; right, No. 559B.





## Opticians' Screwdriver with extra blade/spring- grip screw holder

### No. 552

This screwdriver is specially designed for opticians, watch and clockmakers, etc. for use on small screws.

The swivel knob is concave to fit the finger and hexagonal to prevent rolling. Two nickel-plated tempered blades, both .100" (2.5mm) wide, are furnished. The sliding, spring-grip screw holder fits over the longer blade and when not needed, it can be slipped back, out of the way.

Pressing the bowed spring opens the jaws to receive the screw head. Overall length is 5-3/8" (135mm) for No. 552A and 4-1/2" (113mm) for No. 552B.

| Description                                | Catalog No.     | EDP No. |
|--|-----------------|---------|
| Complete, with Two Blades and Screw Holder | <b>552A</b>     | 52539   |
| With Two Blades                            | <b>552B</b>     | 52540   |
| Screw Holder Only                          | <b>PT99212</b>  | 71927   |
| "A" Blade Only – 1-7/8" (48mm)             | <b>PT02351A</b> | 70330   |
| "B" Blade Only – 2-3/4" (70mm)             | <b>PT02377</b>  | 70335   |



Left, No. 552A; right, No. PT02377 Blade with screw holder only, shown clasping a small screw.

## Eyeglass Screwdriver

### No. 554

A compact and streamlined screwdriver with an overall length of only 2-1/2" (63mm). Highly useful for tightening and removing the many extremely small screws found in eyeglasses, radios, sewing machines, electric razors, etc.

When carrying in pockets or on key rings or watch chains, the blade can be safely reversed and telescoped into the body. Approximate length with blade reversed is 2" (50mm). Chrome plated. Blade width approximately 1/16" (1.5mm).

| Description         | Catalog No.    | EDP No. |
|---------------------|----------------|---------|
| Complete with Blade | <b>554</b>     | 52547   |
| Blade Only          | <b>PT02460</b> | 70367   |

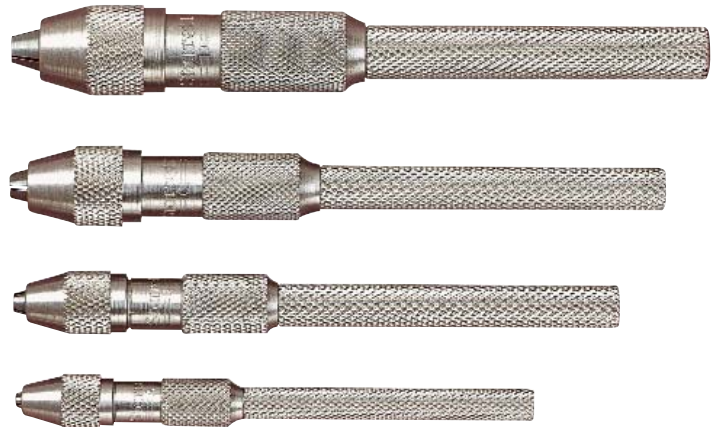




## Pin Vises

Starrett pin vises are useful for securely holding small stock, taps, drills, reamers, scribers, wire, small files, and other tools. The jaws on all are hardened and with a few turns of the binding nut, a firm grip may be obtained. Handles and binding nuts are nickel-plated except for the No. 166 Series.

A hole extends through the full length of the handles so that wires of any length and any diameter up to the full size of the tool can be held.



Top to bottom: Nos. 162D, C, B, A.

### No. 162 Series

0-.187" / 0-4.8mm

The handles of these pin vises are reduced in size so that they can be rapidly rotated between thumb and finger when filing small work.

| Range                                       |           | Catalog No.  | EDP No. |
|---|-----------|--------------|---------|
| Inch  | mm        |              |         |
| 0-.040"                                     | 0-1mm     | <b>162A</b>  | 50599   |
| .030-.062"                                  | 0.8-1.6mm | <b>162B</b>  | 50600   |
| .050-.125"                                  | 1.3-3.2mm | <b>162C</b>  | 50601   |
| .115-.187"                                  | 2.9-4.8mm | <b>162D</b>  | 50602   |
| Set of All 4 Sizes in Protective Vinyl Case |           | <b>S162Z</b> | 50604   |

## Pin Vises with insulated, octagonal handles

### No. 166 Series

0-.187" / 0-4.8mm

These pin vises are the same as our No. 162 Series except that they have an insulating PVC handle which is octagonally shaped, preventing them from rolling when laid down.



Top to bottom: Nos. 166D, C, B, A.

| Range                                       |           | Catalog No.  | EDP No. |
|---|-----------|--------------|---------|
| Inch  | mm        |              |         |
| 0-.040"                                     | 0-1mm     | <b>166A</b>  | 50609   |
| .030-.062"                                  | 0.8-1.6mm | <b>166B</b>  | 50610   |
| .050-.125"                                  | 1.3-3.2mm | <b>166C</b>  | 50611   |
| .115-.187"                                  | 2.9-4.8mm | <b>166D</b>  | 50612   |
| Set of All 4 Sizes in Protective Vinyl Case |           | <b>S166Z</b> | 50614   |

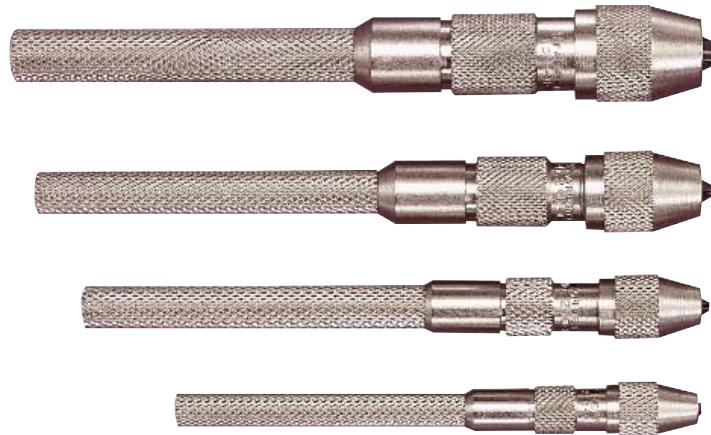


## Pin Vises with tapered collets

### No. 240 Series .010-.200" / 0.25-5.1mm

No. 240 Pin Vises have a special collet design with tapers at both ends, providing maximum clamping surface.

These pin vises also have a smaller body diameter than the chuck, which allows fast opening and closing and rapid rotation between the thumb and finger when used on small work. Available either separately or as a complete set in a convenient case.



Top to bottom: Nos. 240D, C, B, A.

| Range                                       |            | Catalog No.  | EDP No. |
|---|------------|--------------|---------|
| Inch  | mm         |              |         |
| .010-.055"                                  | 0.25-1.4mm | <b>240A</b>  | 51136   |
| .025-.075"                                  | 0.64-1.9mm | <b>240B</b>  | 51137   |
| .045-.135"                                  | 1.2-3.4mm  | <b>240C</b>  | 51138   |
| .110-.200"                                  | 2.8-5.1mm  | <b>240D</b>  | 51139   |
| Set of All 4 Sizes in Protective Vinyl Case |            | <b>S240Z</b> | 51140   |

## Double End Pin Vise

### No. 165 0-.125" / 0-3.2mm

The Starrett No. 165 Double End Pin Vise is ideal for those who want multiple features in a single tool. This pin vise has reversible collets with two size capacities at each end.

The chuck at one end holds work or tools 0-.031" and .093-.125" diameter (0-0.8mm and 2.5-3.2mm).

The chuck at the opposite end holds .031-.062" and .062-.093" diameter (0.8-1.6mm and 1.6-2.5mm).

Both ends of each chuck are beveled, providing "back support."



| Range   |         | Catalog No. | EDP No. |
|---------|---------|-------------|---------|
| Inch    | mm      |             |         |
| 0-.125" | 0-3.2mm | <b>165</b>  | 50608   |



### T-Handle Tap Wrenches No. 93 Series

Starrett No. 93 T-Handle Tap Wrenches are for holding taps, drills, reamers and other small tools to be turned by hand.

The body is centered, enabling the worker to use it on lathe centers or on an upright drilling machine to start the tap straight. The jaws conform to the tool being held, making it rigid and less apt to loosen. They are properly heat treated to withstand ordinary shop use.

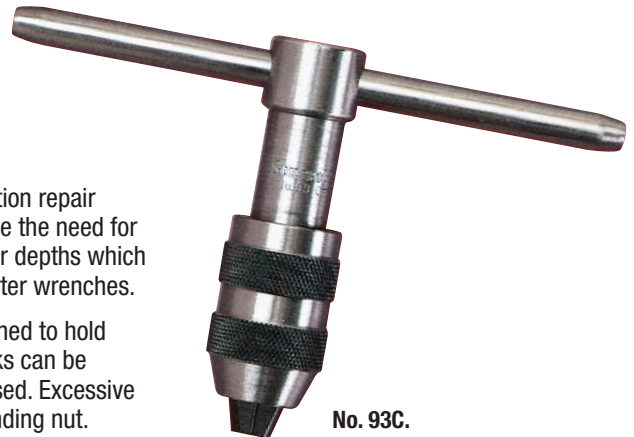
All wrenches have a sliding handle that is frictionally held. This feature permits the handle to be removed entirely or positioned so that leverage can be applied when working in close quarters.

The Nos. 93D, E and F sizes are identical in construction to the Nos. 93A, B and C models, except that the bodies are proportionately longer. These longer tap wrenches are very handy in machine,

Packed one in a box.

automobile service and aviation repair shops because they eliminate the need for stocking special long taps for depths which cannot be reached with shorter wrenches.

**NOTE:** These tools are designed to hold square shanks. Round shanks can be gripped, but care must be used. Excessive tightening may break the binding nut.



No. 93C.

| Capacity   |          |              |       | Body Length |     | Catalog No. | EDP No. |
|------------|----------|--------------|-------|-------------|-----|-------------|---------|
| Tap Size   |          | Square Shank |       | Inch        | mm  |             |         |
| Inch       | mm       | Inch         | mm    | Inch        | mm  |             |         |
| 1/16-3/16" | 1.6-4.7  | 1/16-5/32"   | 1.6-4 | 2"          | 50  | 93A         | 50427   |
| 7/32-7/16" | 5.5-11   | 5/32-1/4"    | 4-6.4 | 2-1/2"      | 65  | 93B         | 50428   |
| 1/4-1/2"   | 6.4-12.7 | 3/16-5/16"   | 4.7-8 | 3-1/2"      | 90  | 93C         | 50429   |
| 1/16-3/16" | 1.6-4.7  | 1/16-5/32"   | 1.6-4 | 6"          | 150 | 93D         | 50430   |
| 7/32-7/16" | 5.5-11   | 5/32-1/4"    | 4-6.4 | 10"         | 250 | 93E         | 50431   |
| 1/4-1/2"   | 6.4-12.7 | 3/16-5/16"   | 4.7-8 | 13"         | 330 | 93F         | 50432   |

### Tap Wrenches No. 91 Series

Starrett No. 91 Tap Wrenches are strong and well proportioned. They are nicely finished and the gripping surfaces are properly tempered. They will firmly hold square or round shanks. They are plunger operated by knurled sleeve – the spring inside the sleeve causes plunger to back off when pressure is removed.

**NOTE:** Round shanks can be gripped, but care must be used. Excessive pressure may break the moveable V-jaw.

Packed one in a box.

No. 91A.



| Capacity  |          |              |        | Body Length |     | Catalog No. | EDP No. |
|-----------|----------|--------------|--------|-------------|-----|-------------|---------|
| Tap Size  |          | Square Shank |        | Inch        | mm  |             |         |
| Inch      | mm       | Inch         | mm     | Inch        | mm  |             |         |
| 1/16-1/4" | 1.6-6.35 | 3/32-5/32"   | 2.4-4  | 6"          | 150 | 91A         | 50419   |
| 3/16-1/2" | 4.7-12.7 | 5/32-9/32"   | 4-7    | 9"          | 225 | 91B         | 50420   |
| 1/4-5/8"  | 6.35-16  | 5/32-3/8"    | 4-9.5  | 12"         | 300 | 91C         | 50421   |
| 5/16-3/4" | 8-19     | 13/64-7/16"  | 5.2-11 | 16"         | 400 | 91D         | 50422   |

### Tap Wrench No. 174

This is a well-designed tap wrench, ideal for holding smaller diameter taps, drills, reamers and other tools up to 1/4" (6.35mm) in diameter.

It will firmly grip round or square shanks It is lightweight and well proportioned and the gripping surface is properly heat treated.

Packed one in a box.

No.174.



| Capacity |               |      | Body Length |      | Catalog No. | EDP No. |
|----------|---------------|------|-------------|------|-------------|---------|
| Tap Size | Shank         |      | Inch        | mm   |             |         |
|          |               | Inch | mm          | Inch | mm          |         |
| No. 0-14 | 1/4" diameter | 6.35 | 3-5/8"      | 90   | 174         | 50658   |





## Tough Grip™ Non-Slip Tool Pad

The large, embossed surface Tough Grip™ Non-Slip Tool Pad is 24" x 36". This large pad is perfect for protecting the calibrations of sensitive tools and it prevents all tools from marring and scratching.

The Tough Grip process keeps tools from sliding off slanted surfaces. The embossed pad may also be used as a holding aid while performing bench work.

The smaller, smooth surface Tough Grip™ Non-Slip Tool Pad is 10" x 24". This pad is perfect for protecting easily damaged surfaces from scratching. It is also ideal for cutting and placing in the drawers of tool boxes.

- ◆ Fire retardant
- ◆ Mold and mildew resistant
- ◆ Fully washable
- ◆ Covered by a 10 year warranty against manufacturing defects
- ◆ Made of strong, reinforced material
- ◆ Able to be cut with scissors
- ◆ Oil and grease resistant



**Above:** Tough Grip Non-Slip Tool Pad is ideal for protecting precision tools and work parts.

**Below:** Tough Grip Tool Pads can also be easily cut and used for applications such as lining the drawer and tray bottoms of tool boxes.



| Description                 | Catalog No. | EDP No. |
|-----------------------------|-------------|---------|
| Smooth Surface, 10" x 24"   | TG-24       | 68852   |
| Embossed Surface, 24" x 36" | TG-36       | 68853   |



## Precision V-Blocks and Clamps

Starrett V-Blocks come in a variety of styles to suit the numerous requirements of machinists. They are for general shop use and layout work, as well as for holding stock in place during light-duty milling, drilling, and grinding operations. All clamp screws have a hole to help secure the workpiece.

### V-Blocks and Clamp

#### No. 268 Series 1-1/8" (28mm) Capacity

The blocks are made of cast iron, each 1-1/2" (38mm) square and 2" (50mm) long. The clamp is ribbed for extra strength and will hold work up to 1-1/8" (28mm) in diameter.

Packed one in a box.



No. 268C V-Blocks, Clamp.

| Capacity |      | Description                                       | Catalog No. | EDP No. |
|----------|------|---|-------------|---------|
| Inch     | mm   |   |             |         |
| 1-1/8"   | 28mm | 2 V-Blocks (One Pair)                             | <b>268A</b> | 51287   |
|          |      | Complete Set with 2 V-Blocks (One Pair) and Clamp | <b>268C</b> | 51289   |
|          |      | Clamp Only  | <b>268B</b> | 51288   |

### V-Blocks and Clamp

#### No. 271 Series 1-1/4" (32mm) Capacity

The V-Blocks of this set are of case hardened steel for wear resistance and may be used singly or in pairs.

This set includes a steel rod that passes through each block, firmly held by friction positioning. This keeps the blocks in alignment and adds convenience for holding work with shoulders because the shoulders can rest between the blocks.

Two grooves on each side of the blocks will hold the clamp for small or large work. The clamp is a steel forging, able to hold work up to 1-1/4" (32mm) in diameter.

Packed one in a box.



No. 271C V-Blocks, Clamp.

| Capacity |      | Description                                       | Catalog No. | EDP No. |
|----------|------|---|-------------|---------|
| Inch     | mm   |   |             |         |
| 1-1/4"   | 32mm | 2 V-Blocks (One Pair)                             | <b>271A</b> | 51293   |
|          |      | Complete Set with 2 V-Blocks (One Pair) and Clamp | <b>271C</b> | 51295   |
|          |      | Clamp Only  | <b>271B</b> | 51294   |



## V-Blocks and Clamps

### No. 278 Series 1" (25mm) Capacity

Starrett No. 278 V-Blocks are precision ground to extreme accuracy. The vees are central, parallel, and square with the ends and sides.

The blocks are made of steel, hardened and ground and numbered in series so that the vees in each set are always in alignment. The blocks have a 1/4-20 tapped hole through the sides so that they may be attached to an angle iron. The angle iron holding the block can then be attached to a lathe faceplate or held by a magnetic chuck.

Each block is 1-1/4" (32mm) square and 1-5/8" (40mm) long.



**No. 278 V-Blocks, Clamps.**

Packed one in a box.

| Capacity |      | Description  | Catalog No. | EDP No. |
|----------|------|--|-------------|---------|
| Inch     | mm   |  |             |         |
| 1"       | 25mm | Complete Set With Two V-Blocks (One Pair) and Two Clamps | <b>278</b>  | 51312   |
|          |      | Clamp Only   | <b>278B</b> | 51313   |

## Dual-Vee Magnetic V-Block

### No. 566 1-3/4" (44mm) Capacity

Starrett Magnetic V-Blocks are designed for versatility and accuracy. All working surfaces are precision ground with typical Starrett accuracy to provide convenient set-ups for inspection and light machining.

Two precision vees will hold round stock sizes from 1/4-1-3/4" (6.4-44mm) diameters.

A powerful, permanent magnet is controlled by a rotary switch and provides sufficient holding power for positive location.

All working surfaces are heat treated for long wear and stability. Each block is 2-1/2" wide x 3" high x 3" long (63 x 75 x 75mm).



**No. 566 V-Block.**

Packed one in a box.

| Capacity |      | Description               | Catalog No. | EDP No. |
|----------|------|---------------------------|-------------|---------|
| Inch     | mm   |                           |             |         |
| 1-3/4"   | 44mm | Dual-Vee Magnetic V-Block | <b>566</b>  | 63323   |



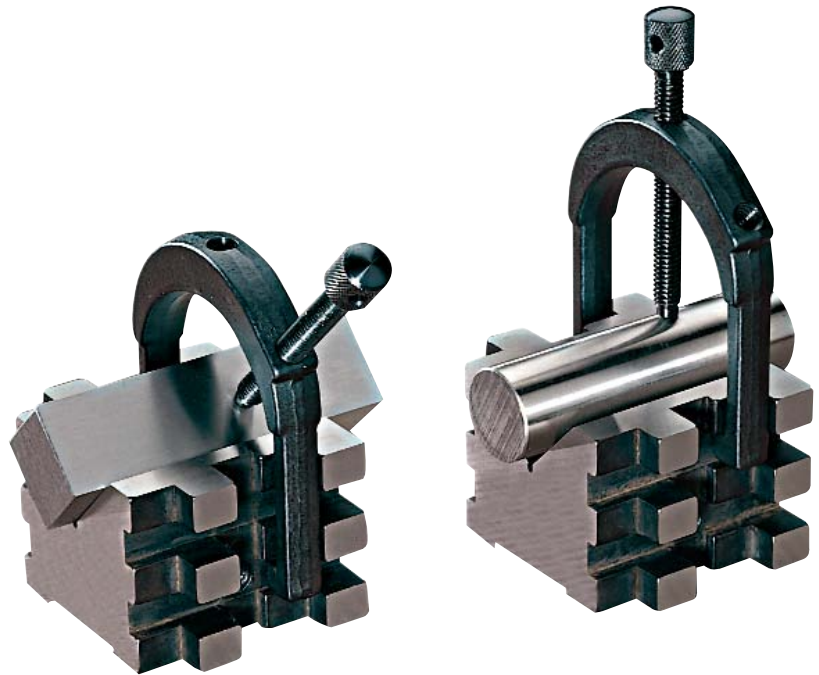
### V-Blocks and Clamps for round or square work

#### No. 568

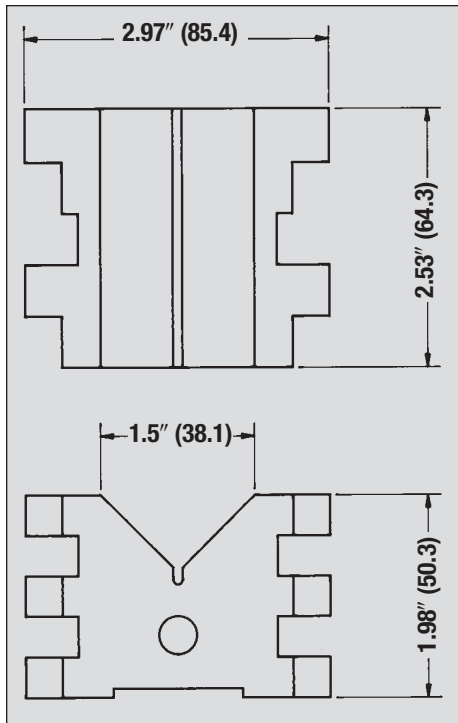
2" (50mm) Round,  
1-7/16" (36mm) Square Capacity

These rugged and versatile blocks have the following features:

- ◆ Hardened steel, precision ground parallel and square
- ◆ V-grooves are ground central and parallel to the sides and base – perfect alignment in matched pairs
- ◆ Clamps have screw holes at 45° and 90° to hold either square or round work
- ◆ Stepped groove construction permits high or low clamp mounting for small or large work
- ◆ Clamps do not project over the width of the block, permitting it to be used on the base, ends or sides
- ◆ 3/8-16 tapped holes permit mounting blocks on faceplates or angle irons
- ◆ Each block is 2-1/2" long x 3" wide x 2" high (63 x 75 x 50mm)



Pair of identical No. 568 V-Blocks, showing clamps in two different positions, for round or square work. V-Block at left has clamp in low position with screw at 45° for holding square work. V-Block at right has clamp in high position and screw at 90° for holding round work.



| Capacity                                       | Description   | Catalog No. | EDP   |
|--|---|-------------|-------|
| 2" (50mm) Dia. Round;<br>1-7/16" (36mm) Square | 1 V-Block and Clamp   | <b>568A</b> | 52590 |
| (1-9/16" [40mm] with<br>Screw at Top)          | Complete Set with 2 V-Blocks and<br>2 Clamps (Matched Pair) | <b>568C</b> | 52592 |
|  | Clamp Only  | <b>568B</b> | 52591 |

Packed one in a box.





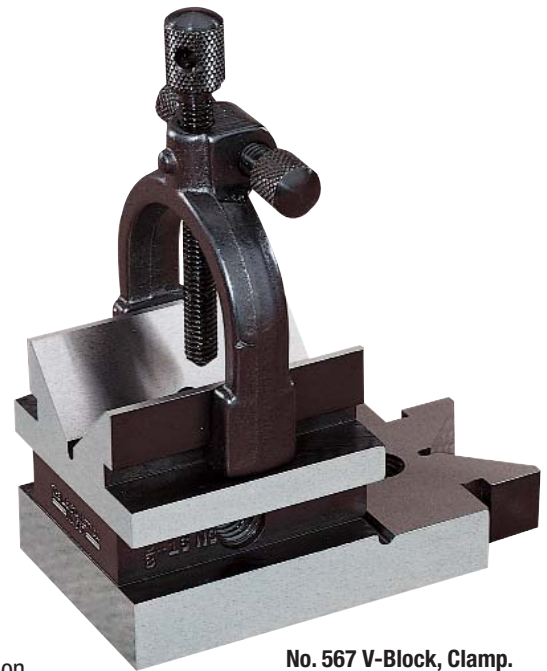
## V-Block and Clamp

### No. 567

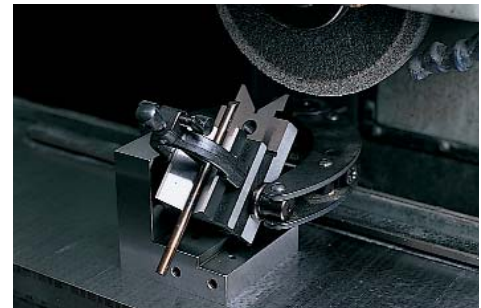
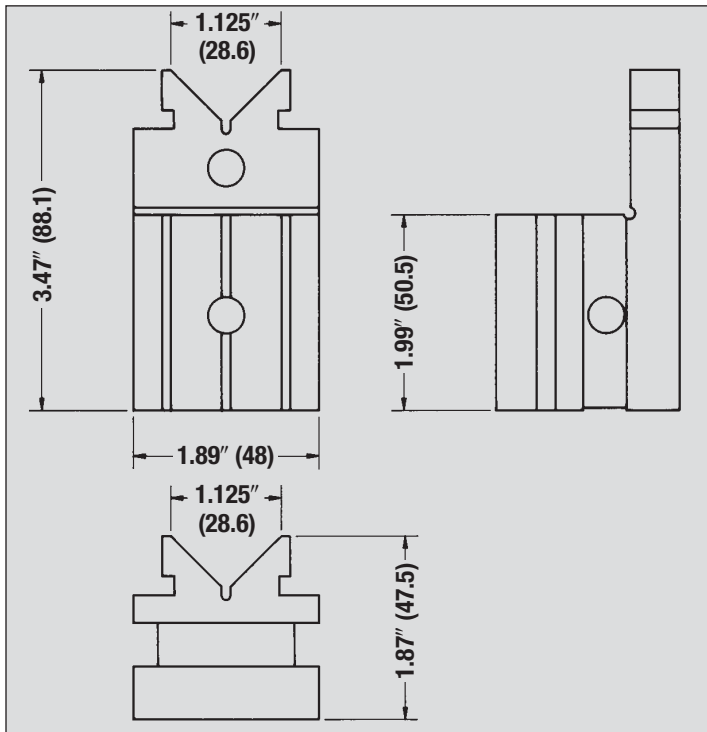
1-5/16" (33mm) Capacity

This is an improved V-block and clamp which has these very versatile features:

- ◆ Can be used on its base, on the end or on either side
  - ◆ The clamp is smaller than the outside width of the block, but has an adjustable width of the block, but has an adjustable side screw to support the block and prevent tilting
  - ◆ The V at the stepped end is at right angles to the base and is handy for holding shouldered studs, pins, etc.
  - ◆ A clearance hole for drilling or removing dowel pins is provided in the block
  - ◆ The block has four 3/8-16 tapped holes, two in the base and one on each side for attachment to an angle iron. The angle iron holding the block can then be attached to a lathe faceplate or held by a magnetic chuck
  - ◆ The clamp is a strong forging
- ◆ The block is hardened and precision ground. The sides are parallel and the V is central and parallel to the sides and base



**No. 567 V-Block, Clamp.**



Grinding an angle on a piece of round stock.



Sharpening cutter flutes.

| Capacity |      | Description                             | Catalog No. | EDP No. |
|----------|------|---|-------------|---------|
| Inch     | mm   |   |             |         |
| 1-5/16"  | 33mm | Complete Set with 1 V-Block and 1 Clamp | <b>567</b>  | 52588   |
|          |      | Clamp Only                              | <b>567B</b> | 70885   |

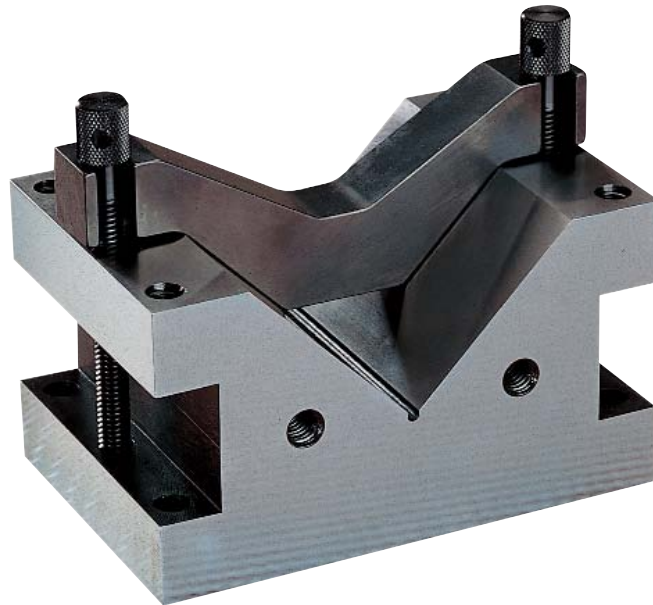


**V-Block and Clamp for  
larger capacity work**

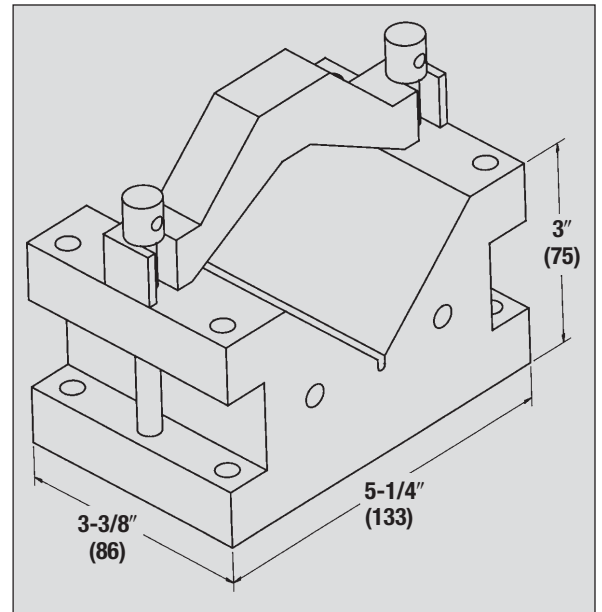
**No. 578 4" (100mm) Capacity**

This is our largest capacity V-block, which is ideal for toolroom, inspection and production work. The features and advantages of this block are:

- ◆ Hardened steel
- ◆ Precision ground flat, square and parallel
- ◆ Rugged, reversible, hardened clamp can accommodate 9/16-4" (14-100mm) diameters of almost any shape of work
- ◆ No clamp interference when the block lies on either side
- ◆ Three available clamp positions
- ◆ Two tapped holes (3/8 x 16) in one end for mounting the V-blocks perpendicular to faceplates, etc.
- ◆ Available in matched pairs by special order



**V-Block with reversible clamp in downward facing position. (Line drawing illustrates clamp in upward facing position.)**



**Block is 3-3/8" long x 5-1/4" wide x 3" high (86 x 133 x 75mm).**

| Description                | Catalog No. | EDP No. |
|----------------------------|-------------|---------|
| V-Block and Clamp          | <b>578</b>  | 64960   |
| Clamp Only with Two Screws | <b>578B</b> | 64988   |

Packed one in a box.



## Contact and Non-Contact Digital Tachometer No. 7793

This Pocket Laser Tachometer (No. S7793Z) is a digital, battery-powered portable optical tachometer that can operate up to 25 feet from a reflective target using a laser light source. Its ergonomic design allows safe, direct line-of-sight viewing of both target and display at the same time, with a non-slip rubber surface for single hand operation.

### Multi-Function

This powerful 32 function Tachometer/Ratemeter, Totalizer/Counter and Timer (stopwatch) is programmable in both inch and metric rates. It has TTL compatible pulse output to trigger devices such as data collectors or stroboscopes.

The kit is supplied with a remote contact assembly including concave and convex tips, a 10cm linear speed wheel, and rugged carrying case.

### Features

- ◆ Operating range up to 25 feet\* (Class 3R visible laser)
- ◆ Accepts remote contact assembly
- ◆ Accepts remote sensors (optional)
- ◆ TTL pulse output
- ◆ Auto ranging/fixed decimal (user selectable)
- ◆ English and metric rates
- ◆ Tripod mounting bushing
- ◆ On-target and low battery indicators
- ◆ Rugged rubberized housing
- ◆ NIST traceable certificate of calibration included



### Specifications

|   |  |
|---|--|
| <b>Display:</b>                               | 5 Alpha-numeric LCD  |
| <b>Ranges</b>                                 |  |
| Optical*                                      | 5-200,000 RPM  |
| Contact**                                     | 0.5-20,000 RPM   |
| <b>Rates 10cm circumference Contact Wheel</b> |  |
| Inches/Min                                    | 1.969-78,740   |
| Feet/Min                                      | 0.164-6,561.7  |
| Yards/Min                                     | 0.055-2,187.2  |
| Centimeters/Min                               | 5.000-200,000  |
| Meters/Min                                    | 0.050-2,000  |
| <b>Totalizer</b>                              | 1-200,000  |
| <b>Accuracy</b>                               | <b>Optical:</b> ±0.01% of reading<br><b>Contact:</b> ±0.05% of reading (rpm) |
| <b>Resolution</b>                             | 0.001-10 RPM   |
| <b>Operating range:</b>                       | 2 Inches to 25 feet, ±70°  |
| <b>Memory:</b>                                | Maximum, Minimum, and Last   |
| <b>Power</b>                                  | (2) "AA" 1.5 VDC Batteries (30 Hours)  |
| <b>Environmental:</b>                         | 5° - 40°C (0° - 100°F)<br>80% RH up to 31°C (88°F)                           |
| <b>Size (H x W x D)</b>                       | 6.92" x 2.4" x 1.6" (176 x 61 x 41mm)  |
| <b>Weight</b>                                 | 7 oz. (210g)   |

\* Performance subject to intensity of ambient light irradiation

\*\* Also reads units per second and per hour

The S7793Z Pocket Laser Tachometer can operate up to 25 feet from a reflective target (above right), or with the remote contact assembly (right).

Left: The kit includes tachometer, RCA, contact tips, 10cm linear contact wheel 5 feet of T-5 reflective tape, (2) "AA" batteries, and latching carrying case.



| Description  | Catalog No.   | EDP No. |
|--|---------------|---------|
| Tachometer, RCA, Contact tips, 10cm linear contact wheel 5 feet of T-5 reflective tape, (2) "AA" batteries, latching carrying case | <b>S7793Z</b> | 68930   |





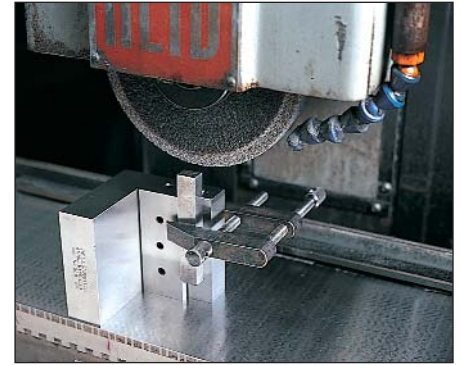
## Precision Angle Plate

### No. 580

These angle plates are invaluable for accurate work in toolroom and small production applications when flatness, squareness and parallelism is important.

The features of this angle plate are:

- ◆ Hardened and tempered steel
- ◆ Precision ground, square and parallel
- ◆ Convenient step for smaller work 3/4" (19mm) down from the top and a 1/4" (6.35mm) seat
- ◆ 10 holes tapped with a 1/4-20 thread for fastening to fixtures and clamping work to the angle plate



Above: Grinding a part parallel and square.

Below: No. 580 Precision Angle Plate.

| Size/Description                          | Catalog No. | EDP No. |
|---|-------------|---------|
| 3" x 3" x 3" (75 x 75 x 75mm) Angle Plate | 580         | 64961   |

Packed one in a box.

## Hold-Downs

### No. 54 Series

These hold-downs have an improved design feature that firmly holds the work flat on a machine bed or in a vise.

The contact edges are tapered to hold the work securely and to force it downward to the bed of the machine or against any parallel surface.

They are especially useful for holding small work or thin materials without distortion.

They are made of tool steel, hardened and ground.

These Hold-Downs are available in 4" (100mm) and 6" (150mm) lengths. Both lengths the same width and thickness, making it simple to use both sizes in a single setup.



Above No. 54A Hold-Downs.

Below: No. 54 Hold-Downs side view – tapered edges hold the work securely.



| Length |       | Width  |      | Catalog No. | EDP No. |
|--------|-------|--------|------|-------------|---------|
| Inch   | mm    | Inch   | mm   |             |         |
| 4"     | 100mm | 27/32" | 21mm | 54A (Pair)  | 50274   |
| 6"     | 150mm |        |      | 54C (Pair)  | 50276   |

Packed one pair in a box.





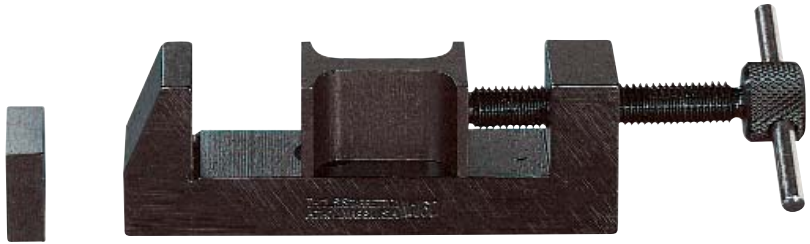
## Toolmakers' Steel Clamps

### No. 160

These clamps are useful in layout work or for holding work securely in drilling and other similar operations. Each clamp is furnished with two take-up blocks that slip on the end of the screw. The blocks are held to allow a slight swivel action that conforms the angle of the block to the shape of the work being held.

There is a hole in the base of the clamps so that they may be fastened to the bench and used as a small vise. Clamps are made of case-hardened steel and are smoothly finished.

Packed one pair in a box.



No. 160 Clamps furnished in pairs (single clamp shown). Take-up block shown on left.

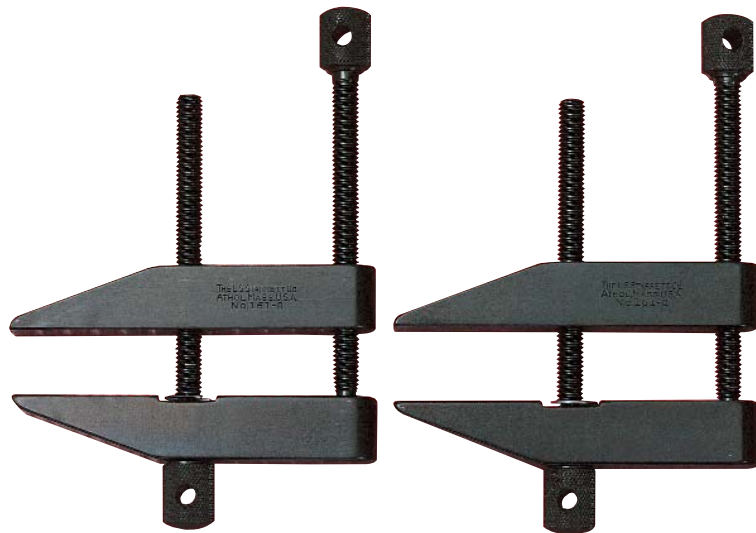
| Capacity |      | Description    | Catalog No. | EDP No. |
|----------|------|----------------|-------------|---------|
| Inch     | mm   |                |             |         |
| 2"       | 50mm | Pair of Clamps | 160         | 50592   |

## Toolmakers' Parallel Clamps

### No. 161 Series

These parallel clamps are designed for maximum strength and rigidity. They are extremely useful for holding work together in tapping and drilling and on various machine setups. The ends of the jaws are rounded to permit clamping under shoulders or in recesses.

A retaining ring holds the loose jaw in alignment when the clamp is being opened or closed. The clamps are made of steel, nicely finished and hardened.



No. 161D Pair of Clamps.

| Capacity |      | Approximate Throat Depth |        | Description    | Catalog No. | EDP No. |
|----------|------|--------------------------|--------|----------------|-------------|---------|
| Inch     | mm   | Inch                     | mm     |                |             |         |
| 3/4"     | 19mm | 21/32"                   | 16.5mm | Pair of Clamps | 161AA       | 50593   |
| 1-1/4"   | 32mm | 13/16"                   | 20.5mm |                | 161A        | 50594   |
| 1-3/4"   | 44mm | 1"                       | 25mm   |                | 161B        | 50595   |
| 2-1/4"   | 57mm | 1-7/32"                  | 30mm   |                | 161C        | 50596   |
| 2-3/4"   | 70mm | 1-25/32"                 | 45mm   |                | 161D        | 50597   |
| 3-1/2"   | 89mm | 2-1/4"                   | 57mm   |                | 161E        | 50598   |

Packed one pair in a box.



**“A” Clamps  
No. 164 Series**

Starrett’s unique, patented “A” clamp design combines great strength and generous throat depth in a compact overall size, with no obtrusive projections. The clamps are versatile and easy to use, designed for every machine shop and toolroom.

**Cam Powered**

Light clamping requires only thumb pressure on the cam stop pin. The design provides a strong leverage ratio that is better than any comparable clamp. If stronger force is desired, it can be achieved by turning the eccentric center pivot pin, using a hex socket wrench after the clamp is adjusted and set. (Hex wrench not furnished.)

**Adaptability**

The hardened pads clamp firmly on non-parallel and uneven surfaces, with no twisting of workpieces or “walking” of the pads. The clean contour of the clamp permits its use in space-restricted areas where other types could not be used.

**Universal Applications**

These rugged clamps fit virtually all clamping needs with more versatility than conventional “C” clamps or parallel clamps.

**Safety**

The absence of a protruding screw and T-handle, the source of many scrapes and bruises, contributes to a safer workplace.



Above: No. 164C “A” Clamp.

Right: Extra firm clamping force can be exerted by tightening the eccentric center pivot pin with a hex socket wrench.



| Maximum Jaw Opening |       | Throat Depth |      | Catalog No. | EDP No. |
|---------------------|-------|--------------|------|-------------|---------|
| Inch                | mm    | Inch         | mm   |             |         |
| 2-1/4"              | 57mm  | 1-5/16"      | 33mm | <b>164A</b> | 63655   |
| 3"                  | 75mm  | 2"           | 50mm | <b>164B</b> | 63656   |
| 4"                  | 100mm | 2-3/4"       | 70mm | <b>164C</b> | 63657   |

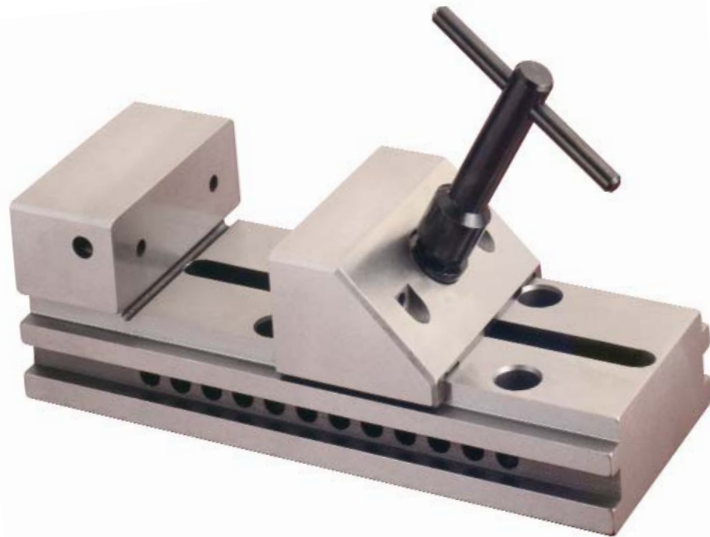
Packed one in a box.



## Precision Grinding Vise No. 581

This vise can be used for many operations, but it is extremely useful for accurate grinding, having the following features:

- ◆ Hardened steel
- ◆ Ground flat, square, and parallel within .0002" (0.005mm)
- ◆ Jaw pressure on workpiece is forward and downward for repeatable positioning and maximum holding power
- ◆ Jaw opening 4" (100mm), jaw depth 1-1/4" (32mm)
- ◆ The movable jaw is slightly narrower than the base, enabling the vise to be used on its side
- ◆ A 1/4-20 tapped hole is provided in each side of the solid jaw to allow the use of a stop for repetitive operations
- ◆ A "T" handle wrench is provided for tightening the movable jaw



- ◆ Four drilled and counterbored holes for 5/16 bolts in the base of the vise for bolting to a sine plate or the bed of a machine tool

Angle blocks are available on special order. For attaching special jaw plates, two holes are drilled in both the solid and movable jaws.

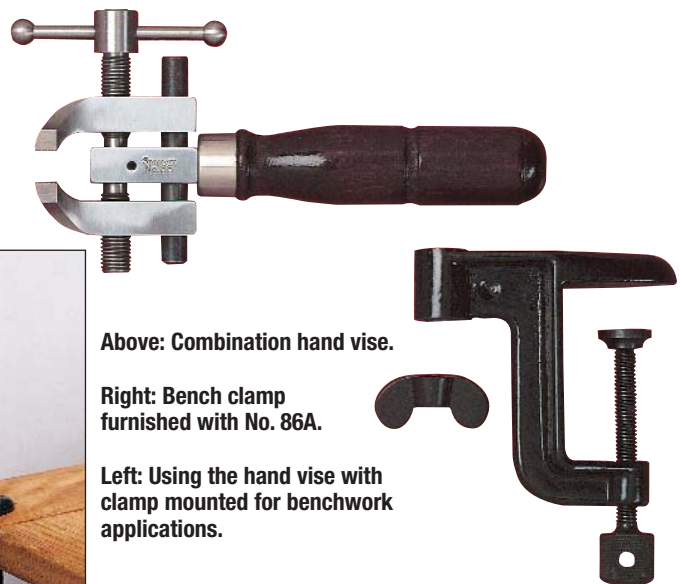
Packed one in a box.

| Description                        | Capacity<br>Jaw Opening x Depth |            | Catalog No. | EDP No. |
|------------------------------------|---------------------------------|------------|-------------|---------|
|                                    | Inch                            | mm         |             |         |
| Grinding Vise with T-handle Wrench | 4 x 1-1/4"                      | 100 x 32mm | 581         | 64962   |

## Combination Hand Vise No. 86 Series

The Starrett No. 86 Combination Hand and Bench Vise has a wide range of uses for all toolmakers, mechanics, hobbyists and do-it-yourselfers. When a vise is needed at different locations for convenience, this tool is indispensable. By removing the handle and substituting the clamp, the tool may be fastened to benches, shelves, etc., approximately 1/2-2-1/8" (13-54mm) in thickness, and can be adjusted to different positions according to the user's preference.

When used as a hand vise, the leverage obtainable with the ball end lever will be appreciated in comparison with a wing nut commonly employed for this purpose. The jaws are made from forgings and are properly tempered.



Above: Combination hand vise.

Right: Bench clamp furnished with No. 86A.

Left: Using the hand vise with clamp mounted for benchwork applications.

Packed one in a box.

| Capacity |      | Description          | Catalog No. | EDP No. |
|----------|------|----------------------|-------------|---------|
| Inch     | mm   |                      |             |         |
| 1-1/2"   | 38mm | Hand Vise with Clamp | 86A         | 50404   |
|          |      | Hand Vise Only       | 86B         | 50405   |





This section shows our complete line of precision machinist levels.

Builders' and contractors' levels can be found in the Jobsite & Workshop Tools section of the catalog.







## Level Use

To get a correct reading with a level, both ends of the bubble should be viewed. If the gaps between the ends of the bubble and the lines are unequal at any time, then they should be averaged out. The reason for this is temperature, which affects the size of the bubble. As a level is warmed the liquid expands, thereby reducing the size of the bubble so that at true-level there will be gaps at both ends between the bubble and the reading lines. Conversely, if the temperature is very cold, the bubble could expand and overlap the reading lines.

Excessive hand heat on the center of the level for an extended period of time could expand the center, causing the working surface to become slightly convex and also create a tendency to spin on flat surfaces. This is more noticeable on very precise levels.

Any level can be checked for accuracy on any flat surface regardless of whether it is level or not. Simply put the level on the

surface and note the position of the bubble. Then reverse the level in the same spot. If the level is true, the bubble will be in the same relative position both ways.

Some models, like our No. 98 Series machinist levels with an adjustable system, have an adjustment that can be made on the job.

## Level Vial Information

The accuracy of a level is dependent on the proper machining of the working surface, the straightness, and rigidity of the construction and the sensitivity of the level vial. Accuracies are very often specified in parts of degrees such as 10-second accuracy or 43-minute accuracy. Technically, we are referring to the sensitivity of the level vial, but many interchange these terms. Since this means little to most people, we use the more practical definition of inches per foot of elevation. For instance, a 10-second vial accuracy means if the level is on an incline that is .0005" per foot, then the bubble on

the vial will move .100" (slightly less than 1/8").

There are three general types of level vials. Ground vials are generally used in precision levels; bent glass and plastic vials are used in most other levels.

Most level vials have just two lines spanning the length of the bubble because most users just want to know if something is level or not.

The more precise levels have vials with a number of reading lines on each side of the bubble. All Inch reading vial graduations are .100" apart. This will show the machinist in a very precise manner how level the equipment is.

Metric reading levels have vial graduations 2mm apart and accuracies are usually described as millimeters per meter. This is an easy conversion to make, so we converted our Inch specifications to an understandable metric reading. Machinists only need to know how far they are out of level if the bubble moves to the next line.

*Builders' and Contractors' Levels can be found in the Jobsite & Workshop Tools section of the catalog.*

## Precision Machinists' Levels

### Nos. 199, 98 and 132 Series

These are the finest levels available, used for precision work that is typically required in industry. They all have these features:

- ◆ All level bases are made from the finest quality seasoned cast iron and are precision-machined on the reference surface
- ◆ Non-machined surfaces have an attractive, black wrinkle finish
- ◆ All models except the No. 199 have an involute longitudinal groove between the bearing flats for accurate seating on round work. This groove has a special involute design, permitting better centering and greater capacity to handle larger rounds
- ◆ Groove and bearing flats are machined together for maximum accuracy

## Master Precision Level

### No. 199 15"/380mm

This Master Precision Level is especially designed to set up, check and test machinery of all types. The efficiency of modern, high speed machinery depends to a large degree upon the levelness of the machine set-up.

With this Master Level you can tell at a glance the exact variation of the levelness of the machinery and make the necessary adjustments.

- ◆ Ground and graduated main vial of 10-second accuracy; one division equals 1/2 thousandth (0.0005) of an inch per foot, or 0.04mm per meter

- ◆ Main vials have seven graduations on each side of the bubble
- ◆ Auxiliary level vial shows lateral position and assists in horizontal setting
- ◆ Level vials are positioned so breakage is reduced to a minimum
- ◆ Fool-proof adjustment to avoid tampering, once set
- ◆ Special alloy iron used to obtain freedom from thermal effects
- ◆ Castings are thoroughly seasoned and machined
- ◆ Reference surface is scraped
- ◆ Nonmachined surfaces have a black wrinkle finish
- ◆ Insulation from handling by means of top plate of nonconductive material



| Length Base |       | Width Base |      | Height Level |      | Catalog No. | EDP No. |
|-------------|-------|------------|------|--------------|------|-------------|---------|
| Inch        | mm    | Inch       | mm   | Inch         | mm   |             |         |
| 15"         | 380mm | 1 5/8"     | 40mm | 3"           | 75mm | 199Z        | 50719   |
|             |       |            |      |              |      | 199Z W/SLC* | 66932   |

Sent in finished wood case. Packed one in a box.

\* Includes redemption card for Standard Letter of Certification (SLC).



### Machinists' Levels with ground and graduated vials

#### No. 98 Series

4-18"/100-450mm

These levels have ground and graduated main vials. All sizes have a cross test vial except the 4" (100mm) model.

The 12" (300mm) model also has a plumb vial and the 18" (450mm) size has a double plumb vial.

These vials are adjustable to a positive setting and are housed in a satin finished brass tube with a friction-fit closing cover to prevent breakage.

The base of the levels features an involute groove running the length of the base, which provides a reliable seat for round work such as pipes or shafting.

With the cross test vial, it is possible to simultaneously level in both directions. This prevents inaccuracies in the main vial reading caused by canting the level sidewise on round work.

The 6" through 18" (150-450mm) main level vials have graduations that are approximately 80-90 seconds or .005" per foot (0.42mm per meter). There are five, six, or seven lines on each side of the bubble, depending on the base length.



Top, No. 98-12; bottom, No. 98-6.



End view showing involute groove.

| Size |       | Description   | Without Case       |         | In Finished Wood Case |         |
|------|-------|---|--------------------|---------|-----------------------|---------|
| Inch | mm    |   | Catalog No.        | EDP No. | Catalog No.           | EDP No. |
| 4"   | 100mm | Without Cross Test Vial   | <b>98-4</b>        | 50440   |                       |         |
|      |       | With Cross Test Vial  | <b>98-6</b>        | 50441   |                       |         |
| 6"   | 150mm | With Cross Test Vial, Standard Letter of Certification*                       | <b>98-6 W/SLC</b>  | 66935   |                       |         |
| 8"   | 200mm | With Cross Test Vial  | <b>98-8</b>        | 50442   |                       |         |
| 12"  | 300mm | With Single Plumb Vial and Cross Test Vial                                    | <b>98-12</b>       | 50443   | <b>98Z-12</b>         | 50444   |
|      |       | With Single Plumb Vial and Cross Test Vial, Standard Letter of Certification* | <b>98-12 W/SLC</b> | 66934   | <b>98Z-12 W/SLC</b>   | 66933   |
| 18"  | 450mm | With Double Plumb Vial and Cross Test Vial                                    | <b>98-18</b>       | 50445   | <b>98Z-18</b>         | 50446   |

\* Includes redemption card for Standard Letter of Certification (SLC).

**NOTE:** To guarantee extreme accuracy, the length of your level should not be longer than the work you are leveling.

Packed one in a box.



## Precision Bench Levels with double plumbs

### No. 132 Series 6-24"/150-600mm

These are moderately priced levels designed for the all-around use of machinists, maintenance and set-up mechanics and carpenters. They are available in a wide range of sizes to suit every requirement.

- ◆ The attractive filigree design of these levels provides a lighter weight, and the curved design evenly dissipates excess heat
- ◆ The base of the levels has an involute groove running the full length, which provides a reliable seat for round work
- ◆ All sizes have a main vial and double plumb vials. Each vial has two graduated lines
- ◆ The main vials have approximately 19-minute sensitivity, meaning if the bubble moves 1/8" off the graduated lines, the out-of-level is approximately .080" per foot. If the bubble is off 2mm, then the out-of-level is approximately 4.4mm per meter



No. 132-12.



End view showing involute groove.

| Size |       | Description                          | Catalog No. | EDP No. |
|------|-------|--------------------------------------|-------------|---------|
| Inch | mm    |                                      |             |         |
| 6"   | 150mm | With Main Vial and Double Plumb Vial | 132-6       | 50562   |
| 9"   | 225mm |                                      | 132-9       | 50563   |
| 12"  | 300mm |                                      | 132-12      | 50564   |
| 24"  | 600mm |                                      | 132-24      | 50566   |

**NOTE:** To guarantee extreme accuracy, the length of your level should not be longer than the work you are leveling.

Packed one in a box.



### Cross Test Level and Plumb

#### No. 134 2 x 3" / 50 x 75mm

This is an especially useful little level, invaluable for plumbing, approximate squaring and leveling work. Made from cast iron with a satin nickel finish, all working surfaces are flat and true. The level has two vials at right angles for cross test leveling without moving the tool and a plumb level at the top for checking squareness. An accurate, well-made and reliable tool, it is also very light and compact and can be easily carried in the pocket.



| Size   |            | Description                          | Catalog No. | EDP No. |
|--------|------------|--------------------------------------|-------------|---------|
| Inch   | Millimeter |                                      |             |         |
| 2 x 3" | 50 x 75mm  | With Cross Test Vials and Plumb Vial | 134         | 50569   |

Packed one in a box.

### Cross Test Level

#### No. 136 2-3/4 x 2-3/4" / 70 x 70mm

Similar to our No. 134 level, the No. 136 has two vials at right angles which permit leveling in both directions without moving the level from the work. The level is light and compact, with an attractive black wrinkle finish and a ground reference surface.



| Size            |            | Description           | Catalog No. | EDP No. |
|-----------------|------------|-----------------------|-------------|---------|
| Inch            | Millimeter |                       |             |         |
| 2-3/4" x 2-3/4" | 70 x 70mm  | With Cross Test Vials | 136         | 50572   |

Packed one in a box.





## Bench Level

### No. 130 3-3/8" / 85mm

This is a very handy, compact bench level with a sensitive and accurate single vial. The body is made of seasoned cast iron with black wrinkle finish and an accurately machined base leveling surface.



| Size   |            | Description    | Catalog No. | EDP No. |
|--------|------------|----------------|-------------|---------|
| Inch   | Millimeter |                |             |         |
| 3-3/8" | 85mm       | With Main Vial | 130         | 50560   |

Packed one in a box.

## Pocket Levels with satin nickel-plated finish

### No. 135 Series

2-1/2 and 3-1/2" / 63 and 88mm

Another extremely useful Starrett level that fits handily in the pocket with no sharp edges. Made from hexagonal stock with convex ends and satin nickel-plated finish.



| Size   |            | Description    | Catalog No. | EDP No. |
|--------|------------|----------------|-------------|---------|
| Inch   | Millimeter |                |             |         |
| 2-1/2" | 63mm       | With Main Vial | 135A        | 50570   |
| 3-1/2" | 88mm       |                | 135B        | 50571   |

Packed one in a box.





## Precision Gage Blocks, Standard Reference Bars, Angle Gage Blocks, True Squares, Optical Polygons and Targets

The first part of this section is devoted to **GAGE BLOCKS** and **STANDARD REFERENCE BARS**.

### Gage Blocks – Major Product Characteristics

Precision gage blocks are the primary standards vital to dimensional quality control in the manufacture of parts. The four major characteristics that are necessary for a precision gage block are accuracy, surface finish, wear resistance and dimensional stability. Other factors are corrosion resistance, hardness, thermal conductivity and coefficient of expansion.

The base material used for gage blocks is crucial in meeting the above criteria. While many materials have been tried, the major types available today are:

- ◆ **Traditional high-grade steel** gage blocks, which are generally used in shop floor environments
- ◆ **Tungsten Carbide** gage blocks, which have the advantage of being harder and longer wearing than steel. (Not available from Webber.)
- ◆ **Ceramic** gage blocks have an advantage over regular steel. They will outwear regular steel and they will not corrode
- ◆ **Chromium Carbide** gage blocks are considered the top of the line – the finest available. They outwear regular steel and ceramic. In addition, they will not corrode and are very stable and accurate, and have exceptional “wringing” qualities

**croblox® Chromium Carbide** – the superior gage block material. The reason that our Webber Gage Division emphasizes gage blocks made from Chromium Carbide is because they are the most stable measuring devices ever developed.

No one in the world except Starrett/Webber has produced the accuracy and stability of our croblox® Grand Masters. They were produced in 1955 of Chromium Carbide material to an accuracy within one millionth of an inch (.0000254mm) and have been checked periodically by the U.S. National Bureau of Standards and the U.S. National Institute of Standards and Technology (NIST) and have remained stable over this period.

### Other Characteristics

#### Accuracy

All Starrett/Webber gage blocks meet or exceed all known specifications. The flatness, parallelism and surface finish necessary to achieve the required accuracies are the same as or better than government requirements.

#### Stability

Starrett/Webber gage blocks do not change in size except through normal wear. Gage block stability is a characteristic that our Webber Gage Division has mastered with over seventy years of experience. Our gage blocks have withstood the test of time.

#### Hardness

Steel blocks have a Rockwell “C” hardness of approximately 64-65. Chromium Carbide blocks have a Rockwell “C” hardness of 71-73, with an unusually fine, hard grain structure which gives them exceptional resistance to wear and abrasion.

#### Thermal Conductivity and Coefficient of Expansion

These are not important considerations when measurements are taken in temperature-controlled environments. This is primarily done when measuring to microinches or microns.

On the shop floor, where precision measurements are rarely finer than .0002” or 0.005mm, the coefficient of expansion of steel, chromium carbide and ceramics is so close as to be negligible.

Thermal conductivity is important on the shop floor. However, because it takes time for a gage block to move to the same temperature as the work piece, we recommend setting the gage block on a heat sink such as a large mass of metal that is at the shop environment temperature.



### WEBBER GAGE DIVISION / L.S. STARRETT CO.

24500 Detroit Road  
Cleveland, OH 44145

Phone: 440-835-0001 Fax: 440-892-9555

**DIMENSIONAL**

NVLAP Code: 20/DO3  
**Gage Blocks**

## How To Order Starrett Precision Gage Blocks

### Gage Block Sets




1. Order by catalog number.
2. Please specify if you require a Commercial Grade Calibration or Master Grade Calibration. See the catalog page regarding our Accredited Gage Block Calibration Service near the end of this section. A certificate of calibration provides individual readings on each block and provides traceability to NIST. Webber gage block calibrations are NVLAP® accredited by NIST. (We need the end user's name and address to place on the certificate.)
3. Specify if you require etched serial numbers. We can provide numbers up to a 6-digit maximum. (Our standard practice is to put the same etch number on each block in a set. Blocks are differentiated by their marked size.)

The buyer of Webber products listed in this catalog agrees to the 100% Relaxed Acceptance Rule contained in ASME B89.7.3.1 (Guidelines for Decision Rules: Considering Measurement Uncertainty in Determining Conformance to Specifications.) Products may not be rejected by the purchaser unless his measurements exceed the published tolerances by more than his uncertainty of measurement.

NVLAP® accreditation does not constitute an endorsement of any product by NVLAP® or any agency of the U.S. government.

### Individual Gage Blocks

1. **Specify Shape**, signified on the page by the following symbols:

- ◆ **Rectangular** 
- ◆ **Square** 
- ◆ **Heavy Duty** 

2. **Specify Material** (croblox®, steel, or ceramic)
3. **Specify Unit of Measure** (inch or metric)
4. **Specify the Size**
5. **Specify Special Lengths**, if applicable (Rectangular Only)
  - Thin block sets (28 pc. inch and 17 pc. metric) are all 1.115" (28.3mm) long. Specify "SS" length
  - .050", .100", and .150" blocks in inch 81-92 pc. sets are 1.380 long. Specify the Long length, "L"
  - .100" blocks contained in the 36, 38, and 43 pc. sets are 1.380" long. Specify the Long length, "L"
6. **Specify Accuracy Grade** (see next page)
7. **Please specify if you require a Commercial Grade Calibration or Master Grade Calibration.** See the catalog page regarding our Accredited Gage Block Calibration Service near the end of this section. A certificate of calibration provides individual readings on each block and provides traceability to NIST. Webber gage block calibrations are NVLAP® accredited by NIST. (We need the end user's name and address to place on the certificate.)
8. **Specify if you require etched serial numbers.** We can provide numbers up to a 6-digit maximum.





## Gage Block Tolerances: B89.1.9

**Inch System:** Tolerances expressed in microinches (.000001") 1 millionth of an inch

|            | Order Webber Grade LM |                               |                    | Order Webber Grade AA<br>B89.1.9 Grade 00 |                               |                    | Order Webber Grade A1<br>B89.1.9 Grade 0 |                               |                    |
|------------|-----------------------|-------------------------------|--------------------|---|-------------------------------|--------------------|--|-------------------------------|--------------------|
|            | Size Tolerance        | Variation in Length Tolerance | Flatness Tolerance | Size Tolerance                            | Variation in Length Tolerance | Flatness Tolerance | Size Tolerance                           | Variation in Length Tolerance | Flatness Tolerance |
| Thru .050" | +1.2/-1.2             | 1.2                           | 1.2                | +4/-4                                     | 2                             | 2                  | +6/-6                                    | 4                             | 4                  |
| Thru .400" | +1.2/-1.2             | 1.2                           | 1.2                | +3/-3                                     | 2                             | 2                  | +5/-5                                    | 4                             | 4                  |
| Thru 1"    | +1.2/-1.2             | 1.2                           | 1.2                | +3/-3                                     | 2                             | 2                  | +6/-6                                    | 4                             | 4                  |
| Thru 2"    | +2.0/-2.0             | 1.2                           | 1.2                | +4/-4                                     | 2                             | 2                  | +8/-8                                    | 4                             | 4                  |
| Thru 3"    | +3.0/-3.0             | 1.2                           | 1.2                | +5/-5                                     | 3                             | Rect.: 2, Sq.: 3   | +10/-10                                  | 4                             | 4                  |
| Thru 4"    | +4.0/-4.0             | 1.2                           | 1.2                | +6/-6                                     | 3                             | Rect.: 2, Sq.: 3   | +12/-12                                  | 5                             | 4                  |
| Thru 5"    |                       |                               |                    | +8/-8                                     | 3                             | Rect.: 2, Sq.: 3   | +16/-16                                  | 5                             | 4                  |
| Thru 6"    |                       |                               |                    | +8/-8                                     | 3                             | Rect.: 2, Sq.: 3   | +16/-16                                  | 5                             | 4                  |
| Thru 7"    |                       |                               |                    | +10/-10                                   | 4                             | 4                  | +20/-20                                  | 6                             | 6                  |
| Thru 8"    |                       |                               |                    | +10/-10                                   | 4                             | 4                  | +20/-20                                  | 6                             | 6                  |
| Thru 10"   |                       |                               |                    | +12/-12                                   | 4                             | 4                  | +24/-24                                  | 6                             | 6                  |
| Thru 12"   |                       |                               |                    | +14/-14                                   | 4                             | 4                  | +28/-28                                  | 7                             | 6                  |
| Thru 16"   |                       |                               |                    | +18/-18                                   | 5                             | 4                  | +36/-36                                  | 8                             | 6                  |
| Thru 20"   |                       |                               |                    | +20/-20                                   | 6                             | 4                  | +44/-44                                  | 10                            | 6                  |

|            | Not Available from Webber<br>B89.1.9 Grade AS1 |                               |                    | Not Available from Webber<br>B89.1.9 Grade AS2 |                               |                    |
|------------|--|-------------------------------|--------------------|--|-------------------------------|--------------------|
|            | Size Tolerance                                 | Variation in Length Tolerance | Flatness Tolerance | Size Tolerance                                 | Variation in Length Tolerance | Flatness Tolerance |
| Thru .050" | +12/-12  | 6                             | 6                  | +24/-24  | 12                            | 10                 |
| Thru .400" | +8/-8  | 6                             | 6                  | +18/-18  | 12                            | 10                 |
| Thru 1"    | +12/-12  | 6                             | 6                  | +24/-24  | 12                            | 10                 |
| Thru 2"    | +16/-16  | 6                             | 6                  | +32/-32  | 12                            | 10                 |
| Thru 3"    | +20/-20  | 6                             | 6                  | +40/-40  | 14                            | 10                 |
| Thru 4"    | +24/-24  | 8                             | 6                  | +48/-48  | 14                            | 10                 |
| Thru 5"    | +32/-32  | 8                             | 6                  | +64/-64  | 16                            | 10                 |
| Thru 6"    | +32/-32  | 8                             | 6                  | +64/-64  | 16                            | 10                 |
| Thru 7"    | +40/-40  | 10                            | 7                  | +80/-80  | 16                            | 10                 |
| Thru 8"    | +40/-40  | 10                            | 7                  | +80/-80  | 16                            | 10                 |
| Thru 10"   | +48/-48  | 10                            | 7                  | +104/-104                                      | 18                            | 10                 |
| Thru 12"   | +56/-56  | 10                            | 7                  | +112/-112                                      | 20                            | 10                 |
| Thru 16"   | +72/-72  | 12                            | 7                  | +144/-144                                      | 20                            | 10                 |
| Thru 20"   | +88/-88  | 14                            | 7                  | +176/-176                                      | 24                            | 10                 |

### Suggested Replacement Grades for GGG-G-15C

| GGG-G-15C Grade | Webber Grade | B89.1.9 Grade |
|-----------------|--------------|---------------|
| 0.5             | LM           | —             |
| 1               | AA           | 00            |
| 2               | A1           | 0             |
| 3               | A            | AS1           |

**NOTE:** The above replacement grades are suggested in B89.1.9. However, the tolerances specified in GGG-G-15C and B89.1.9 are not exactly the same. Gage blocks meeting B89.1.9 specifications may not meet GGG-G-15C requirements and vice versa.

◆ B89.1.9 Grade 00 exceeds DIN, ISO, BS Grades K

#### MATERIAL COEFFICIENTS OF THERMAL EXPANSION ARE:

**Chromium Carbide** 4.7 x 10<sup>-6</sup> inch/°F per inch

**SAE 52100 Steel** 6.4 x 10<sup>-6</sup> inch/°F per inch

**Ceramic** 5.5 x 10<sup>-6</sup> inch/°F per inch



## Gage Block Tolerances: B89.1.9

**Metric System:** Tolerances expressed in micrometers (0.001mm)

|            | Order Webber Grade LM |                               |                    | Order Webber Grade AA<br>B89.1.9 Grade 00 |                               |                       | Order Webber Grade A1<br>B89.1.9 Grade 0 |                               |                    |
|------------|-----------------------|-------------------------------|--------------------|---|-------------------------------|-----------------------|--|-------------------------------|--------------------|
|            | Size Tolerance        | Variation in Length Tolerance | Flatness Tolerance | Size Tolerance                            | Variation in Length Tolerance | Flatness Tolerance    | Size Tolerance                           | Variation in Length Tolerance | Flatness Tolerance |
| Thru 0.5mm | +.03/- .03            | .03                           | .03                | +.10/- .10                                | .05                           | .05                   | +.14/- .14                               | .10                           | .10                |
| Thru 10mm  | +.03/- .03            | .03                           | .03                | +.07/- .07                                | .05                           | .05                   | +.12/- .12                               | .10                           | .10                |
| Thru 25mm  | +.04/- .04            | .03                           | .03                | +.07/- .07                                | .05                           | .05                   | +.14/- .14                               | .10                           | .10                |
| Thru 50mm  | +.05/- .05            | .03                           | .03                | +.10/- .10                                | .06                           | .05                   | +.20/- .20                               | .10                           | .10                |
| Thru 75mm  | +.08/- .08            | .03                           | .03                | +.12/- .12                                | .07                           | Rect (.05), Sq. (.07) | +.25/- .25                               | .12                           | .10                |
| Thru 100mm | +.10/- .10            | .03                           | .03                | +.15/- .15                                | .07                           | Rect (.05), Sq. (.07) | +.30/- .30                               | .12                           | .10                |
| Thru 125mm |                       |                               |                    | +.20/- .20                                | .08                           | Rect (.05), Sq. (.07) | +.40/- .40                               | .14                           | .10                |
| Thru 150mm |                       |                               |                    | +.20/- .20                                | .08                           | Rect (.05), Sq. (.07) | +.40/- .40                               | .14                           | .10                |
| Thru 175mm |                       |                               |                    | +.25/- .25                                | .09                           | .10                   | +.50/- .50                               | .16                           | .15                |
| Thru 200mm |                       |                               |                    | +.25/- .25                                | .09                           | .10                   | +.50/- .50                               | .16                           | .15                |
| Thru 250mm |                       |                               |                    | +.30/- .30                                | .10                           | .10                   | +.60/- .60                               | .16                           | .15                |
| Thru 300mm |                       |                               |                    | +.35/- .35                                | .10                           | .10                   | +.70/- .70                               | .18                           | .15                |
| Thru 400mm |                       |                               |                    | +.45/- .45                                | .12                           | .10                   | +.90/- .90                               | .20                           | .15                |
| Thru 500mm |                       |                               |                    | +.50/- .50                                | .14                           | .10                   | +1.1/- 1.1                               | .25                           | .15                |

|            | Not Available from Webber<br>B89.1.9 Grade AS1 |                               |                    | Not Available from Webber<br>B89.1.9 Grade AS2 |                               |                    |
|------------|--|-------------------------------|--------------------|--|-------------------------------|--------------------|
|            | Size Tolerance                                 | Variation in Length Tolerance | Flatness Tolerance | Size Tolerance                                 | Variation in Length Tolerance | Flatness Tolerance |
| Thru 0.5mm | +.30/- .30                                     | .16                           | .15                | +.60/- .60                                     | .30                           | .25                |
| Thru 10mm  | +.20/- .20                                     | .16                           | .15                | +.45/- .45                                     | .30                           | .25                |
| Thru 25mm  | +.30/- .30                                     | .16                           | .15                | +.60/- .60                                     | .30                           | .25                |
| Thru 50mm  | +.40/- .40                                     | .18                           | .15                | +.80/- .80                                     | .30                           | .25                |
| Thru 75mm  | +.50/- .50                                     | .18                           | .15                | +1.0/- 1.0                                     | .35                           | .25                |
| Thru 100mm | +.60/- .60                                     | .20                           | .15                | +1.2/- 1.2                                     | .35                           | .25                |
| Thru 125mm | +.80/- .80                                     | .20                           | .15                | +1.6/- 1.6                                     | .40                           | .25                |
| Thru 150mm | +.80/- .80                                     | .20                           | .15                | +1.6/- 1.6                                     | .40                           | .25                |
| Thru 175mm | +1.0/- 1.0                                     | .25                           | .18                | +2.0/- 2.0                                     | .40                           | .25                |
| Thru 200mm | +1.0/- 1.0                                     | .25                           | .18                | +2.0/- 2.0                                     | .40                           | .25                |
| Thru 250mm | +1.2/- 1.2                                     | .25                           | .18                | +2.4/- 2.4                                     | .45                           | .25                |
| Thru 300mm | +1.4/- 1.4                                     | .25                           | .18                | +2.8/- 2.8                                     | .50                           | .25                |
| Thru 400mm | +1.8/- 1.8                                     | .30                           | .18                | +3.6/- 3.6                                     | .50                           | .25                |
| Thru 500mm | +2.2/- 2.2                                     | .35                           | .18                | +4.4/- 4.4                                     | .60                           | .25                |

### Suggested Replacement Grades for GGG-G-15C

| GGG-G-15C Grade | Webber Grade | B89.1.9 Grade |
|-----------------|--------------|---------------|
| 0.5             | LM           | —             |
| 1               | AA           | 00            |
| 2               | A1           | 0             |
| 3               | A            | AS1           |

**NOTE:** The above replacement grades are suggested in B89.1.9. However, the tolerances specified in GGG-G-15C and B89.1.9 are not exactly the same. Gage blocks meeting B89.1.9 specifications may not meet GGG-G-15C requirements and vice versa.

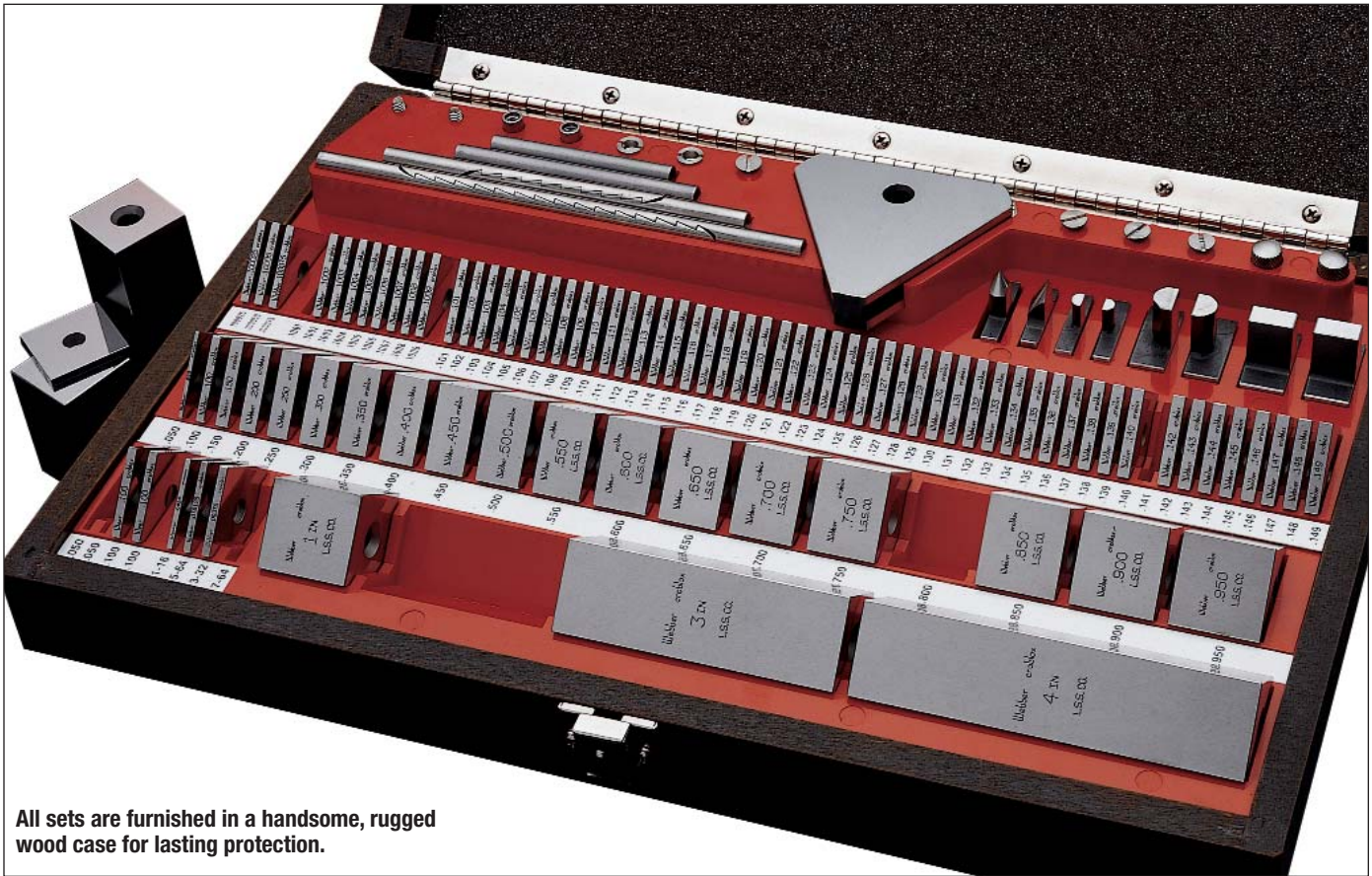
◆ B89.1.9 Grade 00 exceeds DIN, ISO, BS Grades K

#### MATERIAL COEFFICIENTS OF THERMAL EXPANSION ARE:

**Chromium Carbide**  $8.5 \times 10^{-6}$  m/°C per m

**SAE 52100 Steel**  $11.5 \times 10^{-6}$  m/°C per m

**Ceramic**  $9.9 \times 10^{-6}$  m/°C per m



All sets are furnished in a handsome, rugged wood case for lasting protection.

## Inch System Gage Block Sets, Individual Blocks and Accessories

The following pages include these Inch System items in the order shown:

 Rectangular gage blocks and accessories

 Square gage blocks and accessories

 Heavy-duty gage blocks and accessories


**Rectangular croblox® – Inch System  
Gage Block Sets in Case**
**Inch** 

| Accuracy Grade* | Measuring Range  | Blocks Per Set | Blocks Included in Sets  | Catalog No.     |
|-----------------|--|----------------|--|-----------------|
| B89.1.9 0       | .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001  | 81             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>49 Blocks .101 Through .149 (Steps of .001)<br>19 Blocks .050 Through .950 (Steps of .050)<br>4 Blocks 1.000 Through 4.000 (Steps of 1")  | <b>RC 81.A1</b> |
| B89.1.9 00      |  |                |  | <b>RC 81.AA</b> |
| Webber LM       |  |                |  | <b>RC 81.LM</b> |
| B89.1.9 0       | .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001<br>.300-12.000 in Steps of .000025<br>1/16-12.000 in Steps of 1/64 | 88             | Same as in RC 81. Set, Plus<br>3 Blocks .100025, .10005, .100075<br>4 Blocks 1/16, 5/64, 3/32, 7/64  | <b>RC 88.A1</b> |
| B89.1.9 00      |  |                |  | <b>RC 88.AA</b> |
| Webber LM       |  |                |  | <b>RC 88.LM</b> |
| B89.1.9 0       | .200-8.000 in Steps of .001<br>.300-8.000 in Steps of .0001  | 34             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>9 Blocks .101 Through .109 (Steps of .001)<br>9 Blocks .110 Through .190 (Steps of .010)<br>3 Blocks .100 Through .300 (Steps of .100)<br>1 Block .500<br>3 Blocks 1.000, 2.000 and 4.000 | <b>RC 34.A1</b> |
| B89.1.9 00      |  |                |  | <b>RC 34.AA</b> |
| Webber LM       |  |                |  | <b>RC 34.LM</b> |
| B89.1.9 0       | .020-.240 in Steps of .001<br>.040-.240 in Steps of .0001<br>.060-.240 in Steps of .00005  | 28             | 1 Block .02005<br>9 Blocks .0201 Through .0209 (Steps of .0001)<br>9 Blocks .021 Through .029 (Steps of .001)<br>9 Blocks .010 Through .090 (Steps of .010)  | <b>RC 28.A1</b> |
| B89.1.9 00      |  |                |  | <b>RC 28.AA</b> |

**NOTES:** For gage block accessories, order AC 11.A Accessory Set in Case.

Sets include etched serial numbers and Commercial Grade Calibration Certificate. A Master Grade Calibration Certificate is available at extra cost.

\*For complete accuracy specifications, see page at the beginning of this section.





## Rectangular Ceramic – Inch System Gage Block Sets in Case

Inch

Our Ceramic Gage Blocks, offered in rectangular, inch and metric, fill the gap between steel and the universally accepted croblox®. While not as stable as croblox®, ceramic is an excellent alternative to steel because of its superior hardness, thermal expansion and wear characteristics.



Set No. RY 34.A1.

| Accuracy Grade* | Measuring Range  | Blocks Per Set | Blocks Included In Sets  | Catalog No. |
|-----------------|--|----------------|--|-------------|
| B89.1.9 0       | .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001  | 81             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>49 Blocks .101 Through .149 (Steps of .001)<br>19 Blocks .050 Through .950 (Steps of .050)<br>4 Blocks 1.000 Through 4.000 (Steps of 1")  | RY 81.A1    |
| B89.1.9 00      |  |                |  | RY 81.AA    |
| B89.1.9 0       | .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001<br>.300-12.000 in Steps of .000025<br>1/16-12.000 in Steps of 1/64 | 88             | Same as in RY 81. Set, Plus<br>3 Blocks .100025, .10005, .100075<br>4 Blocks 1/16, 5/64, 3/32, 7/64  | RY 88.A1    |
| B89.1.9 00      |  |                |  | RY 88.AA    |
| B89.1.9 0       | .200-8.000 in Steps of .001<br>.300-8.000 in Steps of .0001  | 34             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>9 Blocks .101 Through .109 (Steps of .001)<br>9 Blocks .110 Through .190 (Steps of .010)<br>3 Blocks .100 Through .300 (Steps of .100)<br>1 Block .500<br>3 Blocks 1.000, 2.000 and 4.000 | RY 34.A1    |
| B89.1.9 00      |  |                |  | RY 34.AA    |

**NOTE:** Sets include etched serial number and Commercial Grade Calibration Certificate. A Master Grade Calibration Certificate is available at extra cost.

\*For complete accuracy specifications, see page at the beginning of this section.


**Rectangular Steel – Inch System  
Gage Block Sets in Case**
**B89.1.9 Accuracy Grade 0\***
**Inch** 

| Measuring Range  | Blocks Per Set | Blocks Included In Sets  | Catalog No.     |
|--|----------------|--|-----------------|
| .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001  | 81             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>49 Blocks .101 Through .149 (Steps of .001)<br>19 Blocks .050 Through .950 (Steps of .050)<br>4 Blocks 1.000 Through 4.000 (Steps of 1")  | <b>RS 81.A1</b> |
| .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001<br>.300-12.000 in Steps of .000025<br>1/16-12.000 in Steps of 1/64 | 88             | Same as in RS 81.A1 Set, Plus<br>3 Blocks .100025, .10005, .100075<br>4 Blocks 1/16, 5/64, 3/32, 7/64  | <b>RS 88.A1</b> |
| .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001<br>.300-12.000 in Steps of .000025<br>1/16-12.000 in Steps of 1/64 | 92             | Same as in RS 88.A1 Set, Plus<br>2 Blocks .100" (croblox® Wear Blocks)<br>2 Blocks .050 (croblox® Wear Blocks)   | <b>RS 92.A1</b> |
| .100-4.000 in Steps of .001<br>.150-4.000 in Steps of .0001<br>.200-4.000 in Steps of .00005                                     | 38             | 2 Blocks .050 (croblox® Wear Blocks)<br>1 Block .05005<br>9 Blocks .0501 Through .0509 (Steps of .0001)<br>9 Blocks .051 Through .059 (Steps of .001)<br>11 Blocks .050 Through .150 (Steps of .010)<br>4 Blocks .200 Through .500 (Steps of .100)<br>2 Blocks 1.000 and 2.000 | <b>RS 38.A1</b> |
| .200-8.000 in Steps of .001<br>.300-8.000 in Steps of .0001  | 34             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>9 Blocks .101 Through .109 (Steps of .001)<br>9 Blocks .110 Through .190 (Steps of .010)<br>4 Blocks .100, .200, .300, .500<br>3 Blocks 1.000, 2.000, 4.000   | <b>RS 34.A1</b> |
| .020-.240 in Steps of .001<br>.040-.240 in Steps of .0001<br>.060-.240 in Steps of .00005  | 28             | 1 Block .02005<br>9 Blocks .0201 Through .0209 (Steps of .0001)<br>9 Blocks .021 Through .029 (Steps of .001)<br>9 Blocks .010 Through .090 (Steps of .010)  | <b>RS 28.A1</b> |
| .0625-4.000 in Steps of .0625<br>.100-4.000 in Steps of .100   | 9              | 1 Block .0625, .100, .125, .200, .250, .300,<br>.500, 1.000, 2.000   | <b>RS 9.A1</b>  |

**Micrometer Checking Set**
**B89.1.9 Accuracy Grade AS1\***

|  |    |  |                |
|--|----|--|----------------|
|  | 10 | 10 blocks .105, .210, .315, .420,<br>.500, .605, .710, .815, .920, 1.000 | <b>RS 10.A</b> |
|--|----|--|----------------|

**NOTES:** For gage block accessories, order AC 11.A Accessory Set in Case.

See rectangular block accessories on the next page. Sets include etched serial numbers and Commercial Grade Calibration Certificate. A Master Grade Calibration Certificate is available at extra cost. \*For complete accuracy specifications, see page at the beginning of this section.



**MicroAccurate® – B-Grade Gage Block Sets In Case**

**Inch & Metric**

These B-Grade gage block sets are Starrett Global products. Their very affordable price makes them ideal for general shop floor use. Now, our initial Inch Sets are joined by four Metric B-Grade Sets.

Etched, unique serial numbers are included on each block. Custom numbers are not available.

Sets are available with a choice of two types of certificates of calibration as described below.

Inch System sets have a tolerance of  $\pm 50 \mu\text{in}$ .

Metric System sets have a tolerance of  $\pm 1.25 \mu\text{m}$ .



No. RS 81.B

**Gage Block Sets**

| Measuring Range  | Blocks Per Set | Blocks Included In Sets   | Catalog No. |
|--|----------------|---|-------------|
| <b>Inch System Sets</b><br>.100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001   | 81             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>49 Blocks .101 Through .149 (Steps of .001)<br>19 Blocks .050 Through .950 (Steps of .050)<br>4 Blocks 1.000 Through 4.000 (Steps of 1")   | RS 81.B     |
|  |                |   | RS 81.W     |
| <b>Metric System Sets</b><br>3.0 Through 450 in .0005mm Steps<br>2.0 Through 450 in .001mm Steps<br>1.0 Through 450 in .01mm Steps<br>1.0 Through 450 in .1mm Steps  | 88             | 1 block .5mm<br>1 block 1.0005mm<br>9 blocks 1.001mm Through 1.009mm (Steps of .001mm)<br>49 blocks 1.01mm Through 1.49mm (Steps of .01mm)<br>18 blocks 1mm Through 9.5mm (Steps of .5mm)<br>10 blocks 10mm Through 100mm (Steps of 10mm) | RS 88.MW    |
|  |                |   | RS 88.MB    |
| <b>Metric System Sets</b><br>3.0 Through 250 in .0005mm Steps<br>2.0 Through 250 in .001mm Steps<br>1.0 Through 250 in .01 mm Steps<br>1.0 Through 250 in .1mm Steps | 112            | 1 block .5mm<br>1 block 1.0005mm<br>9 blocks 1.001mm Through 1.009mm (Steps of .001mm)<br>49 blocks 1.01mm Through 1.49mm (Steps of .01mm)<br>48 blocks 1mm Through 24.5mm (Steps of .5mm)<br>4 blocks 25mm Through 100mm (Steps of 25mm) | RS 112.MW   |
|  |                |   | RS 112.MB   |

**NEW**

**Specifications**

| Catalog No. | Features  |
|-------------|---|
| RS 81.B     | Calibration performed at Webber Gage in Cleveland, OH. Certificate of Calibration with NVLAP accreditation. Calibration in accordance with ISO 17025 with dated calibration certificate and NIST traceability number. The name and address of the user may be added to the calibration certificate.<br><b>Inch System (RS 81.B)</b> uncertainty of measurement (k=2): $\mu = 6 + L$ where L is in inches, but $\mu$ not less than 7 $\mu\text{in}$ .<br><b>Metric Systems (RS 88.MB &amp; RS 112.MB)</b> uncertainty of measurement (k=2): $\mu = 0.15 + .001L$ where L is in millimeters, but $\mu$ not less than 0.18 $\mu\text{m}$ . |
| RS 88.MB    |   |
| RS 112.MB   |   |
| RS 81.W     | Calibration performed in China in partnership with Webber Gage. Webber Gage samples the measurements to monitor the calibration results. Calibrations are traceable to NIST, but no NIST traceability number or dates will be given. The name and address of the user will be left blank on the calibration certificate.<br><b>Inch System (RS 81.W)</b> uncertainty of measurement (k=2): 10 $\mu\text{in}$ .<br><b>Metric Systems (RS 88.MW &amp; RS 112.MW)</b> uncertainty of measurement (k=2): $\mu = 0.25 \mu\text{m}$ .   |
| RS 88.MW    |   |
| RS 112.MW   |   |



**Rectangular Gage Block Accessories**  
Steel and croblox® – Inch System

Inch 



**Rectangular Steel and croblox® Accessories**  
Individually or Sets as stated below

| Individual Accessories          |             | No. of Steel Accessories Included |                 |                                       |
|---------------------------------|-------------|-----------------------------------|-----------------|---------------------------------------|
| Description                     | Catalog No. |                                   | Set No. AC 11.A | 81- 92 Block Sets when ord. w/ Acces. |
|                                 | Steel       | croblox®                          |                 |                                       |
| Half-Round Jaw**<br>.250 Radius | RA 1.       |                                   | 2               | 2                                     |
| Straight Jaw**<br>.250" Thick   | RA 4.       | RA 24.                            | 2*              | 2*                                    |
| Clamps<br>0"-1-1/2" Capacity    | RA 5.       |                                   | 1               | 1                                     |
| 1-1/2"-4" Capacity              | RA 6.       |                                   | 1               | 1                                     |
| 4"-6-1/2" Capacity              | RA 7.       |                                   | 1               | 1                                     |
| 0"-12" Capacity                 | RA 8.       |                                   | 1               | 1                                     |
| Scriber Point                   | RA 11.      |                                   | 1               | 1                                     |
| Center Point, 100 C/L           | RA 12.      |                                   | 1               | 1                                     |
| Base Block 1" Thick             | RA 13.      |                                   | 1               | 1                                     |
| Case (CS 9111.)                 |             |                                   | 1               |                                       |

**Rectangular croblox®  
Wear Blocks**

| Size | Catalog No. |
|------|-------------|
| .020 | RC .020 WA1 |
| .050 | RC .050 WA1 |
| .100 | RC .100 WA1 |

- \* croblox® jaws available as an option at extra cost. Please specify.
- \*\*Jaws are normally used in pairs, but are ordered individually. Please order accordingly.

**Additional Accessories**

|                                |        |  |  |
|--------------------------------|--------|--|--|
| Clamps<br>0-18" Capacity       | RA 9.  |  |  |
| 0-24" Capacity                 | RA 10. |  |  |
| 0-36" Capacity                 | RA 14. |  |  |
| Half-Round Jaws<br>.200 Radius | RA 2.  |  |  |
| .100 Radius                    | RA 3.  |  |  |

**Square croblox® – Inch System GageBlock Sets in Case**

Inch 

| Accuracy Grade* | Measuring Range               | Blocks Per Set | Blocks Included In Sets                       | Catalog No. |
|-----------------|-------------------------------|----------------|---|-------------|
| B89.1.9 0       | .100-12.000 in Steps of .001  | 81             | 9 Blocks .1001 Through .1009 (Steps of .0001) | SC 81.A1    |
| B89.1.9 00      | .200-12.000 in Steps of .0001 |                | 49 Blocks .101 Through .149 (Steps of .001)   |             |
| B89.1.9 0       | .100-12.000 in Steps of .001  | 88             | 19 Blocks .050 Through .950 (Steps of .050)   | SC 81.AA    |
| B89.1.9 00      | .200-12.000 in Steps of .0001 |                | 4 Blocks 1.000 Through 4.000 (Steps of 1")    |             |
| B89.1.9 0       | .100-12.000 in Steps of .001  | 88             | Same as in SC 81. Set, Plus                   | SC 88.A1    |
| B89.1.9 00      | .200-12.000 in Steps of .0001 |                | 3 Blocks .100025, .10005, .100075             |             |
| B89.1.9 0       | .100-12.000 in Steps of .001  | 36             | 4 Blocks 1/16, 5/64, 3/32, 7/64               | SC 88.AA    |
| B89.1.9 00      | .200-12.000 in Steps of .0001 |                | 1 Block .050                                  |             |
| B89.1.9 0       | .200-8.000 in Steps of .001   | 36             | 9 Blocks .1001 Through .1009 (Steps of .0001) | SC 36.A1    |
| B89.1.9 00      | .300-8.000 in Steps of .0001  |                | 9 Blocks .101 Through .109 (Steps of .001)    |             |
|                 |                               |                | 9 Blocks .110 Through .190 (Steps of .010)    |             |
|                 |                               |                | 5 Blocks .100 Through .500 (Steps of .100)    |             |
|                 |                               |                | 3 Blocks 1.000, 2.000, 4.000                  | SC 36.AA    |

**NOTES:** All Square croblox® sets above are available with accessories at extra cost. To order, add "X" to catalog number. Accessories are furnished in steel (see following pages).

Sets include etched serial numbers and Commercial Grade Calibration Certificate. A Master Grade Calibration Certificate is available at extra cost.

\*For complete accuracy specifications, see page at the beginning of this section.





### Square Steel – Inch System Gage Block Sets in Case

**B89.1.9 Accuracy Grade 0\***

**Inch**

| Measuring Range  | Blocks Per Set | Blocks Included In Sets  | Catalog No.     |
|--|----------------|--|-----------------|
| .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001  | 81             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>49 Blocks .101 Through .149 (Steps of .001)<br>19 Blocks .050 Through .950 (Steps of .050)<br>4 Blocks 1.000 Through 4.000 (Steps of 1")<br>Above Set also Available with ACCESSORIES** (Extra)   | <b>SS 81.A1</b> |
| .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001<br>.300-12.000 in Steps of .000025<br>1/16-12.000 in Steps of 1/64 | 88             | Same as in SS 81.A1 Set, Plus<br>3 Blocks .100025, .10005, .100075<br>4 Blocks 1/16, 5/64, 3/32, 7/64<br>Above Set also Available with ACCESSORIES** (Extra)   | <b>SS 88.A1</b> |
| .200-8.000 in Steps of .001<br>.300-8.000 in Steps of .0001  | 36             | 1 Block .050<br>9 Blocks .1001 Through .1009 (Steps of .0001)<br>9 Blocks .101 Through .109 (Steps of .001)<br>9 Blocks .110 Through .190 (Steps of .010)<br>5 Blocks .100 Through .500 (Steps of .100)<br>3 Blocks 1.000, 2.000 and 4.000<br>Above Set Also Available with ACCESSORIES** (Extra)  | <b>SS 36.A1</b> |
| .020-.240 in Steps of .001<br>.040-.240 in Steps of .0001<br>.060-.240 in Steps of .00005  | 28             | 1 Block .02005<br>9 Blocks .0201 Through .0209 (Steps of .0001)<br>9 Blocks .021 Through .029 (Steps of .001)<br>9 Blocks .010 Through .090 (Steps of .010)  | <b>SS 28.A1</b> |
| 5.000-84 in Steps of 1.000   | 8              | 8 Blocks 5, 6, 7, 8, 10, 12, 16, 20<br>Accessories Included:<br>6 Each SA 8. Studs<br>2 Each SA 9. Flat Head Screws (long)<br>2 Each SA 10. Flat Head Screws (short)<br>1 Each SA 16. 4 1/2 - 6" Tie Rod (adjustable)<br>1 Each SA 17. 6 - 9" Tie Rod (adjustable)<br>1 Each SA 18. 11 3/4" Tie Rod<br>1 Each SA 19. 15 3/4" Tie Rod<br>2 Each SA 20. 19 3/4" Tie Rods | <b>SS 8.A1X</b> |

**B89.1.9 Accuracy Grade 00\***

|                            |   |                        |                 |
|----------------------------|---|------------------------|-----------------|
| 5.000-84 in Steps of 1.000 | 8 | Same as above SS 8.A1X | <b>SS 8.AAX</b> |
|----------------------------|---|------------------------|-----------------|

**NOTES:** \*\*All square steel sets 34 through 88 are available with accessories at extra cost. To order, add "X" to catalog number. Accessories are steel. See square block accessories on the next page. Sets include etched serial numbers and Commercial Grade Calibration Certificate. A Master Grade Calibration Certificate is available at extra cost.

\* For complete accuracy specifications, see page at the beginning of this section.



**Internal Measuring  
Machine Jaws**

**No. SA 708.** croblox®  
**No. SA 707.** Steel

Jaws are doubled-ended, self-proving, assuring parallelism and squareness. Designed for use with square style gage blocks. Jaws are made of long-wearing croblox® or steel material, 2.000" long, 1.000" wide and .500" thick. Both side edges are lapped 90° square to the gaging faces within 30 seconds of arc and extend beyond the gage blocks in the combination, thus forming a square master.

Jaw and gage combination parallelism is quickly checked merely by turning the combination to the opposite side and rechecking the reading. Furnished in pairs.



**Square Gage Block Accessories  
Steel and croblox® – Inch System**



No. SA 25.A.

**Square Steel and croblox® Accessories  
Individually or sets as stated below**

| Description  | Individual Accessories                                   |          | No. of Steel Accessories Included                                       |  |
|--|--|----------|---|--|
|  | Steel  | croblox® | Set No. SA 25.A and 81 thru 88 Block Sets when ordered with Accessories | 34 and 36 Block Sets when ordered with Accessories |
| Half-Round Jaw**<br>.125 Radius<br>.250 Radius   | SA 1.<br>SA 2.   |          | 2<br>2  | 2  |
| Straight Jaw**<br>.500" Thick  | SA 3.  | SA 23.   | 2*  |  |
| Scriber Point<br>Center Point, .100 C/L<br>Base Block .500 Thick                                     | SA 4.<br>SA 5.<br>SA 6.                                  |          | 1<br>1<br>1   | 1  |
| Knurled Screw<br>Stud<br>Flat Head Screw<br>Long<br>Short<br>Slotted Nut                             | SA 7.<br>SA 8.<br><br>SA 9.<br>SA 10.<br>SA 11.          |          | 2<br>2<br>2<br>2<br>2<br>2  | 2<br>2<br>2<br>2                                   |
| Tie Rods<br>3/4" Solid<br>1-1/2" Solid<br>2-1/4" Solid<br>3" Solid<br>4-1/2-6" Adjust<br>6-9" Adjust | SA 12.<br>SA 13.<br>SA 14.<br>SA 15.<br>SA 16.<br>SA 17. |          | 1<br>1<br>1<br>1<br>1<br>1  | 1<br>1<br>1<br>1                                   |
| Case (CS9168)  |  |          | (For SA 25.A Only)  |  |

**Square croblox® Wear Blocks**

| Size                          | Catalog No. |
|-------------------------------|-------------|
| .100" With 1 Side Countersunk | SC .100 WA1 |

**Additional Accessories**

| Description   | Catalog No.                |           |
|---|----------------------------|-----------|
|   | Steel                      | *croblox® |
| Tie Rods<br>11-3/4" Solid<br>15-3/4" Solid<br>19-3/4" Solid | SA 18.<br>SA 19.<br>SA 20. |           |

\* croblox® jaws available as an option at extra cost. Please specify.

\*\*Jaws are normally used in pairs, but are ordered individually. Please order accordingly.



**Individual Rectangular Gage Blocks - Inch System  
croblox®, ceramic and steel**

Inch █

| Size/Inches                           | Grade | croblox® |    | Ceramic |    | Steel |
|---------------------------------------|-------|----------|----|---------|----|-------|
|                                       |       | AA       | A1 | AA      | A1 | A1    |
| .010                                  |       | •        | •  |         |    | •     |
| .01005                                |       |          |    |         |    | •     |
| .0101 Through .0109 in Steps of .0001 |       |          |    |         |    | •     |
| .011 Through .019 in Steps of .001    |       |          |    |         |    | •     |
| .020 (Wear Blocks)                    |       |          | •  |         |    |       |
| .020 or .02005                        |       | •        | •  |         |    | •     |
| .0201 Through .0209 in Steps of .0001 |       | •        | •  |         |    | •     |
| .021 Through .029 in Steps of .001    |       | •        | •  |         |    | •     |
| .030                                  |       | •        | •  |         |    | •     |
| .040                                  |       | •        | •  |         |    | •     |
| .050 long*                            |       | •        | •  | •       | •  | •     |
| .050 (Wear Blocks)                    |       |          | •  |         |    |       |
| .050S or .050SS                       |       | •        | •  |         |    | •     |
| .05005                                |       |          |    |         |    | •     |
| .0501 Through .0509 in Steps of .0001 |       |          |    |         |    | •     |
| .051 Through .059 in Steps of .001    |       |          |    |         |    | •     |
| .060 or .060SS                        |       | •        | •  |         |    | •     |
| .0625 (1/16)                          |       | •        | •  | •       | •  | •     |
| .070 or .070SS                        |       | •        | •  |         |    | •     |
| .078125 (5/64)                        |       | •        | •  | •       | •  | •     |
| .080 or .080SS                        |       | •        | •  |         |    | •     |
| .090 or .090SS                        |       | •        | •  |         |    | •     |
| .09375 (3/32)                         |       | •        | •  | •       | •  | •     |
| .100 long*                            |       | •        | •  | •       | •  | •     |
| .100 (Wear Blocks)                    |       |          | •  |         |    |       |
| .100S                                 |       | •        | •  | •       | •  | •     |
| .100025                               |       | •        | •  | •       | •  | •     |

| Size/Inches                           | Grade | croblox® |    | Ceramic |    | Steel |
|---------------------------------------|-------|----------|----|---------|----|-------|
|                                       |       | AA       | A1 | AA      | A1 | A1    |
| .10005                                |       | •        | •  | •       | •  | •     |
| .100075                               |       | •        | •  | •       | •  | •     |
| .1001 Through .1009 in Steps of .0001 |       | •        | •  | •       | •  | •     |
| .109375 (7/64)                        |       | •        | •  | •       | •  | •     |
| .101 Through .109 in Steps of .001    |       | •        | •  | •       | •  | •     |
| .110 Through .119 in Steps of .001    |       | •        | •  | •       | •  | •     |
| .120 Through .129 in Steps of .001    |       | •        | •  | •       | •  | •     |
| .130 Through .139 in Steps of .001    |       | •        | •  | •       | •  | •     |
| .140 Through .149 in Steps of .001    |       | •        | •  | •       | •  | •     |
| .150 Long*                            |       | •        | •  | •       | •  | •     |
| .150                                  |       | •        | •  | •       | •  | •     |
| .160 Through .190 in Steps of .010    |       | •        | •  | •       | •  | •     |
| .200, .250, .300, .350                |       | •        | •  | •       | •  | •     |
| .400, .450, .500, .550, .600          |       | •        | •  | •       | •  | •     |
| .650, .700, .750                      |       | •        | •  | •       | •  | •     |
| .800, .850, .900, .950                |       | •        | •  | •       | •  | •     |
| 1.000                                 |       | •        | •  | •       | •  | •     |
| 2.000                                 |       | •        | •  | •       | •  | •     |
| 3.000                                 |       | •        | •  | •       | •  | •     |
| 4.000                                 |       | •        | •  | •       | •  | •     |
| 5.000                                 |       |          |    |         |    | •     |
| 6.000                                 |       |          |    |         |    | •     |

**How To Order**

- ◆ Specify in this sequence: shape, material, size and accuracy grade
- ◆ **Key:**

|               |                 |                   |                 |
|---------------|-----------------|-------------------|-----------------|
| <b>Shape</b>  | <b>Material</b> | <b>Size</b>       | <b>Accuracy</b> |
| R=Rectangular | S=Steel         | (listed in table) |                 |
| S=Square      | C=croblox®      |                   |                 |
|               | Y=Ceramic       |                   |                 |
- ◆ Example: RS .250A1 = Rectangular Steel block, size .250, Grade A1 Accuracy

\*Order long length for Webber set replacements.

**Rectangular Block Sizes**

- ◆ Width: all blocks are .352" wide
- ◆ Length: for blocks under .050", length is 1.115"
- ◆ For blocks with .050 through .190", length is 1.180"
- ◆ For blocks .200" and above, length is 1.380"

**Exceptions**

- ◆ 28 block sets with blocks to .090" are all 1.115" long. .050, .060, .070, .080, .090 blocks in this set are listed with the suffix "ss".
- ◆ .050, .100, .150" blocks contained in the 81-92-piece sets are 1.380" long. Specify "long length".
- ◆ .100" block contained in the 36, 38, and 43-block sets are 1.380" long. Specify "long length".


**Individual Square Gage Blocks – Inch System  
croblox® and steel**
**Inch** 

| Size/Inches                              | Grade | croblox® |    | Steel |
|--|-------|----------|----|-------|
|  |       | AA       | A1 | A1    |
|  |       | 00       | 0  | 0     |
| .010                                     |       |          |    | •     |
| .020                                     |       |          |    | •     |
| .02005                                   |       |          |    | •     |
| .0201 Through .0209 in<br>Steps of .0001 |       |          |    | •     |
| .021 Through .029 in<br>Steps of .001    |       |          |    | •     |
| .030                                     |       |          |    | •     |
| .040                                     |       |          |    | •     |
| .050                                     |       | •        | •  | •     |
| .060                                     |       |          |    | •     |
| .0625 (1/16)                             |       | •        | •  | •     |
| .070                                     |       |          |    | •     |
| .078125 (5/64)                           |       | •        | •  | •     |
| .080                                     |       |          |    | •     |
| .090                                     |       |          |    | •     |
| .09375 (3/32)                            |       | •        | •  | •     |
| .100                                     |       | •        | •  | •     |
| .100 (Wear with Chamfered Hole)          |       |          | •  |       |
| .100025                                  |       | •        | •  | •     |
| .10005                                   |       | •        | •  | •     |
| .100075                                  |       | •        | •  | •     |
| .1001 Through .1009 in<br>Steps of .0001 |       | •        | •  | •     |
| .109375 (7/64)                           |       | •        | •  | •     |
| .101 Through .149 in<br>Steps of .001    |       | •        | •  | •     |
| .150 Through .190 in<br>Steps of .010    |       | •        | •  | •     |
| .200                                     |       | •        | •  | •     |
| .250                                     |       | •        | •  | •     |
| .300                                     |       | •        | •  | •     |
| .350                                     |       | •        | •  | •     |
| .400, .450, .500, .550                   |       | •        | •  | •     |
| .600, .650, .700, .750                   |       | •        | •  | •     |
| .800, .850, .900, .950                   |       | •        | •  | •     |
| 1.000                                    |       | •        | •  | •     |
| 2.000                                    |       | •        | •  | •     |
| 3.000                                    |       | •        | •  | •     |
| 4.000                                    |       | •        | •  | •     |

| Square Steel Blocks Only |       | AA | A1 |
|--------------------------|-------|----|----|
| Size/Inches              | Grade | 00 | 0  |
| 5.000                    |       | •  | •  |
| 6.000                    |       | •  | •  |
| 7.000                    |       | •  | •  |
| 8.000                    |       | •  | •  |
| 10.000                   |       | •  | •  |
| 12.000                   |       | •  | •  |
| 16.000                   |       | •  | •  |
| 20.000                   |       | •  | •  |

**Square Block Size**

- ◆ All square blocks are .950 x .950"
- ◆ Blocks have a .265" hole in the center
- ◆ On blocks .200" thick and over, the hole is countersunk on both faces (croblox® Wear Blocks are countersunk on one face only)

**How To Order**

- ◆ Specify in this sequence: shape, material, size and accuracy grade
- ◆ **Key:**    **Shape**                      **Material**                      **Size**                      **Accuracy**  
                     R=Rectangular                      S=Steel                      (listed in table)  
                     S=Square                                      C=croblox®
- ◆ Example: SS .125A1 = Square Steel block, size .125 with a Grade A1 accuracy





## Heavy-Duty Steel – Inch System Gage Block Sets and Accessories

Inch

**Gaging Area** 17/32 x 1-1/2"

These heavy-duty gage block sets are primarily used for assembling together into exclusive Webber fixtures.

Precision “yardsticks” and height gages can be built up to a required dimension by wringing blocks together and then by the use of eccentric clamps, locking them into place. All blocks over 1” long have 1/4” holes that accept eccentric clamps. All blocks 6” or larger have an insulated center grip to eliminate temperature variations caused by handling.

Precision scribes and dividers for tool layout can be created in a few seconds. The center point is on a .500” center line of a 1” block. The scriber point may be sharpened indefinitely without altering the original accuracy.

Snap gages with inside or outside calipers can be easily assembled using accessories like the eccentric clamps, a quick-acting clamp, and a pair of half-round or straight jaws.



**No. HD 46.A1X.**



**Snap gage is used to check inside dimensions of ring gage still mounted in internal grinder.**



**Building up blocks into precision “yardsticks.”**



**Precision scribes, dividers and snap gages.**



**Heavy-Duty – Inch System Accessories (continued)**

**Inch** 

**Indicator Accessory Set**

This heavy-duty accessory mounts on any build-up of heavy-duty blocks and measures the deviation of the work from nominal or desired size. (Indicator is set and checked for zero by placing blocks on any known flat surface.)

HDA 10 and HDA 12 Indicator Accessory Sets consist of a holding block, extension jaw and a precision Starrett indicator. See catalog description below for indicator ranges and graduations.



Above: Eccentric clamps are used for combining long blocks.

Below: Quick-acting clamps are used for combining fractional inch blocks with blocks 1" or longer.

Left: Indicator Accessory Set.

**Wear Blocks**

crobox® Wear Blocks in .050" and .100" sizes are available for use with heavy-duty blocks.



| Size  | Catalog No.         |
|-------|---------------------|
| .050" | <b>HDC .050 WA1</b> |
| .100" | <b>HDC .100 WA1</b> |

**Heavy-Duty Steel Accessories Individually or Sets as stated below**

| Individual Accessories         |                    | No. of Steel Accessories Included  |
|--------------------------------|--------------------|--|
| <b>Description</b>             | <b>Catalog No.</b> | <b>All 42 thru 46 Piece Sets or 84 Piece Set when ordered with Accessories</b> |
| Half-Round Jaw*<br>.500 Radius | <b>HDA 1.</b>      | 2  |
| Scriber Point                  | <b>HDA 2.</b>      | 1  |
| Center Point, .500 C/L         | <b>HDA 3.</b>      | 1  |
| Eccentric Clamp                | <b>HDA 4.</b>      | (See set description next page for qty.)                                       |
| Quick-Acting Clamp             | <b>HDA 5.</b>      | 1  |
| Base Block 1.500" Thick        | <b>HDA 6.</b>      | 1  |

**Additional Accessories**

|   |                 |  |
|---|-----------------|--|
| Straight Jaw*<br>1.000 Thick  | <b>HDA 820.</b> |  |
| Indicator Set Consisting of Indicator Holding Block, Extension Jaw (1.000" Thick), Indicator with ±.010" Range .0005" Graduations, and Case | <b>HDA 10.</b>  |  |
| Indicator Set As Above Except Indicator With ±.0015" Range .00005" Graduations  | <b>HDA 12.</b>  |  |

\*Jaws are normally used in pairs, but are ordered individually. Please order accordingly.



**Heavy-Duty Steel – Inch System  
Gage Block Sets and Accessories**

**Inch**

**17/32" x 1-1/2" Gaging Area**

**B89.1.9 Accuracy Grade 0\***

| Measuring Range   | Blocks Per Set | Blocks Included In Sets   | Catalog No.      |
|---|----------------|---|------------------|
| .100-12.000 in Steps of .001<br>.200-12.000 in Steps of .0001<br>.300-12.000 in Steps of .00005 | 84             | 2 Blocks .100 Wear croblox®<br>1 Block .10005<br>9 Blocks .1001 Through .1009 (Steps of .0001)<br>49 Blocks .101 Through .149 (Steps of .001)<br>19 Blocks .050 Through .950 (Steps of .050)<br>4 Blocks 1.000 Through 4.000 (Steps of 1")<br>3 Eccentric Clamps<br>Above Set Also Available With 2 Additional Eccentric Clamps and Accessories** (Extra) | <b>HD 84.A1</b>  |
| .200-48.000 in Steps of .001<br>.300-48.000 in Steps of .0001                                   | 46             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>9 Blocks .101 Through .109 (Steps of .001)<br>9 Blocks .110 Through .190 (Steps of .010)<br>9 Blocks .100 Through .900 (Steps of .100)<br>4 Blocks 1.000 Through 4.000 (Steps of 1")<br>6 Blocks 6.000<br>10 Eccentric Clamps and Accessories** (Included)   | <b>HD 46.A1X</b> |
| .200-36.000 in Steps of .001<br>.300-36.000 in Steps of .0001                                   | 44             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>9 Blocks .101 Through .109 (Steps of .001)<br>9 Blocks .110 Through .190 (Steps of .010)<br>9 Blocks .100 Through .900 (Steps of .100)<br>4 Blocks 1.000 Through 4.000 (Steps of 1")<br>4 Blocks 6.000<br>8 Eccentric Clamps and Accessories** (Included)  | <b>HD 44.A1X</b> |
| .200-24.000 in Steps of .001<br>.300-24.000 in Steps of .0001                                   | 42             | 9 Blocks .1001 Through .1009 (Steps of .0001)<br>9 Blocks .101 Through .109 (Steps of .001)<br>9 Blocks .110 Through .190 (Steps of .010)<br>9 Blocks .100 Through .900 (Steps of .100)<br>4 Blocks 1.000 Through 4.000 (Steps of 1")<br>2 Blocks 6.000<br>6 Eccentric Clamps and Accessories** (Included)  | <b>HD 42.A1X</b> |

**NOTES:** Case for HD 84.A1 has space for accessories and six 6.000" heavy-duty blocks. To order with accessories, add "X" to catalog number.

\*For complete accuracy specifications, see page at the beginning of this section.

\*\*See previous page for details.

**Individual Heavy-Duty Gage Blocks – Steel Only**

| Block Size                            |  |
|---------------------------------------|--|
| .050                                  | 2.000  |
| .100, .100025, .10005, .100075        | 3.000  |
| .1001 Through .1009 In Steps of .0001 | 4.000  |
| .101 Through .149 In Steps of .001    | 6.000  |
| .150 Through .190 In Steps of .010    | 6.000 Heavy-Duty Block with Eccentric Clamp and Case |
| .200 Through .950 In Steps of .050    | 10.000   |
| 1.000                                 | 20.000   |

**NOTES:** Sets include etched serial numbrs and Commercial Grade Calibration Certificate. A Master Grade Calibration Certificate is available at extra cost.

Separate cases for Gage Block Sets are also available.

To order individual blocks, specify HD followed by size and accuracy grade. Example: HD .050 A1



## Metric System Gage Block Sets, Individual Blocks and Accessories

The following pages include these metric system items in the order shown:

-  **Rectangular gage blocks and accessories**
-  **Square gage blocks and accessories**



Metric rectangular 88 piece and square 112 sets are shown.

### Mini-Metric Rectangular Steel Gage Block Set No. RS 9.MA1

This mini-metric set of precision gage blocks calibrates micrometers, vernier gages and similar measuring tools. The gage blocks are also useful as setting masters for comparator-type dimensional gages and are useful in teaching the basics of metric measurement.

The set has a capacity of 61mm in 1, 0.5mm or 0.25mm steps. Its nine hardened steel blocks include these sizes: 1, 2, 2.25, 2.5, 3, 5, 10, 15 and 25mm. They are finished to B89.1.9 Accuracy Grade 0 and are furnished in a lined metal case.



Metric re set No. RS 9.MA1





**Rectangular croblox® – Metric System  
Gage Block Sets in Case**

**Metric**

**One Millimeter Base**

| Accuracy Grade* | Measuring Range                    | Blocks Per Set                                   | Blocks Included In Sets                            | Catalog No.       |
|-----------------|------------------------------------|--|--|-------------------|
| B89.1.9 0       | 3.0 Through 450 (Steps of .001mm)  | 45   | 9 Blocks 1.001mm Through 1.009mm (Steps of .001mm) | <b>RC 45.MA1</b>  |
|                 | 2.0 Through 450 (Steps of .01mm)   |  | 9 Blocks 1.01mm Through 1.09mm (Steps of .01mm)    |                   |
| B89.1.9 00      | 1.0 Through 450 (Steps of .1mm)    |  | 9 Blocks 1.1mm Through 1.9mm (Steps of .1mm)       | <b>RC 45.MAA</b>  |
|                 |                                    |  | 9 Blocks 1mm Through 9mm (Steps of 1mm)            |                   |
|                 |                                    |  | 9 Blocks 10mm Through 90mm (Steps of 10mm)         |                   |
| B89.1.9 0       | 3.0 Through 450 (Steps of .0005mm) | 88   | 1 Block .5mm                                       | <b>RC 88.MA1</b>  |
|                 | 2.0 Through 450 (Steps of .001mm)  |  | 1 Block 1.0005mm                                   |                   |
| B89.1.9 00      | 1.0 Through 450 (Steps of .01mm)   |  | 9 Blocks 1.001mm Through 1.009mm (Steps of .001mm) | <b>RC 88.MAA</b>  |
|                 | 1.0 Through 450 (Steps of .1mm)    | 49 Blocks 1.01mm Through 1.49mm (Steps of .01mm) |  |                   |
|                 |                                    |  | 18 Blocks 1mm Through 9.5mm (Steps of .5mm)        |                   |
|                 |                                    |  | 10 Blocks 10mm Through 100mm (Steps of 10mm)       |                   |
| B89.1.9 0       | 3.0 Through 250 (Steps of .0005mm) | 112  | 1 Block .5mm                                       | <b>RC 112.MA1</b> |
|                 | 2.0 Through 250 (Steps of .001mm)  |  | 1 Block 1.0005mm                                   |                   |
| B89.1.9 00      | 1.0 Through 250 (Steps of .01mm)   |  | 9 Blocks 1.001mm Through 1.009mm (Steps of .001mm) | <b>RC 112.MAA</b> |
|                 | 1.0 Through 250 (Steps of .1mm)    | 49 Blocks 1.01mm Through 1.49mm (Steps of .01mm) |  |                   |
|                 |                                    |  | 48 Blocks 1mm Through 24.5mm (Steps of .5mm)       |                   |
|                 |                                    |  | 4 Blocks 25mm Through 100mm (Steps of 25mm)        |                   |

**NOTE:** Sets include etched serial numbers and Commercial Grade Calibration Certificate. Metric croblox® Wear Blocks and/or Master Grade Calibration Certificate are available at extra cost. For gage block accessories, order AC 11.MA Metric Accessory Set in Case.

\*For complete accuracy specifications, see page at the beginning of this section.



**Rectangular Ceramic – Metric System  
Gage Block Sets in Case**

**Metric** 

Now there's another addition to the famous Starrett-Webber line of precision gage blocks. Ceramic, offered in rectangular, inch and metric, fills the gap between steel and the universally accepted croblox®. While not as stable as croblox®, ceramic is an excellent alternative to steel because of its superior hardness, thermal expansion and wear characteristics.



Set No. RY 88.MA1.

| Accuracy Grade* | Measuring Range  | Blocks Per Set | Blocks Included In Sets   | Catalog No.      |
|-----------------|--|----------------|---|------------------|
| B89.1.9 0       | 3.0 Through 450 in .001mm Steps  | 45             | 9 blocks 1.001mm Through 1.009mm (Steps of .001mm)  | <b>RY 45.MA1</b> |
| B89.1.9 00      | 2.0 Through 450 in .01mm Steps<br>1.0 Through 450 in .1mm Steps                                    |                | 9 blocks 1.01mm Through 1.09mm (Steps of .01mm)<br>9 blocks 1.1mm Through 1.9mm (Steps of .1mm)<br>9 blocks 1mm Through 9mm (Steps of 1mm)<br>9 blocks 10mm Through 90mm (Steps of 10mm)                                  | <b>RY 45.MAA</b> |
| B89.1.9 0       | 3.0 Through 450 in .0005mm Steps   | 88             | 1 block .5mm  | <b>RY 88.MA1</b> |
| B89.1.9 00      | 2.0 Through 450 in .001mm Steps<br>1.0 Through 450 in .01mm Steps<br>1.0 Through 450 in .1mm Steps |                | 1 block 1.0005mm<br>9 blocks 1.001mm Through 1.009mm (Steps of .001mm)<br>49 blocks 1.01mm Through 1.49mm (Steps of .01mm)<br>18 blocks 1mm Through 9.5mm (Steps of .5mm)<br>10 blocks 10mm Through 100mm (Steps of 10mm) | <b>RY 88.MAA</b> |

**NOTE:** Sets include etched serial numbers and Commercial Grade Calibration Certificate. A Master Grade Calibration Certificate is available at extra cost.

\*For complete accuracy specifications, see page at the beginning of this section.



**Rectangular Steel – Metric System  
Gage Block Sets in Case**

**Metric**

**One Millimeter Base**

**B89.1.9 Accuracy Grade 0\***

| Measuring Range  | Blocks Per Set | Blocks Included in Sets  | Catalog No.                     |
|--|----------------|--|---------------------------------|
| 1.0 Through 61.0 in 1.0mm Steps<br>2.0 Through 61.0 in .5mm Steps<br>4.0 Through 61.0 in .25mm Steps                                   | 9              | 3 blocks 1.0mm, 2.0mm, 2.25mm<br>4 blocks 2.5mm, 3.0mm, 5.0mm, 10.0mm<br>2 blocks 15.0mm, 25.0mm   | <b>RS 9.MA1<br/>MINI-METRIC</b> |
| 3.0 Through 450 in .001mm Steps<br>2.0 Through 450 in .01mm Steps<br>1.0 Through 450 in .1mm Steps                                     | 45             | 9 blocks 1.001mm Through 1.009mm (Steps of .001mm)<br>9 blocks 1.01mm Through 1.09mm (Steps of .01mm)<br>9 blocks 1.1mm Through 1.9mm (Steps of .1mm)<br>9 blocks 1mm Through 9mm (Steps of 1mm)<br>9 blocks 10mm Through 90mm (Steps of 10mm) | <b>RS 45.MA1</b>                |
| 3.0 Through 450 in .0005mm Steps<br>2.0 Through 450 in .001mm Steps<br>1.0 Through 450 in .01mm Steps<br>1.0 Through 450 in .1mm Steps | 88             | 1 block .5mm<br>1 block 1.0005mm<br>9 blocks 1.001mm Through 1.009mm (Steps of .001mm)<br>49 blocks 1.01mm Through 1.49mm (Steps of .01mm)<br>18 blocks 1mm Through 9.5mm (Steps of .5mm)<br>10 blocks 10mm Through 100mm (Steps of 10mm)      | <b>RS 88.MA1</b>                |
| 3.0 Through 250 in .0005mm Steps<br>2.0 Through 250 in .001mm Steps<br>1.0 Through 250 in .01mm Steps<br>1.0 Through 250 in .1mm Steps | 112            | 1 block .5mm<br>1 block 1.0005mm<br>9 blocks 1.001mm Through 1.009mm (Steps of .001mm)<br>49 blocks 1.01mm Through 1.49mm (Steps of .01mm)<br>48 blocks 1mm Through 24.5mm (Steps of .5mm)<br>4 blocks 25mm Through 100mm (Steps of 25mm)      | <b>RS 112.MA1</b>               |

**Micrometer Checking Set**

**B89.1.9 Accuracy Grade AS1\***

|  |    |  |                 |
|--|----|--|-----------------|
|  | 10 | 10 blocks 2.5mm, 5.1mm, 7.7mm, 10.3mm, 12.9mm<br>15.0 mm, 17.6mm, 20.2mm, 22.8mm, 25.0mm | <b>RS 10.MA</b> |
|--|----|--|-----------------|

**NOTES:** No. AC 11.MA Metric Accessory Set in Case, metric croblox® Wear Blocks in sets, etched serial numbers, and Certificate of Calibration are all available at extra cost.  
See rectangular metric block accessories on the next page.

\* For complete accuracy specifications, see page at the beginning of this section.



**Rectangular Gage Block Accessories  
Steel and croblox® – Metric System**

**Metric** 



No. AC 11.MA.

**Rectangular Steel and croblox® Accessories  
Individually or Sets as stated below**

| Individual Accessories         |             | No. of Steel Accessories Included |                  |
|--------------------------------|-------------|-----------------------------------|------------------|
| Description                    | Catalog No. |                                   | Set No. AC 11.MA |
|                                | Steel       | croblox®                          |                  |
| Half-Round Jaw**<br>5mm Radius | RA 101.     |                                   | 2                |
| Straight Jaw**<br>5mm Thick    | RA 104.     | RA 204.                           | 2*               |
| Clamps                         |             |                                   |                  |
| 0-38mm Capacity                | RA 5.       |                                   | 1                |
| 38-100mm Capacity              | RA 6.       |                                   | 1                |
| 100-165mm Capacity             | RA 7.       |                                   | 1                |
| 0-300mm Capacity               | RA 8.       |                                   | 1                |
| Scriber Point                  | RA 11.      |                                   | 1                |
| Center Point, 2mm C/L          | RA 112.     |                                   | 1                |
| Base Block, 25mm Thick         | RA 113.     |                                   | 1                |
| Case (CS 9111.)                |             |                                   | 1                |

**Rectangular croblox®  
Wear Blocks**

| Size  | Catalog No. |
|-------|-------------|
| 1.0mm | RCM 1.0 WA1 |
| 2.0mm | RCM 2.0 WA1 |

**Additional Accessories**

|                  |        |  |  |
|------------------|--------|--|--|
| Clamps           |        |  |  |
| 0-450mm Capacity | RA 9.  |  |  |
| 0-600mm Capacity | RA 10. |  |  |
| 0-900mm Capacity | RA 14. |  |  |

\* croblox® jaws available as an option at extra cost. Please specify.


\*\*Jaws are normally used in pairs, but are ordered individually. Please order accordingly.





## Square Combination croblox® and Steel – Metric System Gage Block Sets in Case

An ideal combination of value, price and convenience, these sets include a popular selection of croblox® and steel as listed.

| Two Millimeter Base  |                | B89.1.9 Accuracy Grade 0*   | Metric  |
|--|----------------|---|--|
| Measuring Range  | Blocks Per Set | Blocks** Included in Sets   | Catalog No.  |
| 6.0 Through 450 in .001mm Steps<br>4.0 Through 450 in .01mm Steps<br>2.0 Through 450 in .1mm Steps                                     | 45             | 9 Blocks 2.001 Through 2.009 (Steps of .001mm)<br>9 Blocks 2.01 Through 2.09 (Steps of .01mm)<br>9 Blocks 2.1 Through 2.9 (Steps of .1mm)<br>9 Blocks 1.0 Through 9.0 (Steps of 1.0mm)<br>9 Blocks 10 Through 90 (Steps of 10mm)  | <b>S2C 45.MA1</b>  |
| 6.0 Through 450 in .001mm Steps<br>4.0 Through 450 in .01mm Steps<br>2.0 Through 450 in .1mm Steps                                     | 45             | Same as Above Plus the Following Accessories:<br>1 pair SA 102. 6 mm Radius Jaws<br>1 each SA 4. Scriber Point<br>2 each SA 7. Knurled Screws<br>2 each SA 8. Studs<br>2 each SA 9. Flat Head Screws (long)<br>2 each SA 10. Flat Head Screws (short)<br>2 each SA 11. Slotted Nuts<br>1 each SA 12. 19mm Tie Rod<br>1 each SA 13. 38mm Tie Rod<br>1 each SA 14. 57mm Tie Rod<br>1 each SA 15. 76mm Tie Rod<br>1 each SA 16. 114-152mm Tie Rod (adjustable) | <b>S2C 45.MA1X</b>   |
| 6.0 Through 450 in .0005mm Steps<br>4.0 Through 450 in .001mm Steps<br>2.0 Through 450 in .01mm Steps<br>2.0 Through 450 in .1mm Steps | 88             | 1 Block .5mm<br>1 Block 2.0005mm<br>9 Blocks 2.001 Through 2.009 (Steps of .001mm)<br>49 Blocks 2.01 Through 2.49 (Steps of .01mm)<br>18 Blocks 1.0 Through 9.5 (Steps of .5mm)<br>10 Blocks 10 Through 100 (Steps of 10mm)   | <b>S2C 88.MA1</b>  |
| 6.0 Through 250 in .0005mm Steps<br>4.0 Through 250 in .001mm Steps<br>2.0 Through 250 in .01mm Steps<br>2.0 Through 250 in .1mm Steps | 112            | 1 Block .5mm<br>1 Block 2.0005mm<br>9 Blocks 2.001 Through 2.009 (Steps of .001mm)<br>49 Blocks 2.01 Through 2.49 (Steps of .01mm)<br>48 Blocks 1.0 Through 24.5 (Steps of .5mm)<br>4 Blocks 25 Through 100 (Steps of 25mm)   | <b>S2C 112.MA1</b>   |

**\*\*NOTE:** All blocks are croblox®, except sizes below 1.5mm and above 10mm, which are steel.

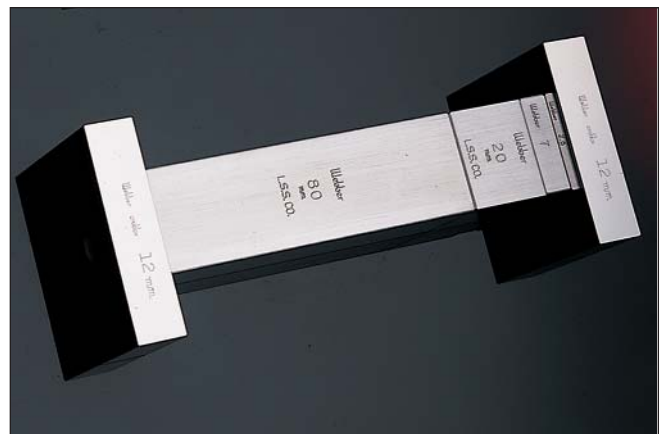
**NOTE:** Metric croblox® Wear Blocks are available as option. Sets include etched serial numbers and Commercial Grade Calibration Certificate. A Master Grade Calibration Certificate is available at extra cost.

\*For complete accuracy specifications, see page at the beginning of this section.

### Internal Measuring Machine Jaws croblox® No. SA 712. Steel No. SA 711.

Double ended, self proving- assures parallelism and squareness. Designed for use with square style gage blocks, jaws are made of long-wearing croblox® or steel 50.8mm long, 25.4mm wide and 12mm thick. Both side edges are lapped 90° square to the gaging faces within 30 seconds of arc and extend beyond the gage blocks in the combination, thus forming a square master.

Jaw and gage combination parallelism is checked merely by turning the combination to the opposite side and rechecking the reading. Furnished in pairs.




**Square Steel – Metric System  
Gage Block Sets in Case**
**Metric** 
**Two Millimeter Base**
**B89.1.9 Accuracy Grade 0**

| Measuring Range  | Blocks Per Set | Blocks Included in Sets  | Catalog No.        |
|--|----------------|--|--------------------|
| 6.0 Through 450 in .001mm Steps<br>4.0 Through 450 in .01mm Steps<br>2.0 Through 450 in .1mm Steps                                     | 45             | 9 Blocks 2.001mm Through 2.009mm (Steps of .00mm)<br>9 Blocks 2.01mm Through 2.09mm (Steps of .01mm)<br>9 Blocks 2.1mm Through 2.9mm (Steps of .1mm)<br>9 Blocks 1.0mm Through 9mm (Steps of 1.0mm)<br>9 Blocks 10mm Through 90mm (Steps of 10mm)  | <b>S2S 45.MA1</b>  |
| 6.0 Through 450 in .001mm Steps<br>4.0 Through 450 in .01mm Steps<br>2.0 Through 450 in .1mm Steps                                     | 45             | Same as Above Plus the Following Accessories:<br>1 Pair SA 102. 6mm Radius Jaws<br>1 Each SA 4. Scriber Point<br>2 Each SA 7. Knurled Screws<br>2 Each SA 8. Studs<br>2 Each SA 9. Flat Head Screws (Long)<br>2 Each SA 10. Flat Head Screws (Short)<br>2 Each SA 11. Slotted Nuts<br>1 Each SA 12. 19mm Tie Rod<br>1 Each SA 13. 38mm Tie Rod<br>1 Each SA 14. 57mm Tie Rod<br>1 Each SA 15. 76mm Tie Rod<br>1 Each SA 16. 114-152mm Tie Rod (adjustable) | <b>S2S 45.MA1X</b> |
| 6.0 Through 450 in .0005mm Steps<br>4.0 Through 450 in .001mm Steps<br>2.0 Through 450 in .01mm Steps<br>2.0 Through 450 in .1mm Steps | 88             | 1 Block .5mm<br>1 Block 2.0005mm<br>9 Blocks 2.001mm Through 2.009mm (Steps of .001mm)<br>49 Blocks 2.01mm Through 2.49mm (Steps of .01mm)<br>18 Blocks 1.0mm Through 9.5mm (Steps of .5mm)<br>10 Blocks 10mm Through 100mm (Steps of 10mm)  | <b>S2S 88.MA1</b>  |
| 6.0 Through 250 in .0005mm Steps<br>4.0 Through 250 in .001mm Steps<br>2.0 Through 250 in .01mm Steps<br>2.0 Through 250 in .1mm Steps | 112            | 1 Block .5mm<br>1 Block 2.0005mm<br>9 Blocks 2.001mm Through 2.009mm (Steps of .001mm)<br>49 Blocks 2.01mm Through 2.49mm (Steps of .01mm)<br>48 Blocks 1.0mm Through 24.5mm (Steps of .5mm)<br>4 Blocks 25mm Through 100mm (Steps of 25mm)  | <b>S2S 112.MA1</b> |
| 125mm to 2100mm  | 8              | 8 Blocks, 125mm, 150mm, 175mm, 200mm,<br>250mm, 300mm, 400mm, 500mm<br>Accessories Included:<br>6 Each SA 8. Studs<br>2 Each SA 9. Flat Head Screws (long)<br>2 Each SA 10. Flat Head Screws (short)<br>1 Each SA 16. 114-152mm Tie Rod (adjustable)<br>1 Each SA 17. 152-228mm Tie Rod (adjustable)<br>1 Each SA 18. 298mm Tie Rod<br>1 Each SA 19. 400mm Tie Rod<br>2 Each SA 20. 502mm Tie Rods   | <b>SS 8.MA1X</b>   |

**B89.1.9 Accuracy Grade 00\***

|                 |   |                         |                  |
|-----------------|---|-------------------------|------------------|
| 125mm to 2100mm | 8 | Same as Above SS 8.MA1X | <b>SS 8.MAAX</b> |
|-----------------|---|-------------------------|------------------|

**NOTE:** Sets include etched serial numbers and Commercial Grade Calibration Certificate. A Master Grade Calibration Certificate is available at extra cost.

\* For complete accuracy specifications, see page at the beginning of this section.



**Square Steel or croblox® – Metric System  
Gage Block Accessories**

**Metric**



**Square Steel and croblox® Accessories  
Individually or Sets as stated below**

No. SA 25.MA.

| Individual Accessories                       |                    |          | No. of Steel Accessories Included |  |
|--|--------------------|----------|-----------------------------------|--|
| Description                                  | Catalog No.        |          | Set No. SA 25.MA                  | 45 Block Set when ordered with Accessories |
|  | Steel              | croblox® |                                   |  |
| Half-Round Jaw**<br>3mm Radius<br>6mm Radius | SA 101.<br>SA 102. |          | 2<br>2                            | 2  |
| Straight Jaw**<br>12mm Thick                 | SA 103.            | SA 203.  | 2*                                |  |
| Scriber Point                                | SA 4.              |          | 1                                 | 1  |
| Center Point 2mm C/L                         | SA 105.            |          | 1                                 |  |
| Base Block 12mm Thick                        | SA 106.            |          | 1                                 |  |
| Knurled Screw                                | SA 7.              |          | 2                                 | 2  |
| Stud   | SA 8.              |          | 2                                 | 2  |
| Flat Head Screw                              |                    |          |                                   |  |
| Long   | SA 9.              |          | 2                                 | 2  |
| Short  | SA 10.             |          | 2                                 | 2  |
| Slotted Nut                                  | SA 11.             |          | 2                                 | 2  |
| Tie Rods                                     |                    |          |                                   |  |
| 19mm Solid                                   | SA 12.             |          | 1                                 | 1  |
| 38mm Solid                                   | SA 13.             |          | 1                                 | 1  |
| 57mm Solid                                   | SA 14.             |          | 1                                 | 1  |
| 76mm Solid                                   | SA 15.             |          | 1                                 | 1  |
| 114-152mm Adjustable                         | SA 16.             |          | 1                                 | 1  |
| 152-228mm Adjustable                         | SA 17.             |          | 1                                 | 1  |
| Case (CS 9168.)                              |                    |          | 1                                 |  |

**Square croblox® Wear Blocks**

| Size                             | Catalog No.        |
|----------------------------------|--------------------|
| 2.0mm with<br>1 Side Countersunk | <b>SCM 2.0 WA1</b> |

\* croblox® jaws available as an option at extra cost. Please specify.

\*\*Jaws are normally used in pairs, but are ordered individually. Please order accordingly.

**NOTE:** Set No. SS 8.MA1X and SS 8.MAAX furnished with 6 studs, 2 short screws, 2 long screws, one each 114mm, 152mm, 298mm, 400mm tie rods and two 502mm tie rods.

**Additional Accessories**

| Description | Catalog No. | Set No. SA 25.MA | No. of Steel Accessories Included |
|-------------|-------------|------------------|-----------------------------------|
| Tie Rods    |             |                  |                                   |
| 298mm       | SA 18.      |                  |                                   |
| 400mm       | SA 19.      |                  |                                   |
| 502mm       | SA 20.      |                  |                                   |



## Individual Rectangular and Square Gage Blocks - Metric System croblox®, ceramic and steel

### Rectangular

| Size/Millimeters  | Grade | croblox® |    | Ceramic |    | Steel |
|---|-------|----------|----|---------|----|-------|
|   |       | AA       | A1 | AA      | A1 | A1    |
|   |       | 00       | 0  | 00      | 0  | 0     |
| 0.3, 0.4*<br>0.5**<br>0.6 Through 0.9 in .1mm Steps*<br>1.0 or 1.0005<br>1.0 Wear Blocks  |       | •        | •  | •       | •  | •     |
| 1.001 Through 1.009 in Steps of .001<br>1.01 Through 1.14 in Steps of .01<br>1.15 Through 1.49 in Steps of .01<br>1.5 Through 1.9 in Steps of .1<br>2.0 |       | •        | •  | •       | •  | •     |
| 2.0 Wear Blocks<br>2.5<br>3.0 Through 4.5 in Steps of .5  |       | •        | •  | •       | •  | •     |
| 5.0 Through 6.5 in Steps of .5<br>7.0 Through 10.0 in Steps of .5<br>10.5 Through 14.5 in Steps of .5   |       | •        | •  | •       | •  | •     |
| 15.0<br>15.5 Through 19.5 in Steps of .5  |       | •        | •  | •       | •  | •     |
| 20.0<br>20.5 Through 24.5 in Steps of .5  |       | •        | •  | •       | •  | •     |
| 25.0 and 30.0<br>40.0<br>50.0   |       | •        | •  | •       | •  | •     |
| 60.0<br>70.0<br>75.0 and 80.0<br>90.0<br>100.0  |       | •        | •  | •       | •  | •     |

### Rectangular Block Sizes

- Width: ♦ All blocks are 9mm wide
- Lengths: ♦ For blocks 10mm thick and under, length is 30mm  
♦ For blocks 10.5mm thick and above, length is 35mm
- Exceptions: \*Blocks are 28.3mm long  
\*\*When ordering the 0.5mm block, specify length (28.3 or 30mm)

### Square

| Sizes/Millimeters   | Grade | croblox® | Steel |
|---|-------|----------|-------|
|   |       | A1       | A1    |
|   |       | 0        | 0     |
| 0.5 mm Only<br>1.0<br>1.5   |       | •        | •     |
| 2.0 Wear Blocks with<br>1 Side Countersunk<br>2.0 or 2.0005<br>2.001 Through 2.009 in .001mm Steps<br>2.01 Through 2.49 in .01mm Steps<br>2.5 Through 2.9 in .1mm Steps |       | •        | •     |
| 3.0 Through 10.0 in .5mm Steps<br>10.5 Through 14.5 in .5mm Steps<br>15mm<br>15.5 Through 19.5 in .5mm Steps<br>20.0mm Only<br>20.5 Through 24.5 in .5mm Steps          |       | •        | •     |
| 25.0<br>30.0<br>40.0<br>50.0<br>60.0  |       | •        | •     |
| 70.0<br>75.0<br>80.0<br>90.0<br>100.0   |       | •        | •     |

### Steel Only

|                                  | Grade | 00 | 0 |
|----------------------------------|-------|----|---|
| 125.0<br>150.0<br>175.0<br>200.0 |       | •  | • |
| 250.0<br>300.0<br>400.0<br>500.0 |       | •  | • |

### Square Block Size

- ♦ All blocks are 24.1mm x 24.1mm
- ♦ Blocks have a 6.7mm hole in the center
- ♦ On blocks 5.0mm thick and over, the hole is countersunk on both faces. (croblox® Wear Blocks are countersunk on one face only)

### How To Order

- ♦ Specify in this sequence: shape, material, "M" for Metric, size, accuracy grade
- Key:**
- |                 |                 |               |                   |                 |
|-----------------|-----------------|---------------|-------------------|-----------------|
| <b>Shape</b>    | <b>Material</b> | <b>Metric</b> | <b>Size</b>       | <b>Accuracy</b> |
| R = Rectangular | S = Steel       | M             | (listed in table) |                 |
| S = Square      | C = croblox®    |               |                   |                 |
|                 | Y = Ceramic     |               |                   |                 |
- ♦ Example: RSM 2.0, A1 = Rectangular Steel block, Metric size 2.0, Grade A1 Accuracy





## Standard Reference Bars

### Inch

12", 19", 25", 37", 49"

### Millimeter

300, 500, 650, 950, 1250mm

These Standard Reference Bars are invaluable for use in checking table movement of machine tools, accuracy of vernier height gages, surface plate transfer measurement, and for final inspection of precision machine tools and coordinate measuring machines.

The "channel design" places additional measuring pads at appropriate points over the length of the bar as reference points for x, y or z axis measurements. Channel design permits use of the bar on its base (vertical) or on its back or either side (horizontal). The alternating gage block jaws and spacer blocks are permanently wrung and fastened together to form 1" increments for inch bars and 25mm increments for metric bars.

A special bushing arrangement allows the master stack to conform to thermal conditions prevailing during use, thus providing a true master even under less than perfect laboratory conditions. Mating surfaces are treated during assembly to prevent corrosion.

Non-standard lengths and measuring increments are available on special order. A Certificate of Calibration is included. All models are furnished with storage case.

## Height Gages

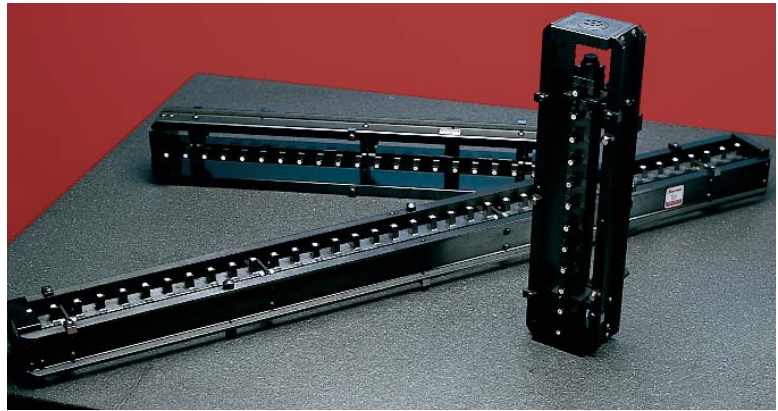
Starrett/Webber-built height gages and accessories are described elsewhere in this catalog, as noted.



Left: DIGI-CHEK Height Gage – see Page 127.



Right: DIGI-CHEK II – see Page 126.



Standard Sizes are 12", 19", 25", 37" and 49" in the inch system and 300mm, 500mm, 650mm, 950mm and 1250mm in the millimeter system.

## Specifications

| Description                                       | Inch System   | Millimeter System  |
|---|---|--|
| Tolerance (Stack)<br>Maximum:<br>Minimum:         | expressed in $\mu\text{in.}$<br>2.5L + 10 L in inches<br>- 10 | expressed in $\mu\text{m}$<br>.0025L + .25 L in millimeters<br>- .25 |
| Parallelism: Gage surfaces to Base and Each Other | 15 $\mu\text{in.}$  | 0.4 $\mu\text{m}$  |
| Uncertainty of Calibration                        | 10 + 2.0L L in inches expressed in $\mu\text{in.}$            | 25 + .002L L in millimeters expressed in $\mu\text{m.}$              |

**Note:** The accuracy of the surface that supports the gage must be taken into account when determining the accuracy of any measurements

## With Channel Design

| Inch System |                |         | Millimeter System |                   |         |
|-------------|----------------|---------|-------------------|-------------------|---------|
| Size        | Catalog No.    | EDP No. | Size              | Catalog No.       | EDP No. |
| 12"         | <b>RBC 12.</b> | 92626   | 300mm             | <b>RBCM 300.</b>  | 93642   |
| 19"         | <b>RBC 19.</b> | 92627   | 500mm             | <b>RBCM 500.</b>  | 92617   |
| 25"         | <b>RBC 25.</b> | 92628   | 650mm             | <b>RBCM 650.</b>  | 93053   |
| 37"         | <b>RBC 37.</b> | 92629   | 950mm             | <b>RBCM 950.</b>  | 92619   |
| 49"         | <b>RBC 49.</b> | 92630   | 1250mm            | <b>RBCM 1250.</b> | 92620   |

## Free Standing Stack Without Channel Design – Vertical Position Only

| Inch System |               |         | Millimeter System |                 |         |
|-------------|---------------|---------|-------------------|-----------------|---------|
| Size        | Catalog No.   | EDP No. | Size              | Catalog No.     | EDP No. |
| 8"          | <b>RB 8.</b>  | 92616   | 200mm             | <b>RBM 200.</b> | 93261   |
| 10"         | <b>RB 10.</b> | 92623   | 250mm             | <b>RBM 250.</b> | 93262   |
| 12"         | <b>RB 12.</b> | 92624   | 300mm             | <b>RBM 300.</b> | 93263   |
| 18"         | <b>RB 18.</b> | 92625   | 450mm             | <b>RBM 450.</b> | 93264   |



Left: DIGI-CHEK Reverse Reading Blocks and Right: DIGI-CHEK Riser Blocks – see Page 129.





## Angle Gage Block Sets

Webber Angle Gage Blocks permit fast, simple and accurate measurements of any angle. They are far superior to sine bar measuring methods, that involve trigonometric formulae and complex stacks of gage blocks.

Angle gage blocks come in three accuracies, croblox® Reference Angle Blocks with a 1-second accuracy, steel Calibration Grade Angle Blocks with 2-second accuracy, and steel Working Grade Angle Blocks with 5-second accuracy. Each grade can be purchased in sets that will measure in steps of one-second, one-minute or one-degree to suit any need. (See angle block specification information on next two pages.)

### ◆ Reference Angle Blocks

#### **croblox®: 1-second accuracy**

Designed for optical or as reference standards for autocollimators, spectrometers, etc. They are unsurpassed for use in aerospace, optical and precision instrument fields.

### ◆ Calibration Angle Blocks

#### **Steel: 2-second accuracy**

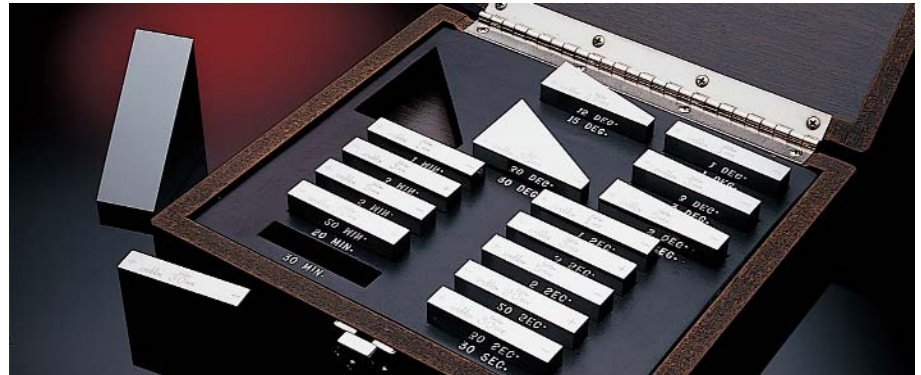
The same high quality as the Reference Grade Angle Blocks

### ◆ Working Angle Blocks

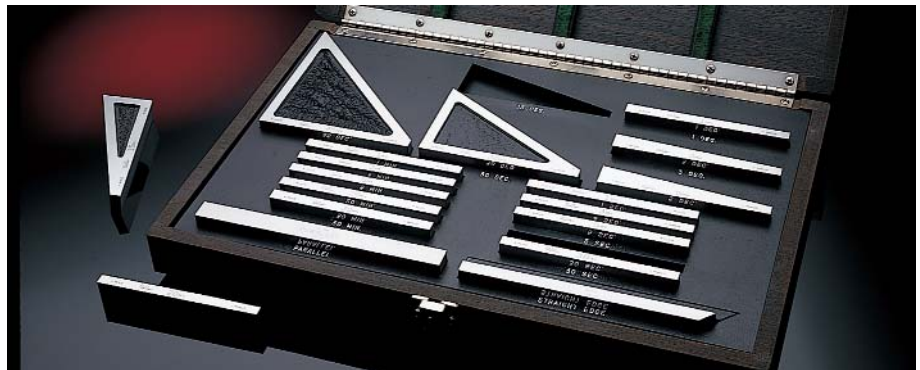
#### **Steel: 5-second accuracy**

These angles are designed for shop or tool room. The longer gaging surfaces are made for use with an indicator. These blocks reduce set-up time and minimize error in grinding both simple and compound angles

**Note:** The catalog numbers and specifications of our angle gage blocks have been changed in response to updated requirements concerning the application of the uncertainty of measurement. See the next two pages for information regarding the specifications of our angle blocks.



Above: No. AG 16.R Below: No. AG 18.W.



| Catalog No. | Description/<br>Accuracy Grade    | Blocks Per Set | Measuring Range   | Blocks Included In Sets   |
|-------------|-----------------------------------|----------------|-------------------|---|
| AG 6.R      | Reference Grade<br>±1.0 Second    | 6              | 0-99° in 1° Steps | 6 Blocks, 1°, 3°, 5°, 15°, 30°, 45°                                   |
| AG 6.C      | Calibration Grade<br>±2.0 Seconds |                |                   |   |
| AG 8.W      | Working Grade<br>±5.0 Seconds     |                |                   |   |
| AG 11.R     | Reference Grade<br>±1.0 Second    | 11             | 0-99° in 1' Steps | 6 Blocks, 1°, 3°, 5°, 15°, 30°, 45°<br>5 Blocks, 1', 3', 5', 20', 30' |
| AG 11.C     | Calibration Grade<br>±2.0 Seconds |                |                   |   |
| AG 13.W     | Working Grade<br>±5.0 Seconds     |                |                   |   |
| AG 16.R     | Reference Grade<br>±1.0 Second    | 16             | 0-99° in 1" Steps | 6 Blocks, 1°, 3°, 5°, 15°, 30°, 45°<br>5 Blocks, 1', 3', 5', 20', 30' |
| AG 16.C     | Calibration Grade<br>±2.0 Seconds |                |                   |   |
| AG 18.W     | Toolroom<br>±5.0 Seconds          |                |                   |   |

**NOTE:** One 6" (150mm) parallel and one 6" (150mm) knife edge are included with Working Grade Sets.

To order individually, specify in the following key sequence:

**Key:** AngleGage    Numeric Size    Angle Units    Accuracy Grade  
Prefix            of Angle            (Degree, Min., Sec.)    R, C, or W  
AG                    45                    D                            R

Example: AG 45.DR = a Reference Grade 45° Angle Block

All sets furnished in case. Cases also available separately. Order as follows: The Calibration Set and the Reference Case No. is CS 9135. The Working Case No. is CS 9134.





**Angle Gage Block Specifications**

**Accuracy In Microinches (Microns)**

| Material                                   | Reference Grade<br>croblox® | Calibration Grade<br>Steel | Working Grade<br>Steel |
|--|-----------------------------|----------------------------|------------------------|
| Tolerances: Deviation From Nominal         | ±1.0 second                 | ±2.0 second                | ±5.0 second            |
| Flatness of Gaging Surfaces                | 6µin. (0.15µm)              | 8µin. (0.20µm)             | 14µin. (0.35µm)**      |
| Flatness & Parallelism of Sides            | 8µin. (0.20µm)              | 8µin. (0.20µm)             | 16µin.* (0.40µm)**     |
| Squareness of Sides to Gaging Surfaces     | 6 seconds                   | 8 seconds                  | 12 seconds             |
| Area of Gaging Surfaces†                   | 1" x 2" (25 x 50mm)         | 1" x 2" (25 x 50mm)        | 5/8" x 4" (16 x 100mm) |
| Surface Finish (Gage Surfaces Only)        | 0.4µin. AA (.01µm AA)       | 0.6µin. AA (.015µm AA)     | 1.0µin. AA (.025µm AA) |
| Estimated Uncertainty of Measurement (k=2) | 0.6 seconds                 | 1.0 seconds                | 3.5 seconds            |

Flatness tolerances exclude 1.5mm from the edges on all angle blocks except where marked with \*\*. Then 3mm from the edge is excluded.  
† Dimension of gaging surfaces in millimeters is approximate.

**Using Angle Gage Blocks Superior to Sine Bar Methods**

A precision angle has always been difficult to set because of the involved trigonometric formula that is used with the sine bar.

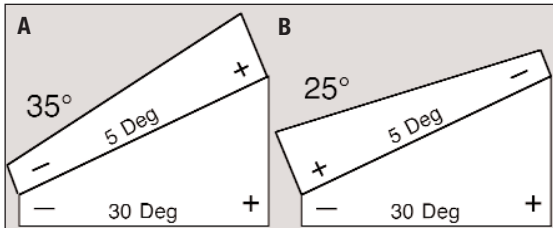
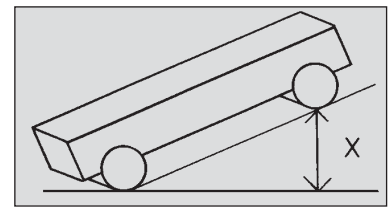
The main difficulty lies in the dimension X in diagram which often results in a figure with many decimal places. Gage blocks can only approximate this value. For example, to measure 44°30' using a 5" sine bar the following steps are required:

|   |           |
|---|-----------|
| Sine for 44°30' angle                         | .7009093  |
| For dimension X multiply by 5                 | 3.5045465 |
| Gage Blocks necessary to match this dimension | .1005     |
|   | .104      |
|   | .300      |
|   | 3.000     |
|   | 3.5045    |

3.5045465 - 3.5045 = Residual error .0000465  
With angle gage blocks, you take a 45° block from the set, wring on a 30° block so

This error cannot be eliminated in sine bar procedure.

that the plus end of 45° block contacts the minus end of 30° block, and you have an angle of 44°30'. It is not only easy to accomplish, it is absolutely accurate.

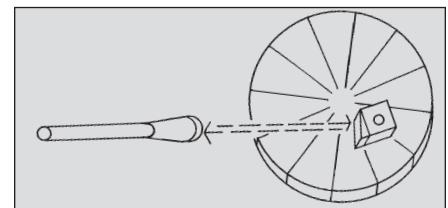


**Ease and Versatility**

A set consisting of only 16 blocks will measure 356,400 angles in steps of one second, to an accuracy of 1/5,000,000th of a circle! These micro-accurate blocks can be used in either plus or minus positions. In "A", right, example, take the 30° angle and add the 5° angle to obtain a measurement of 35° (making sure that both plus ends are together). In "B" use the same two blocks but wring them together so that the minus end of the 5° block is over the plus end of the 30° block. This will subtract 5° from 30°, thus giving your 25° measurement.

**Indexing a Large Rotary Table**

A Webber Angle Block or True Square is positioned on the work and a beam of light from an autocollimator is directed against the gaging surface. This becomes 0°, or the reference surface. Other angle blocks are then added in proper combination to measure each succeeding angle. The table is rotated and inspected at each position with reference to the light beam. This method indexes large workplaces quickly, with accuracy measured in fractional seconds.



**Inspecting a Simple Angle**

The photo below shows a workpiece on which an angle of 30° is required. The workpiece is resting on a parallel\* which is wrung to angle blocks forming 30°. The entire set-up is lined up vertically with an angle plate and then indicated across the top of the work to determine the correctness of the angle.

\*Parallels are not necessary, but they are convenient because of their longer reference surface.



**Setting a Revolving Magnetic Chuck**

A chuck is set for a 38° angle. Three blocks, +30°, +5° and +3°, are assembled and mounted with the parallel\*. The indicator quickly tells if the setting is accurate. Adjustment is a matter of seconds. A revolving chuck teams up perfectly with angle blocks to make possible several applications in tool grinding that are more difficult with other methods.



## True Squares

True squares are designed for fast, precision indexing with angle gage blocks.

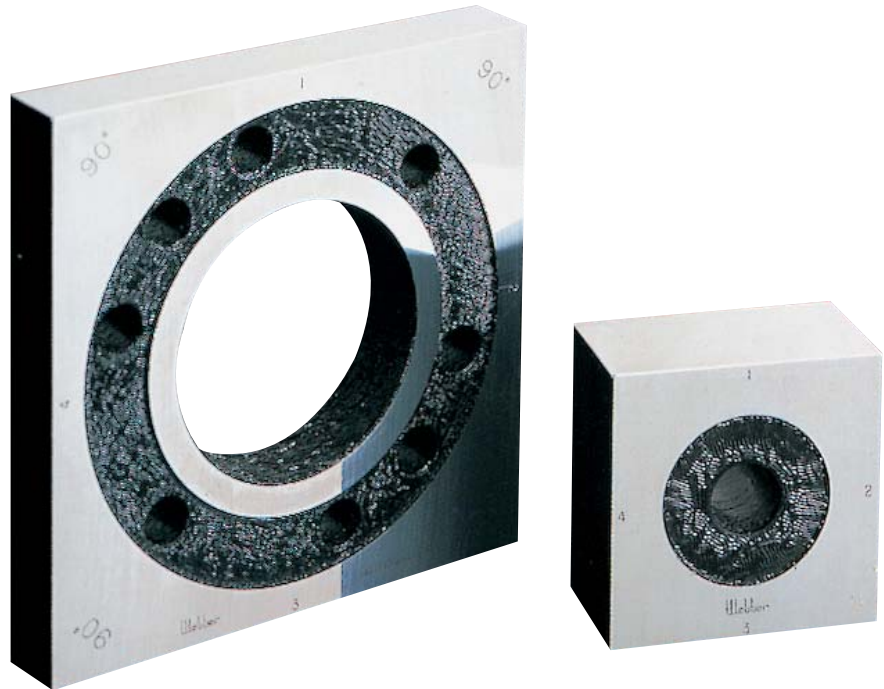
All faces of Webber True Squares are at precisely 90° to adjacent sides, with perfect optical flatness and parallelism to permit use with autocollimators.

Applications for fast precision indexing and setting of angular grinding fixtures are almost unlimited. For example: the work and the true square are mounted together on a revolving fixture. A notch is ground by two successive cuts, one at 90° with the true square, and the other at 2° with the addition of two angle blocks (+3° and -1°) mounted on square. An indicator reading is taken before each grind. This process is then repeated by turning the True Square to successive zero readings.

True Squares are designed for use as an accessory to our angle gage blocks to easily make angles greater than 45° and through 180°.

Webber True Squares also permit a fast, easy check of indexing tables. The gaging faces are at precise 90° angles with optical flatness and finishes that permit the use of autocollimators.

**NOTE:** The catalog numbers and specifications of our true squares have been changed in response to updated requirements concerning the application of the uncertainty of measurement.



### True Square Specifications

| Catalog No.                                | TS 21.R                  | TS 21.C                   | TS 44.W                   | TS 66.W                   |
|--|--------------------------|---------------------------|---------------------------|---------------------------|
| Grade                                      | Reference                | Calibration               | Working                   | Working                   |
| Material                                   | croblox®                 | Steel                     | Steel                     | Steel                     |
| Tolerances:<br>Deviation From Nominal      | ±1.0 second              | ±2.0 second               | ±5.0 second               | ±5.0 second               |
| Flatness of Gaging Surfaces                | 6µin.<br>(0.15µm)        | 8µin.<br>(0.20µm)         | 14µin.<br>(0.35µm)**      | 14µin.<br>(0.35µm)**      |
| Flatness & Parallelism of Sides            | 8µin.<br>(0.20µm)        | 8µin.<br>(0.20µm)         | 16µin.<br>(0.40µm)**      | 16µin.<br>(0.40µm)**      |
| Squareness of Sides to Gaging Surfaces     | 6 seconds                | 8 seconds                 | 12 seconds                | 12 seconds                |
| Area of Gaging Surfaces†                   | 1" x 2"<br>(25 x 50mm)   | 1" x 2"<br>(25 x 50mm)    | 5/8" x 4"<br>(16 x 100mm) | 5/8" x 6"<br>(16 x 150mm) |
| Surface Finish<br>(Gage Surfaces Only)     | 0.4µin. AA<br>(0.1µm AA) | 0.6µin. AA<br>(.015µm AA) | 1.0µin. AA<br>(.025µm AA) | 1.0µin. AA<br>(.025µm AA) |
| Estimated Uncertainty of Measurement (K=2) | 0.6 seconds              | 1.0 seconds               | 3.5 seconds               | 4.0 seconds               |

Flatness tolerances exclude 1.5mm from the edges on all angle blocks except where marked with \*\*. Then, 3mm from the edge is excluded.

† Dimension of gaging surfaces in millimeters is approximate.

Case included with all true squares.





## Optical Polygons

Webber Optical Polygons provide an easy, accurate method of checking and calibrating angles. They are designed for use with autocollimators in measuring angle spacing.

The exclusive one-piece design provides compact, fixed master for precise angle spacing. Target faces are highly reflective and optically flat.

Chrome carbide polygons provide a hardness of Rockwell 71-73 C and a corrosion resistance 10-20 times that of 18-8 stainless steel, resulting in lifetime accuracy.

Maintenance problems are virtually eliminated due to their ruggedness and extreme stability.

To order polygons, specify number in the following key/sequence:

**Optical Polygon** OP

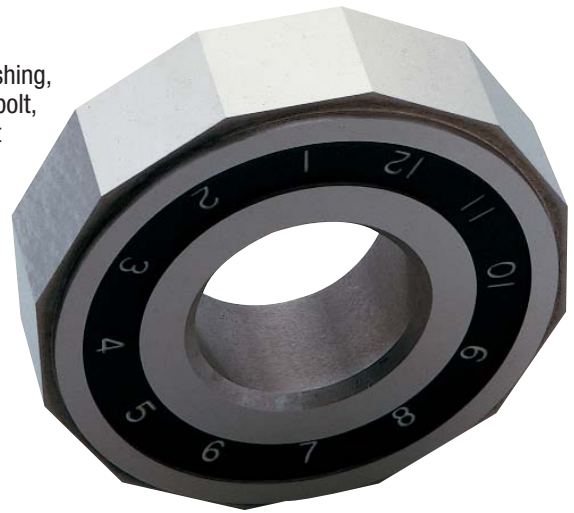
**No./Faces**

**Decimal**

**Accuracy Grade**

Example: OP 3.0 = A 3-sided optical polygon with a 0 Reference Accuracy

A 1" mounting hole, flanged bushing, lapped washer and hold-down bolt, furnished with each unit, permit mounting the polygon in any desired attitude. Available in two accuracy grades. Furnished in case. Certificate of Calibration included.



### Specifications

| No. of Sides | Angle Spacing Degrees | Diameter Across Corners<br>Inch (mm) | Height<br>Inch (mm) | Target                    |                 |                 |
|--------------|-----------------------|--------------------------------------|---------------------|---------------------------|-----------------|-----------------|
|              |                       |                                      |                     | Size<br>Inch (mm)         | Area<br>Sq. In. | Area<br>Sq. Cm. |
| 3            | 120                   | 2.90"<br>(73.6mm)                    | .880"<br>(22.3mm)   | 75" x .75"<br>(19 x 19mm) | .56             | 3.60            |
| 4            | 90                    |                                      |                     |                           |                 |                 |
| 5            | 72                    |                                      |                     |                           |                 |                 |
| 6            | 60                    |                                      |                     |                           |                 |                 |
| 8            | 45                    |                                      |                     |                           |                 |                 |
| 9            | 40                    |                                      |                     |                           |                 |                 |
| 10           | 36                    |                                      |                     |                           |                 |                 |
| 12           | 30                    |                                      |                     |                           |                 |                 |

## croblox® Reflecting Cubes

Stable and maintenance free, reflecting cubes are ideal for 90° indexing or alignment in optical tooling or inspection. Reflectivity: 55% in visible spectrum, 87-88% at 10.6 microns.

Starrett-Webber stocks semi-finished solid cube blanks in four standard sizes: 3/4" (19.0mm), 1" (25.4mm), 1 1/2" (38.1mm) and 2" (50.8mm). Also available as standard is a .950" (24mm) square with a 17/64" (6.7mm) countersunk center hole.



| Accuracy Grade | Target Area Flatness* | Accuracy of Calibration (Uncertainty) | Maximum Deviation of Faces from Nominal |
|----------------|-----------------------|---------------------------------------|---|
|                |                       |                                       | 3-12                                    |
| Reference 0    | 4 μin.<br>(.10 μm)    | ±1.0 sec.                             | ±1.0 sec.                               |
| Calibration 1  |                       |                                       | ±2.0 sec.                               |

\*Excludes .020" (0.5mm) from edges.

**ALL SIZES:** Flatness and parallelism – top and bottom –.00005"; maximum pyramidal error ±15 seconds.

### To order, specify the following information:

(1) The number and position of all finished sides, including the base:

**NOTE:** for fixturing purposes during manufacturing, the bottom face must be one of the finished sides. The bottom face is etched with the Webber logo, a serial number, and face identifications as applicable.

Example #1: 4 sides: Top, front, Left, and Base.

Example #2: 3 sides: Front, Right, an Base.

(2) Specify the manufacturing tolerances of the 90° angles, 1 second, 3 seconds, or other angular specification. NOTE: Our uncertainty of measurement is estimated to be ±1.0 seconds. This uncertainty should be added to the manufacturing tolerance to give practical tolerance of the cube.

(3) Specify if a Certificate of calibration is needed, at extra cost.

**NOTE:** Other sized cubes up to 2-inches are available on special order. Through holes, etched reticules, or threaded holes into stainless steel inserts may also be specified at extra cost.



## Fused Quartz Optical Flats

For visually checking the flatness of seals, gages and mating surfaces. Through means of interpreting light interference patterns or bands, the optical flat provides a simple, accurate precision method for measuring surface flatness. Flats are crafted from high quality fused quartz and provide the maximum resistance to wear, damage and temperature variations.

Starrett-Webber optical flats are available in single or double surfaces and three accuracy grades. The double flat has both surfaces finished to tolerance but not necessarily parallel. Double flats provide longer service because wear is distributed over two surfaces. All are furnished with case.

Coating is available and it aids readability when applied to one surface. Coating is of value on single-sided flats only. Coating on a double surface will reduce the readability of the other surface.

When ordering, specify size, accuracy grade, single or double side, and coated or not.

### Accuracy Grades

|                 |                              |
|-----------------|------------------------------|
| Reference Grade | 1 $\mu$ in.<br>(.03 $\mu$ m) |
| Master Grade    | 2 $\mu$ in.<br>(.05 $\mu$ m) |
| Working Grade   | 4 $\mu$ in.<br>(.10 $\mu$ m) |



### Standard Sizes\*

|                            |                              |                           |
|----------------------------|------------------------------|---------------------------|
| 1" x 1/2"<br>(25 x 12.7mm) | 3" x 11/16"<br>(75 x 17.5mm) | 5" x 7/8"<br>(125 x 22mm) |
| 2" x 5/8"<br>(50 x 16mm)   | 4" x 3/4"<br>(100 x 19mm)    | 6" x 1"<br>(150 x 25mm)   |

\*Dimensions shown in millimeters are approximate.

**NOTE:** Larger sizes available on special order.

Optical flats are made to U.S. Federal Specifications GG-0-635. Certificate of Calibration available at extra cost.

Accuracy of Calibration (uncertainty) 3 $\mu$ in. (0.08 $\mu$ m).

## Optical Parallel Set (Sapphire) OFPS2.

This optical set checks micrometer anvil and spindle faces for flatness and squareness to the spindle axis. The set includes two parallels, with one .0125" thicker than the other, enabling a measuring face to check at half revolution points of the spindle. Each flat is identified. Furnished in case. (Available in sapphire only.)

### Specifications

|  |
|--|
| 1" diameter x 1/2" Double Surfaced           |
| Flatness Within 4 $\mu$ in. (.10 $\mu$ m)    |
| Parallelism Within 4 $\mu$ in. (.10 $\mu$ m) |
| Tolerance Between Steps .0005"               |





## Gage Block Stones

If a block does not wring together with other blocks, it may be the result of nicks or other damage. Examine blocks carefully with a magnifying glass. If a small burr is found, it may be removed with a gage block stone.

Starrett-Webber stones, when used moderately, may be rubbed directly on the gaging surfaces without danger of decreasing the size of the gage block. Available in 3 styles/materials as listed.

**GS 13** is recommended for use with steel gage blocks

**SAO 13** is recommended for general use. Steel, ceramic, or carbide blocks

**SAO 23** is recommended for use with carbide and ceramic gage blocks



| For Block Material | Description  | Catalog No.    |
|--------------------|--|----------------|
| Steel              | Black Granite Stone, 1/4 x 1 x 3" (6.3 x 25 x 75mm)            | <b>GS 13.</b>  |
|                    | Sintered Aluminum Oxide, 5/16 x 1 x 3" (8 x 25 x 75mm)         | <b>SAO 13.</b> |
| Steel or Carbide   | Serrated Aluminum Oxide With Case, 1 x 2 x 3" (25 x 50 x 75mm) | <b>SAO 23.</b> |

## Chamois

These Starrett-Webber synthetic chamois cloths, rather than natural chamois, are recommended for wiping gage surfaces. They can be used with solvents and oils, including Starrett M-1® All-Purpose Lubricant, and are washable in detergents.

| Description | Catalog No.  |
|-------------|--------------|
| Dry         | <b>CH 1.</b> |
| Lubricated  | <b>CH 2.</b> |







## Accredited Gage Block Calibration Service

In accordance with: ISO 17025  
ANSI/NCSL Z540-1  
ISO 10012-1  
former MIL-STD-45662A

### Master Grade Calibration

The calibration procedure is regarded as a process to be controlled and monitored using SPC techniques. Information that would enable the analysis of control data is to be recorded and made available to the user upon request (at extra cost). A second master, sometimes referred to as a control block, is used in the calibration. The purpose of the second master is to generate known difference readings which can be plotted and analyzed. The average of the known differences of several readings of the two masters and the range of their differences can be analyzed using statistical techniques. The calibration process can be demonstrably controlled.

Our Reference Gage Blocks are calibrated directly by the National Institute of Standards and Technology. All other Reference Standards are periodically checked and calibrated either by NIST or NVLAP accredited laboratories. Documented histories are maintained. Statistical methods are used to control the master gages.

All necessary information required to confirm the calibration and calculations is captured. All raw data from the comparator, the temperature of the blocks, the temperature of the comparator, and the relative humidity of the surrounding environment is recorded for each measurement. Applied correction factors are to be broken down and recorded as well as the results of any calculations. The measurement uncertainty is individually computed for each size.

Reported measurement uncertainties based upon a 95% confidence level (two standard deviations) are dynamic, reflecting the current performance of the specific equipment and operator. Other factors included in the stated uncertainty are derived from a detailed error analysis. The error analysis is based upon experimentation whenever possible or industry consensus from estimates derived from NIST publications. Experimental checks of the stated uncertainty levels are made using laboratory comparison techniques involving both internal repeatability studies and external comparisons with other calibration laboratories.

The checks and balances under the Master Grade guidelines require considerably more time and effort than the Commercial Grade Calibrations. The entire process is under constant review and testing.

**NOTICE:** Webber Gage cannot recommend recalibration due dates on our calibration certificates or calibration stickers. Recalibration due dates must be provided to us at the time of order. If this information is not provided, the recalibration due date will be left blank for the user to add.

### Commercial Grade Calibration

Calibrations are performed using the same program as our Master Grade calibrations except that the second master, the control block, is omitted. By omitting this control block some of the statistical tests are also omitted which results in larger uncertainty.

All necessary information to confirm the calibration is recorded. All raw data from the comparator, the temperature of the blocks, the temperature of the comparator, and the relative humidity of the surrounding environment is recorded for each measurement. Applied correction factors are broken down and are recorded, as well as the results of any calibrations.

Our Reference Gage Blocks are calibrated directly by the National Institute of Standards and Technology. All other reference standards are calibrated either by NIST or NVLAP accredited laboratories. Documented histories are maintained of our measuring and test equipment. Statistical methods are used to control our Master Gage Blocks.

Reported uncertainties are based on a 95% confidence level. Experimental checks of the uncertainty are made using laboratory comparison techniques involving repeatability studies and external comparisons with other calibration laboratories.

### Approximate Best Uncertainty Values for blocks up through 4" (100mm) in length

| Grade       | Master Grade  |          | Commercial Grade |          |
|-------------|---------------|----------|------------------|----------|
|             | Uncertainty   | Minimum  | Uncertainty      | Minimum  |
| Webber LM   | 0.65 + 0.7L   | 1.4 µin. | not available    |          |
|             | .016 + .0007L | .035 µm  |                  |          |
| B89.1.9 00  | 1.2 + 0.7L    | 1.7 µin. | 1.6 + 1.0L       | 2.4 µin. |
|             | .03 + .0007L  | .045 µm  | .04 + .001L      | .060 µm  |
| B89.1.9 0   | 1.8 + 0.7L    | 2.0 µin. | 2.0 + 1.0L       | 3.0 µin. |
|             | .045 + .0007L | .050 µm  | .05 + .001L      | .075 µm  |
| B89.1.9 AS1 | 2.0 + 0.7L    | 2.0 µin. | 2.0 + 1.0L       | 3.0 µin. |
|             | .05 + .0007L  | .050 µm  | .05 + .001L      | .075 µm  |

**NVLAP® accreditation does not constitute an endorsement of any product by NVLAP or any agency of the U.S. Government.**





## Gage Block Recalibration Service

Our calibration service catches worn gage blocks before trouble starts ... eliminating costly production inaccuracies. Be sure to have your gage blocks checked regularly.

Starrett-Webber Gage Division offers all gage block users a complete calibration service as insurance against production inaccuracies.

Any brand of used rectangular, square or heavy-duty gage blocks will be calibrated and the deviation from the marked size of each block will be shown on the Certificate of Calibration. All linear measurements are based on the new International Inch or Meter.

For obvious reasons, Starrett-Webber does not calibrate new gage blocks of other brands.

This gage block calibration service is done promptly, and blocks are ready to be returned to you within a few days after their receipt by Starrett-Webber.

1. After your gage block set arrives in the Starrett-Webber receiving room, it is given a receiving number and each block is cleaned to remove oil, grease and film. The case is also thoroughly cleaned.
2. Next, each block is lightly stoned to remove small nicks and burrs. This does not guarantee that the blocks will wring if they are heavily nicked, scratched, or burred.
3. Your gage blocks are then individually compared with master blocks which are accurate to fractions of one millionth of an International Inch. Starrett-Webber Grand Master Blocks are Starrett-Webber croblox® (solid chrome carbide) and therefore

are longer wearing and more stable than steel masters. Starrett-Webber Grand Master Gage Blocks are calibrated directly by the U.S. National Institute of Standards and Technology (NIST).

4. A computer automatically processes the Certificate of Calibration to insure complete accuracy in recording gage block size. This certificate shows the deviation from the marked size of each block and marks those sizes which need replacing.
5. A quotation is then prepared showing the costs of any recommended replacements in the original material and croblox®, if applicable.
6. If no replacements are required, or if you have issued instructions to only calibrate and return the set, the gages are packed and returned to you with a Certificate of Calibration showing the "as found" readings.
7. If you authorize the replacements, your Certificate of Calibration is marked to indicate which blocks were replaced and the date of replacement. However, if you wish, an "as found" and an "as left" certificate can be made at extra cost.

### Calibration Service

When sending gage blocks to Starrett-Webber Gage Division for calibration, please specify whether we are to (A) calibrate, issue certificate and return only; (B) Calibrate, advise condition and hold for instructions; or (C) Calibrate, replace worn and missing blocks, and return. If order specifies that worn and missing blocks should be replaced, and the cost of replacement approaches that of a new set, we will inform you, quote prices and wait for instructions.

## Shipping Damage is Costly and Inconvenient Please Protect Your Valuable Gage Blocks by Proper Packaging

Remember, gage block cases are made for immobile storage – not as shipping crates.

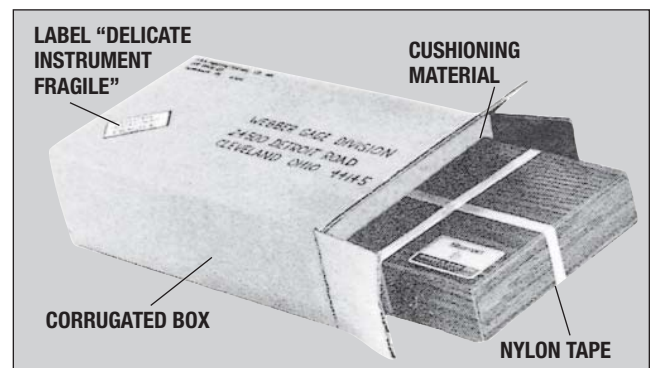
Follow these steps when preparing your gage blocks for shipment:

1. Gage blocks should be treated with rust preventative such as Starrett M-1® Lubricant.
2. Place waxpaper over the blocks.

3. If necessary, place Kimpak or similar cushioning inside lid to prevent jiggling of blocks in the inserts. Do not force lid closed.
4. Seal the closed case with nylon or fiberglass reinforced heavy tape. The clasp will not hold in shipping nor will paper tape.
5. Use a strong outer shipping container large enough to allow sufficient, firm cushioning material to withstand shock in transit.
6. Mark outer carton plainly, "**DELICATE INSTRUMENTS – FRAGILE**".



Example of a set damaged in transit due to improper packaging.











## Granite Surface Plates and Accessories

In 2006, The L.S. Starrett Company acquired Tru-Stone Technologies in Waite Park, MN. With this acquisition, a broad variety of new capabilities are now available to Starrett customers.

### OEM Capabilities

Our Tru-Stone Technologies Division continues to provide solutions to customers in precision granite, carbon fiber, ceramic, high precision vacuum chucks and other materials. We offer granite machine bases and surface plates to meet your requirements up to 55 feet long and weighing 72 tons

Whether your application requires a simple standard surface plate or a large OEM assembly, the Tru-Stone Technologies Division will work with you to fulfill those requirements.

Every linear measurement depends on an accurate reference surface from which final dimensions are taken. Starrett Precision Granite Surface Plates provide this reference plane for work inspection and for work layout. Their high degree of flatness, overall quality and workmanship also make them ideal bases for mounting sophisticated mechanical, electronic and optical gaging systems.

### Material

The granite for Starrett surface plates has been selected for the best balance of physical properties, maximum resistance to wear and for deflection under load. Each plate has been lapped to a fine microinch finish to minimize tool wear and drag.

The most important element in the performance and life of granite surface plates is the percentage of quartz that is present in the stone. Quartz is more than twice as resistant to wear as the other minerals in granite. It provides bearing points that are of a hard, highly polished, smooth character which protect the accuracy and finish of both the surface plate and the tools and instruments used on it.

Starrett Crystal Pink Granite has the highest percentage of quartz of any granite. Our Charcoal Black Granite also contains quartz, though a slightly lower content than our Crystal Pink, but higher than other plates produced with black granite. Higher quartz content means greater wear resistance. The longer a surface plate holds its accuracy, the less often it will require resurfacing, ultimately providing better value.

## Selection

### Accuracy Under Load

Starrett Crystal Pink and Charcoal Black Granite plates have a thickness capable of supporting a total normal load equal to 50 lb. for each square foot (24kg for each 1,000 sq. cm) of surface area loaded in the center of the plate – without deflecting the plate along a diagonal of more than one-half the flatness tolerance. This is the accepted rating in the U.S. Federal Specification GGG-P-463c.

In the situations where abnormal loading conditions are anticipated, Starrett can engineer and modify surface plate thickness to meet virtually any requirement.

### Ledges and Clamping

Surface plates without work clamping ledges are recommended for sustained accuracy and reliability. Ledges are for work clamping purposes only. If excessive torque is used when applying clamps to ledges, it can adversely affect measurements taken near the plate edges. If clamping is important, T-slots and threaded metal inserts may be installed in the surface.

## Accuracy

### Specifications

Starrett Granite Surface Plates meet or exceed U.S. Federal Specification GGG-P-463c.

### Starrett Tru-Stone Technologies Division

1101 Prosper Drive  
P.O. Box 430  
Waite Park, MN 56387

### Starrett Granite Surface Plate Calibration

- Calibration of granite surface plates, granite parallels (2 and 4-sided), granite straight edges, granite tri-squares, granite angle plates and granite squares
- Surface plate re-lapping
- Calibration Lab is accredited by A2LA to ISO/IEC 17025\*

\*The L.S. Starrett Company's accreditations are site-specific and tool-specific. The scope of accreditation is available upon request to each location.





### Technical Information

#### Accuracy

Starrett Granite Surface Plates are manufactured in three grades of accuracy:

- ◆ **Grade AA - Laboratory Grade**  
This is typically specified for precision operations in constant temperature gaging rooms and metrology departments.
- ◆ **Grade A – Inspection Grade**  
This is typically specified for general work in quality control.
- ◆ **Grade B – Toolroom Grade**  
This is typically specified for production checking work throughout the shop.

#### Unilateral Flatness Tolerance

Overall flatness tolerance is based on unilateral measurement. All points on the work surface shall be contained between two parallel planes separated at a distance no greater than the amount specified for each particular grade and size as shown in our listings.

#### Repeat Reading Tolerance

Repeat reading tolerance is easily checked with Repeat Reading Gage. This gage detects local areas, not overall flatness

In addition to the overall flatness tolerance referred to above, Starrett provides repeat reading tolerances as follows:

| Diagonal Inches (mm)      | Full Indicator Movement (F.I.M.) In Microinches and (Microns) |           |           |                    |
|---------------------------|---|-----------|-----------|--------------------|
|                           | Grade AA  | Grade A   | Grade B   | Obtained           |
| Through 30" (750)         | 35 (.9)   | 60 (1.5)  | 110 (2.8) | When Not Specified |
| Over 30-60" (750-1500)    | 45 (1.1)  | 70 (1.8)  | 120 (3)   |                    |
| Over 60-90" (1500-2250)   | 60 (1.5)  | 80 (2)    | 160 (4)   |                    |
| Over 90-120" (2250-3000)  | 75 (1.9)  | 100 (2.5) | 200 (5)   |                    |
| Over 120-150" (3000-3800) | 90 (2.3)  | 120 (3)   | 240 (6)   |                    |
| Over 150" (3800)          | 100 (2.5)   | 140 (3.6) | 280 (7)   |                    |
| All Sizes                 | 25 (.6)   | 50 (1.3)  | 100 (2.5) | When Specified     |

A repeat reading gage detects minute variations of the surface within the unilateral flatness tolerance of the whole surface.



Inspecting a granite plate with an autocollimator.

#### Certified Accuracy

Before shipment, each surface plate must pass a critical final inspection to prove that its entire surface is within the specified tolerance. The final inspection is done with an autocollimator in a controlled atmosphere. This instrument is checked and certified against standards traceable to the U.S. National Institute of Standards and Technology (NIST). The instrument's certification is on file at the Starrett Tru-Stone Technologies Division in Waite Park, MN.

All shipments of Starrett precision granite products include a Certificate of Inspection which verifies traceability to NIST as well as certifying that the inspection requirements of U.S. MIL-I-45208A and Federal Spec. GGG-P-463c have been met.

#### Periodic Inspection

Every surface plate in use should be frequently inspected, especially under shop conditions where abrasion is common. An effective inspection program should include regular checks with an autocollimator. If tolerance variations are excessive, the plate can be transferred to work involving less accuracy or it can be resurfaced to restore its original level of accuracy.

#### Resurfacing Services

Resurfacing facilities for Starrett and other makes of granite surface plates are available in our plant or yours. For details, refer to the last page of this section.

#### Design Assistance

Starrett Tru-Stone Technologies Division engineers will provide prompt assistance on any problem related to surface plate design, installation or use. Our staff is available to assist in your design of larger OEM projects.

To get the best service and value from any granite plate, contact Starrett Tru-Stone.





## Custom Engineered Granite Solutions

### For Oversize Parts and Assembling

Starrett has unparalleled experience and expertise in building special, extra-large granite surface plates and custom products from granite to meet specific requirements.

All Starrett special surface plates are made from single, solid slabs of granite quarried in one piece, machined in one piece and finished to your specified dimensions and tolerances.



**Above:** Starrett offers unparalleled design expertise and experience to work with your engineers to create the ideal custom solution for your application.

### Special plates are usually requested in two different categories:

**Inspecting oversize parts:** The first category is for inspecting oversize parts and assemblies such as diesel engine blocks and crankshafts, vehicle frames, missile components and ground support equipment.

Inquiries for granite surface plates to accommodate oversize parts and assemblies should indicate:

1. Type of part to be staged
2. Distribution of weight
3. Degree of inspection accuracy required
4. Work holding requirements
5. Footing requirements, ceiling height and availability of heavy-duty work-handling equipment

**Modifying standard plates:** The second general category relates to modifying standard plates or building special surface plates for work-holding attachments of many different types.

Threaded and solid inserts, adaptor holes, T-slots, dovetails – almost anything added to conventional gaging fixtures can also be added to Starrett surface plates, extending their accuracy and versatility for numerous applications. Precision edges, made square with the top surface and adjacent edges, as well as precision graduated rules can also be added.

### Tru-Vac Vacuum & Air-lift Technology

Starrett provides both standard and custom solutions for vacuum chucking, positioning or air-lift part transfer. Our innovative Tru-Vac technology integrates the stability and precision flatness of granite with a porous medium, usually ceramic.

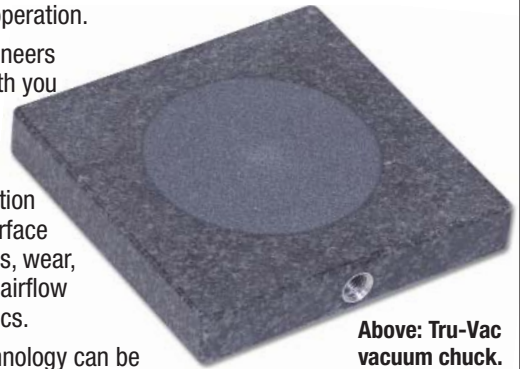
Tru-Vac can eliminate the need for mechanical clamping with its inherent part distortion or damage risk by utilizing vacuum draw at specific locations or distributed over the entire surface of your part.

Conversely, Tru-Vac technology can be utilized to provide positive pressure to allow your delicate parts to glide on a cushion of air from which they can be safely lifted or transferred to the next operation.

Starrett engineers will work with you to select the best porous medium for your application based on surface area, flatness, wear, and desired airflow characteristics.

Tru-Vac technology can be utilized in air chucks smaller than a hockey puck or larger than a conference room table. Vacuum zones can be of nearly any shape by virtue of our CNC milling capabilities.

Multiple zones can be utilized to accommodate a variety of part sizes or even to provide a combination of negative and positive pressure for controlled part movement.



**Above:** Tru-Vac vacuum chuck.

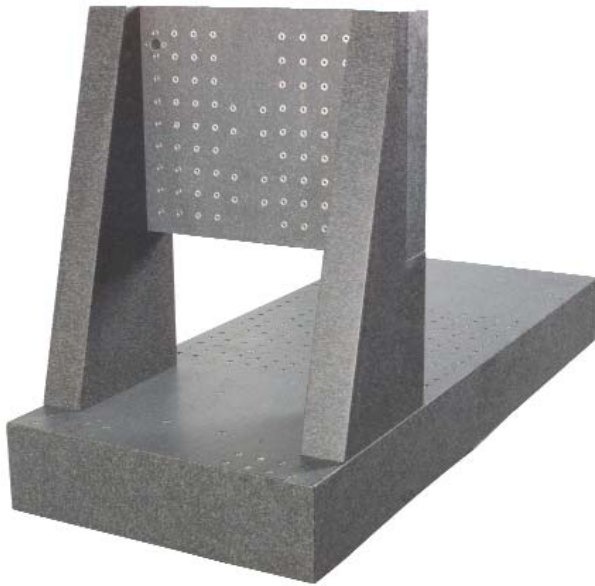


**Left:** We can build custom fixture plates that provide exceptional positional accuracy for one or several of your applications.

We can build and assemble this work-holding or special gaging equipment to very close tolerance in either fractional, decimal inch or metric dimensions. All special plates are quoted on an individual basis,

based on complexity and tolerance requirements. We will work with you to give you the best, most economical solution for your application.

The uses of Starrett special granite surface plates are limited only by the imagination of the creative tool designer. Inquiries for special surface plates like the type shown will be studied and recommendations given without obligation.



**Technical Capabilities**

Starrett has a variety of technical capabilities that, combined with our expertise, makes us the perfect choice for your custom granite requirements.

These capabilities include:

- Drilled and bored holes with precise size and location (*right*)
- Inserts turned and inspected in-house for quality control and custom options
- T-slots and inserts bonded using proprietary methods
- CNC milling of patterns of clearance areas
- Specialty slot milling capabilities
- Unsurpassed dimensional control of flat, square, and parallel surfaces



**Examples of Custom Applications Capabilities**

**Top/Left:** Multi-plane bases with precise insert accuracy.

**Right:** Laser verified geometric accuracy.

**Bottom/Left:** Extremely large (or small) part capabilities.



**Assembly Integration**

In addition to collaborating on the design and building of your machine foundation, Starrett technicians are skilled at value-added assembly.

Using precision equipment in our assembly laboratories, we can provide you with the next level assembly, such as adding bearing rails, encoder rails, screw drives, stages, or vibration damping devices.

Having this assembly done at our factory provides accountability for accurate performance.







## Crystal Pink Granite Surface Plates



Starrett Crystal Pink Granite Surface Plates are accurate for use in metrology laboratories and wear resistant for use in abrasive shop environments.

Crystal Pink is the finest, most durable granite surface plate available to industry today. The name is derived from the fact that it has the highest crystalline quartz content of any granite surface plate.

### Surface Finish

Even distribution of large quartz crystals provides a smooth finish, which significantly reduces wear on the surface plate and the instruments used on it. This fine micro-finish, combined with the natural voids in the surface, prevents wringing and provides a velvety-smooth tool action.

### Wear Life

Our experience with surface plate performance in customers' plants shows that non-quartz-bearing granite in average daily use requires resurfacing about once a year. Crystal Pink plates used in these same plants have required resurfacing only once every three to five years, on average.

### No Ledge Grade AA Laboratory



| Surface Size |             | Thickness |     | Flatness<br>Unilateral Tolerance |        | Weight |      |              |
|--------------|-------------|-----------|-----|----------------------------------|--------|--------|------|--------------|
| Inch         | mm          | Inch      | mm  | Inch                             | mm     | Lb.    | kg   | EDP          |
| 12" x 12"    | 300 x 300   | 4"        | 100 | .000050"                         | 0.0012 | 55     | 25   | <b>80601</b> |
| 12" x 18"    | 300 x 450   |           |     |                                  |        | 85     | 39   | <b>80610</b> |
| 18" x 18"    | 450 x 450   |           |     |                                  |        | 125    | 57   | <b>80619</b> |
| 18" x 24"    | 450 x 600   | 6"        | 150 | .000075"                         | 0.0019 | 248    | 113  | <b>80628</b> |
| 24" x 24"    | 600 x 600   |           |     |                                  |        | 330    | 150  | <b>80646</b> |
| 24" x 36"    | 600 x 900   |           |     |                                  |        | 495    | 225  | <b>80655</b> |
| 36" x 36"    | 900 x 900   |           |     |                                  |        | 745    | 338  | <b>80701</b> |
| 36" x 48"    | 900 x 1200  | 8"        | 200 | .000200"                         | 0.0050 | 1320   | 599  | <b>80710</b> |
| 36" x 60"    | 900 x 1500  | 10"       | 250 | .000250"                         | 0.0063 | 2065   | 937  | <b>80719</b> |
| 36" x 72"    | 900 x 1800  | 12"       | 300 | .000300"                         | 0.0076 | 2970   | 1347 | <b>80728</b> |
| 48" x 72"    | 1200 x 1800 |           |     |                                  |        | 3960   | 1796 | <b>80755</b> |
| 48" x 96"    | 1200 x 2400 |           |     |                                  |        | 7040   | 3193 | <b>80773</b> |

No Ledge and Two Ledge are listed this page and the following two pages. Four Ledge available by request.

**Continued on the following two pages.**

**NOTE:** Other sizes available by request.



### Crystal Pink Granite Surface Plates (continued)

#### Starrett Crystal Pink:

- ◆ Meets or exceeds U.S. Federal Specification GGG-P-463c for flatness
- ◆ Great surface hardness and wear resistance – the highest percentage of quartz crystals of any granite plate
- ◆ Smooth, jewel-like quartz bearing points protect accuracy and finish of both the surface and the tools used on it
- ◆ Quality and economy combined
- ◆ Comparable to black granite plates while outwearing them as much as 5 to 1
- ◆ Meets or exceeds 50 lb. per square foot (24kg per 1,000 sq. cm) load bearing specifications. Available in 100 lb. (45kg) test series

Standard-size plates are mounted on resilient support pads, providing isolation from normal vibration and a non-distorting 3-point suspension.

Packed one per crate with skids for forklift handling.



#### Special Requirements

Should your application require something other than a standard surface plate, we can provide you with custom options.

Starrett can produce your plate from pink, black or gray granite.

Custom sizes and thicknesses are available upon request to meet your needs.

We can also add holes, counterbores, threaded or solid stainless steel inserts, and t-slots to your surface plate.

Contact Starrett Tru-Stone for assistance.

#### No Ledge Grade A Inspection

| Surface Size |             | Thickness |     | Flatness Unilateral Tolerance |        | Weight |      | EDP          |
|--------------|-------------|-----------|-----|-------------------------------|--------|--------|------|--------------|
| Inch         | mm          | Inch      | mm  | Inch                          | mm     | Lb.    | kg   |              |
| 12" x 12"    | 300 x 300   | 4"        | 100 | .000100"                      | 0.0025 | 55     | 25   | <b>80604</b> |
| 12" x 18"    | 300 x 450   |           |     |                               |        | 85     | 39   | <b>80613</b> |
| 18" x 18"    | 450 x 450   |           |     |                               |        | 125    | 57   | <b>80622</b> |
| 18" x 24"    | 450 x 600   | 6"        | 150 | .000150"                      | 0.0038 | 248    | 113  | <b>80631</b> |
| 24" x 24"    | 600 x 600   |           |     |                               |        | 330    | 150  | <b>80649</b> |
| 24" x 36"    | 600 x 900   |           |     |                               |        | 495    | 225  | <b>80658</b> |
| 36" x 36"    | 900 x 900   |           |     |                               |        | 745    | 338  | <b>80704</b> |
| 36" x 48"    | 900 x 1200  | 8"        | 200 | .000400"                      | 0.0101 | 1320   | 599  | <b>80713</b> |
| 36" x 60"    | 900 x 1500  |           |     |                               |        | 2065   | 937  | <b>80722</b> |
| 36" x 72"    | 900 x 1800  | 10"       | 250 | .000600"                      | 0.0152 | 2475   | 1123 | <b>80731</b> |
| 48" x 72"    | 1200 x 1800 |           |     |                               |        | 3300   | 1497 | <b>80758</b> |
| 48" x 96"    | 1200 x 2400 |           |     |                               |        | 5280   | 2395 | <b>80776</b> |

#### No Ledge Grade B Toolroom

|           |             |     |     |          |        |      |      |              |
|-----------|-------------|-----|-----|----------|--------|------|------|--------------|
| 12" x 12" | 300 x 300   | 4"  | 100 | .000200" | 0.0050 | 55   | 25   | <b>80607</b> |
| 12" x 18" | 300 x 450   |     |     |          |        | 83   | 38   | <b>80616</b> |
| 18" x 18" | 450 x 450   |     |     |          |        | 125  | 57   | <b>80625</b> |
| 18" x 24" | 450 x 600   | 6"  | 150 | .000300" | 0.0076 | 165  | 75   | <b>80634</b> |
| 24" x 24" | 600 x 600   |     |     |          |        | 220  | 100  | <b>80652</b> |
| 24" x 36" | 600 x 900   |     |     |          |        | 495  | 225  | <b>80661</b> |
| 36" x 36" | 900 x 900   |     |     |          |        | 745  | 338  | <b>80707</b> |
| 36" x 48" | 900 x 1200  | 8"  | 200 | .000800" | 0.0125 | 990  | 449  | <b>80716</b> |
| 36" x 60" | 900 x 1500  |     |     |          |        | 1650 | 749  | <b>80725</b> |
| 36" x 72" | 900 x 1800  |     |     |          |        | 1980 | 898  | <b>80734</b> |
| 48" x 72" | 1200 x 1800 | 10" | 250 | .001400" | 0.0355 | 2640 | 1198 | <b>80761</b> |
| 48" x 96" | 1200 x 2400 |     |     |          |        | 4400 | 1996 | <b>80779</b> |

#### How to Order

- Specify:**
1. Surface size of plate
  2. Grade AA, A or B tolerance
  3. Number of ledges – two or none.

Continued on the following page.

NOTE: Other sizes available by request.





**Crystal Pink Granite  
Surface Plates (continued)**

**Two Ledge Surface Plates**



**How to Order**  
Specify: 1. Surface size of plate  
2. Grade AA, A or B tolerance  
3. Number of ledges – two or none.



While not listed, both pink and black granite Four Ledge Starrett Surface Plates are available by request.

**Two Ledge Grade AA Laboratory**

| Surface Size |             | Thickness |     | Flatness Unilateral Tolerance |        | Weight |      | EDP          |
|--------------|-------------|-----------|-----|-------------------------------|--------|--------|------|--------------|
| Inch         | mm          | Inch      | mm  | Inch                          | mm     | Lb.    | kg   |              |
| 12" x 12"    | 300 x 300   | 4"        | 100 | .000050"                      | 0.0012 | 50     | 23   | <b>80602</b> |
| 12" x 18"    | 300 x 450   |           |     |                               |        | 78     | 35   | <b>80611</b> |
| 18" x 18"    | 450 x 450   |           |     |                               |        | 120    | 54   | <b>80620</b> |
| 18" x 24"    | 450 x 600   | 6"        | 150 | .000075"                      | 0.0019 | 224    | 102  | <b>80629</b> |
| 24" x 24"    | 600 x 600   |           |     |                               |        | 306    | 139  | <b>80647</b> |
| 24" x 36"    | 600 x 900   |           |     |                               |        | 460    | 209  | <b>80656</b> |
| 36" x 36"    | 900 x 900   |           |     |                               |        | 710    | 322  | <b>80702</b> |
| 36" x 48"    | 900 x 1200  | 8"        | 200 | .000200"                      | 0.0050 | 1250   | 567  | <b>80711</b> |
| 36" x 60"    | 900 x 1500  | 10"       | 250 | .000250"                      | 0.0063 | 1950   | 885  | <b>80720</b> |
| 36" x 72"    | 900 x 1800  | 12"       | 300 | .000300"                      | 0.0076 | 2810   | 1275 | <b>80729</b> |
| 48" x 72"    | 1200 x 1800 |           |     |                               |        | 3795   | 1721 | <b>80756</b> |
| 48" x 96"    | 1200 x 2400 |           |     |                               |        | 6750   | 3062 | <b>80774</b> |

**Two Ledge Grade A Inspection**

|           |             |     |     |          |        |      |      |              |
|-----------|-------------|-----|-----|----------|--------|------|------|--------------|
| 12" x 12" | 300 x 300   | 4"  | 100 | .000100" | 0.0025 | 50   | 23   | <b>80605</b> |
| 12" x 18" | 300 x 450   |     |     |          |        | 78   | 35   | <b>80614</b> |
| 18" x 18" | 450 x 450   |     |     |          |        | 120  | 54   | <b>80623</b> |
| 18" x 24" | 450 x 600   | 6"  | 150 | .000150" | 0.0038 | 224  | 102  | <b>80632</b> |
| 24" x 24" | 600 x 600   |     |     |          |        | 306  | 139  | <b>80650</b> |
| 24" x 36" | 600 x 900   |     |     |          |        | 460  | 209  | <b>80659</b> |
| 36" x 36" | 900 x 900   |     |     |          |        | 710  | 322  | <b>80705</b> |
| 36" x 48" | 900 x 1200  | 8"  | 200 | .000400" | 0.0101 | 1250 | 567  | <b>80714</b> |
| 36" x 60" | 900 x 1500  | 10" | 250 | .000500" | 0.0127 | 1950 | 885  | <b>80723</b> |
| 36" x 72" | 900 x 1800  |     |     |          |        | 2340 | 1061 | <b>80732</b> |
| 48" x 72" | 1200 x 1800 |     |     |          |        | 3165 | 1436 | <b>80759</b> |
| 48" x 96" | 1200 x 2400 | 12" | 300 | .001000" | 0.0254 | 5060 | 2295 | <b>80777</b> |

**Grade B Toolroom**

|           |             |     |     |          |        |      |      |              |
|-----------|-------------|-----|-----|----------|--------|------|------|--------------|
| 12" x 12" | 300 x 300   | 4"  | 100 | .000200" | 0.0050 | 50   | 23   | <b>80608</b> |
| 12" x 18" | 300 x 450   |     |     |          |        | 76   | 34   | <b>80617</b> |
| 18" x 18" | 450 x 450   |     |     |          |        | 118  | 54   | <b>80626</b> |
| 18" x 24" | 450 x 600   | 6"  | 150 | .000300" | 0.0076 | 155  | 70   | <b>80635</b> |
| 24" x 24" | 600 x 600   |     |     |          |        | 210  | 95   | <b>80653</b> |
| 24" x 36" | 600 x 900   |     |     |          |        | 460  | 209  | <b>80662</b> |
| 36" x 36" | 900 x 900   |     |     |          |        | 710  | 322  | <b>80708</b> |
| 36" x 48" | 900 x 1200  | 8"  | 200 | .000800" | 0.0203 | 955  | 433  | <b>80717</b> |
| 36" x 60" | 900 x 1500  |     |     |          |        | 1560 | 708  | <b>80726</b> |
| 36" x 72" | 900 x 1800  |     |     |          |        | 1870 | 848  | <b>80735</b> |
| 48" x 72" | 1200 x 1800 | 10" | 250 | .001200" | 0.0304 | 2530 | 1148 | <b>80762</b> |
| 48" x 96" | 1200 x 2400 |     |     |          |        | 4215 | 1912 | <b>80780</b> |

Continued from the previous two pages.

NOTE: Other sizes available by request.



### Charcoal Black Granite Surface Plates

Our charcoal black granite has a high quartz content which provides greater resistance to wear and damage than other black granite plates.

This material has low water absorption rates, thus minimizing the possibility of your precision gages rusting while setting on the plates.

This black granite creates little glare resulting in less eyestrain for individuals using the plates.

We have chosen our charcoal black granite with the specific intent of keeping thermal expansion to a minimum.



**How to Order**  
**Specify:** 1. Surface size of plate  
 2. Grade AA, A or B tolerance  
 3. Number of ledges – two or none.

**Special Requirements**  
 Should your application require something other than a standard surface plate, we can provide you with custom options.  
 Starrett can produce your plate from pink, black or gray granite. Custom sizes and thicknesses are available upon request to meet your needs.  
 We can also add holes, counterbores, threaded or solid stainless steel inserts, and t-slots to your surface plate.  
 Contact Starrett Tru-Stone for assistance.

Listed are No Ledge Plates – Two Ledge and Four Ledge Plates available by request.

**NOTE:** Sizes other than those listed are available by request.

#### No Ledge Grade AA Laboratory

| Surface Size |            | Thickness |     | Flatness Unilateral Tolerance |        | Weight |      | EDP          |
|--------------|------------|-----------|-----|-------------------------------|--------|--------|------|--------------|
| Inch         | mm         | Inch      | mm  | Inch                          | mm     | Lb.    | kg   |              |
| 12" x 12"    | 300 x 300  | 4"        | 100 | .000050"                      | 0.0012 | 55     | 25   | <b>80900</b> |
| 12" x 18"    | 300 x 450  |           |     |                               |        | 85     | 39   | <b>80906</b> |
| 18" x 24"    | 450 x 600  |           |     | .000075"                      | 0.0019 | 248    | 113  | <b>80912</b> |
| 24" x 24"    | 600 x 600  |           |     |                               |        | 330    | 150  | <b>80918</b> |
| 24" x 36"    | 600 x 900  | 6"        | 150 | .000100"                      | 0.0025 | 495    | 225  | <b>80924</b> |
| 36" x 36"    | 900 x 900  |           |     | .000150"                      | 0.0038 | 745    | 338  | <b>80936</b> |
| 36" x 48"    | 900 x 1200 | 8"        | 200 | .000200"                      | 0.0050 | 1320   | 599  | <b>80942</b> |
| 36" x 60"    | 900 x 1500 | 10"       | 250 | .000250"                      | 0.0063 | 2065   | 937  | <b>80948</b> |
| 36" x 72"    | 900 x 1800 | 12"       | 300 | .000300"                      | 0.0076 | 2970   | 1347 | <b>80954</b> |

#### No Ledge Grade A Inspection

|           |            |     |     |          |        |      |      |              |
|-----------|------------|-----|-----|----------|--------|------|------|--------------|
| 12" x 12" | 300 x 300  | 4"  | 100 | .000100" | 0.0025 | 55   | 25   | <b>80902</b> |
| 12" x 18" | 300 x 450  |     |     |          |        | 85   | 39   | <b>80908</b> |
| 18" x 24" | 450 x 600  |     |     | .000150" | 0.0038 | 248  | 113  | <b>80914</b> |
| 24" x 24" | 600 x 600  |     |     |          |        | 330  | 150  | <b>80920</b> |
| 24" x 36" | 600 x 900  | 6"  | 150 | .000200" | 0.0050 | 495  | 225  | <b>80926</b> |
| 36" x 36" | 900 x 900  |     |     | .000300" | 0.0076 | 745  | 338  | <b>80938</b> |
| 36" x 48" | 900 x 1200 | 8"  | 200 | .000400" | 0.0101 | 1320 | 599  | <b>80944</b> |
| 36" x 60" | 900 x 1500 |     |     | .000500" | 0.0127 | 2065 | 937  | <b>80950</b> |
| 36" x 72" | 900 x 1800 | 10" | 250 | .000600" | 0.0152 | 2475 | 1123 | <b>80956</b> |

#### No Ledge Grade B Toolroom

|           |             |     |     |          |        |              |      |              |
|-----------|-------------|-----|-----|----------|--------|--------------|------|--------------|
| 12" x 12" | 300 x 300   | 3"  | 75  | .000200" | 0.0050 | 55           | 25   | <b>80904</b> |
| 12" x 18" | 300 x 450   |     |     |          |        | 83           | 38   | <b>80910</b> |
| 18" x 24" | 450 x 600   |     |     | .000300" | 0.0076 | 165          | 75   | <b>80916</b> |
| 24" x 24" | 600 x 600   | 220 | 100 |          |        | <b>80922</b> |      |              |
| 24" x 36" | 600 x 900   | 4"  | 100 | .000400" | 0.0101 | 495          | 225  | <b>80928</b> |
| 36" x 36" | 900 x 900   |     |     | .000600" | 0.0152 | 745          | 338  | <b>80940</b> |
| 36" x 48" | 900 x 1200  | 6"  | 150 | .000800" | 0.0203 | 990          | 449  | <b>80946</b> |
| 36" x 60" | 900 x 1500  |     |     | .001000" | 0.0254 | 1650         | 749  | <b>80952</b> |
| 36" x 72" | 900 x 1800  | 8"  | 200 | .001200" | 0.0304 | 1980         | 898  | <b>80958</b> |
| 48" x 72" | 1200 x 1800 |     |     | .001400" | 0.0355 | 2640         | 1198 | <b>80966</b> |



## Surface Plate Stands

Our stands are constructed from welded square steel tubing to provide exceptional strength and durability. Steel crossbeams are located at the proper support points to ensure maximum surface plate accuracy.

Stands are supplied with a scratch and abrasion resistant industrial powder coated finish. In addition to our standard beige gray color, other colors are available upon request and at an additional charge.

Stationary stands come with leveling adjusters with the typical adjustment being 2". Rolling stands are fabricated with two stationary and two swivel casters.

Stands require no assembly. Order by surface plate size.



## Tube Steel Stands

| Surface Plate Size |             | Weight |     | Stationary Stand EDP | Rolling Stand EDP |
|--------------------|-------------|--------|-----|----------------------|-------------------|
| Inch               | mm          | Lb.    | kg  |                      |                   |
| 12" x 18"          | 300 x 450   | 50     | 23  | 82220                | 82221             |
| 18" x 18"          | 450 x 450   | 65     | 29  | 82222                | 82223             |
| 18" x 24"          | 450 x 600   | 75     | 34  | 82224                | 82225             |
| 24" x 24"          | 600 x 600   | 85     | 39  | 82226                | 82227             |
| 24" x 36"          | 600 x 900   | 95     | 43  | 82228                | 82229             |
| 24" x 48"          | 600 x 1200  | 145    | 66  | 82230                | 82231             |
| 36" x 36"          | 900 x 900   | 165    | 75  | 82232                | 82233             |
| 36" x 48"          | 900 x 1200  | 185    | 84  | 82234                | 82235             |
| 36" x 60"          | 900 x 1500  | 205    | 93  | 82236                | 82237             |
| 36" x 72"          | 900 x 1800  | 235    | 107 | 82238                | 82239             |
| 48" x 60"          | 1200 x 1500 | 255    | 116 | 82240                | 82241             |
| 48" x 72"          | 1200 x 1800 | 265    | 120 | 82242                | 82243             |
| 48" x 96"          | 1200 x 2400 | 345    | 156 | 82244                | 82245             |



## Surface Plate Cleaner

To keep surface plates and other precision granite products in top condition, they should be cleaned frequently with Starrett Cleaner. This helps prevent abrasion of tools by dirt and other foreign particles.

The liquid cleaner, which also acts as a degreaser and rust inhibitor, should be used without water to minimize the risk of rusting tools.

Supplied in a variety of containers as listed.



| Description   | EDP   |
|---|-------|
| 55 gal. (250 liter) Drum                                | 81820 |
| 1 gal. (4.5 liter)<br>Case of Four                      | 81822 |
| 1 Quart (4.5 liter)<br>Case of 2                        | 81824 |
| Waterless Cleaner<br>(Case of Twelve<br>32 oz. bottles) | 81828 |



## Cabinet Type Surface Plate Stands

Cabinet stands provide a strong, rigid support for standard plates listed, plus a handy place to store frequently used inspection tools and accessories.

The standard height is 36" (900mm) from the floor to top of the surface plate.

All stands made from heavy-gauge welded steel, have locking doors on the front. The 48" (1200mm) wide stands are equipped with doors front and back unless otherwise specified. Stands are supplied with leveling screws or casters as listed. Order by surface plate size and thickness.



| Surface Plate Size |             | Stand Weight |     | With Leveling Screws EDP | With Casters EDP |
|--------------------|-------------|--------------|-----|--------------------------|------------------|
| Inch               | mm          | Lb.          | kg  |                          |                  |
| 24" x 36"          | 600 x 900   | 190          | 86  | <b>81504</b>             | <b>81506</b>     |
| 36" x 36"          | 900 x 900   | 245          | 111 | <b>81516</b>             | <b>81518</b>     |
| 36" x 48"          | 900 x 1200  | 300          | 136 | <b>81513</b>             | <b>81515</b>     |
| 36" x 60"          | 900 x 1500  | 365          | 166 | <b>81519</b>             | <b>81521</b>     |
| 36" x 72"          | 900 x 1800  | 440          | 200 | <b>81522</b>             | <b>81524</b>     |
| 48" x 72"          | 1200 x 1800 | 660          | 299 | <b>81525</b>             | <b>81527</b>     |

**NOTE:** Granite Surface Plate is not included with stand – order separately.

## Surface Plate Covers

We highly recommend the use of surface plate covers to protect your precision granite investment. Prevent abrasive build up on your plates with our covers made from heavy gauge vinyl with a soft interior lining. Our covers provide a tough, durable, protective outside with a soft cushion inside.

### Vinyl Covers



| For Surface Size |             | EDP          |
|------------------|-------------|--------------|
| Inch             | mm          |              |
| 12" x 12"        | 300 x 300   | <b>83020</b> |
| 12" x 18"        | 300 x 450   | <b>83021</b> |
| 18" x 18"        | 450 x 450   | <b>83022</b> |
| 18" x 24"        | 450 x 600   | <b>83023</b> |
| 24" x 24"        | 600 x 600   | <b>83024</b> |
| 24" x 36"        | 600 x 900   | <b>83025</b> |
| 24" x 48"        | 600 x 1200  | <b>83026</b> |
| 36" x 36"        | 900 x 900   | <b>83027</b> |
| 36" x 48"        | 900 x 1200  | <b>83028</b> |
| 36" x 60"        | 900 x 1500  | <b>83029</b> |
| 36" x 72"        | 900 x 1800  | <b>83030</b> |
| 48" x 60"        | 900 x 1500  | <b>83031</b> |
| 48" x 72"        | 1200 x 1800 | <b>83032</b> |
| 48" x 96"        | 1200 x 2400 | <b>83033</b> |





## Granite Metrology Accessory Products

### Toolmakers' Flats

These handy flats are small precision surface plates that are ideal for many inspection and checking uses throughout the plant.

They are especially well suited for layout work and offer an easy, portable reference for gaging small parts.

Offered in Crystal Pink Granite or Impala Black Granite, Starrett Toolmakers' Flats are 12" long x 8" wide x 2" thick (300 x 200 x 50mm) and finished to an overall tolerance of .0001" (0.0025mm).

The shipping weight is 20 lbs. (9kg).



| Description          | EDP          |
|----------------------|--------------|
| Crystal Pink Granite | <b>81803</b> |
| Impala Black Granite | <b>81802</b> |

### Three-Face Granite Tri-Squares

Three-Face Granite Tri-Squares provide an excellent, economical way for accurately checking the X-Y-Z axes on CNC machine tools and coordinate measuring machines.

Lying in the horizontal position, with an indicator in the spindle, the X and Y axes can be checked for 90° squareness. With the square in

the vertical position, tracing along the vertical edge of the square can check the perpendicularity of the Z axis.

Granite tri-squares may also be used in the same manner that steel squares would be used for the direct checking of squareness and straightness.



| Dimensions |        |           |      |        |           | Weight |    | Accuracy Grade – EDP No.                           |   |
|------------|--------|-----------|------|--------|-----------|--------|----|--|---|
| Inch       |        |           | mm   |        |           |        |    | AA Laboratory<br>.000025"/6" TIR<br>(0.0006/150mm) | A Inspection<br>.000050"/6" TIR<br>(0.0012/150mm) |
| Base       | Height | Thickness | Base | Height | Thickness | Lb.    | kg |  |   |
| 9"         | 12"    | 3"        | 225  | 300    | 75        | 23     | 10 | <b>81961</b>                                       | <b>81962</b>                                      |
| 12"        | 18"    | 4"        | 300  | 450    | 100       | 60     | 27 | <b>81964</b>                                       | <b>81965</b>                                      |
| 18"        | 24"    | 4"        | 450  | 600    | 100       | 120    | 54 | <b>81967</b>                                       | <b>81968</b>                                      |

**NOTE:** Other sizes quoted on application.



## Five-Face Master Squares

Five-Face Granite Master Squares are popular for accurately checking the X-Y-Z axes on CNC machin2.253e tools and coordinate measuring machines.

Lying in the horizontal position with an indicator in the spindle, the X and Y axes can be checked for 90° squareness. With the square in the vertical position, tracing along the vertical edge of the square can check the perpendicularity of the Z axis. By tracing along the top edge of the square while in the vertical position, it will check parallelism of the table in the X and Y axes to the spindle.

Five-face master squares may also be used on any work that requires the checking of squareness or parallelism.



| Dimensions |        |           |      |        |           | Weight |     | Accuracy Grade – EDP No.                           |   |
|------------|--------|-----------|------|--------|-----------|--------|-----|--|---|
|            |        |           |      |        |           |        |     | AA Laboratory<br>.000025"/6" TIR<br>(0.0006/150mm) | A Inspection<br>.000050"/6" TIR<br>(0.0012/150mm) |
| Inch       |        |           | mm   |        |           |        |     |  |   |
| Base       | Height | Thickness | Base | Height | Thickness | Lb.    | kg  |  |   |
| 12"        | 12"    | 3"        | 300  | 300    | 75        | 41     | 19  | <b>81919</b>                                       | <b>81920</b>                                      |
| 14"        | 14"    | 3"        | 350  | 350    | 75        | 56     | 25  | <b>81922</b>                                       | <b>81923</b>                                      |
| 16"        | 16"    | 4"        | 400  | 400    | 100       | 98     | 44  | <b>81925</b>                                       | <b>81926</b>                                      |
| 24"        | 24"    | 4"        | 600  | 600    | 100       | 220    | 100 | <b>81931</b>                                       | <b>81932</b>                                      |

## Granite Parallels

Produced in two sizes, Starrett Granite Parallels are useful in setting up work on surface plates and machine tables. Available in matched pairs, finished on two opposite faces or all four faces. Storage cases are available at extra cost.



### Starrett Granite

| Length x Thickness x Height |                | Grade AA Laboratory        |        |              |              | Grade A Inspection         |        |              |              | Weight Per Pair |    | Case Only    |
|-----------------------------|----------------|----------------------------|--------|--------------|--------------|----------------------------|--------|--------------|--------------|-----------------|----|--------------|
|                             |                | Unilateral Tolerance (TIR) |        | 2-Face       | 4-Face       | Unilateral Tolerance (TIR) |        | 2-Face       | 4-Face       |                 |    |              |
| Inch                        | mm             | Inch                       | mm     | EDP          | EDP          | Inch                       | mm     | EDP No.      | EDP No.      | Lb.             | kg | EDP          |
| 12 x 1 x 2                  | 300 x 25 x 50  | .000025                    | 0.0012 | <b>81695</b> | <b>81696</b> | .000050                    | 0.0025 | <b>81697</b> | <b>81698</b> | 4               | 2  | <b>81708</b> |
| 24 x 2 x 4                  | 600 x 50 x 100 | .000050                    | 0.0038 | <b>81703</b> | <b>81704</b> | .000100                    | 0.0076 | <b>81705</b> | <b>81706</b> | 36              | 16 | <b>81710</b> |





## Accuracy Assurance Products & Services

### Repeat Reading Gage

This high-precision instrument provides a fast check on surface plate repeatability with readings taken on a high magnification electronic amplifier. This gage detects local error, not overall flatness.

The base has an adjustment knob for zero-setting the cartridge-type gaging head, and all contact points resting on the granite, including the contact point of the gaging cartridge, are carbide and lapped to a fine finish.

The instrument also accommodates AGD indicators with .375" (9.5mm) diameter stems. Extra-length contact points may be required.



| Description              | EDP No. |
|--------------------------|---------|
| Repeat Reading Gage Only | 81815   |
| Case                     | 81818   |

### Calibration Services

Starrett calibration and resurfacing services are available for all types and brands of granite surface plates. When certification of surface tolerance is required, recalibration service with an auto-collimator will be provided with accuracy traceable to the U.S. National Institute of Standards and Technology.

Plates that need resurfacing can be serviced at Waite Park, MN, Jedburgh, Scotland, and Itu, Brazil. Calibration and resurfacing of tri-squares, master squares, master angles, V-blocks, parallels and straight edges is also available at our at Waite Park, MN location

Resurfacing can also be done in your plant, saving crating and shipping costs as well as equipment down time. The cost is based on a square foot plate area with additional charge for travel. For a quotation, send us a list of plates, their sizes and the flatness tolerance required.

### Tolerances for Repeat Reading of Measurement

| Diagonal Inches (mm) | Full Indicator Movement (F.I.M.) in Microinches and (Microns) |           |           | Obtained           |
|----------------------|---|-----------|-----------|--------------------|
|                      | Grade AA  | Grade A   | Grade B   |                    |
| Through 30" (750)    | 35 (.9)   | 60 (1.5)  | 110 (2.8) | When not Specified |
| 30-60" (750-1500)    | 45 (1.1)  | 70 (1.8)  | 120 (3)   |                    |
| 60-90" (1500-2250)   | 60 (1.5)  | 80 (2)    | 160 (4)   |                    |
| 90-120" (2250-3000)  | 75 (1.9)  | 100 (2.5) | 200 (5)   |                    |
| 120-150" (3000-3800) | 90 (2.3)  | 120 (3)   | 240 (6)   |                    |
| Over 150" (3800)     | 100 (2.5)   | 140 (3.6) | 280 (7)   |                    |
| All Sizes            | 25 (.6)   | 50 (1.3)  | 100 (2.5) | When Specified     |

A repeat reading gage detects minute variations of the surface within the unilateral flatness tolerance of the whole surface.

When resurfacing is done in your plant, tolerances for repeat reading of measurement will be per the table from U.S. Federal Specification GGG-P-463c, paragraph 3.3.3. Closer repeat reading tolerances of 25, 50 and 100 millionths can

only be assured if the resurfacing is done at our facilities.

#### Recalibration

Recalibrations are provided by our Calibration Lab which is A2LA accredited.





400 SERIES

QUADRA-CHEK 200

|          | in     | mm     | + |
|----------|--------|--------|---|
| CIRCLE 1 |        |        |   |
| X        | 0.0151 |        |   |
| Y        | 0.0012 |        |   |
| D/r      | 0.4556 |        |   |
| Pts=7    | F      | 0.0050 |   |

DR0  
Recall View Change Tel

point line circle distance angle skew magic





## The Powerful and Versatile Starrett Line of Optical Measuring Projectors

Optical measurement is a non-contact technique that graphically displays and measures parts with dimensions and shapes that would be hard to measure with regular tools.

The heart of these systems are precision optics, superb lighting and a highly accurate workstage. They combine to ensure bright, sharp images and exceptional accuracy.

Generally, horizontal models work well with parts that need to be fixtured, held in a vise, or on centers. Vertical models provide comparable accuracy and are ideal for parts that are placed on the glass insert of the workstage. Vertical systems work well when the parts to be measured are flexible or soft (i.e., plastic, thin stampings or electrical components).

The versatile Starrett line includes optical systems from 12-30" (300-750mm) screen diameters, horizontal and vertical models and a wide range of special machines. We offer choices of lens magnification, manual, motor-driven and CNC workstage travel, and with mechanical or electronic readouts.

### Specification Guide

| Model   | Horizontal Benchtop |           |           | Horizontal Floor-Standing |           | Vertical Benchtop |           | Vertical Floor |
|---|---------------------|-----------|-----------|---------------------------|-----------|-------------------|-----------|----------------|
|   | HE400MkIII          | HB400     | HD400     | HF600                     | HF750     | VB300             | VB400     | VF600          |
| <b>Screen Size</b>  | 16" (400)           | 16" (400) | 16" (400) | 24" (600)                 | 30" (762) | 12" (300)         | 16" (400) | 24" (600)      |
| <b>Workstage Travel</b>                                     |                     |           |           |                           |           |                   |           |                |
| Horizontal (X) Axis   | 10" (250)           | 12" (300) | 16" (400) | 12" (300)                 | 12" (300) | 6" (150)          | 8" (200)  | 8" (200)       |
| (Y) Axis  | 4" (100)            | 6" (150)  | 6" (150)  | 8" (200)                  | 8" (200)  | 2.8" (70)         | 4" (100)  | 8" (200)       |
| <b>Stage Travel Options</b>                                 |                     |           |           |                           |           |                   |           |                |
| 1. Horizontal (X) Axis                                      | N/A                 | 16" (400) | N/A       | A                         | A         | 6" (150)          | 10" (250) | A              |
| (Y) Axis  | N/A                 | 6" (150)  | N/A       | A                         | A         | 2" (50)           | 6" (150)  | A              |
| 2. Horizontal (X) Axis                                      | N/A                 |           |           | A                         | A         | 2" (50)           |           | A              |
| (Y) Axis  | N/A                 |           |           | A                         | A         | 2" (50)           |           | A              |
| <b>Measurement Display/Readout Systems</b>                  |                     |           |           |                           |           |                   |           |                |
| Micrometers/Indicators                                      | N/A                 | N/A       | N/A       | N/A                       | N/A       | 0                 | 0         | 0              |
| QC121   | 0                   | 0         | 0         | 0                         | 0         | 0                 | 0         | 0              |
| QC221   | 0                   | 0         | 0         | 0                         | 0         | 0                 | 0         | 0              |
| QC221E  | 0                   | 0         | 0         | 0                         | 0         | 0                 | 0         | 0              |
| QC300   | N/A                 | 0         | 0         | 0                         | 0         | N/A               | N/A       | N/A            |
| QC5215  | 0                   | 0         | 0         | 0                         | 0         | 0                 | 0         | 0              |
| CNC Automatic Table Movement                                | N/A                 | 0         | 0         | 0                         | 0         | N/A               | 0         | 0              |
| <b>Profile Illumination</b>                                 | S                   | S         | S         | S                         | S         | S                 | S         | S              |
| <b>High Intensity Dual-Lamp Surface (Illumination 150W)</b> | N/A                 | N/A       | N/A       | 0                         | 0         | N/A               | N/A       | 0              |
| <b>Fiber Optic Surface Illumination</b>                     | S                   | S         | S         | S                         | S         | N/A               | 0         | S              |
| <b>On-Axis Through-the-Lens Surface Illumination</b>        | N/A                 | N/A       | N/A       | N/A                       | N/A       | 0                 | 0         | N/A            |
| <b>Digital Screen Protractor</b>                            | S                   | S         | S         | S                         | S         | 0                 | S         | S              |
| <b>Power X-Y Axis</b>                                       | N/A                 | 0         | 0         | S                         | S         | N/A               | 0         | 0              |
| <b>Quick-Release</b>  | S                   | S         | S         | S                         | S         | S                 | S         | S              |
| <b>Blower-Cooled Lamphouse</b>                              | S                   | S         | S         | S                         | S         | S                 | S         | S              |
| <b>Multi-Position Lens Turret</b>                           | N/A                 | N/A       | S         | S                         | S         | N/A               | S         | 0              |
| <b>Light-Duty Rotary Vise</b>                               | 0                   | 0         | 0         | 0                         | 0         | N/A               | N/A       | N/A            |
| <b>Heavy-Duty Rotary Vise</b>                               | N/A                 | N/A       | N/A       | 0                         | 0         | N/A               | N/A       | N/A            |
| <b>Precision Rotary Workstage</b>                           | N/A                 | N/A       | N/A       | N/A                       | N/A       | 0                 | 0         | 0              |
| <b>Centers and Vees</b>                                     | 0                   | 0         | 0         | 0                         | 0         | 0                 | 0         | 0              |
| <b>Heavy-Duty Centers and Vees</b>                          | N/A                 | N/A       | N/A       | 0                         | 0         | N/A               | N/A       | N/A            |
| <b>Glass Plate Workholder</b>                               | 0                   | 0         | 0         | 0                         | 0         | N/A               | N/A       | N/A            |
| <b>Iris Diaphragm</b>                                       | 0                   | 0         | 0         | 0                         | 0         | N/A               | N/A       | 0              |
| <b>Range of Lens Magnification</b>                          |                     |           |           |                           |           |                   |           |                |
| 10x, 20x, 25x, 31.25x, 50x, 100x                            | 0                   | 0         | 0         | 0                         | 0         | 0                 | 0         | 0              |
| <b>Lens Magnification 5x</b>                                | N/A                 | 0         | N/A       | 0                         | 0         | N/A               | N/A       | 0              |
| <b>Universal Rotary Vee Block</b>                           | 0                   | 0         | 0         | 0                         | 0         | N/A               | N/A       | N/A            |
| <b>Adjustable Mechanical Centers</b>                        | 0                   | 0         | 0         | 0                         | 0         | N/A               | N/A       | N/A            |
| <b>OV<sup>2</sup> Video Attachment</b>                      | 0                   | 0         | 0         | 0                         | 0         | N/A               | N/A       | N/A            |

**Key:** Standard = S; Option = 0; Not Available = N/A; On Application = A, Dimensions in Inch and (mm)

#### Terminology

**Working Distance** is the distance between the objective lens and the component when the component is in focus.

**Field of View (FOV)** is the viewing area of the component. A 30mm FOV using a 10x lens would produce a screen image of 300mm.

**Half Field View** is the maximum size a component can be projected to the center of the screen before colliding with the lens.

**Full Field View** is the maximum size a component can be projected over the full screen before colliding with the lens.

**Projected Image** is how a component is projected onto the screen in relation to its placement on the workstage.

Specifications subject to change.



### Horizontal Benchtop Measuring Projector

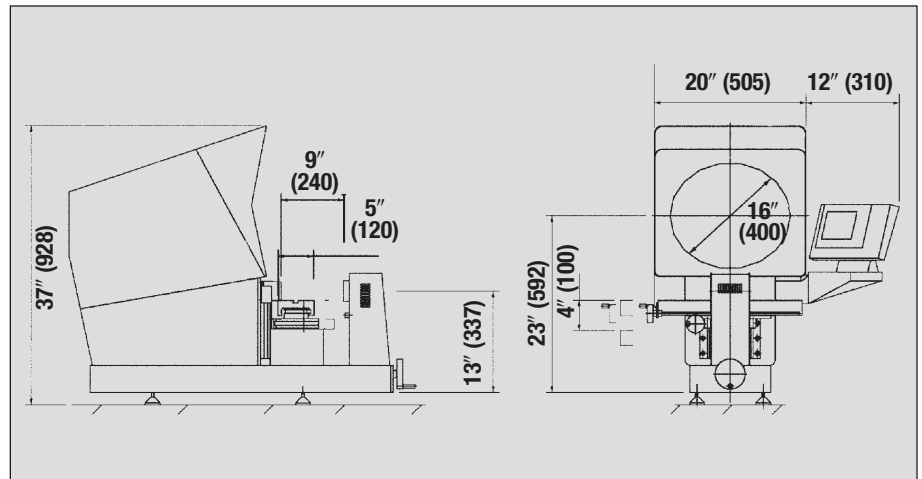
#### No. HE400 MkIII

16" (400mm) Screen Diameter

The Starrett HE400 MkIII provides exceptional performance, a large 16" screen, a full range of features, and Starrett quality at a competitive price.

#### Standard Features

- ◆ Sturdy, all metal construction
- ◆ 16" (400mm) screen with integral hood, precision cross lines and calibration markings
- ◆ 10 x 4" (254 x 100mm) measuring travel
- ◆ High precision workstage with 18.9 x 4.7" (480 x 120mm) top plate
- ◆ 15.4 lbs (7kg) workstage capacity with 55 lbs (25kg) max. capacity
- ◆ 13.8" (355mm) capacity between centers
- ◆ Lamphouse mounted helix adjustment for accurate threadform inspection
- ◆ Fine adjustment on all axes, plus zero backlash, fast traverse X-axis mechanism
- ◆ Fully retractable duplex fiber optic surface illumination
- ◆ Fan cooled halogen profile illumination with high/low intensity and yellow/green filter
- ◆ Heidenhain .00005" (0.001mm) resolution scales
- ◆ Digital protractor (1 minute res.) Q-Axis
- ◆ 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
- ◆ Optical edge detection (optional)
- ◆ Available with OV<sup>2</sup>, Starrett's innovative Optical-Video Adaptor. Refer to OV<sup>2</sup> page for details



For readout choices, refer to pages at the end of this section.



## Horizontal Benchtop Measuring Projector

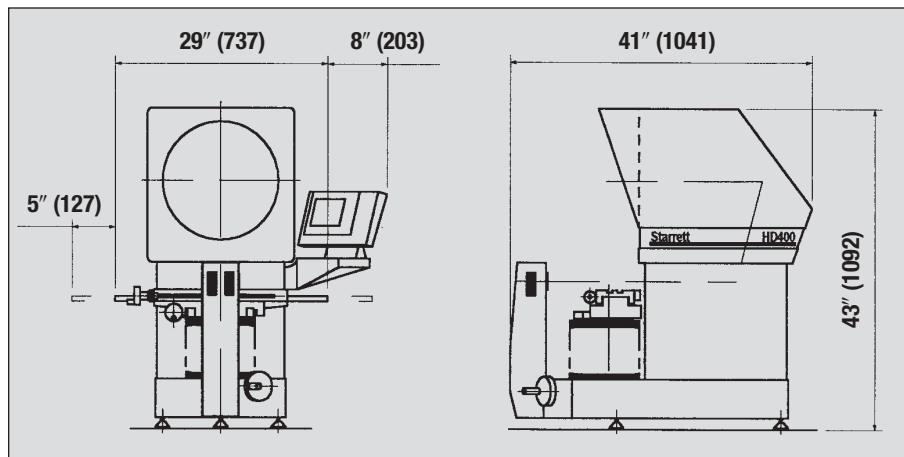
### No. HB400

16" (400mm) Screen Diameter

Superlative in design and function, the HB400 is ideal for the most demanding applications in optical measurement.

#### Standard Features

- ◆ Vertically correct image
- ◆ Fully useable 16" (400mm) diameter screen with crosslines and calibration marks
- ◆ Heavy-duty, metal construction
- ◆ High precision workstage
- ◆ New, larger 12" x 6" (300 x 150mm) measuring range (extended 16" X-axis measuring ranges are available)
- ◆ Staging area 21-1/4" (540mm) by 5-1/8" (130mm)
- ◆ Dual fixturing slots
- ◆ Screen-mounted overlay chart clips
- ◆ 110 lb. (50kg) weight capacity
- ◆ Dual intensity (hi/low) tungsten halogen profile illumination
- ◆ Twin-bundle, adjustable on-axis, fiber optic surface illumination
- ◆ Operator glare shields for surface illumination
- ◆ Helix angle stage adjustable  $\pm 15^\circ$
- ◆ Quick-change, bayonet style lens mount
- ◆ Q-Axis displayed in digital readout
- ◆ Heidenhain .00005" (0.001mm) resolution scales
- ◆ Centrally mounted vertical (Y-axis) scale (in-line with lens/workpiece)
- ◆ Threadless X-axis quick-release for "zero" backlash
- ◆ Protective guideway covers for both X and Y axes
- ◆ Full (and upgradable) range of readout systems/software
- ◆ Swing-away lamphouse (optional)
- ◆ Optical edge detection (optional)
- ◆ 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
- ◆ Available as manual, motorized and CNC
- ◆ Available with OV<sup>2</sup>, Starrett's innovative Optical-Video Adaptor. Refer to OV<sup>2</sup> page for details



For readout choices, refer to pages at the end of this section.





### Horizontal Benchtop Dual Lens Measuring Projector

**No. HD400**  
16" (400mm) Screen Diameter

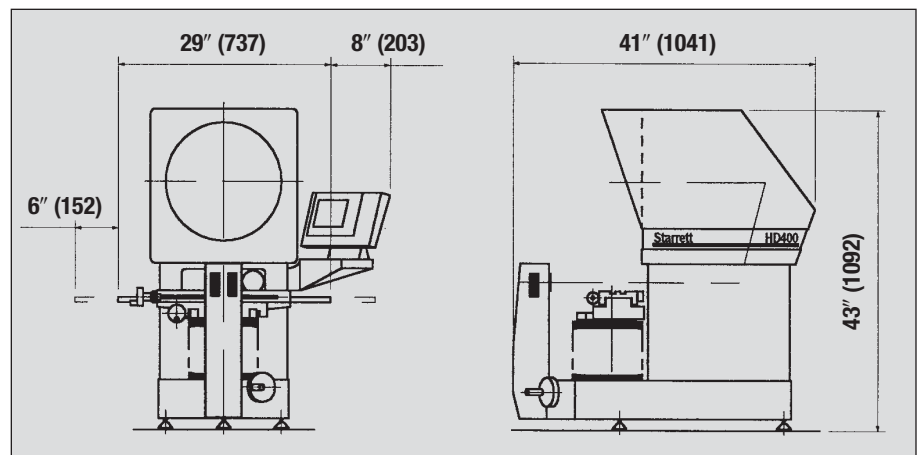
Based on our very popular HB400 platform, the HD features an exclusive indexing dual lens slide, a newly enlarged 16" x 6" (400 x 150mm) measuring range, and crisp, clear, tri-bundle surface illumination. Once again we have "raised the bar" in benchtop projectors.

#### Standard Features

- ◆ Exclusive indexing dual lens mount
- ◆ Vertically correct image
- ◆ Fully useable 16" (400mm) diameter screen with crosslines and calibration marks
- ◆ Heavy duty, metal construction
- ◆ 16" x 6" (400 x 150mm) measuring range
- ◆ Dual fixturing slots
- ◆ Staging area 21-1/4" (540mm) by 5-1/8" (130mm)
- ◆ Screen-mounted overlay chart clips
- ◆ 110 lb. (50kg) weight capacity
- ◆ Dual intensity (hi/low) tungsten halogen profile illumination
- ◆ Unique triple bundle, adjustable, fiber optic surface illumination
- ◆ Operator glare shields for surface illumination
- ◆ Helix angle stage adjustable  $\pm 15^\circ$
- ◆ Quick-change, bayonet style lens mount
- ◆ Q-Axis displayed in digital readout
- ◆ Heidenhain .00005" (0.001mm) resolution scales
- ◆ Centrally mounted vertical (Y-axis) scale (in-line with lens/workpiece)
- ◆ Threadless X-axis quick-release for "zero" backlash
- ◆ Protective guideway covers for both X and Y axes
- ◆ Full (and upgradable) range of readout systems/software
- ◆ Swing-away lamphouse (optional)
- ◆ Optical edge detection (optional)
- ◆ 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
- ◆ Available as manual, motorized and CNC
- ◆ Available with OV<sup>2</sup>, Starrett's innovative Optical-Video Adaptor. Refer to OV<sup>2</sup> page for details



Dual Lens HD400 Shown with the New QC-300.



For readout choices, refer to pages at the end of this section.



## Horizontal Floor Standing Measuring Projector

**No. HF600** In Line  
24" (600mm) Screen Diameter

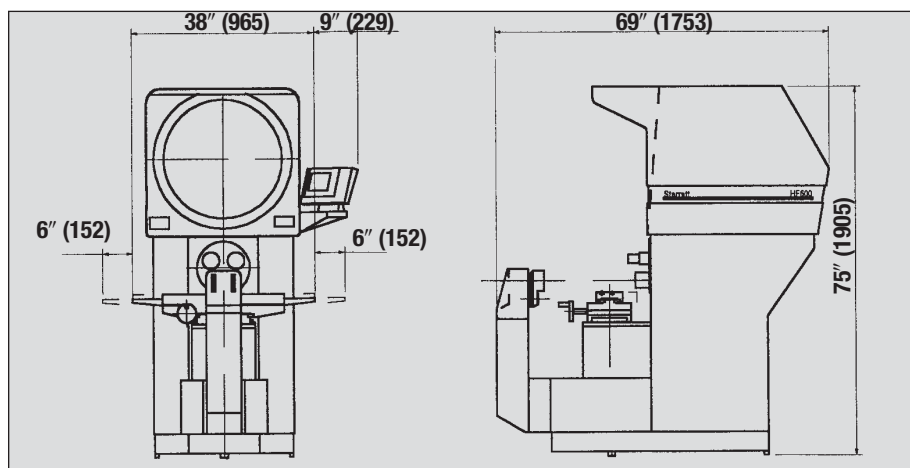
At only 31" (725mm) across, this machine offers a compact footprint for a floor standing system. It offers a large heavy duty stage with 330 lb. (150kg) weight capacity.

### Features

- ◆ Motorized X and Y axes
- ◆ Vertically correct image
- ◆ Fully useable 24" (600mm) diameter screen with crosslines and calibration marks
- ◆ Multi-position external lens turret
- ◆ Heavy-duty, metal construction
- ◆ 12" x 8" (300 x 200mm) measuring range
- ◆ Optional Heavy Duty 16" (400mm) X axis measuring range
- ◆ 3" (75mm) focal travel
- ◆ Nickel-plated steel stage with cross roller bearings
- ◆ 25" x 9" (625 x 225mm) staging area
- ◆ Dual fixturing slots
- ◆ Screen-mounted overlay chart clips
- ◆ 330 lb. (150kg) capacity
- ◆ 500 lb. (225kg) capacity with Heavy Duty option
- ◆ Dual intensity (hi/low) tungsten halogen profile illumination with yellow/green filter
- ◆ Dual-bundle, adjustable, fiber optic surface illumination standard with optional high-intensity dual lamp
- ◆ Helix angle stage adjustable  $\pm 15^\circ$
- ◆ Q-Axis displayed in digital readout
- ◆ Heidenhain .00005" (0.001mm) resolution scales
- ◆ Centrally mounted vertical (Y-axis) scale (in-line with lens/workpiece)
- ◆ Threadless X-axis quick-release for "zero" backlash
- ◆ Protective guideway covers for both X and Y axes
- ◆ Available with QC-300 or QC-200 readout, or with PC and QC-5000 Software
- ◆ Hood and curtains supplied as standard
- ◆ Optical edge detection (optional)
- ◆ 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
- ◆ 5x lens available on special order (replaces turret)
- ◆ Optional CNC capability with QC-5000 software
- ◆ Available with OV<sup>2</sup>, Starrett's innovative Optical-Video Adaptor. Refer to OV<sup>2</sup> page for details



No. HF600 MK2 with QC221E Readout.



For readout choices, refer to pages at the end of this section.



### Horizontal Floor Standing Measuring Projector

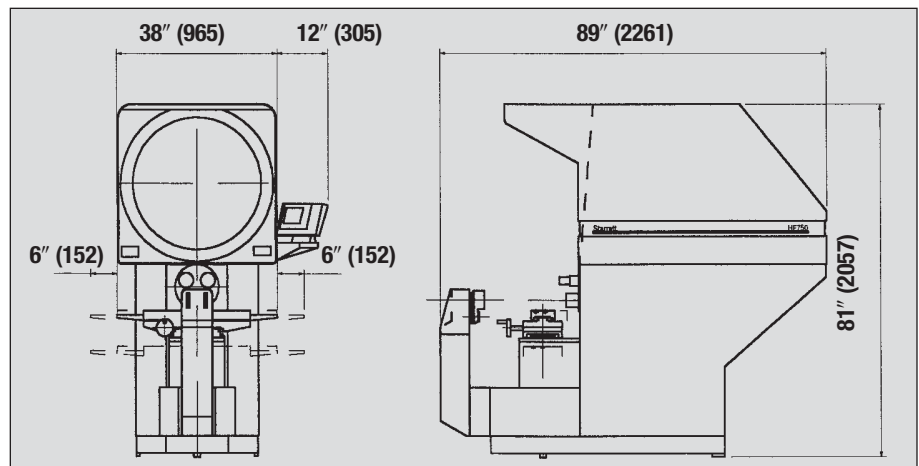
#### No. HF750

30" (750mm) Screen Diameter

A proven performer, the No. HF750 combines an erect, 30" (750mm) screen with rugged construction.

#### Standard Features

- ◆ Motorized X and Y axes
- ◆ Vertically correct image
- ◆ Fully useable 30" (750mm) screen with crosslines and calibration marks
- ◆ Multi-position external lens turret
- ◆ Heavy duty, metal construction
- ◆ 12" x 8" (300 x 200mm) measuring range
- ◆ Optional Heavy Duty 16" (400mm) X axis measuring range
- ◆ 3" (75mm) focal travel
- ◆ Nickel-plated steel stage with cross roller bearings
- ◆ 25" x 9" (625 x 225mm) staging area
- ◆ Dual fixturing slots
- ◆ Screen-mounted overlay chart clips
- ◆ 330 lb. (150kg) capacity (Heavy duty 500 lb. (225kg) capacity available)
- ◆ Dual intensity (hi/low) tungsten halogen profile illumination with yellow/green filter
- ◆ Dual-bundle, adjustable, fiber optic surface illumination with optional high-intensity dual lamp surface illumination
- ◆ Helix angle stage adjustable  $\pm 15^\circ$
- ◆ Q-Axis displayed in digital readout
- ◆ Heidenhain .00005" (0.001mm) resolution scales
- ◆ Centrally mounted vertical (Y-axis) scale (in-line with lens/workpiece)
- ◆ Threadless X-axis quick-release for "zero" backlash
- ◆ Protective guideway covers for both X and Y axes
- ◆ Available with QC-300 or QC-200 readout, or with PC and QC-5000 Software
- ◆ Hood and curtains supplied as standard
- ◆ Optical edge detection (optional)
- ◆ 10x, 20x, 25x, 31.25x, 50x, and 100x magnifications available
- ◆ 5x lens available on special order (replaces turret)
- ◆ Optional CNC capability with QC-5000 software
- ◆ Available with OV<sup>2</sup>, Starrett's innovative Optical-Video Adaptor. Refer to OV<sup>2</sup> page for details



For readout choices, refer to pages at the end of this section.





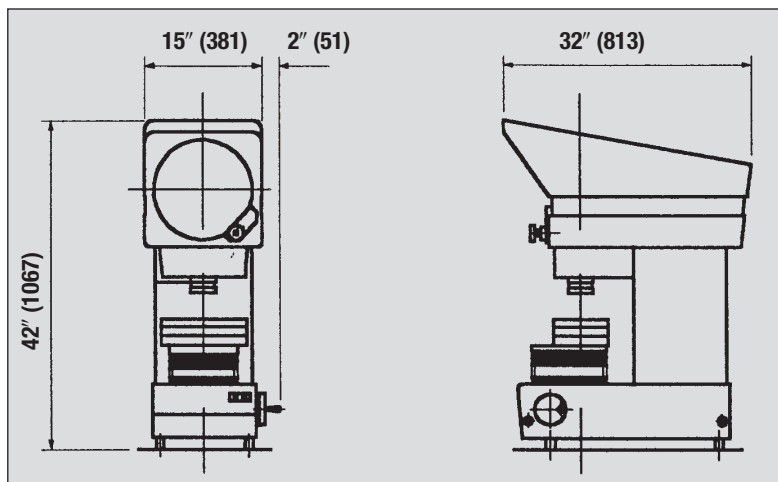
**Vertical Benchtop  
Measuring Projector**

**No. VB300**

12" (300mm) Screen Diameter

**Standard Features**

- ◆ Ideal for rapid inspection of small components
- ◆ Workstage support has X and Y axis manual travel
- ◆ Manual focus 4" (100mm)
- ◆ Accommodates components up to 11 lbs. (5kg)
- ◆ Front working distances:
  - 10x** - 3.1" (80mm),
  - 20x** - 3" (76mm),
  - 25x** - 2.4" (62mm),
  - 50x** - 2" (50mm),
  - 100x** - 1.6" (41mm)
- ◆ Profile illumination – High-power, fan-cooled, tungsten halogen, switchable, high/low intensity and yellow/green filter
- ◆ Surface illumination-on-axis adjustable
- ◆ Integral hood
- ◆ Q-Axis displayed in digital readout
- ◆ Workstage:
  - Top plate:** 10.6" x 6.9" (270 x 175mm) - Electronic
  - Glass insert:** 8" x 4.5" (200 x 115mm)
  - Measuring travel:** 6" x 2.8" (150 x 70mm)
- ◆ 0-0.00005" (0-0.001mm) scales
- ◆ Available with a choice of QC-300, QC-200, or QC-100 readouts
- ◆ Projection lens choices – 10x, 20x, 25x, 31.25x, 50x, 100x with a single lens mount



For readout choices, refer to pages at the end of this section.



### Vertical Benchtop Measuring Projector

#### No. VB400

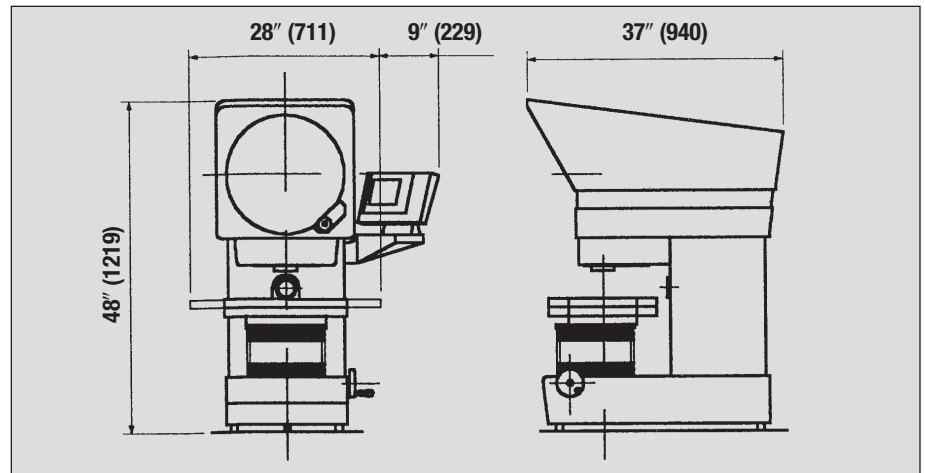
16" (400mm) Screen Diameter

#### Standard Features

- ◆ Ideal for high or low volume parts. Can be used in calibration labs or on the shop floor as a stand-alone unit. Also a good choice for general purpose toolroom work to measure complex shapes and hole patterns easily and quickly
- ◆ Accommodates components up to 22 lbs. (10kg)
- ◆ 360° angular movement to 1 minute of arc with electronic protractor
- ◆ Helix angle with universal indexing fixture
- ◆ Front working distances:
  - 10x** - 3.1" (80mm),
  - 20x** - 3.2" (82mm),
  - 25x** - 2.8" (70mm),
  - 50x** - 2.1" (53mm),
  - 100x** - 1.7" (43mm)
- ◆ Profile illumination – Switchable high/low intensity, fan-cooled, tungsten halogen lamp with yellow/green filter
- ◆ Surface illumination – On-axis system
- ◆ Q-Axis displayed in digital readout
- ◆ Integral hood

#### Optional Features

- ◆ Workstage options:
  - 1. Top plate:** 16" x 9" (400 x 225mm)  
**Glass insert:** 9-1/4" x 5-1/2" (240 x 140mm)  
**Measuring travel:** 8" x 4" (200 x 100mm)
  - 2. Top plate:** 17.7" x 11.2" (450 x 285mm)  
**Glass insert:** 11.4" x 7-1/2" (290 x 190mm)  
**Measuring travel:** 10" x 6" (250 x 150mm)
- ◆ Workstage travel:
  - 1. Motorized or full CNC option**
  - 2. Manual hand-focus travel 4" (102mm)**
- ◆ Projection lens choices: 10x, 20x, 25x, 31.25x, 50x, 100x with a single lens or a 3-lens turret mount



For readout choices, refer to pages at the end of this section.



## Vertical Floor Standing Measuring Projector

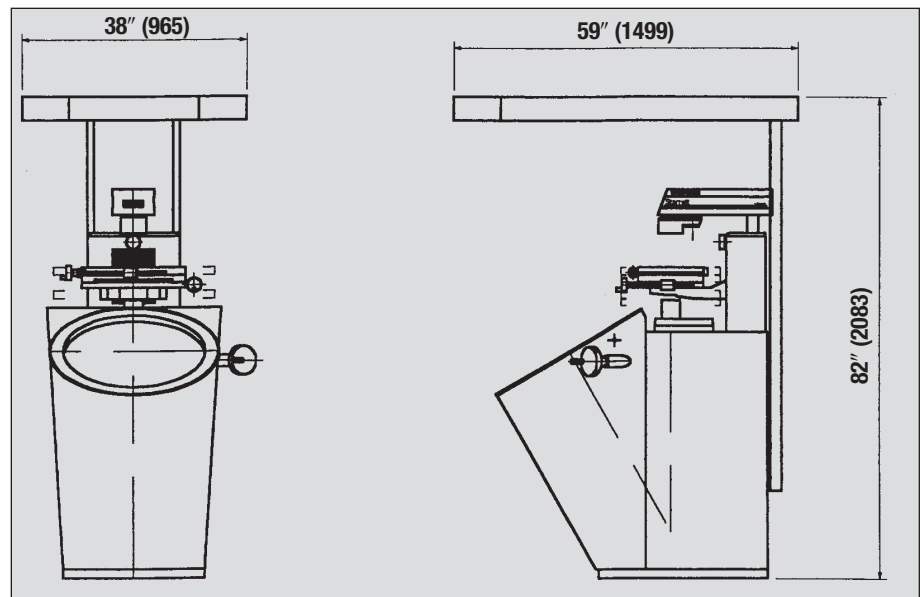
### No. VF600

24" (600mm) Screen Diameter

Especially suitable for larger components found in the electronics, pressings, and extrusion industries. The VF600 is ideal for use with overlays.

#### Features

- ◆ Screen is angled 30° from horizontal for clear, easy viewing
- ◆ Workstage plate is 16" x 9" (400 x 225 mm)
- ◆ Glass insert is 9-1/4" x 5-1/2" (235 x 140mm)
- ◆ Workstage travel is 8" x 4" (200 x 100mm)
- ◆ Accommodates components up to 66 lbs. (30kg)
- ◆ 360° angular measurement to 1 minute of arc with electronic protractor
- ◆ Helix angle: ±10° lamphouse adjustment
- ◆ Front working distances:
  - 5x - 8.6" (220mm),
  - 10x - 5.4" (138mm),
  - 20x - 5" (127mm),
  - 25x - 4.1" (103mm),
  - 50x - 3.5" (88mm),
  - 100x - 1.7" (44mm)
- ◆ Profile illumination – High-power, fan-cooled, tungsten halogen 150W lamp with yellow/green filter
- ◆ Surface illumination – Fan-cooled 150W lamp/fiber-optic system
- ◆ Hood and curtains
- ◆ Workstage travel available as manual, motorized or CNC option
- ◆ Projection lens choices 10x, 20x, 25x, 31.25x, 50x, 100x or a 3-lens turret (5x fixed lens on special order)



For readout choices, refer to pages at the end of this section.





### OV<sup>2</sup> Optical-Video Adaptor

The OV<sup>2</sup>™ is a special video camera that can be interchanged with the lens of Starrett Horizontal Optical Measuring Projectors to create a low cost video measuring system.

Now, the OV<sup>2</sup> utilizes the graphic capabilities of QC-300 display, eliminating the need for a separate video output monitor and crosshair generator.

The OV<sup>2</sup> adaptor is available as an option with new Starrett Horizontal Optical Measuring Projectors and as an easy-to-install field retrofit.

When used with the dual lens Starrett HD400, the OV<sup>2</sup> allows immediate access to both Video and Optical measurement without changing the part setup.

#### Features

- ◆ Replaces bayonet mount comparator lens with video camera to create a video measuring system
- ◆ Installation is fast and simple
- ◆ Change over between normal optical mode and OV<sup>2</sup> is easy and fast
- ◆ 6.5:1 zoom lens with up to 32mm of working distance allows maximum stage travel utilization
- ◆ Video magnifications of 240X
- ◆ OV<sup>2</sup> utilizes the large internal video display and touch screen control of the new QC-300
- ◆ The QC-300 provides the option of entering datapoints manually through the integrated crosshair or automatically through video edge detection (VED). VED provides superior repeatability while minimizing operator input error
- ◆ Lens dovetails into projector body and is prealigned for linear accuracy
- ◆ Works with all Starrett Horizontal Optical Measuring Projectors
- ◆ When used with the Starrett HD400, the OV<sup>2</sup> allows immediate access to both video and optical measurement without changing the part setup
- ◆ Utilizes your existing investment to provide a low cost entry into video measurement technology
- ◆ OV<sup>2</sup> is also available with conventional flat screen monitor and crosshair generator



Above and right: The new, improved OV<sup>2</sup>™ Optical-Video Adaptor utilizes the graphic capabilities of the QC300 Display.



Above: OV<sup>2</sup> installed in a HD400 with a X10 lens.



Right: Easily interchangeable between normal optical mode and OV<sup>2</sup> video.





## Electronic Readout/Measurement Systems

### Quadra-Chek® 121



The QC-121 is a flexible, compact and precise digital readout that provides very high levels of precision and accuracy.

Features include:

- ◆ High-visibility LCD display
- ◆ Versatile display console
- ◆ Resolution 0.00005" or 0.001mm
- ◆ Inch/metric conversion
- ◆ Incremental or absolute measurement
- ◆ Zero reset
- ◆ Linear error compensation
- ◆ Sound feedback
- ◆ RS232C serial port
- ◆ Parallel port
- ◆ Languages – English, Spanish, Italian, German, French

### Quadra-Chek® 221



An advanced digital readout system for performing 2-axis measurements at very high levels of precision and accuracy.

Record desired feature and construction measurements quickly, easily and accurately with the time-saving, patented Measure Magic® technology. Features easy-to-use programming and data management output.

All the features of the QC-100 plus:

- ◆ Skew function for rapid part alignment correction
- ◆ Single key calculation for angles, radius/diameter, distances, etc.
- ◆ Display in either polar or Cartesian coordinates
- ◆ 200 point feature memory (stored or displayed)
- ◆ Three built-in reports (Feature, Tolerance, .csv to Excel export)
- ◆ **QC-221E** includes Automatic Edge Detection. Achieve higher throughput, more accurate measurements and more consistent data with optical comparators using optical edge detection. Automatic point entry reduces operator subjectivity and fatigue

### Quadra-Chek® 300



The new Quadra-Chek 300 Series Geometric Readout features an enhanced touch-screen interface and patented Measure Magic® technology. It is ideal for the measurement of 2D features. All QC-300 Series models include parallel, serial and USB ports for use with printers and in networks.

The video capabilities of the QC-300 are utilized by the Starrett OV<sup>2</sup> Optical - Video Adaptor.

- ◆ LCD 8.4" color touch screen SVGA
- ◆ Enclosure (W x H x D) 11.5" x 7.5" x 2.75"
- ◆ Base (W x H x D) 10" x 2" x 7.5"
- ◆ Inputs: Up to 4 axes, external connections including footswitch, remote keypad, RS232C serial port, parallel port and USB port
- ◆ Inch/metric conversion
- ◆ Video edge detection (VED) option
- ◆ Graphical display for tolerance, features, etc.
- ◆ Two styles of manual crosshair (used by OV<sup>2</sup>)
- ◆ Single edge video tool enables automatic entry of single points





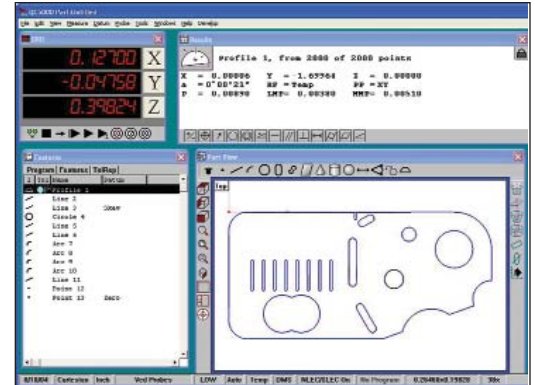
### Electronic Readout/Measurement Systems (continued)

#### Quadra-Chek 5215 Software with a Windows® PC

Quadra-Chek® 5215 is a Microsoft Windows-based application available for Starrett Optical Systems running with a PC rather than a readout. It supports precise measurement and inspection of 2D parts.

#### Features

- ◆ Windows® protocols
- ◆ Graphic user interface
- ◆ Icon-based tools and toolbars
- ◆ Color-coding
- ◆ Audio feedback
- ◆ Contextual help
- ◆ Intelligent, time-saving protocols
- ◆ CAD export
- ◆ SPC export
- ◆ CNC control
- ◆ Optical Edge Detection
- ◆ Custom reporting
- ◆ Drag and Drop Report Generator
- ◆ Data Import for part programming and Export for reverse engineering
- ◆ Result Data Export to Microsoft Access, Excel, .CSV and .TXT formats for data collection and PC applications
- ◆ Full Geometrical Feature Measurement
- ◆ Full Geometrical Tolerancing
- ◆ Fully customizable screen layout
- ◆ Lockable screen layouts
- ◆ Available in multiple languages
- ◆ Intuitive yet powerful part programming with point and click editing capabilities
- ◆ Interactive 3-D Part View
- ◆ Free software updates



#### CNC and Edge Sensing Capability

Perform repetitive measurements at high speed and reduce time-consuming and subjective crosshair alignment by combining the speed of QC-CNC with the accuracy of Automatic Edge Sensing.

#### Programming and Automation

Simplified program creation – Turn on the Record function and the software “learns” the datums, measuring sequence, tolerances and reporting functions for subsequent parts.

**CAD file import** – Import pre-existing part specifications from CAD programs to jumpstart the part programming process. Imports the .DXF file from your CAD system and, simply by selecting the features you want measured, will automatically create the part program for you! With QC-CNC, the QC-5215 can also perform a path optimization, again making your inspection time faster without sacrificing accuracy.

**Guided program use** – Visual and audio cues guide operators through programmed sequences, simplifying the measurement process for entire parts or specific sequences.





## Accessories

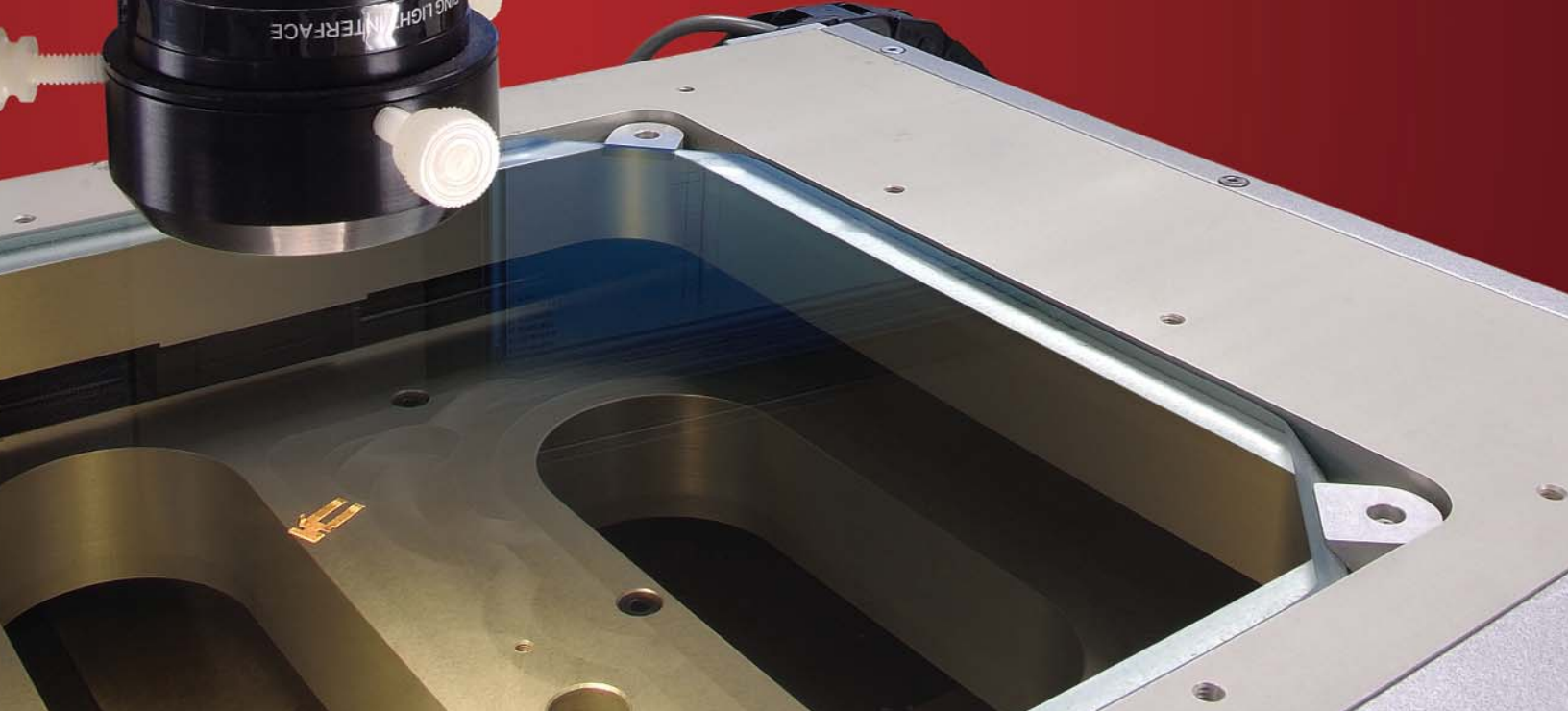
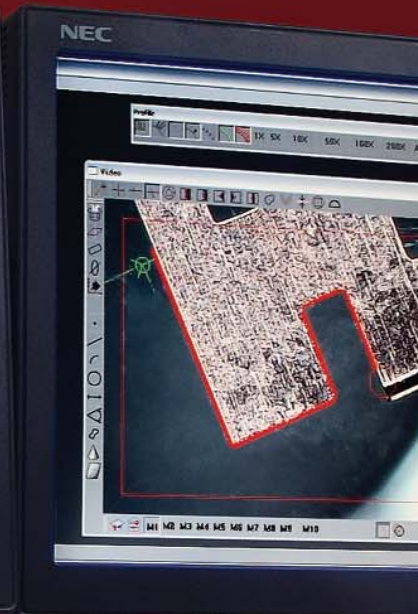
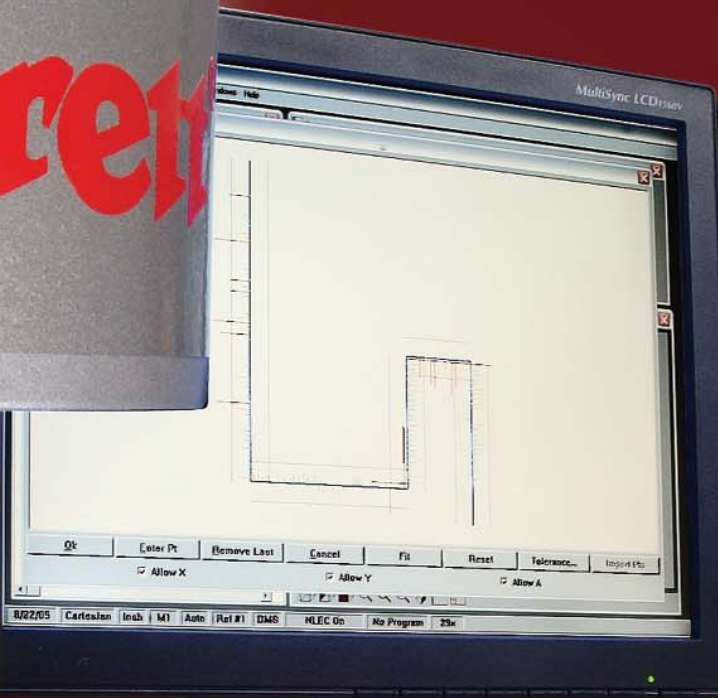
We offer a full range of accessories and stands designed specifically for Starrett Optical Systems to ensure efficient system setup and change-over for a broad range of applications.



| Photo Key | Part No. | Description                              | For Models                                      |
|-----------|----------|--|---|
| A         | P-10115  | Large Centers & Vees                     |   |
| B         | P-10114  | 2-1/32" Capacity Rotary Vise             | HF600, HF750                                    |
| C         | P-10089  | Checking Graticle                        | HB400   |
|           | P-12217  |  | HF750   |
| D         | P-10116  | Small Centers & Vees                     | HF600, HF750                                    |
| E         | P-10094  | Centers & Vees                           | HB400   |
|           | P-10101  |  |   |
| F         | P-11215  | Helix Center Support Fixture             | VB300   |
|           | P-11808  |  | VB400, VF600                                    |
| G         | P-11807  | Centers & Vees                           | VB400, VF600                                    |
| H         | P-10118  | Vertical Glass Plate Holder              | HF600, HF750                                    |
| J         | P-10096  | Vertical Glass Plate Holder              | HB400   |
| K         | P-10091  | Rotary Vise with 1-1/4" Capacity         | HB400 (Also larger Horizontal Projectors)       |
| M         | P-11809  | Rotary Workstage                         | VB400, VF600 (200mm x 100mm Workstage)          |
| N         | P-10093  | Fixed Position Vise with 1-1/4" Capacity | HB400 (Also larger Horizontal Projectors)       |
| P         | P-10092  | Universal Vee Block on Rotary Base       |   |
| Q         | P-11212  | Rotary Workstage                         | VB300 6" x 2-7/8" (150mm x 70mm) Workstage Only |
| R         | P-11214  | Centers & Vees                           |   |
| S         | P-10095  | 30" Cabinet Base                         | HE400, HB400, HD400                             |
|           | P-10102  | 23" Cabinet Base                         | VB300, VB400                                    |



# Starrett







## Galileo Video Inspection Systems

With the unbeatable combination of precision mechanics, powerful and intuitive software, and support from the most respected name in measurement, Starrett's Galileo Vision Systems take camera-based measuring systems to the next level.

From simple, manual, single-feature operation to complex, automated part measurements, Galileo combines high-resolution images with a sturdy, precision mechanical platform and excellent illumination capabilities to deliver superb accuracy for a wide range of measuring applications. Galileo systems are constructed to the highest quality standards, providing exceptional performance and consistent, reliable operation.

Galileo Systems are available with a choice of control and software systems, from larger systems such as the AV612-5 shown below to the manual Galileo EZ described on the following pages. If your



application requires a system with similar capabilities but different configuration, be sure to contact us. We will work with you to configure a system that will meet your requirements.

Galileo is easy to use, versatile, accurate, and with a wide range of options, you can configure a Galileo system that's just right for your application and budget.



**Galileo AV612-5  
12" System with full  
CNC control and  
optional workstation.**



### Galileo CNC Video Inspection System

Larger Galileo Systems such as the CNC controlled AV612-5 System shown on the previous page with optional workstation are powerful and versatile. They can be configured with options to create a system that is ideal for your application.

These CNC video inspection systems come with powerful, full-featured Quadra-Chek QC-5000 3-D Metrology Software as described on the following page.



#### Features & Specifications

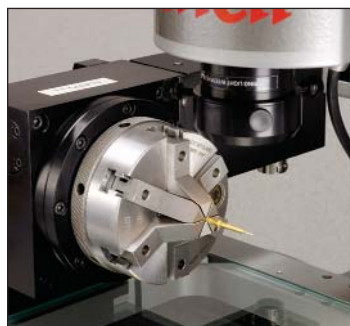
- ◆ **Optics:** 12:1 Video zoom package with video magnifications of 15X to 550X\*
- ◆ **Lighting:** Fiber optic ring and sub-stage (bottom) lighting with fiber optic coaxial through the lens) available as an option or white LED ring and sub-stage with white LED coaxial (through the lens) available as an option.
- ◆ **Video Camera:** Color CCD, 768H X 494V pixel array
- ◆ **Two LCD monitors**
- ◆ **Drive Method:** X/Y/Z and Zoom Stepper drives with CNC and joystick control for X, Y, and Z.
- ◆ **Travel & Measuring Capacity:**  
X: 6" or 12" (150mm or 300mm),  
Y: 6" (150mm),  
Z: 5.5" (140mm)
- ◆ **Metrology Software:** Metronics Quadra-Chek QC-5000 three dimensional software.
- ◆ **Linear Accuracy:**  
(X&Y):  $E2=1.9+5L/1000$ ,  
(Z):  $E1=2.5+5L/1000^{**}$
- ◆ **Resolution:** 0.0005mm (.00002")
- ◆ **Maximum Workload:** 40 lbs. (18kg.)
- ◆ **Warranty:** One year

#### Options & Accessories

- ◆ ¼X, ½X, ¾X, 1-½X, and 2X auxiliary lenses
- ◆ CNC rotary positioning device
- ◆ Integrated workstation
- ◆ Video side probes
- ◆ Touch probe
- ◆ Adjustable 4" (100mm) Z-axis dovetail slide
- ◆ Four quadrant LED ring light

\* Auxilliary lenses required to acheive full magnification ranges.

\*\*Accuracy is achieved at the glass plate level at 68F +/- 1F (20C +/- ½ C) using maximum magnification with 2X auxilliary lens.



Left: Optional Rotary Positioning Device.



Right: Optional Touch Probe.



Above: Optional 4-Quadrant LED Ring Light.

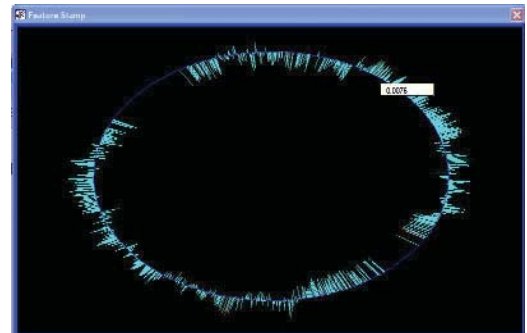
**Quadra-Chek® QC-5000 3-D Metrology Software**

Galileo CNC Systems include the powerful, industry-leading Metronics Quadra-Chek QC-5000 software with dual monitors. This full-featured and intuitive metrology software features the familiar MS-Windows™ operating system.

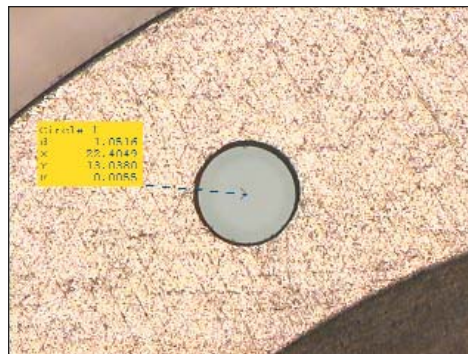


**Features & Specifications**

- ◆ Measure Magic allowing automatic feature recognition
- ◆ Drag and Drop report generator
- ◆ Video Image Capture (.jpg, .bmp) with graphical reporting capabilities
- ◆ Data Import for part programming and Export for reverse engineering
- ◆ Result Data Export to Microsoft Access, Excel, .CSV and .TXT formats for data collection and PC applications
- ◆ Integrated video scanning with 2-D Profiling/Best Fit Software
- ◆ Full geometrical feature measurement
- ◆ Full geometrical tolerancing
- ◆ Fully customizable screen layout spread out over two monitors
- ◆ Lockable screen layouts
- ◆ Available in several languages
- ◆ Full suite of video edge detection (VED) tools
- ◆ Integrated image processing tools
- ◆ Intuitive yet powerful part programming with point-and-click editing capabilities
- ◆ Interactive 3-D part view
- ◆ Definable user access privilege levels
- ◆ Form Graphics/Features
- ◆ Free software updates

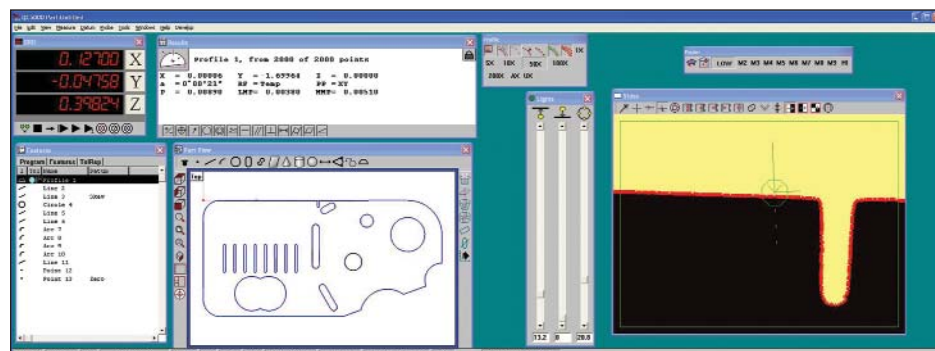
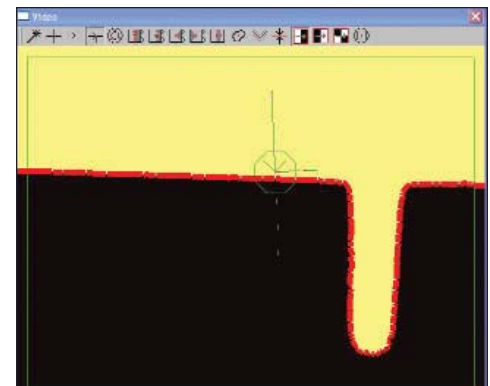


**Above: Form Graphics**



**Left: Video Capture Report**

**Right: Scanning with the Worm Tool**



### Galileo EZ

The Galileo® EZ is a general-purpose video-based measurement system ideal for quality assurance and inspection labs and manufacturing, assembly and research facilities.

A precision mechanical bearing X-Y-Z stage and column translates data accurately and repeatably to a dedicated metrology display or host PC with measurement software and choice of system enhancements.



#### Features

- ◆ 8" x 4" (200 x 100mm) X-Y measuring platform with 6" (150mm) of Z-Travel
- ◆ 6 to 1 zoom video optics
- ◆ Dual output 150 watt, fiber optic illuminator
- ◆ Hi-resolution color video camera
- ◆ .5-micron resolution scales standard
- ◆ Compatible with the QC-300 and QC-200 (see information on the following page)
- ◆ Fiber optic ring light and collimated substage light
- ◆ Calibrated and certified for system accuracy
- ◆ Granite base
- ◆ One year warranty

#### Specifications

- ◆ **Travel, X-Y-Z:**  
8" x 4" x 6" (200mm x 100mm x 150mm) or  
6" x 12" x 5" (150mm x 300mm x 125mm)
- ◆ **Accuracy, X-Y:**  $E1=2.5+7L/1000$
- ◆ **Resolution:** .00002" (.0005mm)
- ◆ **X-Y Squareness, within:**  
.0001"/inch (.0025mm/25mm)
- ◆ **Column to stage, within:** .00016"/inch  
(.004mm/25mm)
- ◆ **Maximum workload:** 20lbs. (9kg)
- ◆ **Zoom magnification:** 6.5 to 1 on  
QC-300 monitor, approx. 20X to  
120X range

#### Options

- ◆ Z-axis measuring
- ◆ 1/2X auxiliary lens
- ◆ 2X auxiliary lens
- ◆ 150mm line standard for system  
calibration verification
- ◆ Co-axial illumination and 3-light  
illuminator





### QC-300 Geometric Readout for Galileo EZ

The Quadra-Chek 300 Series Geometric Readout is a perfect match for the Galileo EZ. It features an enhanced touch-screen interface and patented Measure Magic® technology. It is ideal for the measurement of 2D features.

All QC-300 Series models include parallel, serial and USB ports for use with printers and in networks.

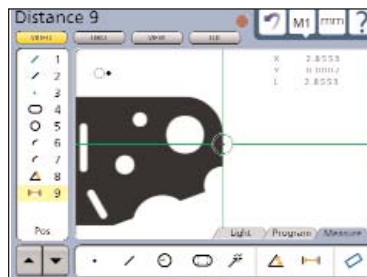
The video capabilities of the QC-300 are utilized by the Starrett Galileo EZ Vision System (as well as the OV<sup>2</sup> option for Optical comparators).

#### QC-300 Specifications

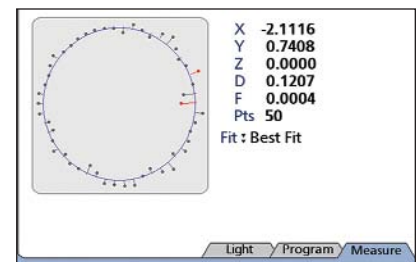
- ◆ LCD 8.4" color touch screen SVGA
- ◆ Enclosure (W x H x D) 11.5" x 7.5" x 2.75"
- ◆ Base (W x H x D) 10" x 2" x 7.5"
- ◆ Inputs: Up to 4 axes, external connections including footswitch, remote keypad, RS232C serial port, parallel port and USB port
- ◆ Inch/metric conversion
- ◆ Video edge detection (VED) option
- ◆ Graphical display for tolerance, features, etc.

#### Data Point Entry

- ◆ Two styles of manual crosshair
- ◆ Single edge video tool enables automatic entry of single points
- ◆ Multi-edge video tools allows simultaneous entry of multiple points
- ◆ Nine different color options available for data entry to fit the requirements of virtually any color part



Video Edge Detection (VED)



Data cloud graphic showing form error

### QC-200



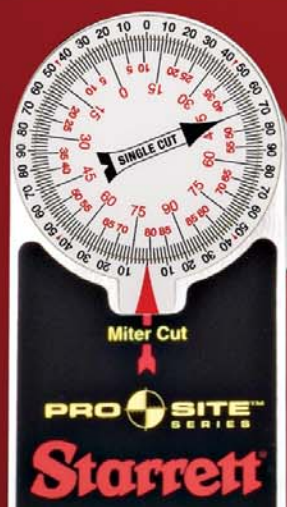
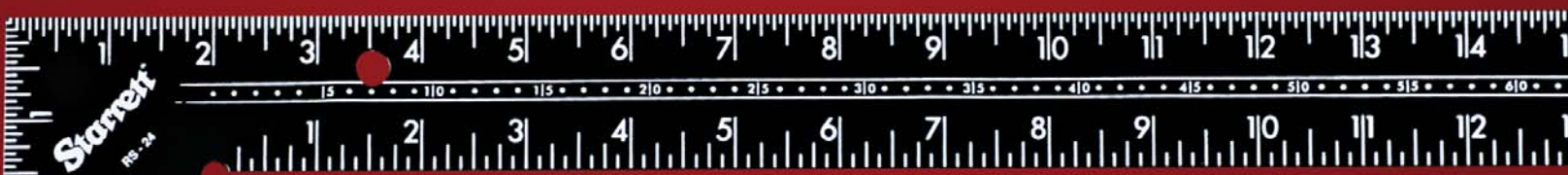
#### QC-200 Features & Specifications

- ◆ Inch/metric conversion, incremental or absolute measurement, zero reset
- ◆ Linear error compensation
- ◆ RS232C interface for SPC data collection
- ◆ Skew function for part alignment correction
- ◆ Form indication (roundness, etc.)
- ◆ Part programming
- ◆ Point, Arc, Circle, Distance, and Angle measuring ability with GD & T
- ◆ QC-200-based Galileo EZ Systems require a video monitor and crosshair generator





|                               | Pages |
|-------------------------------|-------|
| Measuring Tapes.....          | 516   |
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## Comprehensive line of precision tapes to fit every need

- ◆ Starrett tapes are offered in a wide range of styles and sizes. Graduations are available in English and Metric to meet virtually every requirement for accurate tape measurement
- ◆ Short-line steel tapes (lengths up to 30' and 8 meters) are coated with a tough-baked yellow enamel, graduated with sharp black and red markings and overcoated with a superb, ultraviolet-cured protective coating. Our process gives the line a non-glare matte finish
- ◆ Special short-line tapes, top quality folding wood rules, chalk lines and reels
- ◆ Special short-line tapes and measure wheels
- ◆ Long-line steel tapes (lengths up to 100' and 30 meters). Long-line tapes 50' or 15 meters and up are also available with the same coatings as short lines or Starrett grey with clear polymer coat steel
- ◆ Fiberglass long-line tapes available up to 300 feet in length, oil-gaging tape lines and oil-gaging plumb bobs
- ◆ All Starrett precision measuring tapes are characterized by accuracy, ease of handling and most importantly by the distinct lines and numbering styles which makes reading easy
- ◆ All Starrett steel tapes are accurately made to master standards, calibrated by the (U.S.) National Institute of Standards and Technology (NIST)
- ◆ Starrett offers a measuring tape calibration service. To use this service, send the measuring tape and specific instructions as to what is desired, to:  
The L. S. Starrett Company, ATTENTION: Calibration Laboratory, at 121 Crescent Street, Athol, MA 01331 U.S.A.

## Short-Line Tapes Feature Rugged, Industrial Quality

### Readability ... The Starrett Difference

All Starrett tapes have a clear, uncluttered line and numbering style. This stems from our experience with precision measuring tools. Sharp black-and-red markings and bold numerals on the yellow background allow for accuracy and easy reading. Blades have stud marks every 16" on English lines, and truss center marks every 19.2 inches on 1" wide English lines.

### Superior, Heavy-Duty Blades

Starrett regular measuring tape lines are constructed with thick, tough, tempered high carbon steel blades. They have a baked yellow-enamel background, covered with an ultraviolet-cured coating for superb protection. Our blades stand out without buckling at longer lengths than flimsy ones.

### Adjusting End Hooks

Self-adjusting end hooks with Tough Tip® blade protector slides to compensate for its own thickness. Has nail slot for drawing circles.

### Tough Tip® Blade Protector

Tough Tip® is a triple-riveted, stainless steel plate which reinforces the tape blade end and dramatically reduces breakage, increasing the life of the blade. (Not available on 1/2" tapes.)

### Impact-Resistant Case

Impact-resistant cases are available in chrome and high-visibility colors. Cases are also grooved for easier gripping.

### Handy Belt Clip

All short-line tapes come with handy metal belt clip except on 1/4" tape models.



Rugged blades with exceptional readability.

Self-adjusting end hook with Tough Tip® blade protector. Outlasts ordinary blades.



## Catalog Numbering Legend for Short-Line Tapes

### Prefixes and Color/Finish Designations

- A** – Automatic (ControLok®)
- AR** – (Rapid-Eighths™) 1/48" Readouts
- C** – Chrome Finish
- CH** – Charcoal Black
- CT** – Code Tape® (for Americans with Disabilities Act)
- L** – Replacement Line
- MG** – Magnesium Case
- P** – Push Pull
- Y** – High-Visibility Yellow

### Suffixes

- M6** – Numbered Consecutive Centimeters to the End
- M7** – Numbered Consecutive Centimeters to Each Meter and Repeat
- M8** – Numbered Consecutive Millimeters to Each Decimeter and Repeat
- ME9** – Numbered Consecutive Centimeters to the End; Consecutive inches and Footmarks
- ME11** – Numbered Consecutive Millimeters to Each Meter and Repeat; Consecutive Inches and Footmarks
- ME12** – Numbered Consecutive Millimeters to Each Decimeter and Repeat; Consecutive Inches and Footmarks
- D** – Decimal
- J** – Diameter Tape
- L** – Locking
- S** – Shrink
- T** – Engineer's (10ths and 100ths of a Foot)





### Short-Line Tape Graduations and Numbering Styles

#### S1 Regular English

- ◆ Available in 1/2", 3/4", and 1" widths
- ◆ Graduated in 1/16" on both edges
- ◆ Graduated 1/32" for the first foot of 1/2" and 3/4" wide blades only
- ◆ Numbered in consecutive inches to 1' and repeat on one edge and consecutive inches on the other edge
- ◆ Blades have stud marks every 16" on English lines, and truss center marks every 19.2 inches on 1" wide English lines



#### S2 Engineer's

- ◆ Available in 1/2" width
- ◆ Printed "10ths - 100ths Engineers"
- ◆ Top edge graduated in 16ths and numbered in consecutive inches
- ◆ Bottom edge graduated in 100ths of a foot and numbered in 10ths of a foot and repeat



#### S3A

- ◆ Available in 1/4" width
- ◆ Graduated one side in 16ths and numbered in consecutive inches



#### S4 Shrink

- ◆ Available in 1/2" width
- ◆ Printed 1/8" to foot
- ◆ One-eighth of an inch shrink per foot graduated in 32nds for the first foot and 16ths for the rest
- ◆ The top edge is numbered in consecutive inches to 1' and repeat
- ◆ The bottom edge is numbered in consecutive inches



#### S5 Decimal English/Metric

- ◆ Available in 1/2" (13mm) width
- ◆ Top edge graduated in millimeters and numbered in consecutive millimeters
- ◆ Bottom edge graduated in 10ths of an inch and numbered in consecutive inches
- ◆ First foot graduated in 50ths of an inch (.020") and numbered every 10th



(Continued on next page.)



**Short-Line Tape Graduations and Numbering Styles (continued)**

**S6 Metric**

- ◆ Available in 13, 19, and 25mm widths
- ◆ Graduated in millimeters and numbered in consecutive centimeters to the end of the tape line



**S8 Metric**

- ◆ Available in 13, 19, and 25mm widths
- ◆ Graduated in millimeters and numbered in consecutive millimeters to each decimeter and repeat



**S9 English/Metric**

- ◆ Available in 1/2", 3/4", and 1" (13, 19, and 25mm) widths
- ◆ Lower edge graduated in millimeters and numbered in consecutive centimeters to the end
- ◆ Top edge graduated in 16ths of an inch and numbered in consecutive inches and numbered at each foot



**S11 English/Metric**

- ◆ Available in 1/2", 3/4", and 1" (13, 19, and 25mm) widths
- ◆ Lower edge graduated in millimeters and numbered in consecutive millimeters to each meter and repeat
- ◆ Top edge graduated in 16ths of an inch and numbered in consecutive inches and numbered at each foot



**S12 English/Metric**

- ◆ Available in 1/2", 3/4", and 1" (13, 19, and 25mm) widths
- ◆ Lower edge graduated in millimeters and numbered in consecutive millimeters to each decimeter and repeat
- ◆ Top edge graduated in 16ths of an inch and numbered in consecutive inches and numbered at each foot





## ProSite Series Measuring Tapes

Extreme durability for working professional tradesmen. The ProSite® Series Measuring Tapes are ergonomically shaped and feature an over-molded grip for sure, easy handling. They are built with a variety of features that make them the perfect measuring tapes for the professional tradesmen.

- ◆ Ergonomic non-slip over-molded grip – comfortable to hold and easy to handle under any working conditions
- ◆ High visibility, impact resistant case
- ◆ Robust cam-operated lock for positive locking
- ◆ Heavy-duty, nylon coated blade is three times more wear resistant
- ◆ Tough Tip® Stainless Steel Blade Protector – greatly reduces blade breakage under the severe demands of the jobsite
- ◆ Shock absorbing blade bumper cushions the impact of the blade when it's retracted, ensuring longer tip and blade life



### English

| Blade Width x Length | Blade Graduation Style* | Catalog No. | EDP No. |
|----------------------|-------------------------|-------------|---------|
| 1" x 16'             | S1                      | XY1-16      | 67671   |
| 1" x 25'             |                         | XY1-25      | 67670   |
| 1" x 30'             |                         | XY1-30      | 67672   |

### English/Metric

| Blade Width x Length  | Blade Graduation Style* | Catalog No. | EDP No. |
|-----------------------|-------------------------|-------------|---------|
| 1" x 16' (25mm x 5m)  | S12                     | XY1-5ME     | 67779   |
| 1" x 25' (25mm x 8m)  |                         | XY1-8ME     | 67780   |
| 1" x 30' (25mm x 10m) |                         | XY1-10ME    | 67781   |

\*See tape line illustrations at the beginning of this section.





## Magnesium Case Measuring Tape

“Magnesium” is the first and only tape with a 100% magnesium case that is lightweight and incredibly strong with a compact, ergonomic shape and many other features in a top-of-the-line professional tape:

- ◆ **Ergonomic Non-Slip Rubber Grip** – Ribbed design is comfortable to hold and easy to handle under any working conditions
- ◆ **Soft Touch Cam-Activated Lock** – A cam-activated positive locking mechanism that prevents the blade from slipping
- ◆ **Heavy-Duty, UV Coated Blade is three times more wear resistant** – Increased protection provides longer life when working in harsh conditions
- ◆ **Tough Tip® Stainless Steel Blade Protector** – Triple-riveted stainless steel blade protector greatly reduces blade breakage
- ◆ **Durable Stainless Steel Belt Clip** – Handy metal clip designed to accept any belt width
- ◆ **Improved Reel Design for Smoother Action** – A re-engineered reel and a heavy-duty rust-resistant return spring provides smoother blade action
- ◆ **Shock Absorbing Blade Bumper** – Cushions the impact of the blade when it's retracted, ensuring longer tip and blade life



### English

| Blade Width x Length | Blade Graduation Style* | Case      | Catalog No. | EDP No. | Replacement Blades Only |         |
|----------------------|-------------------------|-----------|-------------|---------|-------------------------|---------|
|                      |                         |           |             |         | Catalog No.             | EDP No. |
| 1" x 25'             | S1                      | Magnesium | MG1-25      | 66993   | L1-25                   | 65435   |

\*See tape line illustrations on previous pages.



## ControlLok Automatic Lock-and-Retract Tapes

ControlLok™ features a heavy-duty tape line that automatically stays put for ease of control and handling:

- ◆ No more fractured fingers from wild, uncontrolled tape line returns
- ◆ Simply pull the tape out to the length you want and it automatically stays there
- ◆ A top control lever allows you to “inch” the blade into the desired position or control the speed when fully retracting it into the case, because the blade automatically locks when pressure is released from the thumb lever
- ◆ Top-lever position eliminates accidental retraction (as in bottom-lever designs)
- ◆ Compact size and contoured design features rubber top grip for comfort and ease-of-handling



### English

| Blade Width x Length | Blade Grad. Style* | Catalog No. | EDP   | Replacement Blades |       |
|----------------------|--------------------|-------------|-------|--------------------|-------|
|                      |                    |             |       | Catalog No.        | EDP   |
| 1/2" x 12'           | S1                 | AY12-12     | 65927 | L12-12             | 65436 |
| 3/4" x 16'           | S1                 | AY34-16     | 65926 | L34-16             | 65352 |
| 1" x 25'             | S1                 | AY1-25      | 65925 | L1-25              | 65435 |
| 1" x 33'             | S1                 | AY1-33      | 66397 | L1-33              | 66398 |

### English/Metric

|                       |     |            |       |           |       |
|-----------------------|-----|------------|-------|-----------|-------|
| 1" x 26'/(25mm x 8m)  | S9  | AY1-8ME9   | 66214 | L1-8ME9   | 65698 |
| 1" x 26'/(25mm x 8m)  | S12 | AY1-8ME12  | 66197 | L1-8ME12  | 65700 |
| 1" x 33'/(25mm x 10m) | S12 | AY1-10ME12 | 66402 | L1-10ME12 | 66385 |



**Tru-Lok® Tapes**



Industrial quality tape measures with heavy-duty blades as standard ... A basic measuring tape style used by professionals and homeowners. Named Tru-Lok® because the blade positively locks in position until the cam-activated lock button is released. A new, heavy-duty tape line is furnished standard (except where noted) ... ideal for demanding conditions.

Tru-Lok® tapes are available in three case colors – smooth, shiny chrome cases, charcoal black and high-visibility yellow.

- ◆ Tough Tip® Blade Protector standard on all blades (except 1/2" tapes)
- ◆ Rugged, impact resistant case



Tru-Lok Tapes are available in three colors and a wide variety of English, English/Metric and Metric sizes.



**English**

| Blade Width x Length | **Blade Grad. Style | Case Color/ Finish | Catalog No. | EDP   | Replacement Blades |       |
|----------------------|---------------------|--------------------|-------------|-------|--------------------|-------|
|                      |                     |                    |             |       | Catalog No.        | EDP   |
| 1/2" x 12'           | S1                  | Chrome             | C12-12      | 65418 | L12-12             | 65436 |
|                      |                     | Charcoal           | CH12-12     | 65942 |                    |       |
|                      |                     | Yellow             | Y12-12      | 65943 |                    |       |
|                      |                     | Yellow             | Y12-12†     | 12155 |                    |       |
| 3/4" x 12'           | S1                  | Charcoal           | CH34-12     | 66168 | L34-12             | 66256 |
|                      |                     | Yellow             | Y34-12      | 12142 |                    |       |
| 3/4" x 16'           | S1                  | Chrome             | C34-16      | 65386 | L34-16             | 65352 |
|                      |                     | Charcoal           | CH34-16     | 65937 |                    |       |
|                      |                     | Yellow             | Y34-16      | 65938 |                    |       |
| 3/4" x 25'*          | S1                  | Charcoal           | CH34-25     | 65940 | L34-25             | 65357 |
|                      |                     | Yellow             | Y34-25      | 12143 |                    |       |
| 1" x 25'             | S1                  | Chrome             | C1-25       | 65366 | L1-25              | 65435 |
|                      |                     | Charcoal           | CH1-25      | 65932 |                    |       |
|                      |                     | Yellow             | Y1-25       | 65933 |                    |       |
| 1" x 30'             | S1                  | Chrome             | C1-30       | 65382 | L1-30              | 65437 |
|                      |                     | Charcoal           | CH1-30      | 66209 |                    |       |
|                      |                     | Yellow             | Y1-30       | 65936 |                    |       |
| 1" x 33'             | S1                  | Yellow             | Y1-33       | 66408 | L1-33              | 66398 |

**English/Metric**

|                         |          |            |            |           |           |       |
|-------------------------|----------|------------|------------|-----------|-----------|-------|
| 1/2" x 12' (13mm x 4m)  | S9       | Chrome     | C12-4ME9   | 65782     | L12-4ME9  | 65740 |
|                         | S12      | Chrome     | C12-4ME12  | 65784     | L12-4ME12 | 65742 |
| Charcoal                |          | CH12-4ME12 | 65944      |           |           |       |
| 3/4" x 16' (19mm x 5m)  | S9       | Chrome     | C34-5ME9   | 65758     | L34-5ME9  | 65704 |
|                         | S11      | Chrome     | C34-5ME11  | 65759     | L34-5ME11 | 65705 |
|                         |          | Chrome     | C34-5ME12  | 65760     |           |       |
|                         | Charcoal | CH34-5ME12 | 65939      | L34-5ME12 | 65706     |       |
| 3/4" x 26' (19mm x 8m*) | S12      | Charcoal   | CH34-8ME12 | 65941     | L34-8ME12 | 65736 |
| 1" x 26' (25mm x 8m)    | S9       | Chrome     | C1-8ME9    | 65746     | L1-8ME9   | 65698 |
|                         | S12      | Chrome     | C1-8ME12   | 65748     | L1-8ME12  | 65700 |
|                         |          | Charcoal   | CH1-8ME12  | 65934     |           |       |
| 1" x 33' (25mm x 10m)   | S12      | Yellow     | Y1-10ME12  | 66379     | L1-10ME12 | 66385 |

**Metric**

|           |    |        |         |       |         |       |
|-----------|----|--------|---------|-------|---------|-------|
| 25mm x 8m | S6 | Chrome | C1-8M6  | 65743 | L1-8M6  | 65695 |
| 19mm x 5m | S6 | Chrome | C34-5M6 | 65755 | L34-5M6 | 65701 |
| 13mm x 4m | S8 | Chrome | C12-4M8 | 65781 | L12-4M8 | 65739 |

† Includes redemption card for Standard Letter of Certification (SLC).

\* Regular thickness tape line.

\*\* See tape line illustrations at the beginning of this section.





### Starrett Tough Tapes™

- ◆ High visibility, impact resistant, rugged cases
- ◆ Ergonomic over-molded soft grip
- ◆ Smooth blade lock holds the blade firmly in place
- ◆ New wide blade on the MY109-25 provides extra blade stand-out
- ◆ Tough Tapes offer a high quality, value priced tape measure

| Blade Width x Length | Blade Style | Catalog No. | EDP   |
|----------------------|-------------|-------------|-------|
| 1/2" x 12'           | S1          | MY12-12     | 68932 |
| 3/4" x 16'           | S1          | MY34-16     | 68933 |
| 1" x 25'             | S1          | MY1-25      | 68934 |
| 1" x 33'             | S1          | MY1-33      | 68935 |
| 1.09" x 25'          | S1          | MY109-25    | 11625 |
| 1" x 25'             | (Right)     | MY1-25F     | 12182 |
| 1" x 8m/26'          | S9          | MY1-8ME     | 12150 |
| 1.09" x 8m/26'       | S9          | MY109-8ME   | 12151 |



Left: MY34-16.

Right: MY1-25.

Below: Blade for MY1-25F.



### Rapid-Eighths™ Measuring Tape with 1/8" readouts on the blade 25'

This Tru-Lok® design tape features convenient 1/8" fractional references clearly marked on the blade, making measurements easier and faster to read.

#### Tru-Lok Features:

- ◆ Blade positively locks in position until the cam-activated lock button is released
- ◆ Heavy-duty blade with Tough Tip® End Hook for longer life
- ◆ Rugged impact-resistant case in a high visibility color



Convenient 1/8" readouts on the blade.



#### English Reading

| Blade Width x Length | Case Color | Catalog No. | EDP No. |
|----------------------|------------|-------------|---------|
| 1" x 25'             | Yellow     | YR1-25F     | 12176   |



## Special-Purpose Measuring Tapes

### Engineer's Tapes

10, 25, 33'

Tapes have Tru-Lok® design features. Top edge of the tape line is graduated in consecutive inches and 16ths, bottom edge in 10ths of a foot and 100ths of a foot.

### Decimal English/Metric Tape 1/2" x 10'/3m

Tape is graduated in decimal English and metric and has Tru-Lok® design features. Top edge of the tape line is graduated in millimeters, bottom edge the first foot is graduated in 50ths (.020") of an inch. The balance of the tape is graduated in 10ths of an inch. Tape is popular for the heavy equipment manufacturing industry.

### Shrink Tape 1/2" x 12'

Tape is graduated for 1/8th of an inch shrink-per-foot and has Tru-Lok® design features. The first foot shows shrink graduations of 1/32nds of an inch; the balance of the tape is graduated in 1/16ths of an inch; feet and inches on the top edge; consecutive inches on bottom edge. Ideal for patternwork.



| Description            | Blade       |          | Blade Graduation Style* | Case Color/Finish | Catalog No. | EDP No. |
|------------------------|-------------|----------|-------------------------|-------------------|-------------|---------|
|                        | Width       | Length   |                         |                   |             |         |
| Engineer's             | 1/2"        | 10'      | S2                      | Yellow            | Y12-10T     | 12156   |
|                        | 1"          | 25'      |                         | Chrome            | CE1-25      | 67553   |
|                        | 1"          | 33'      |                         | Chrome            | CE1-33      | 67554   |
| Decimal English/Metric | 1/2" (13mm) | 10' (3m) | S5                      | Charcoal          | CH12-10DME  | 65792   |
| Shrink                 | 1/2"        | 12'      | S4                      | Yellow            | Y12-12S     | 12157   |

\*See tape line illustrations at beginning of this section.

## Roofing Tape

25'

The patented Starrett Roofing Tape is designed to assist in laying out the two most common roofing shingles.

When laying conventional (traditional or 3-tab) shingles, use the black scale on the tape with bond markings indicated with a circle around the number. For dimensional (architectural) shingles, use the red scale on the tape with bond markings indicated with a red oval around the number.

Using the pre-marked roofers blade, a grid is created using the two series of linear measurements: Course layout – marked vertically along the slope of the roof and bond layout – marked horizontally.

The roofing tape helps the roofer work more efficiently and reduces errors.



| Description | Blade |        | Case Color/Finish | Catalog No. | EDP No. |
|-------------|-------|--------|-------------------|-------------|---------|
|             | Width | Length |                   |             |         |
| Roofing     | 1"    | 25'    | Yellow Plastic    | RT1-25      | 65663   |



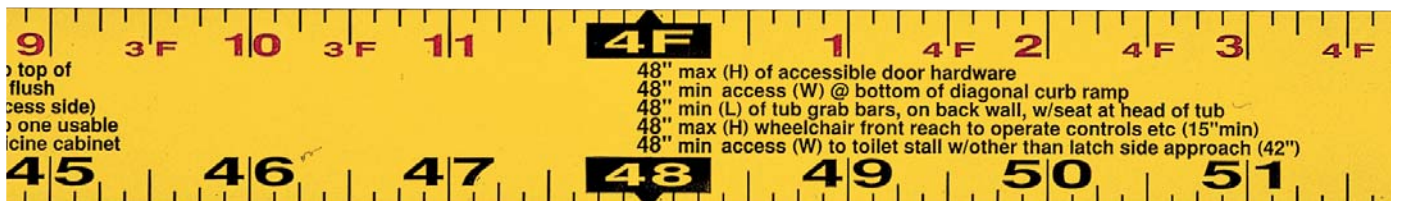
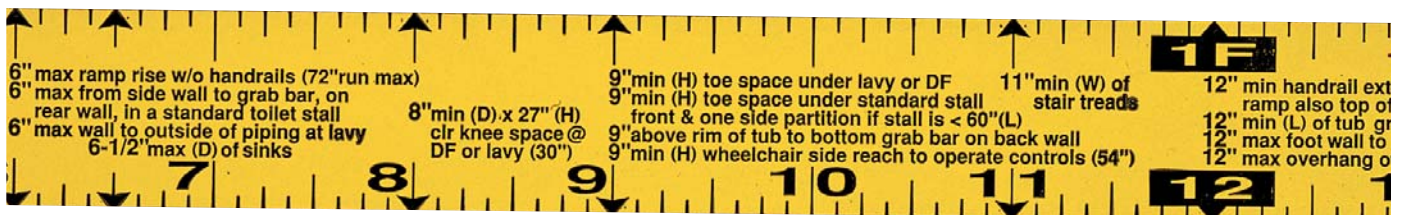
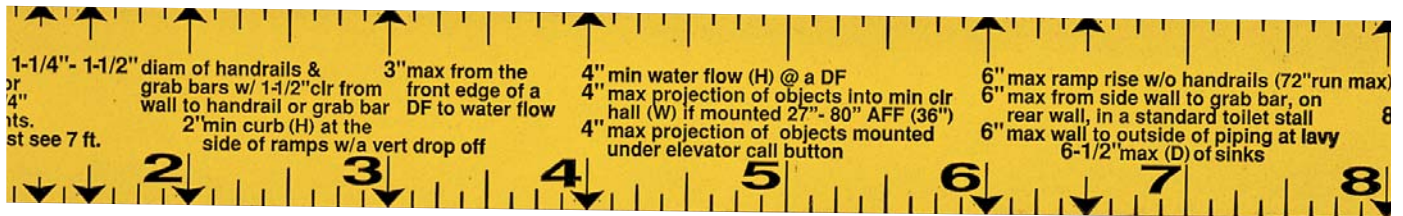


**Code Tape Measuring Tape with ADA building code requirements on the blade 25'**

This rugged tape with Tru-Lok™ design features a heavy-duty tape line as standard, and has special information printed on the blade that commercial builders and contractors will appreciate. The blade gives practical information for the building, locating, and installation of various equipment required by the ADA (Americans with Disabilities Act). This unique product is yet another good example of Starrett tape measure innovation.



| Catalog No. | EDP No. | Description            |
|-------------|---------|------------------------|
| CT1-25      | 65896   | 1" x 25'<br>Code Tape® |







**Locking or Non-Locking  
Thin Tapes 10' (3m)**

Yellow case is thin, durable and compact. Case is 2" (50mm) wide at the base. Easy-to-read black markings on the tape line. Non-movable end hook. Locking models have convenient push-button lock at the side of the base.



No. Y14-10L.

**English**

| Blade Width | Length | Blade* Grad. Style | Locking     |         | Non-Locking |         |
|-------------|--------|--------------------|-------------|---------|-------------|---------|
|             |        |                    | Catalog No. | EDP No. | Catalog No. | EDP No. |
| 1/4"        | 10'    | S3A – Inch         | Y14-10L     | 12159   | Y14-10      | 12161   |

\*See tape line illustrations at the beginning of this section.

**Pocket Measuring Tapes**

**Push-Pull Tapes**

8, 12' / 4m

The case is molded of high-impact plastic. Non-locking tape line retracts automatically into case. Yellow tape line marked in red and black. Self-adjusting end hook slides to compensate for the thickness, assuring accurate inside/outside measurements.



**English**

| Blade Width | Length | Blade* Graduation Style | Catalog No. | EDP No. |
|-------------|--------|-------------------------|-------------|---------|
| 1/2"        | 8'     | S1 – Inch               | PY12-8      | 12172   |
|             | 12'    |                         | PY12-12     | 12173   |

**English/Metric**

|             |          |                       |            |       |
|-------------|----------|-----------------------|------------|-------|
| 1/2" (13mm) | 12' (4m) | S9 – Inch and Metric  | PY12-4ME9  | 12174 |
|             |          | S12 – Inch and Metric | PY12-4ME12 | 12175 |

\*See tape line illustrations at the beginning of this section.



### Mini-Tape with key chain

Handy mini-tape with key chain, 1/4" wide tape line, 3' length.



#### Mini-Tape with key chain

| Blade Width | Length | Blade* Graduation Style | Catalog No. | EDP No. |
|-------------|--------|-------------------------|-------------|---------|
| 1/4"        | 3'     | S3A – Inch              | C14-3Y      | 65802   |

### Key Caddy

Heavy-duty die-cast case with a 21" stainless steel chain and large key ring. Returns keys and other articles automatically. Ideal for custodians, maids, watchmen, service station attendants and many others. Also great for welders to carry torch ignitors.

Available with regular belt clip that clips over belt.



| Description            | Catalog No. | EDP No. |
|------------------------|-------------|---------|
| With Regular Belt Clip | SK1         | 63135   |

### Measure Stix™ Steel Measuring Tape with adhesive backing

4, 6, 12' / 1.2, 2, 4m

Tape measure sticks to almost any work surface for convenient, at-a-glance measurements. High quality precision steel rule is flat with permanent adhesive back. Cut to size with scissors. Mount on workbenches, saw tables, drafting tables, etc.



#### English – left-to-right

| Blade Width | Length | Blade Graduation Style* | Catalog No. | EDP No. |
|-------------|--------|-------------------------|-------------|---------|
| 1/2"        | 4'     | S1 – Inch               | SM44W       | 63168   |
|             | 12'    |                         | SM412W      | 63170   |
| 3/4"        | 6'     |                         | SM66W       | 63169   |

#### English - right-to-left

| Blade Width | Length | Blade Graduation Style* | Catalog No. | EDP No. |
|-------------|--------|-------------------------|-------------|---------|
| 1/2"        | 6'     | S1 – Inch               | SM46WRL     | 66634   |
|             | 12'    |                         | SM412WRL    | 64919   |

#### English/Metric – left-to-right

| Blade Width | Length    | Blade Graduation Style* | Catalog No. | EDP No. |
|-------------|-----------|-------------------------|-------------|---------|
| 1/2" – 13mm | 4' – 1.2m | S12 – Inch and Metric   | SM44ME      | 63171   |
|             | 12' – 4m  |                         | SM412ME     | 63173   |
| 3/4" – 19mm | 6' – 2m   |                         | SM66ME      | 63172   |

\*See tape line illustrations at the beginning of this section.



## Long-Line Steel Tapes Feature Rugged Industrial Quality

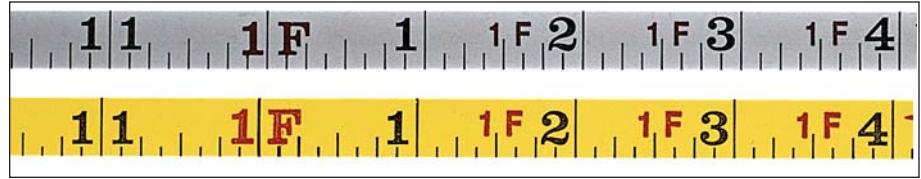
### Readability – The Starrett Difference

All Starrett tapes have a clear ncluttered line and numbering style. This is an outgrowth of our experience with precision measuring tools of all types.

Sharp black-and-red markings allow for accurate, easy reading.

English tapes all have the “quick reading” feature with the foot figure appearing before each inch mark.

Blades have stud marks every 16” on English lines.



Top, Starrett Grey with clear polymer coating, hard wearing, stain and corrosion resistant. Foot figures and flags for 16” stud centers in red. Bottom, Starrett Yellow Finish – tough, durable BAKED ENAMEL on “phosphatized” steel. Foot figures and flags for 16” stud centers in red.

### Superior Blade Types

- ◆ Hard wearing grey with clear polymer coating
- ◆ Corrosion resistant stainless steel
- ◆ Tough-baked, yellow enamel finish
- ◆ Overcoated with an ultraviolet-cured top coating for superb blade protection
- ◆ Nylon clad steel

### Impact-Resistant Cases

- ◆ Starrett Long-Line Tapes are available in vinyl-covered steel cases or high-visibility colored cases molded of high-impact ABS plastic
- ◆ All steel cases have nylon rolls at the opening of the case to reduce wear and prevent damage to the tape line
- ◆ All cases also feature a long, pop-open folding handle for fast, easy rewinding

### Hook Rings

Nos. 510 and 530 Series tapes have a hook ring which measures from zero on the outside of the ring and the inside of the hook. If desired, hooks or rings can be anchored on wood by a nail.

## Catalog Numbering Legend For Long-Line Tapes

#### Prefixes

- H** – Hook and ring
- L** – Replacement line
- O** – High-visibility orange
- Y** – High-visibility yellow

#### Suffixes

- B** – Blank end
- CI** – Consecutive inches to 1/16”
- F** – Graduated in feet, inches, and 1/16”
- CM** – Graduated in millimeters, numbered in centimeters
- CME** – Graduated in millimeters, numbered in centimeters, and English graduations
- T** – Graduated in feet, 10ths, and 100ths of a foot
- J** – Diameter tape graduated in 64ths
- JT** – Diameter tape graduated in 100ths







### Long-Line Tape Graduations and Numbering Styles

#### L1 English

- ◆ Graduated in 8ths and numbered one to twelve inches to each foot and repeat, with quick-reading figures



#### L3 English

- ◆ Graduated in 16ths and numbered in consecutive inches



#### L5-64, L5-100 Diameter Tape

- ◆ One side is graduated in 8ths and numbered in feet and inches
- ◆ The other side is graduated and numbered each diameter inch
- ◆ One diameter inch to the left of zero graduated in 64ths diameter inch (L5-64) and numbered each quarter inch, or graduated in 100ths of a diameter inch (L5-100) and numbered each one 10th



#### L6 English/Metric

- ◆ The bottom edge is graduated in millimeters and numbered in consecutive centimeters (every 10 mm) to each meter and repeat, quick-reading figures every 100mm
- ◆ The top edge is graduated in 8ths and numbered in consecutive inches up to each foot and repeat



#### L8 Metric

- ◆ Graduated in millimeters and numbered in consecutive centimeters to each meter and repeat



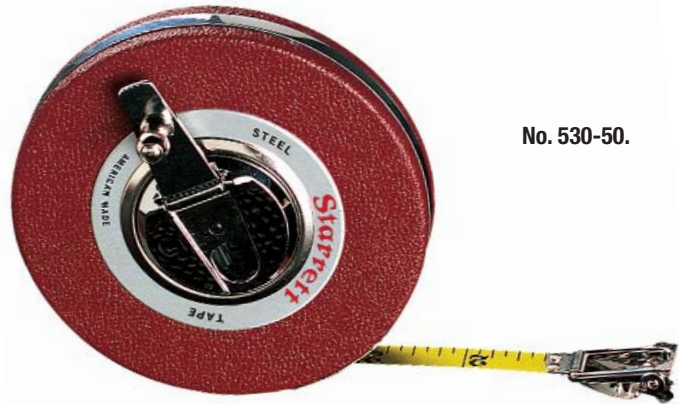


**Steel Long-Line Measuring Tapes**

**No. 530 Series with yellow enamel-coated tape lines**

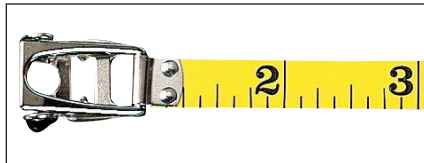
50, 100'/15, 20, 30m

This No. 530 Series has a tape line with a tough-baked yellow enamel-coated line.



No. 530-50.

**No. 530 Series, Yellow Enamel-Coated English**



Example of the tape line hook ring shown, No. 530 with yellow enamel-coated tape line.

| Length    | Blade Graduation Style* | Catalog No. | EDP No. | Replacement Lines Only |         |
|-----------|-------------------------|-------------|---------|------------------------|---------|
|           |                         |             |         | Catalog No.            | EDP No. |
| 50'       | L1 – Inch               | 530-50      | 65945   | LHY530-50              | 63294   |
| 100'      |                         | 530-100     | 65946   | LHY530-100             | 63295   |
| 600''-50' | L3                      | 530CI-600   | 65949   | LHY530CI-600           | 63300   |
| 50'       | L5-100                  | 530JT-50    | 65953   | LHY530JT-50            | 65967   |

**Metric**

|     |    |          |       |             |       |
|-----|----|----------|-------|-------------|-------|
| 15m | L8 | 530-15CM | 65956 | LHY530-15CM | 65970 |
| 20m |    | 530-20CM | 65957 | LHY530-20CM | 65971 |
| 30m |    | 530-30CM | 65958 | LHY530-30CM | 65972 |

ALL TAPE LINES ARE 3/8" (9.5mm) WIDE. \*See tape line illustrations on previous pages.

**Steel Long-Line Measuring Tapes in ABS Plastic Case**

**No. 510 Series with yellow enamel-coated tape lines**

50, 100'/15, 20, 30m

The No. 510 Series has the same tape line as the No. 530 Series, except the numbers are printed in one color only, and the line is housed in high-impact ABS plastic cases in high-visibility colors. This series is available in 3/8" (9.5mm) wide tape lines.



Left-to-right, Nos. 0510-50, and Y510-50

**English**

| Blade Width | Length Feet - Meters | Blade Graduation Style* | Case Color | Catalog No. | EDP No. |
|-------------|----------------------|-------------------------|------------|-------------|---------|
| 3/8"        | 50'                  | L1 – Inch               | Orange     | 0510-50     | 65987   |
|             |                      |                         | Yellow     | Y510-50     | 65988   |
|             | 100'                 |                         | Orange     | 0510-100    | 65990   |
|             |                      |                         | Yellow     | Y510-100    | 65991   |

**English/Metric**

|               |            |                 |        |            |       |
|---------------|------------|-----------------|--------|------------|-------|
| 3/8"<br>9.5mm | 50' – 15m  | L6–Inch, Metric | Yellow | Y510-15CME | 66210 |
|               | 100' – 30m |                 |        | Y510-30CME | 66211 |

\*See tape line illustrations on previous pages.



**Nylon Clad Steel Long Line Measuring Tapes**

**No. 536 Series**  
100, 200, 300'

- ◆ Nylon clad steel is rigid, wear resistant
- ◆ Easy-to-read blade – graduated feet and inches to 1/8ths on high visibility yellow. Decimal graduations on the other side
- ◆ Open reel/handle design is easy to handle and rewind
- ◆ Designed for engineers and surveyors

| Length | Catalog No.    | EDP No. |
|--------|----------------|---------|
| 100'   | <b>536-100</b> | 66550   |
| 200'   | <b>536-200</b> | 66551   |
| 300'   | <b>536-300</b> | 66552   |

ALL TAPE LINES ARE 1/2" (13mm) WIDE.

No. 536-100







**Fiberglass Long-Line Measuring Tapes**

**Nos. 535, 533 Series with open reel**

50, 100, 200, 300' / 15, 30, 50m

**No. 532 Series with closed reel 100' / 30m**

- ◆ Nonconductive and noncorrosive fiberglass tape lines will not rust and resists fading
- ◆ Moisture-resistant fiberglass tapes are vinyl coated with heat-sealed graduations for longer life

**Nos. 535, 533 Series**

- ◆ Easy-grip handle accommodates large hands
- ◆ Enclosed frame protects tape line
- ◆ Waterproof ABS frame and case makes cleanup fast and easy
- ◆ Long rewind handle with rotating fingertip knob makes blade rewinding smoother and easier
- ◆ Pointed bottom end of the frame allows positioning of tape line for accurate measurements
- ◆ Corrosion resistant steel exit rollers
- ◆ Hook ring end
- ◆ English and English/metric tapes graduated in feet and inches in 1/8ths of an inch front side, 10ths and 100ths of a foot on back side, and graduated every 2 millimeters
- ◆ Metric tapes graduated every two millimeters and numbered in consecutive centimeters to each meter and repeat

**No. 532 Series**

- ◆ Protective closed reel made of rugged ABS plastic
- ◆ Convenient hand strap on back of the case for easy operation
- ◆ Hook ring end



**Nos. 535, Series Open Reel**

**English**

| Length | Catalog No. | EDP No. |
|--------|-------------|---------|
| 100'   | 535-100     | 64234   |
| 200'   | 535-200     | 64236   |
| 300'   | 535-300     | 64237   |

**English/Metric**

|            |           |       |
|------------|-----------|-------|
| 50' (15m)  | 533-15CME | 66044 |
| 100' (30m) | 533-30CME | 66045 |
| 200' (60m) | 533-60CME | 65853 |

**Metric**

|     |          |       |
|-----|----------|-------|
| 15m | 533-15CM | 65113 |
| 30m | 533-30CM | 65114 |
| 50m | 533-50CM | 65115 |

**No. 532 Series Closed Reel**

**English**

|      |         |       |
|------|---------|-------|
| 100' | 532-100 | 64238 |
|------|---------|-------|

**Metric**

|     |          |       |
|-----|----------|-------|
| 30m | 532-30CM | 61873 |
|-----|----------|-------|

ALL TAPE LINES ARE 1/2" (13mm) WIDE.



### Professional Measuring Wheels

#### PMW Series

Starrett high quality Professional Measure Wheels provide accurate measurements, handle tough jobs with ease and are priced right.

- ◆ Quicker and easier than a tape measure, Measure Wheels offer precision, non-skip, quick and easy measuring
- ◆ Just set the counter to zero and start walking
- ◆ Adds forward and subtracts in reverse
- ◆ Works over contours and around curves and in places less expensive units either do not work or skip

#### PMW-2

12" precision molded wheel, 5-digit counter with a 10,000 ft. maximum. Twist and lock handle extends to 35". For home, interiors, remodeling, appraisals, janitorial applications and estimating.

#### PMW-3

36" precision molded wheel, 5-digit counter with a 10,000 ft. maximum. Twist and lock handle extends to 40.5". Convenient flip up stand. For home, yard, real estate appraisals, fencing, remodeling, landscaping and estimating.

#### PMW-740

48" precision molded wheel, 5-digit counter with a 10,000 ft. maximum. 26" handle folds for easy storage. Convenient flip up stand. For farm and ranch, construction sites, law enforcement, insurance adjusters, real estate, appraisals, fencing, remodeling, landscaping and estimating.



Left-to-right: PMW-2, PMW-3, PMW-740.

| Description       | Catalog No. | EDP No. |
|-------------------|-------------|---------|
| 12" Measure Wheel | PMW-2       | 68833   |
| 36" Measure Wheel | PMW-3       | 68835   |
| 48" Measure Wheel | PMW-740     | 68834   |



The PMW-2 and PMW-3 have a safety yellow, 5-digit counter showing feet and inches.



The counter on the PMW-740 is mounted high and easy to read at a glance



**Oil-Gaging Tape Measures**  
**Grey with clear polymer coat tape lines**

**No. 507 Series**  
**50, 66, 100' / 15, 20, 30m**

These tapes are designed for tank gaging of heavy and light oils, gasoline, etc. The grey with clear polymer coat steel tape lines are easy to read, corrosion resistant and have a swivel snap at the end of the line for hooking the plumb bob on.

Tool features a heavy-duty steel frame with black, rust-resistant finish and a removable hardwood handle. Tool also has a one-piece winding handle that locks the line at any setting.

The No. 507 has a wide blade (1/2"/13mm) and a heavy plumb bob is furnished with the tool.



**English – With or Without No. 515C† Plumb Bob**

| Blade Width | Length | Blade Graduation Style* | With Plumb Bob |         | With Shackle, Without Plumb Bob |         | Replacement Lines with Swivel Snaps Only |         |
|-------------|--------|-------------------------|----------------|---------|---------------------------------|---------|--|---------|
|             |        |                         | Catalog No.    | EDP No. | Catalog No.                     | EDP No. | Catalog No.                              | EDP No. |
| 1/2"        | 50'    | L1 – Inch               | C507CB-50      | 55454   | C507C-50                        | 55846   | LC507C-50                                | 55460   |
|             | 66'    |                         | C507CB-66      | 55455   | C507C-66                        | 55847   | LC507C-66                                | 55461   |
|             | 100'   |                         | C507CB-100     | 55457   | C507C-100                       | 55849   | LC507C-100                               | 55463   |

**Metric – With or Without No. 515C† Plumb Bob**

|       |     |         |            |       |           |       |            |       |
|-------|-----|---------|------------|-------|-----------|-------|------------|-------|
| 13 mm | 15m | L8 – cm | C507MCB-15 | 55851 | C507M-15M | 55855 | LC507M-15M | 55859 |
|       | 20m |         | C507MCB-20 | 55852 | C507M-20M | 55856 | LC507M-20M | 55860 |
|       | 30m |         | C507MCB-30 | 55853 | C507M-30M | 55857 | LC507M-30M | 55861 |

**Metric – With or Without No. 515MD† Graduated Plumb Bob**

|       |     |         |            |       |  |  |            |       |
|-------|-----|---------|------------|-------|--|--|------------|-------|
| 13 mm | 15m | L8 – cm | C507MDB-15 | 61956 |  |  | LC507M-15M | 55859 |
|       | 20m |         | C507MDB-20 | 61957 |  |  | LC507M-20M | 55860 |
|       | 30m |         | C507MDB-30 | 61958 |  |  | LC507M-30M | 55861 |

\*See tape line illustrations on previous pages.

†See next page for plumb bob descriptions.

**SAFETY PRECAUTIONS WHEN USING OIL-GAGING TAPES**

**CAUTION:** When gaging a tank, it is possible for an explosion to occur if proper grounding procedures are not followed:

1. Always ground yourself and your tools by touching the tank ladder before climbing the ladder. Do not wear gloves; use your hands to ground yourself.
2. Ground yourself again before opening the gaging hatch by touching the handrail or the platform with your hand, without gloves.
3. Always keep contact between the gaging tape and the edge of the hatch from the time the gaging bob enters the hatch until you remove it.
4. Never gage a tank during an electrical storm.





**Oil-Gaging Plumb Bobs**

**No. 515 Series**

15-22 oz. (0.4-0.63kg)

**Innage Plumb Bobs for Measuring Tank Contents**

(What remains in the tank.)

**No. 515C** – Solid, round-style brass bob with a tapered point, serrated on the side for holding oil or water-finding paste, or for chalking. Suitable for either heavy or light oils.

**No. 515D** – Similar in style to the No. 515C, with deep cut graduations in 1/8ths of an inch marked on the bob. This is our heaviest bob, for use in the heaviest oils.

**No. 515MD** – Same as the No. 515D, but the graduations are in millimeters.

**No. 515F** – Solid brass round-style bob with a cupped end. The cupped end can be used with a wax-like substance allowing the ability to detect foreign matter in tanks.



**515C**

**515D**

**515MD**

**515F**

**515E**

**Outage Plumb Bob for Measuring Tank Usage**

(How much has been used or how much is not in the tank.)

**No. 515E** – Solid brass bob with an extra-wide dark strip which helps show the oil line. The bob is graduated in 1/16ths of an inch from the inside of the top hole 6" down to the bottom from left to right.

The bob is lowered into the tank until it just penetrates the liquid and then the tape reading is recorded. After rewinding the tape, whatever the clear reading is from the oil line up is added to the tape reading to give the total amount used (outage).

**Plumb Bobs for Measuring Tank Contents (Innage)**

| Catalog No.  | EDP No. | Dimensions |          | Weight |      |
|--------------|---------|------------|----------|--------|------|
|              |         | Length     | Diameter | oz     | kg   |
| <b>515C</b>  | 55536   | 6-3/4"     | 1"       | 20     | 0.57 |
| <b>515D</b>  | 55537   |            |          | 22     | 0.63 |
| <b>515MD</b> | 55538   | 170mm      | 25mm     | 20     | 0.57 |
| <b>515F</b>  | 55540   | 6-3/4"     | 1"       |        |      |

**Plumb Bob for Measuring Tank Usage (Outage)**

|             |       |         |          |    |     |
|-------------|-------|---------|----------|----|-----|
| <b>515E</b> | 55539 | 6-3/16" | 3/4" sq. | 15 | 0.4 |
|-------------|-------|---------|----------|----|-----|



## 6' Wood Folding Rules

Wood rules are 6' long with rust resistant, brass-plated steel spring-joints for reliable folding and locking. Solid maple wood has deep-embossed, easy-to-read numerals and red 16" stud center markings.

The rules are 5/8" wide and clear-coated for lasting protection. The Nos. SX40 and SO60 models are two-way reading rules which conveniently read from left to right from either end, regardless of which end is unfolded first. The Nos. SX40F and SO60F "inside" reading models read left to right from one end only and lie flat on the work surface for easier inside reading and marking.

Available with or without a six inch graduated brass extension for measuring closed-in areas between doors, windows, walls, etc.



Top, No. SX40 with extension; bottom, No. SO60.

### 6' Length

| Reading                     | Without Extension |         | With Brass Extension |         |
|-----------------------------|-------------------|---------|----------------------|---------|
|                             | Catalog No.       | EDP No. | Catalog No.          | EDP No. |
| Regular (2-Way Reading)     | <b>SO60</b>       | 63179   | <b>SX40</b>          | 63177   |
| Flat (Inside 1-Way Reading) | <b>SO60F</b>      | 63180   | <b>SX40F</b>         | 63178   |

## Brick Masons' and Engineers' 6' Special Folding Wood Rules

### Standard Brick Rule

White Rule, 6' long, outside printed in consecutive inches and 1/16ths. Inside printed with brick masons' scale in black figures and course counters in red.

### Oversize Brick Rule

Yellow Rule, 6' long, outside printed in consecutive inches and 1/16ths. Inside printed with brick masons' scale in black letters (to avoid confusion with the standard scale) and red course counters.

### Modular Brick Rule

White Rule, 6' long, outside printed in consecutive inches and 1/16ths. Inside printed with six scales to be used for each 16" length in each course • two courses for concrete and glass block • 3 courses for facing tile • 4 courses for small firing tile and economy brick • 5 courses for engineered brick • 6 courses for standard brick • 8 courses for Roman brick. All of the scales allow for mortar space.

### Engineers' Rule

White Rule, 6' long, with thick hardwood slats and embossed graduations. Graduated in feet, 1/10ths and 100ths.



Top, No. 90A; middle, No. 90B, bottom, No. 91E.

### 6' Length

| Description         | Catalog No. | EDP No. |
|---------------------|-------------|---------|
| Standard Brick Rule | <b>90A</b>  | 65807   |
| Oversize Brick Rule | <b>90B</b>  | 65808   |
| Modular Brick Rule  | <b>90C</b>  | 65809   |
| Engineers' Rule     | <b>91E</b>  | 11957   |



### Starrett Carpenters' Rules

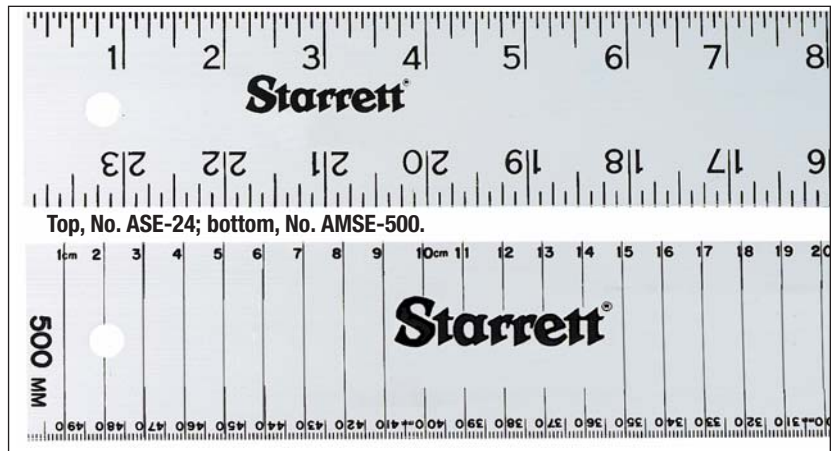
These inexpensive, lightweight rules are made of aluminum with all graduations screen printed.

### Aluminum Straight Edge Rules

**No. ASE Series** 24-96"

**No. AMSE Series**  
500-2000mm

Parallel, accurate, flexible rules are made of anodized aluminum. Edges are smooth, square and straight. Rules lie flat, resist bending and feature large, easy-to-read numbers. Rules are 2" (50mm) wide with inch graduations reading 1/8" on one edge, 1/16" on the other on the ASE Series, centimeter and millimeter graduations reading on either edge on the AMSE Series.



### 24-96" Lengths

| Length | Thickness | Catalog No. | EDP No. |
|--------|-----------|-------------|---------|
| 24"    | .081"     | ASE-24      | 36090   |
| 36"    |           | ASE-36      | 36091   |
| 48"    |           | ASE-48      | 36092   |
| 60"    |           | ASE-60      | 36093   |
| 72"    |           | ASE-72      | 36094   |
| 96"    |           | ASE-96      | 36095   |

### 500-2000mm Lengths

|        |     |           |       |
|--------|-----|-----------|-------|
| 500mm  | 2mm | AMSE-500  | 36097 |
| 1000mm |     | AMSE-1000 | 36098 |
| 1500mm | 3mm | AMSE-1500 | 36099 |
| 2000mm |     | AMSE-2000 | 36100 |

### Aluminum Rules / Yardsticks / Meterstick

**No. AR Series** 12-36"

**No. MS-2** 1m (39.37")

These rules have the same construction/finish features as the ASE/AMSE Series except they are 1-1/8" (30mm) wide and .075" (1.9mm) thick. Also, on the MS-2, graduations are in 1mm (with mm conversion table) on one side; 1/8" and 1mm graduations on the other.



### 12-36" Lengths

| Length | Thickness | Description   | Catalog No. | EDP No. |
|--------|-----------|---------------|-------------|---------|
| 12"    | .075"     |               | AR-12       | 36101   |
| 18"    |           | AR-18         | 36102       |         |
| 24"    |           | AR-24         | 36103       |         |
| 36"    |           | Ruled 2 Sides | AR2-36      | 36104   |

### Meterstick

|                |                  |               |      |       |
|----------------|------------------|---------------|------|-------|
| 1m<br>(39.37") | 1.9mm<br>(.075") | Ruled 2 Sides | MS-2 | 36107 |
|----------------|------------------|---------------|------|-------|





**Utility Knives**

Starrett offers a wide selection of utility knives to suit the cutting needs of mechanics, carpenters, maintenance workers and do-it-yourselfers.

**BLADES ARE SHARP. USE CAUTION WHEN HANDLING.**

**Hidden Edge® Utility Knife**

This innovative knife keeps the blade safely tucked away when not in use, yet instantly available by simply releasing the safety lock and squeezing the lever to the knife body.

The cutting depth is easily and accurately adjusted with a thumb wheel.

With quick release blade change and storage for spares in the lever, blade changes are fast and tool-free – you do not have to take this knife apart to change the blade.

Optional belt holster is also available.

- ◆ Easy to use
- ◆ Adjustable cutting depth
- ◆ Fast, tool-free blade changes



| Description                | Catalog No. | EDP No. |
|----------------------------|-------------|---------|
| Hidden Edge® Utility Knife | <b>S011</b> | 67584   |
| Hidden Edge® Belt Holster  | <b>968</b>  | 67981   |

1. Registered trademark of The Hidden Edge Company, Inc.

**Pressure Point™ Utility Knives**

The Pressure Point™ line of utility knives provide exceptional handling comfort, enhanced cutting leverage and rugged performance.

- ◆ Heavy-duty knife features ergonomic rugged die-cast case
- ◆ Fits snugly in the user's hand with contoured finger and thumb position, superior comfort and cutting leverage
- ◆ Spring-loaded thumb switch allows smooth, quick blade adjustment to four cutting positions (S010Y) and fully retracts the blade to lock when not in use
- ◆ Includes three blades
- ◆ Two versions now available – the S010Y original comfort grip design and the new S014 with a black overmold

**S014 Only Features**

- ◆ Quick release blade storage in handle
- ◆ Quick change blade release and replacement
- ◆ Locks in three positions
- ◆ Accepts regular and heavy-duty blades
- ◆ Black overmold



**Above: S010Y**  
**Below: S014**

| Description                                       | Catalog No.  | EDP   |
|---|--------------|-------|
| Pressure Point™ Utility Knife with comfort shape  | <b>S010Y</b> | 66994 |
| Pressure Point™ Utility Knife with black overmold | <b>S014</b>  | 67989 |



**UTILITY KNIFE BLADES ARE SHARP.  
USE CAUTION WHEN HANDLING.**

### Break-Away Blade Utility Knives

The new Starrett utility knives feature a snap-off blade design. They are available in 2 sizes, small and large, as well as in 2 colors, red and yellow.



**S013 Large Red  
front view**



**S04Y Small Yellow  
back view**

| Description                                 | Catalog No. | EDP   |
|---|-------------|-------|
| Small Red Break-Away Blade Utility Knife    | <b>S04R</b> | 61783 |
| Large Red Break-Away Blade Utility Knife    | <b>S013</b> | 68831 |
| Small Yellow Break-Away Blade Utility Knife | <b>S04Y</b> | 68832 |
| Large Yellow Break-Away Blade Utility Knife | <b>S012</b> | 68830 |

### Heavy-Duty Knives Adjustable and Retractable

Knives have a rugged die-cast handle with a comfortable grip. The design prevents the blade from pushing up through the handle when applying cut pressure. The spring-loaded thumb switch smoothly adjusts the blade to three cutting positions and retracts the blade for safe locking. Blade locks in four positions. Includes three blades.



**S01**



**S010**



**S01Y**



**S02**

### Heavy-Duty Utility Knife and Scraper, S02

Combination fixed blade utility knife and scraping tool, complete with two blades. Rugged, die-cast handle with grey enamel finish. Blade notch in handle allows for scraping. Case design prevents blade from pushing up through handle.

### Retractable Mini-Knife, S03

A handy, pocket-sized adjustable utility knife with key chain. Adjusts to three positions. Complete with two blades. Chrome plated case.

| Description           | Color  | Catalog No. | EDP.  |
|-----------------------|--------|-------------|-------|
| Utility Knife         | Grey   | <b>S01</b>  | 63182 |
|                       | Orange | <b>S010</b> | 64400 |
|                       | Green  | <b>S01G</b> | 64399 |
|                       | Yellow | <b>S01Y</b> | 66105 |
| Utility Knife/Scraper | Grey   | <b>S02</b>  | 63183 |
| Mini-Knife            | Chrome | <b>S03</b>  | 63184 |

### Replacement Blades and Dispensers



| Description                         | Fits                    | No. of Blades | Catalog No.    | EDP   |
|-------------------------------------|-------------------------|---------------|----------------|-------|
| Blades on Card                      | S011, S010Y, S014       | 5             | <b>S01R-5</b>  | 63185 |
| Blades Bulk Pack                    | S01, S010, S010Y, SA01G | 100           | <b>SB-100</b>  | 63503 |
| Mini-Knife Blades on Card           | S03                     | 5             | <b>S03R-5</b>  | 63186 |
| Blades with Dispenser               | S011, S010Y, S014       | 100           | <b>SB-100D</b> | 63326 |
| Blades with Dispenser               | S01, S010, S010Y, SA01G | 10            | <b>KS01R</b>   | 61776 |
| Hook Blades w/Dispenser             |                         | 10            | <b>KSH01R</b>  | 61778 |
| Small Break-Away Blades w/Dispenser | S04R, S04Y              | 10            | <b>KS05R</b>   | 61784 |
| Large Break-Away Blades w/Dispenser | S012, S013              | 10            | <b>KS06R</b>   | 61786 |



**ProSite® Super Chalk Box 140' (42m)** 

In response to requests from many of our professional users, we have created a high capacity Super Chalk Box. It holds a full 1 lb. 12 oz. of powdered chalk and 140" of line!

The high-visibility yellow case is made from high impact plastic.

**Reel Fast® Chalk Lines 100' (30m)** 

Reel Fast® Chalk Lines rewind 3 1/2 times faster than regular ones. They are available in chrome-plated or high-visibility orange or yellow cases. All cases are of high-impact plastic for durability. Features include a fast, easy push-button line release, a large chalk capacity and an easy pop-in line refill.

The locking handle also allows the tool to be used as a plumb bob. Supplied without chalk except for Nos. SACL-100B and SACL-100B combination packs.



From left to right: Nos. CL200 Super Chalk Box, SACLY-100, SACLO-100, SACL-100.

| Description                                | Case Color/Finish | Catalog No.      | EDP   |
|--|-------------------|------------------|-------|
| Super Chalk Box                            | Yellow            | <b>CL200</b>     | 11923 |
| Chalk Line without Chalk                   | Chrome            | <b>SACL100</b>   | 63661 |
|  | Orange            | <b>SACLO-100</b> | 64407 |
|  | Yellow            | <b>SACLY100</b>  | 64173 |
| Chalk Line with 4 Oz. Bottle of Blue Chalk | Chrome            | <b>SACL100B</b>  | 64270 |
|  | Yellow            | <b>SACLY100B</b> | 66375 |

**Replacement Lines Only**

|  |               |       |
|--|---------------|-------|
| 100' (30m) Replacement Line for Reel Fast Models | <b>RFL100</b> | 66049 |
| 140' (42m) Replacement Line for Super Chalk Box  | <b>SRL140</b> | 12149 |





### Chalk Lines/Plumb Lines 50, 100' (15, 30m)

Chalk lines are available in two styles – die-cast reel with durable enamel finish or molded high-impact ABS black plastic reel. Exclusive slide-action lock and hook ring also provides true plumb bob action. Lock releases automatically on rewind. Handle closes flush with the case. Leak resistant tip opens for quick filling with chalk. Supplied without chalk. Top-quality replacement lines on “pop-in” spool for use in Starrett chalk line reels. Replacement lines also fit most other chalk reels.



Left, No. SCL50; right, No. SCL15.

| Length     | Die-Cast Models |         | ABS Plastic Models |         |
|------------|-----------------|---------|--------------------|---------|
|            | Catalog No.     | EDP No. | Catalog No.        | EDP No. |
| 50' (15m)  | SCL50           | 63138   | SCL15              | 63140   |
| 100' (30m) | SCL100          | 63139   | SCL110             | 63141   |

#### Replacement Lines Only

| Length     | Catalog No. | EDP No. |
|------------|-------------|---------|
| 50' (15m)  | SRL50       | 63166   |
| 100' (30m) | SRL100      | 63167   |

### Chalk Refills

Highest quality, specially formulated, powdered chalk colored to mark distinctly. Lays down a hard, clean line that won't blow away. Available in red, white, blue, and fluorescent orange. Packaged in easy-to-use plastic bottles with no-spill cap. For use in all chalk line reels.

**WARNING:** This product contains Silicone Dioxide, which may be injurious to your health if inhaled. Avoid inhalation. Keep out of children's reach.

**CAUTION:** Chalk acts as a permanent coloring agent on some materials, with no known method of removal. Use accordingly.



| Unit Weight     | Color              | Catalog No. | EDP No. |
|-----------------|--------------------|-------------|---------|
| 8 oz. (227g)    | Blue               | SC8B        | 63146   |
|                 | Red                | SC8R        | 63147   |
|                 | White              | SC8W        | 63148   |
|                 | Fluorescent Orange | SC8O        | 67455   |
|                 | Green              | SC8G        | 68768   |
|                 | Permanent Blue     | SUC8B       | 68764   |
|                 | Permanent Black    | SUC8BLK     | 68766   |
|                 | Permanent Red      | SUC8R       | 64487   |
| 5 lbs. (2.27kg) | Blue               | SC5B        | 63154   |
|                 | Red                | SC5R        | 63155   |
|                 | White              | SC5W        | 63156   |
|                 | Fluorescent Orange | SC5O        | 67456   |
|                 | Green              | SC5G        | 68769   |
|                 | Permanent Blue     | SUC5B       | 68765   |
|                 | Permanent Black    | SUC5BLK     | 68767   |
|                 | Permanent Red      | SUC5R       | 64488   |



**Starrett Carpenters', Masons' and Plumbers' Levels**

These levels are offered in three categories of quality and in a variety of lengths and styles. They are all accurate and well-made.

- ◆ Builders' and contractors' levels with the new unbreakable block vial system, with or without adjustment capability

- ◆ Professional levels for workers in the building trades who value dependability
- ◆ Economy levels that are inexpensive but very adequate for the homeowner or do-it-yourselfer

**ProSite®, Professional Series Box Beam Levels**

**No. BXY Series**

24, 96"/60, 240cm

Designed with ribs to maximize strength and stability and allow for easy add-on accessories. The magnified horizontal vial with large bubble makes it easier to read accurately. Levels feature glare-resistant setting with luminous base for easy reading in dimly lit areas. The solid block acrylic vials are readable upside down with the same accuracy as right-side up and are shock-proof, leak-proof, fog-proof.

Heavy duty aluminum I-beam frame and virtually unbreakable under normal working conditions. Adjustable vials make it easy to set grades accurately and re-calibrate to level or plumb.

- ◆ New over-molded end caps
- ◆ Rails are made of high strength, high profile heat-treated aluminum
- ◆ Accuracy .025°, 1/64" over 3' (.4mm over 1m)
- ◆ Replaceable vials allow for quick and easy repair
- ◆ All vials clear of top and bottom level rail

**Level Extender**

- ◆ Use with any Starrett BXY Series level to extend length up to 7'
- ◆ Stand-off feet can be used to bridge cross bracing or crowns in wood

**Adjusting the Level Vial**

If adjustment is needed, adjust the screw to move the bubble half the difference noted. An adjustment can also be made to accommodate a small desired pitch angle. Plumb vials are also adjustable.

**No. BXY Series**

| Length         |       | Description                  | Cat. No.      | EDP   |
|----------------|-------|------------------------------|---------------|-------|
| Inch           | cm    |                              |               |       |
| 24"            | 60cm  | 3 Vials (2 Plumb, & 1 Level) | <b>BXY-24</b> | 36334 |
| 36"            | 90cm  |                              | <b>BXY-36</b> | 36335 |
| 48"            | 120cm | 4 Vials (2 Plumb, & 2 Level) | <b>BXY-48</b> | 36336 |
| 72"            | 180cm |                              | <b>BXY-72</b> | 36337 |
| 78"            | 198cm |                              | <b>BXY-78</b> | 36338 |
| 96"            | 240cm |                              | <b>BXY-96</b> | 36339 |
| Level Extender |       |                              | <b>LE-48</b>  | 12191 |

**NEW**



No. BXY-24.

**Level Use**

To get a correct reading with a level, both ends of the bubble should be viewed. If the gaps between the ends of the bubble and the lines are unequal at any time, then they should be averaged out. The reason for this is temperature, which affects the size of the bubble. As a level is warmed the liquid expands, thereby reducing the size of the bubble so that at true-level there will be gaps at both ends between the bubble and the reading lines. Conversely, if the temperature is very cold, the bubble could expand and overlap the reading lines.

Excessive hand heat on the center of the level for an extended period of time could expand the center, causing the working surface to become slightly convex and also create a tendency

to spin on flat surfaces. This is more noticeable on very precise levels.

Any level can be checked for accuracy on any flat surface regardless of whether it is level or not. Simply put the level on the surface and note the position of the bubble. Then reverse the level in the same spot. If the level is true, the bubble will be in the same relative position both ways.

Some models, like our builders' and contractors' levels with the new adjustable and unbreakable vial system, have an adjustment that can be made on the job. The adjustment is easily made by moving the bubble back by one-half the total error.



### Box-Beam, Aluminum, Top-Reading Levels, Value Line



No. BBL-24.

#### Nos. BBL, BBLM Series 12-96"/60-240cm

Designed with ribs to maximize strength and stability and allow for easy add-on accessories. The magnified horizontal vial with large bubble makes it easier to read accurately. Levels feature glare-resistant setting with luminous base for easy reading in dimly lit areas. The solid block acrylic vials are readable upside down with the same accuracy as right-side up and are shock-proof, leak-proof, fog-proof. Heavy duty aluminum I-beam frame and virtually unbreakable under normal working conditions. Adjustable vials make it easy to set grades accurately and re-calibrate to level or plumb.

- ◆ Rails are made of high strength heat treated aluminum
- ◆ Accuracy .025°, 1/64" over 3' (.4mm over 1m)
- ◆ Replaceable vials allow for quick and easy repair
- ◆ All vials clear of top and bottom of level rail

#### No. BBL Series

| Size |       | Description                | Catalog No.   | EDP No. |
|------|-------|----------------------------|---------------|---------|
| Inch | cm    |                            |               |         |
| 12"  | 30cm  | 2 Vials (1 Plumb, 1 Level) | <b>BBL-12</b> | 12098   |
| 24"  | 60cm  | 3 Vials (2 Plumb, 1 Level) | <b>BBL-24</b> | 12099   |
| 36"  | 90cm  |                            | <b>BBL-36</b> | 12100   |
| 48"  | 120cm |                            | <b>BBL-48</b> | 12101   |
| 72"  | 180cm | 4 Vials (2 Plumb, 2 Level) | <b>BBL-72</b> | 12102   |
| 78"  | 198cm |                            | <b>BBL-78</b> | 12103   |
| 96"  | 240cm |                            | <b>BBL-96</b> | 12104   |

#### No. BBLM Series with magnetic edge

|     |       |                            |                |       |
|-----|-------|----------------------------|----------------|-------|
| 24" | 60cm  | 3 Vials (2 Plumb, 1 Level) | <b>BBLM-24</b> | 12110 |
| 48" | 120cm |                            | <b>BBLM-48</b> | 12111 |

### Level Vial Information

The accuracy of a level is dependent on the proper machining of the working surface, the straightness, and rigidity of the construction and the sensitivity of the level vial. Accuracies are very often specified in parts of degrees such as 10-second accuracy or 43-minute accuracy. Technically, we are referring to the sensitivity of the level vial, but many interchange these terms. Since this means little to most people, we use the more practical definition of inches per foot of elevation. For instance, a 10-second vial accuracy means if the level is on an incline that is .0005" per foot, then the bubble on the vial will move .100" (slightly less than 1/8").

There are three general types of level vials. Ground vials are generally used in precision levels; bent glass and plastic vials are used in most other levels.

Most level vials have just two lines spanning the length of the bubble because most users just want to know if something is level or not.

The more precise levels have vials with a number of reading lines on each side of the bubble. All inch reading vial graduations are .100" apart. This will show the machinist in a very precise manner how level the equipment is.

Metric reading levels have vial graduations 2mm apart and accuracies are usually described as millimeters per meter. This is an easy conversion to make, so we converted our inch specifications to an understandable metric reading. Machinists only need to know how far they are out of level if the bubble moves to the next line.





**Expert Series of Box-Beam, Aluminum, Top-Reading Levels**

No. 140-3-600.



**Nos. 140, 170 Series**

Expert Series of superb, precision levels for carpenters, builders, and plumbers

- ◆ Accuracy of .02" (0.5mm), maintained even when turned through 180 degrees
- ◆ 360 degree viewing and an unbreakable block vial system
- ◆ No. 170 Series Levels have a strong, magnetic working edge on one side for hands-free leveling of ferrous metal surfaces

**No. 140 Series**

| Size |       | Description                | Catalog No. | EDP No. |
|------|-------|----------------------------|-------------|---------|
| Inch | cm    |                            |             |         |
| 12"  | 30cm  | 2 Vials (1 Plumb, 1 Level) | 140-300     | 67240   |
| 24"  | 60cm  | 3 Vials (2 Plumb, 1 Level) | 140-3-600   | 67428   |
| 36"  | 90cm  |                            | 140-3-900   | 67424   |
| 48"  | 120cm |                            | 140-3-1200  | 67250   |
| 72"  | 180cm | 4 Vials (2 Plumb, 2 Level) | 140-3-1800  | 67430   |

**No. 170 Series**

|     |        |                            |          |       |
|-----|--------|----------------------------|----------|-------|
| 24" | 60 cm  | 2 Vials (1 Plumb, 1 Level) | 170-600  | 67254 |
| 48" | 120 cm |                            | 170-1200 | 67257 |

**Heavy-Duty Aluminum, Top-Reading Levels**

No. BC-TA-24.



**No. BC-TA Series**

24, 48"/60, 120cm

**No. BC-MTA Series with magnetic edge**

24, 48"/60, 120cm

*With Unbreakable and Adjustable Block Vial System*

- ◆ Heavy-duty aluminum I-beam frame
- ◆ Acrylic block vials, unbreakable under normal working conditions
- ◆ Level vial is easily checked and adjusted for level and plumb on the job
- ◆ Large, top-reading level vial is magnified and fluorescent and is open on three sides for easy viewing
- ◆ Accurate, machined, barrel-shaped vials have full 360 degree viewing
- ◆ Shock-absorbing end caps protect working edges and preserve accuracy
- ◆ Convenient hang hole
- ◆ Strong magnetic working edge on one side of the No. BC-MTA models frees hands when leveling ferrous metal surfaces
- ◆ Convenient hang hole
- ◆ Strong, magnetic working edge on one side of the No. BC-MTA models frees hands when leveling ferrous metal surfaces

**No. BC-TA Series**

| Size |       | Description  | Catalog No. | EDP No. |
|------|-------|--|-------------|---------|
| Inch | cm    |  |             |         |
| 24"  | 60cm  | 3 Vials (2 Plumb, 1 Top-Reading Level), Adjustable Vials | BC-TA-24    | 36377   |
| 48"  | 120cm |  | BC-TA-48    | 36378   |

**No. BC-MTA Series with magnetic edge**

|     |       |   |           |       |
|-----|-------|---|-----------|-------|
| 24" | 60cm  | 3 Vials (2 Plumb, 1 Top-Reading Level), Adjustable Vials, One Magnetic Edge | BC-MTA-24 | 36379 |
| 48" | 120cm |   | BC-MTA-48 | 36380 |



### Professional Levels

#### Brass Bound Hardwood Levels

No. BB-24.



#### No. BB Series

24, 48"/60, 120cm

- ◆ Made of select hardwood and permanently reinforced with double-angle brass bindings
- ◆ Brass edges provide added stability and a rugged surface for increased accuracy and better wear
- ◆ Tough yellow Pyrex® vials have large bubbles and ceramic-fired lines for fast, dependable reading
- ◆ Clear glass windows protect vials from dirt and damage
- ◆ Shock-absorbing end caps protect working edges and preserve accuracy

| Size |       | Description                            | Catalog No.  | EDP No. |
|------|-------|--|--------------|---------|
| Inch | cm    |  |              |         |
| 24"  | 60cm  | 6 Vials (4 Plumb, 2 Level), Open Grips | <b>BB-24</b> | 36014   |
| 48"  | 120cm |  | <b>BB-48</b> | 36016   |

#### Laminated Hardwood Levels

No. LMP-24.

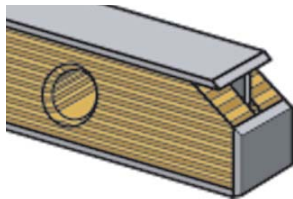


#### No. LMP Series

24, 48"/60, 120cm

LMP levels are professional quality, I-beam levels made of laminated American Birch, a native hardwood, reinforced with an aluminum I-beam frame and working edge. This enviro-friendly approach results in a more stable and warp-resistant level.

- ◆ Shock-absorbing end caps protect working edges and preserve accuracy
- ◆ Tough yellow Pyrex® vials with large bubbles and ceramic fired lines for fast, dependable reading
- ◆ Clear glass windows protect vials from dirt and damage
- ◆ Convenient hanging hole



Laminated hardwood layering with reinforced I-beam construction provides superior strength.

| Size |     | Description                | Laminated Wood Finish | Catalog No.   | EDP No. |
|------|-----|----------------------------|-----------------------|---------------|---------|
| Inch | cm  |                            |                       |               |         |
| 24"  | 60  | Pyrex®                     | Dyed Brown            | <b>LMP-24</b> | 36393   |
| 48"  | 120 | 6 Vials (4 Plumb, 2 Level) |                       | <b>LMP-48</b> | 36394   |



## Starrett Economy Levels

### Master Pro™ Hardwood Levels



No. MPH-24.

#### No. MPH Series 24-78" / 60-198cm

- ◆ Select hardwood construction, reinforced with an aluminum I-beam frame and working edges
- ◆ Tough, oversized, yellow Pyrex® vials with large bubbles and ceramic fired lines for fast dependable readings
- ◆ Clear glass windows protect vials from dirt and damage
- ◆ Shock-absorbing end caps preserve accuracy, protect working edges

| Size |       | Description                                    | Catalog No.   | EDP No. |
|------|-------|--|---------------|---------|
| Inch | cm    |  |               |         |
| 24"  | 60cm  | 6 Vials (4 Plumb, 2 Level)                     | <b>MPH-24</b> | 68192   |
| 36"  | 90cm  |  | <b>MPH-36</b> | 68193   |
| 48"  | 120cm |  | <b>MPH-48</b> | 68194   |
| 72"  | 180cm | 8 Vials (4 Plumb, 4 Level)<br>Door Jamb Roller | <b>MPH-72</b> | 68195   |
| 78"  | 198cm |  | <b>MPH-78</b> | 68196   |

### Economy Aluminum Levels



No. ST3-24.

#### No. ST Series 18-48" / 45-120cm

- ◆ Medium-duty aluminum I-beam cross section with flanged edges for increased strength. Large octagonal vial sights for maximum visibility
- ◆ Permanently mounted vials have full 360 degree viewing and require no adjustment

| Size |       | Description                | Catalog No.   | EDP No. |
|------|-------|----------------------------|---------------|---------|
| Inch | cm    |                            |               |         |
| 18"  | 45cm  | 2 Vials (1 Plumb, 1 Level) | <b>ST2-18</b> | 36042   |
| 24"  | 60cm  |                            | <b>ST2-24</b> | 36043   |
| 24"  | 60cm  | 3 Vials (2 Plumb, 1 Level) | <b>ST3-24</b> | 36044   |
| 48"  | 120cm |                            | <b>ST3-48</b> | 36048   |





### Die-Cast Professional Levels

All Starrett Die-Cast Aluminum Levels have these features:

- ◆ Cast from durable aluminum alloy
- ◆ Boxed ends and one-piece I-beam construction for superior integral strength
- ◆ Accurate for tasks with closer tolerances
- ◆ Can be completely immersed in liquid and will not warp or vary in accuracy
- ◆ Ruled edges and large, round vial sights

### Die-Cast Aluminum Level



#### EP-24 24"/60cm

- ◆ Extremely stable, die-cast construction
- ◆ Working edges ground for accuracy, one edge ruled (1/8" and millimeters)
- ◆ Yellow vials with large bubbles and ceramic-fired lines for fast and dependable reading

- ◆ Clear glass windows protect vials from dirt and damage

| Size |      | Description                            | Catalog No. | EDP No. |
|------|------|--|-------------|---------|
| Inch | cm   |  |             |         |
| 24"  | 60cm | 6 Vials (4 Plumb, 2 Level), Ruled Edge | EP-24       | 36022   |

### Master Pro Heavy-Duty Die-Cast Aluminum Mechanics' Levels



#### ML Series 18, 24"/45, 60cm

- ◆ Six-function mechanics' level will level, plumb, check 45°, check pitch, set pitch, and measure length
- ◆ Extremely stable, cast construction
- ◆ Working edges ground for accuracy
- ◆ Permanently marked rule affixed to top reads left to right (1/16") on one side and centering rule on the other (1/8")

- ◆ Locking pitch/grade-screw adjustment
- ◆ Graduated top-sight level vial indicates pitch (1/8"/foot)

- ◆ Tough, yellow Pyrex® vials with large bubbles and ceramic-fired lines for fast, dependable reading

| Size |      | Description                          | Catalog No. | EDP No. |
|------|------|--------------------------------------|-------------|---------|
| Inch | cm   |                                      |             |         |
| 18"  | 45cm | 4 Vials (2 Plumb, 1 Level, and 45°), | ML-18       | 36031   |
| 24"  | 60cm | Grade Screw Adjustment               | ML-24       | 36032   |

### Sta-True™ Professional Aluminum Levels



#### STE Series

24-96"/60-240cm

#### MST Series with Magnetic Edge

24-72"/60-180cm

- ◆ One-piece extruded aluminum frame
- ◆ I-beam cross-section with flanged edges for increased strength
- ◆ Rectangular vial sights with vials having full 360 degree viewing
- ◆ Permanently mounted acrylic vials require no adjustment
- ◆ MST models have a large magnetic strip on the working edge to free hands while leveling ferrous surfaces

#### No. STE Series

| Size |       | Description                         | Catalog No. | EDP No. |
|------|-------|-------------------------------------|-------------|---------|
| Inch | cm    |                                     |             |         |
| 24"  | 60cm  | 3 Vials (1 Plumb, 1 Level, and 45°) | STE-24      | 36053   |
| 36"  | 90cm  | 3 Vials (2 Plumb, 1 Level)          | STE-36      | 36055   |
| 48"  | 120cm |                                     | STE-48      | 36056   |
| 72"  | 180cm | 5 Vials (3 Plumb, 2 Level)          | STE-72      | 36057   |
| 96"  | 240cm |                                     | STE-96      | 36059   |

#### No. MST Series

|     |       |   |        |       |
|-----|-------|---|--------|-------|
| 24" | 60cm  | 3 Vials (2 Plumb, 1 Level), One Magnetic Edge | MST-24 | 36062 |
| 48" | 120cm | One Magnetic Edge                             | MST-48 | 36064 |
| 72" | 180cm | 5 Vials (3 Plumb, 2 Level), One Magnetic Edge | MST-72 | 36065 |



**Replacement Vial Kits for  
selected Starrett regular  
and block vial system levels**

**VK Series**

The exclusive Starrett replaceable vial system keeps downtime to a minimum. Each kit contains all the parts necessary for quick and simple field repairs. This unique system allows craftsmen to easily configure level, plumb and 45° vials to meet specific needs. Contains all parts necessary for repair or replacement of one vial assembly.

- ◆ Permanently marked vials
- ◆ Vial windows
- ◆ Vial window frames



Left: Block Vial Kit.



Right: Regular Vial Kit.

| Fits Series   | Description | Catalog No. | EDP No. |
|---------------|-------------|-------------|---------|
| STE, MST      | Plumb       | VK92045     | 36144   |
|               | Level       | VK92046     | 36145   |
|               | 45°         | VK92047     | 36146   |
| LZ            | Plumb       | VK99466     | 36294   |
| BC-TA, BC-MTA | Level       | VK99467     | 36295   |

**Magnetic Strips**

**MGT Series**

24-78"/60-198cm

Magnetic strips with adhesive backing adhere to the level's working edges. Frees hands when leveling metal materials.



| Size/Length |             | Description         | Catalog No. | EDP No. |
|-------------|-------------|---------------------|-------------|---------|
| Inch        | cm          |                     |             |         |
| 24" x 3/4"  | 60cm x 2cm  | Magnetic Tape Strip | MGT-2       | 36289   |
| 36" x 3/4"  | 90cm x 2cm  |                     | MGT-3       | 36290   |
| 48" x 3/4"  | 120cm x 2cm |                     | MGT-4       | 36291   |
| 72" x 3/4"  | 180cm x 2cm |                     | MGT-6       | 36292   |
| 78" x 3/4"  | 198cm x 2cm |                     | MGT-6 1/2   | 36293   |

Magnetic Strips attach easily to metal edges.

**Level Case**

**L48ZZ** 48"/120cm



Rugged, blow-molded case with snap-lock cap stores and protects most 48" (120cm) levels.

| Description            | Catalog No. | EDP No. |
|------------------------|-------------|---------|
| 48" (120cm) Level Case | L48ZZ       | 66326   |

- ◆ Shields level vials and wood surfaces from harmful ultraviolet rays and heat of direct sunlight
- ◆ Convenient hang-hole on top of cap



### Pocket Levels with satin nickel-plated finish

#### No. 135 Series

2-1/2 and 3-1/2" / 63 and 88mm



Another extremely useful Starrett level that fits handily in the pocket with no sharp edges. Made from hexagonal stock with convex ends and satin nickel-plated finish.



| Size        | Description    | Catalog No. | EDP No. |
|-------------|----------------|-------------|---------|
| 2-1/2"/63mm | With Main Vial | 135A        | 50570   |
| 3-1/2"/88mm |                | 135B        | 50571   |

### Aluminum Line/Pocket Level

#### No. E-3 3"/7.5cm

Lightweight, durable aluminum construction prevents line sag. Sure-grip line hooks hold line and allow level to slide freely. Flat base for accurate surface leveling. Large vial sight. Permanently marked for fast, dependable readings.



| Description                  | Catalog No. | EDP No. |
|------------------------------|-------------|---------|
| 1-Vial Level with Line Hooks | E-3         | 36077   |

### Colored Line/Pocket Levels with V-grooved base

#### No. PE Series 3"/7.5cm

Lightweight, rugged plastic construction prevents line sag. Sure-grip line hooks hold line and allows level to slide freely. V-grooved base for surface leveling and tubular work. Large top and bottom vial sights. Permanently marked level vial for fast, dependable readings. Handy pocket clip. Available in red or high-visibility orange or green.



| Color  | Description                                  | Catalog No. | EDP No. |
|--------|--|-------------|---------|
| Red    | 1-Vial Level with Line Hooks and Pocket Clip | PE-2        | 36076   |
| Orange |  | PE0-2       | 36265   |
| Green  |  | PEG-2       | 36266   |





**Torpedo Levels**

Torpedo levels are handy tools that find their way into most tool boxes. They are relatively small, are light but sturdy, and come in a variety of styles.

All of our torpedo levels have three vials; a top and side reading level, plumb, and 45° miter. Each vial is precision mounted, requiring no adjustment.

All feature hang holes as well.

**Aluminum Torpedo Levels with grooved or magnetic base**

**Nos. A-9, M-9 9"/23cm**

These levels have a cast aluminum frame with working surfaces that are lapped for accuracy. The No. A-9 has a V-grooved base for plumbing and tubular work. The No. M-9 has a strong magnet set in the base to hold the level securely to iron and steel surfaces.



No. A-9.

| Base      | Description  | Catalog No. | EDP No. |
|-----------|--|-------------|---------|
| V-Grooved | With 3 Vials (1 Plumb, 1 Level, 1 45°), Side and Top Reading | A-9         | 36069   |
| Magnetic  |  | M-9         | 36070   |

**Aluminum Torpedo Level with magnetic base and grooved top surface**

**No. AM-9 9"/23 m**

Our best torpedo level ... This level has a cast aluminum frame with working surfaces that are lapped for accuracy.



A strong magnetic base holds the level securely to iron and steel surfaces. The

V-grooved top working surface is ideal for plumbing and tubular work.

| Description  | Catalog No. | EDP No. |
|--|-------------|---------|
| With 3 Vials (1 Plumb, 1 Level, 1 45°), Side and Top Reading | AM-9        | 36071   |

**Colored Torpedo Levels with magnetic base and grooved top edge**

**No. PLM Series 9"/23cm**

Get a level that is easy to see on your bench. Choose from neon orange or yellow.

Levels feature a precision molded, high-impact styrene frame, a magnetic base which holds securely to ferrous surfaces, and a V-grooved top edge for plumbing or tubular work.

No. PLMY-9,



| Color  | Description  | Catalog No. | EDP No. |
|--------|--|-------------|---------|
| Yellow | With 3 Vials (1 Plumb, 1 Level, 1 45°), Side and Top Reading | PLMY-9      | 12171   |
| Orange |  | PLMO-9      | 64409   |

**Bull's-Eye Circular Level**  
**No. BE-1**

Level with all purpose, circular vial has full 360 degree viewing. Sturdy plastic construction. Large sight for ease of reading. Ideal for home, workshop and industry. Level appliances, turntables, etc. Carry in your pocket. Size is 1-3/4" (44mm) in diameter.



| Description           | Catalog No. | EDP No. |
|-----------------------|-------------|---------|
| 1-3/4" Circular Level | BE-1        | 36078   |



**Engineers' and Plumbers' Levels  
with adjustable incline level, fixed level and plumb**



Left: No. 133A.

Right: End view showing involute groove.



**No. 133 Series** 10 and 15"  
**No. 133M Series**  
250 and 375mm

Specially designed for engineers, plumbers, and other mechanics, Starrett No. 133 Levels combine three uses in one with their 3-level feature – a fixed level, a plumb and an adjustable incline level.

Both the main level and incline level vials can be read from the side and the top.

The incline level tube has a hinged mounting inside the level frame. After placing the level on any inclined surface it is adjusted to the “level” position. The

degree of incline is then indicated by the pointer at the end of the level tube and read off a graduated plate.

The inch reading plate is graduated in 1/16” per foot (1.6mm per 300mm) and reads up to 2” per foot (50mm per 300mm) incline.

Millimeter reading plates are graduated in millimeters per 250mm and read up to 40mm per 250mm incline.

The base of the levels have an involute groove running the full length, which provides a reliable seat for round work.

**Inch Models**

| Size | Description                            | Catalog No. | EDP No. |
|------|--|-------------|---------|
| 10"  | With Adjustable, Fixed and Plumb Vials | <b>133A</b> | 50567   |
| 15"  |  | <b>133B</b> | 50568   |

**Millimeter Models**

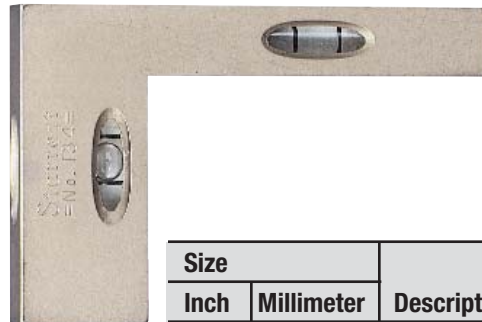
|       |  |              |       |
|-------|--|--------------|-------|
| 250mm | With Adjustable, Fixed and Plumb Vials | <b>133MA</b> | 65499 |
| 375mm |  | <b>133MB</b> | 65500 |

**NOTE:** To guarantee extreme accuracy, the length of your level should not be longer than the work you are leveling.

**Cross Test Level and Plumb**

**No. 134** 2 x 3" / 50 x 75mm

This is an especially useful little level, invaluable for plumbing, approximate squaring and leveling work. Made from cast iron with a satin nickel finish, all working surfaces are flat and true. The level has two vials at right angles for cross test leveling without moving the tool and a plumb level at the top for checking squareness. An accurate, well-made and reliable tool, it is also very light and compact and can be easily carried in the pocket.



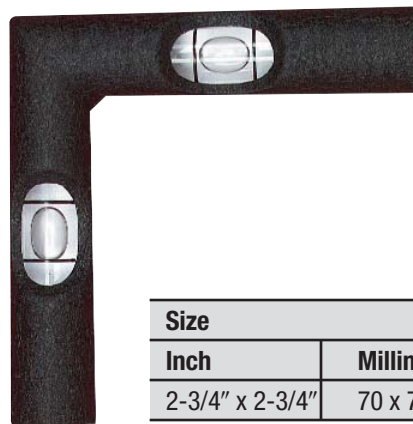
| Size   |            | Description                          | Cat. No.   | EDP   |
|--------|------------|--------------------------------------|------------|-------|
| Inch   | Millimeter |                                      |            |       |
| 2 x 3" | 50 x 75mm  | With Cross Test Vials and Plumb Vial | <b>134</b> | 50569 |

**Cross Test Level**

**No. 136**

2-3/4 x 2-3/4" / 70 x 70mm

Similar to our No. 134 level, the No. 136 has two vials at right angles which permit leveling in both directions without moving the level from the work. The level is light and compact, with an attractive black wrinkle finish and a ground reference surface.



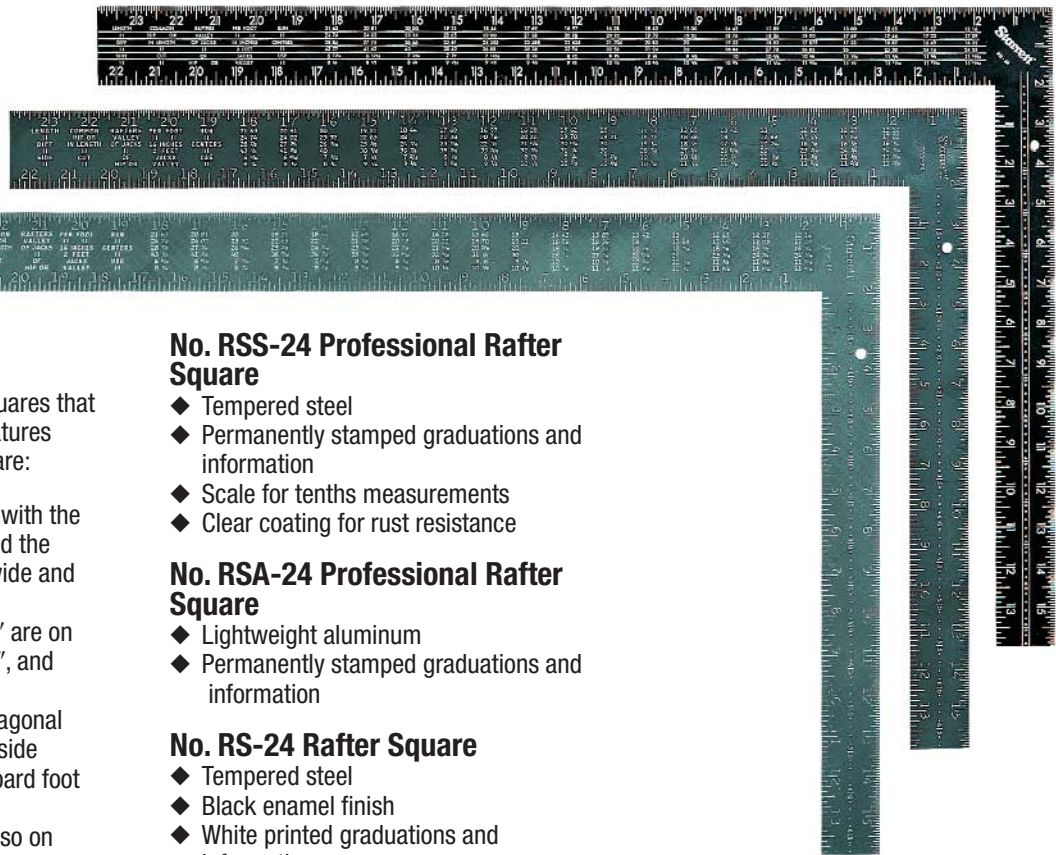
| Size            |            | Description           | Cat. No.   | EDP   |
|-----------------|------------|-----------------------|------------|-------|
| Inch            | Millimeter |                       |            |       |
| 2-3/4" x 2-3/4" | 70 x 70mm  | With Cross Test Vials | <b>136</b> | 50572 |

Packed one in a box.



## Rafter Squares

Top, No. RS-24;  
Middle, No. RSA-24;  
Bottom, No. RSS-24.



### No. RS Series 24"

These are standard L-shaped squares that are full of useful information. Features common to all of these squares are:

- ◆ Solid, one-piece construction with the body 24" long and 2" wide and the tongue 16" long and 1-1/2" wide and square with the body
- ◆ Graduations of 1/8" and 1/16" are on the face side and 1/10", 1/12", and 1/16" on the back side
- ◆ Rafter information and an octagonal measuring scale on the front side
- ◆ Wood screw, pilot drill, and board foot information on the back side
- ◆ Brace measure information also on the back side
- ◆ Hanging hole on each square
- ◆ Instruction manual included

### No. RSS-24 Professional Rafter Square

- ◆ Tempered steel
- ◆ Permanently stamped graduations and information
- ◆ Scale for tenths measurements
- ◆ Clear coating for rust resistance

### No. RSA-24 Professional Rafter Square

- ◆ Lightweight aluminum
- ◆ Permanently stamped graduations and information

### No. RS-24 Rafter Square

- ◆ Tempered steel
- ◆ Black enamel finish
- ◆ White printed graduations and information

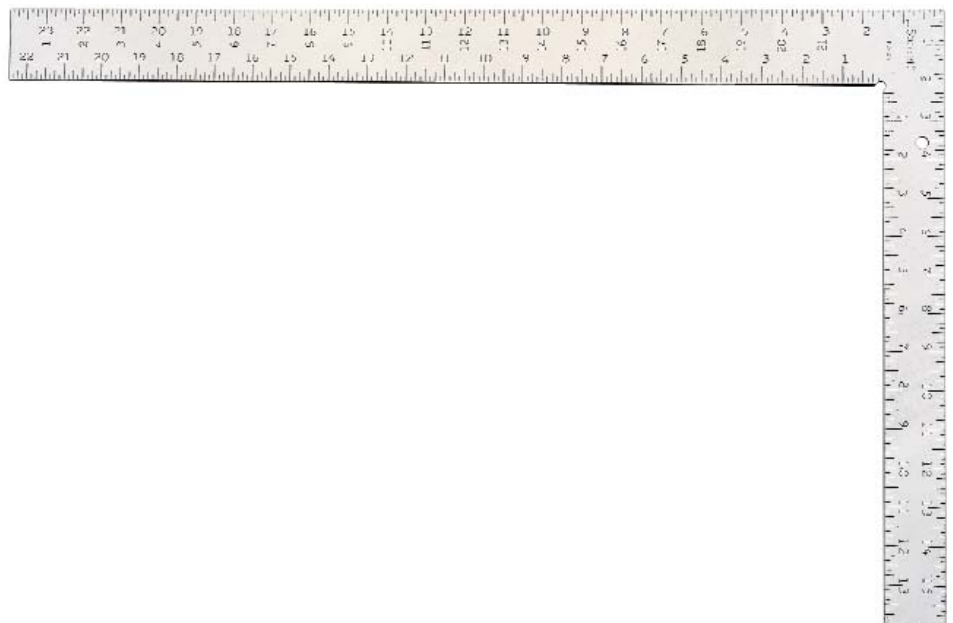
#### 24" Size

| Description             | Catalog No.   | EDP No. |
|-------------------------|---------------|---------|
| Steel, Stamped Scale    | <b>RSS-24</b> | 36130   |
| Aluminum, Stamped Scale | <b>RSA-24</b> | 36131   |
| Steel, Printed Scale    | <b>RS-24</b>  | 36128   |

## Professional Framing Square

### No. FS-24 24" EDP 36129

- ◆ One-piece tempered steel, 24" x 2" body and 16" x 1-1/2" tongue
- ◆ Face and back permanently stamped with 1/8" graduations
- ◆ Clear coating for rust resistance
- ◆ Convenient hang hole







### Carpenters' Try Square

**No. TS-8**

**EDP 12152**



This is a neat and handy small square that can easily fit into a tool chest. It has these features:

- ◆ An 8" steel blade permanently stamped with 1/8" graduations on both sides
- ◆ Brass bound hardwood handle with convenient finger grooves



### Stair Gage Fixture Attachments for rafter and framing squares

**No. 111 (long)**

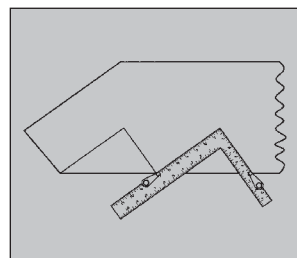
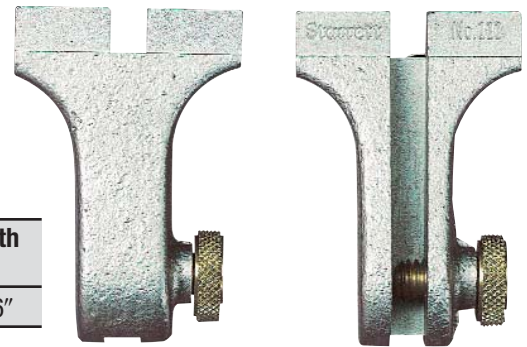
**No. 470 (short)**

**No. 111**

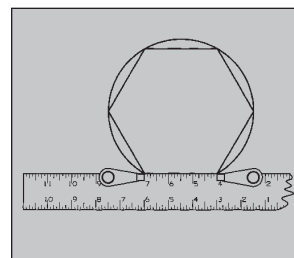
A pair of these fixtures clamped to a carpenter's framing or rafter square forms a handy gage for laying out stair stringers, hip, valley, and other rafter cuts plus many other unusual cuts.

- ◆ Furnished in pairs – one right hand and one left hand
- ◆ Nickel plated cast iron is tough and rust resistant
- ◆ Ends are machined square for true work contact and alignment with square blade graduations
- ◆ Brass clamp screw to prevent marring the blade

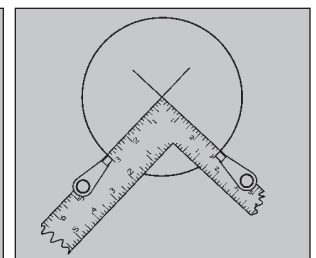
| Catalog No. | EDP No. | Length | Width Slot |
|-------------|---------|--------|------------|
| 111 (Pair)  | 50476   | 1-7/8" | 3/16"      |



Laying out a stair stringer.



Laying out a hexagon within a circle.



Quartering a circle, using square and fixtures as a center gage.



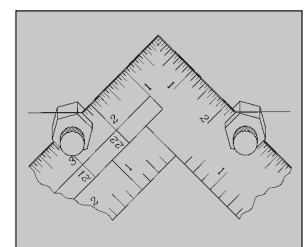
**No. 470**

These stair gage fixtures are similar to our No. 111, except they have a smaller area that contacts the square blade. They are a convenient, small size and are lower in cost.

- ◆ Furnished in pairs
- ◆ Nickel plated hexagonal steel for strength and resistance to rust
- ◆ Brass clamp screw to prevent marring the blade
- ◆ Slotted to keep two opposite hexagonal faces at right angles to the edge of the square for true work contact and positive alignment with graduations



| Catalog No. | EDP No. | Width Across Flats | Width Slot |
|-------------|---------|--------------------|------------|
| 470 (Pair)  | 52482   | 3/4"               | 3/16"      |





## Aluminum T-Square

### No. T 24-48"

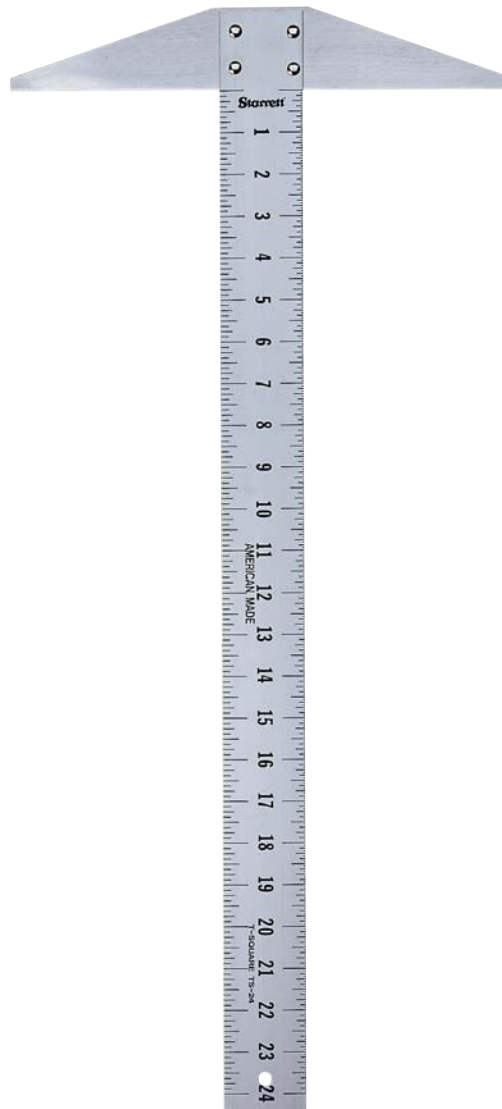
- ◆ 2" wide x .081" thick anodized aluminum blade lies flat and resists bending
- ◆ Large, easy-to-read numbers
- ◆ Graduations are 1/8" on one edge and 1/16" on the other
- ◆ For drafting and general layout work

| Length | Catalog No. | EDP No. |
|--------|-------------|---------|
| 24"    | <b>T-24</b> | 36134   |
| 36"    | <b>T-36</b> | 36136   |
| 48"    | <b>T-48</b> | 36138   |

## Special Squares



Above: No. DS-4 Giant Square.  
Below: No. T-24 T-Square.



## Giant Aluminum Square No. DS Series

These large squares are primarily used for drywall cutting, layout work and layout on plywood and sheet metal.

- ◆ The offset head is 22" x 1-1/2". (Blade is the same width as a standard electrical outlet box.)
- ◆ The standard square is 1/8" thick and the heavy duty square is 3/16" thick
- ◆ Large, easy-to-read numbers and graduations – inches, 8ths and 16ths

| Size       | Description           | Catalog No. | EDP No. |
|------------|-----------------------|-------------|---------|
| 48"L x 2"W | Assembled             | <b>DS-4</b> | 36119   |
|            | Heavy Duty, Assembled | <b>DS-6</b> | 36121   |
| 54"L x 2"W | Heavy Duty, Assembled | <b>DS-7</b> | 36381   |

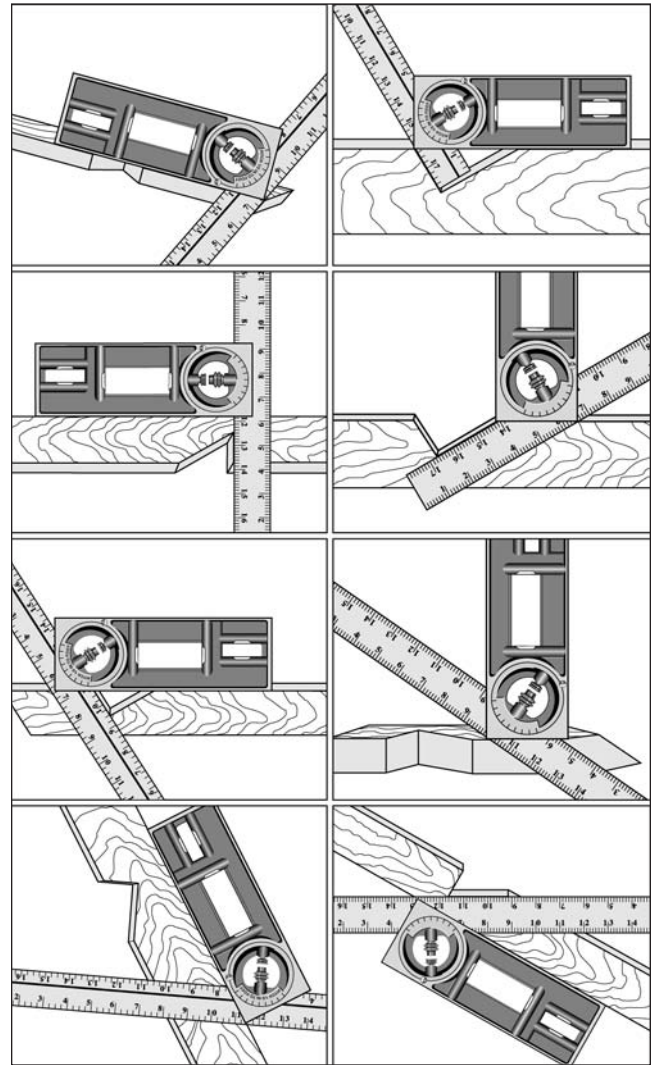


### Builders' Combination Tool

#### No. 439 Series 18 and 24"

This versatile tool is invaluable for carpenters, builders, patternmakers, cabinetmakers and all mechanics.

- ◆ Combines seven tool functions in one compact, practical unit. It is a rule, square, level, plumb, protractor, bevel and pitch-to-foot indicator
- ◆ It consists of a stock, 9" (230mm) long, a hardened, machine-divided 1-1/2" (38 mm) wide blade in 18" or 24" lengths, and a protractor
- ◆ On one side the protractor is graduated from zero to 90° in both directions showing the direct and supplementary angles. The other side is graduated in 1/2" pitch increments from 0-12" per foot pitch
- ◆ The stock has four levels which permits leveling or plumbing the work in relation to any angle or pitch
- ◆ Tool is ideal for laying out or cutting valleys or hips of different pitches, done as follows: Rotate the blade to the desired pitch, place the face of the stock against the work and draw a line. Then place the square end of the stock against the line and draw the complementary line. This gives the complementary angle automatically, without calculation



| Blade Length | Blade Graduation     | Head Graduation |               | Cat. No.      | EDP   |
|--------------|----------------------|-----------------|---------------|---------------|-------|
|              |                      | Degrees         | Pitch         |               |       |
| 18"          | No. 4 – 8ths, 16ths, | 0-90°           | 0-12" per ft. | <b>439-18</b> | 52110 |
| 24"          | 32nds, 64ths         |                 |               | <b>439-24</b> | 52111 |

Packed one in a box.

### Angle Meter

#### No. AM-2/EDP No. 36080 0-90°

This angle meter offers a fast, easy and inexpensive way to measure angles.

- ◆ Large, readable scale for accurate readings from 0-90° in any quadrant
- ◆ Magnetic base frees hands when used on ferrous surfaces
- ◆ Measures any angle for pitch or slope
- ◆ Handy rise, run, angle, and pitch information on back of tool







NEW

## Combination Protractor

No. CP505A-12 EDP 12256

The CP505A-12 Combination Protractor is the latest addition to the popular ProSite® 505 Protractor family.

The 5-in-1 CP505A-12 performs all of the function of the current models, plus more, as follows:

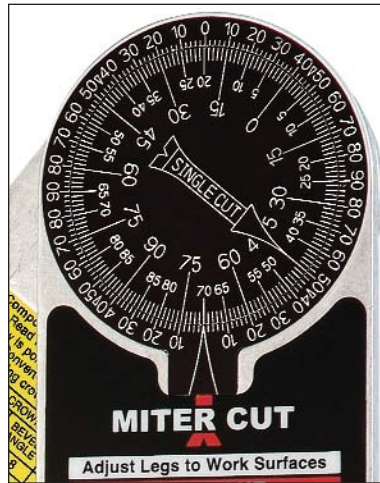
- (1) Miter Cut (for miter joints): Transfer readings directly to the Miter Saw
- (2) Single Cut (for butt joints): Transfer readings directly to the Miter Saw.
- (3) Compound Cut Conversion Table (on the bottom leg with the tool facing up): Specifically for the Compound Miter Saw.
  - For cutting Crown Molding as it lays flat in the Compound Miter Saw.
  - Directly transfer the 'Miter Cut' conversions to the Compound Miter Saw.
- (4) Protractor (Reverse side of tool): The actual angle on two scales; 0°-180°-0° and 180°-0°-180°.
- (5) Roof Pitches: With the tool face down, a quick reference to common roof pitches can be determined by matching the leg of the tool to the lines on the roof pitch scale.

The CP505A-12 is precision machined with lightweight aluminum construction and features a Teflon® "O" Ring for smooth & precise Operation.



The scales on the dial of this new tool are laser engraved for exceptional accuracy. This is the first 505-family tool to feature laser engraving.

As with all 505 Series protractors, the CP505-12A eliminates the guessing and the math, saving time and minimizing waste.



Above: Miter Cut and Single Cut readings (see #1 and #2, left).



Above: 0°-180°-0° and 180°-0°-180° protractor (see #4, left).

**Compound Cut Conversion Table**  
Read the value the "Miter Cut" arrow is pointing to on the inner dial. Convert that reading here. (Used for cutting crown and trim as they lay flat)

| "MITER CUT" | 38° CROWN   |             | 45° CROWN   |             |
|-------------|-------------|-------------|-------------|-------------|
|             | MITER ANGLE | BEVEL ANGLE | MITER ANGLE | BEVEL ANGLE |
| 1           | 0.6         | 0.8         | 0.7         | 0.7         |
| 2           | 1.2         | 1.6         | 1.4         | 1.4         |
| 3           | 1.9         | 2.4         | 2.1         | 2.1         |
| 4           | 2.5         | 3.2         | 2.8         | 2.8         |
| 5           | 3.1         | 3.9         | 3.5         | 3.5         |

Left: Compound Cut Conversion Table (see #3, left).



Above: Roof pitch reference (see #5, Left).



**Combination Protractor**  
No. CP505A-12





### Protractor

#### 505A, 12" & 7"

The ProSite® Protractor takes error-prone calculations out of the process of miter cuts. Simply set your saw to the angle that you read. Upside down or backwards, the reading is always correct.

This easy-to-use tool has two scales. The red scale and arrow show the angle for a miter joint, while the black arrows and scale provide the angle to fit a single workpiece to an angle.

The ProSite® Protractor saves time and reduces waste. The tool is ideal for carpenters, plumbers and all building trades that require the measuring and transferring of angles. It is also invaluable for home use.

- ◆ Made from durable 1/4" aluminum with Teflon® 'O' ring for smooth and precise operation
- ◆ Available in 12" and 7" models. While markedly different in appearance, the 7" ProSite Protractor, has an identical dial and functions in the same way as the 12"
- ◆ Optional leather holster available for 12" models



1. Measure the angle.



2. Set the saw to the angle that the **Red Arrow** points to on the **Red Scale**.



3. Cut the pieces with the left and right angle, respectively.



4. The result: A perfect miter.

| Description                             | Catalog No. | EDP   |
|---|-------------|-------|
| 12" Combination Protractor              | CP505A-12   | 12256 |
| 12" Miter Protractor                    | 505A-12     | 67752 |
| 7" Miter Protractor                     | 505A-7      | 11677 |
| Leather Holster for CP505A-12 & 505A-12 | 970         | 68838 |



## Carpenters' Dividers

### No. 92 Series 6, 9" (150, 225mm)

These dividers combine rigidity, light weight and easy handling. The legs are forged steel, well-shaped, properly tempered and highly polished. The adjustable point may be quickly removed and a common pencil inserted in its place. The No. 92-9 9" (225mm) size is designed to accommodate a standard long pencil, especially useful for carpenters. No. 88 Ball Points may be used with the No. 92 Series.

The sturdy construction of the joint, combined with the quadrant, eliminates side deflection of the legs. A quadrant adjusting nut permits fine-adjustments for close measurements. A check nut located between the legs locks the legs firmly after the proper adjustment has been made. This feature prevents the legs from moving in and out with the grain on wood when scribing, or sliding off rough spots when scribing on metals.



Left, No. 92-6; right, No. 92-9 with pencil inserted and adjustable point removed at right.

| Size* |       | Catalog No. | EDP No. |
|-------|-------|-------------|---------|
| Inch  | mm    |             |         |
| 6"    | 150mm | 92-6        | 50423   |
| 9"    | 225mm | 92-9        | 50426   |

\*NOTE: Actual capacity is one-third greater than the listed size.





**Carpenters' and Sheet  
Metal Workers'  
Improved Extension  
Dividers**

**No. 85 Series with caliper legs  
7-12" (175-300mm)**

The Starrett No. 85 extension dividers are exceptionally rigid although light in weight and easy to handle. The head is made of forged steel. The hardened points are well shaped and bent slightly so they can be rotated and brought closer together if desired.

The sturdy construction of the joint, combined with the quadrant that projects through the legs and is frictionally locked by a knurled clamp nut, eliminates side deflection of the legs. A quadrant adjusting nut permits fine-adjustments for close measurements. A check nut located between the legs firmly locks the legs after proper adjustment has been made. This feature prevents the legs from moving in and out with the grain on wood when scribing, or sliding off rough spots when scribing on metal.

A common pencil fits either arm. No. 88 Ball Points may also be used with this divider.

**Capacity**

- ◆ The 7" (175mm) size will scribe or draw a 22" (550mm) circle. The auxiliary caliper legs will caliper 11" (275mm) outside and 13" (325mm) inside
- ◆ The 9" (225mm) size will scribe or draw a 30" (750mm) circle. The auxiliary caliper legs will caliper 14" (350mm) outside and 16" (400mm) inside
- ◆ The 12" (300mm) size will scribe or draw a 40" (1000mm) circle. The auxiliary caliper legs will caliper 17" (425mm) outside and 19" (475mm) inside



**No. 85D 9" (226mm) Divider complete with inside and outside caliper legs.**

| Size* |       | With Divider Legs Only |         | Complete with Divider Legs, Inside and Outside Legs |         |
|-------|-------|------------------------|---------|---|---------|
| Inch  | mm    | Catalog No.            | EDP No. | Catalog No.   | EDP No. |
| 7"    | 175mm | <b>85A</b>             | 50398   | <b>85C</b>  | 50400   |
| 9"    | 225mm | <b>85B</b>             | 50399   | <b>85D</b>  | 50401   |
| 12"   | 300mm | <b>85E</b>             | 50402   | <b>85F</b>  | 50403   |

\*NOTE: Actual capacity is one-third greater than the listed size.



## Steel Plumb Bobs

### No. 177 Series

2-3/4 – 14-1/2 oz. / 78-400g

Our best ... For top accuracy in all layout work, construction and surveying. Made from solid steel to provide a low center of gravity and great weight in proportion to their short length and small diameter.

Each bob is furnished with a strong, braided 8' silk line which can be conveniently wound around a recess at the top of the bob.

- ◆ Hexagonal shaped head prevents rolling
- ◆ Hardened and ground removable point for greater accuracy, longer life. Easily replaced if worn or broken
- ◆ Sure grip knurling on polished steel body for easy handling



String can be easily drawn into a specially slotted neck at the top, providing true hanging. Also eliminates the need for tying knots.

| Weight     |       | Catalog No. | EDP No. |
|------------|-------|-------------|---------|
| Oz.        | Grams |             |         |
| 2-3/4 oz.  | 78g   | <b>177A</b> | 50660   |
| 5 oz.      | 140g  | <b>177B</b> | 50661   |
| 8-1/2 oz.  | 240g  | <b>177C</b> | 50662   |
| 14-1/2 oz. | 400g  | <b>177D</b> | 50663   |



## Solid Brass Plumb Bobs

### No. PBB Series

8, 16 oz. / 230, 450g

Rugged, polished solid brass plumb bobs with replaceable, hardened steel points provide reliable accuracy and corrosion resistance.

- ◆ Easy, self-centering line assembly with screw cap design
- ◆ Points easily replaced if worn or broken
- ◆ Conforms to U.S. Government Specifications GGG-P-501e
- ◆ 10' (300cm) of nylon cord included

| Weight/Desc.           |       | Catalog No.    | EDP No. |
|------------------------|-------|----------------|---------|
| Oz.                    | Grams |                |         |
| 8 oz.                  | 230g  | <b>PBB-8</b>   | 36270   |
| 16 oz.                 | 450g  | <b>PBB-16</b>  | 36271   |
| Replaceable Point Only |       | <b>PT24513</b> | 36277   |



No. PBB-8.

## Solid Steel Plumb Bobs

### No. PB Series

6-16 oz. / 170-450g

Plumb bobs feature rugged, nickel-plated steel construction for durability. One-piece hexagonal body design will not roll and there are no separate parts to lose. Head has easy-thread feature for fast string insertion (string is not furnished).

| Weight |       | Catalog No.  | EDP No. |
|--------|-------|--------------|---------|
| Oz.    | Grams |              |         |
| 6 oz.  | 170g  | <b>PB-6</b>  | 36112   |
| 8 oz.  | 230g  | <b>PB-8</b>  | 36113   |
| 12 oz. | 340g  | <b>PB-12</b> | 36114   |
| 16 oz. | 450g  | <b>PB-16</b> | 36115   |



No. PB-6.





## Tough Grip™ Non-Slip Tool Pad

The large, embossed surface Tough Grip™ Non-Slip Tool Pad is 24" x 36". This large pad is perfect for protecting the calibrations of sensitive tools, and it prevents all tools from marring and scratching.

The Tough Grip process keeps tools from sliding off slanted surfaces. The embossed pad may also be used as a holding aid while performing bench work.

The smaller, smooth surface Tough Grip™ Non-Slip Tool Pad is 10" x 24". This pad is perfect for protecting easily damaged surfaces from scratching. It is also ideal for cutting and placing in the drawers of tool boxes.

- ◆ Fire retardant
- ◆ Mold and mildew resistant
- ◆ Fully washable
- ◆ Covered by a 10-year warranty against manufacturing defects
- ◆ Made of strong, reinforced material
- ◆ Able to be cut with scissors
- ◆ Oil and grease resistant



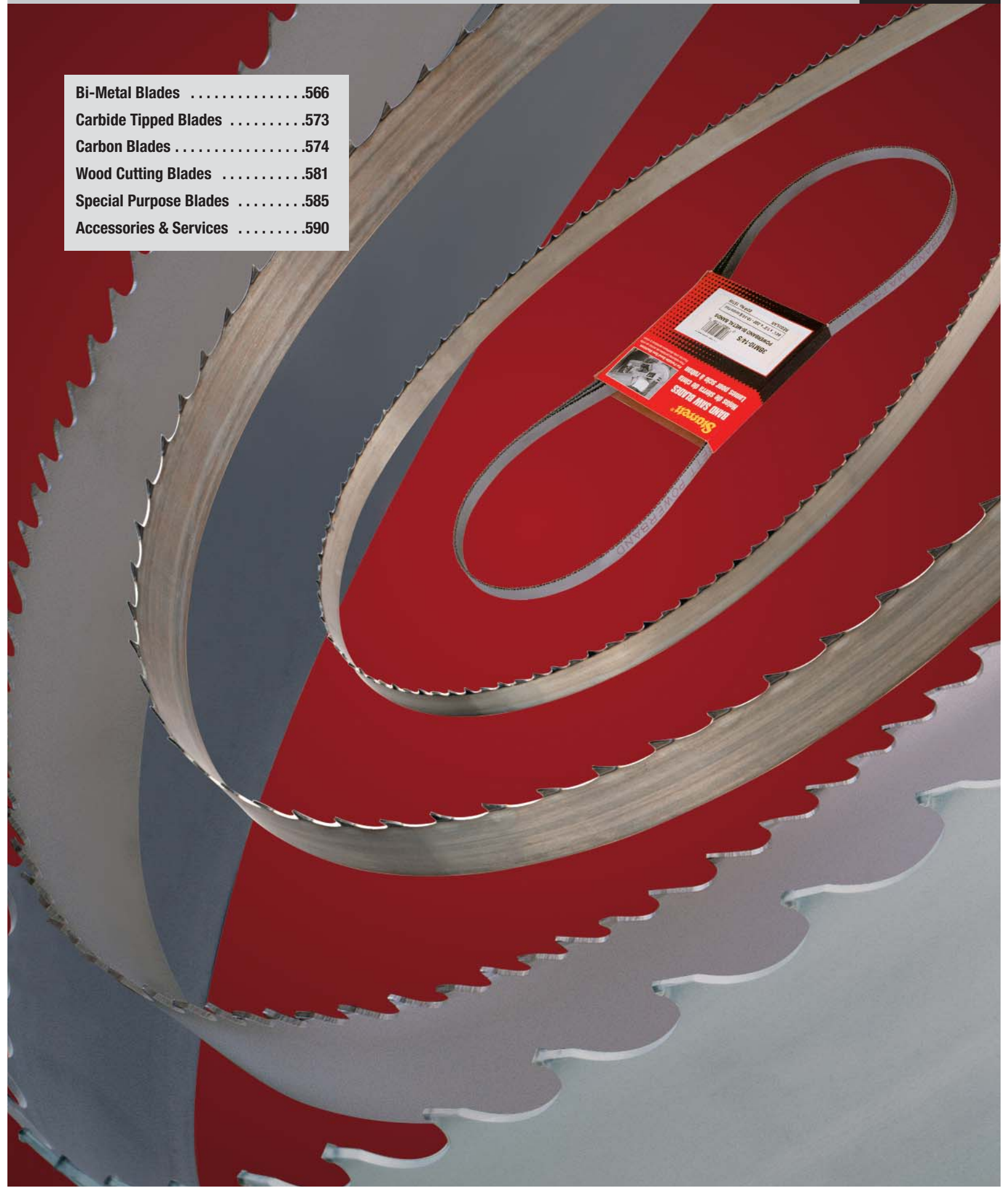
**Above:** Tough Grip non-slip Tool Pad is ideal for protecting precision tools and work parts.

**Below:** Tough Grip Tool Pads can also be easily cut and used for applications such as lining the drawer and tray bottoms of tool boxes.



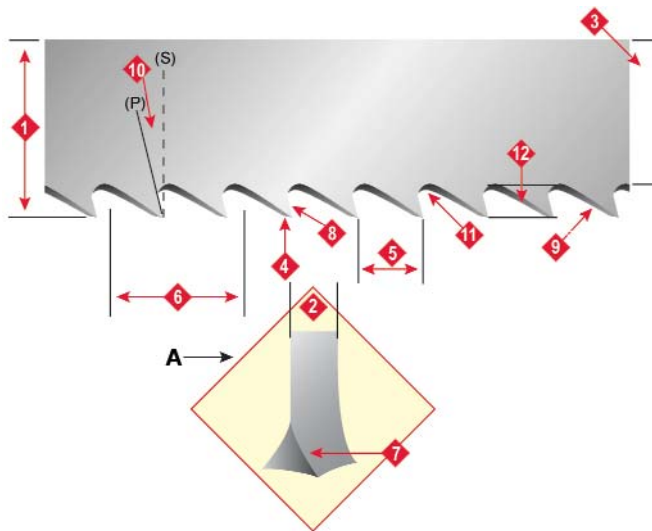
| Description               | Catalog No. | EDP No. |
|---------------------------|-------------|---------|
| Smooth Surface, 10"x24"   | TG-24       | 68852   |
| Embossed Surface, 24"x36" | TG-36       | 68853   |

|                              |      |
|------------------------------|------|
| Bi-Metal Blades .....        | .566 |
| Carbide Tipped Blades .....  | .573 |
| Carbon Blades .....          | .574 |
| Wood Cutting Blades .....    | .581 |
| Special Purpose Blades ..... | .585 |
| Accessories & Services ..... | .590 |



# BAND SAW BLADES

## Band Saw Blade Overview



- 1 **Width** Tip of the cutting edge to the back of the blade
- 2 **Thickness** Measurement taken on body (gage)
- 3 **Blade Body** The back of the blade, to the bottom of the gullet
- 4 **Tooth** The cutting portion of the blade
- 5 **Tooth Pitch** Distance from one tooth tip to the next tip
- 6 **T.P.I.** Number of teeth per inch
- 7 **Tooth Set** Bending of the teeth, right or left, to allow blade clearance through the cut (or kerf) — see illustration “A” above
- 8 **Tooth Face** Surface of the tooth, where the chip is formed
- 9 **Tooth Back** The angled surface of the tooth opposite the tooth face
- 10 **Tooth Rake Angle** Positive (P) or Straight (S). The angle of the tooth face measured from a line perpendicular to the back of the blade
- 11 **Gullet** The curved area between two teeth
- 12 **Gullet Depth** The distance from the tooth tip to the bottom of the gullet

## Selecting the Best Band Saw Blade — A Six Step Method

Getting the most efficient performance from your band saw machine requires the proper band saw blade. The information below will give you the best blade recommendation in most cases.

There are always exceptions due to machine type/condition or some variation in the materials to be cut. If you need help, your distributor or Starrett saw expert will be happy to assist.

### 1 – Blade Type

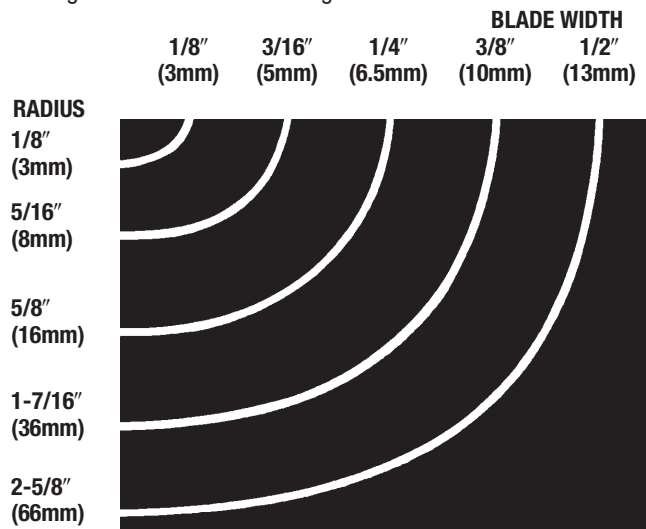
Use this chart as a guide to pick a blade or blades that match the materials to be cut, then see the appropriate blade information.

## Starrett Blade Type

| Materials   | Best   | Good  |
|---|--|---|
| Exotic & Nickel-Based Alloys — Inconel & High-Hardness Steels (HRc 30-40) | <b>Gladiator</b> or<br><b>Gladiator Pulsator</b>                     | <b>Carbide Tipped</b>                           |
| Tool & Stainless Steel  | <b>Gladiator</b><br>over 5" (125mm) use<br><b>Gladiator Pulsator</b> | <b>Die Pro</b>                                  |
| Alloy & High Carbon Steel   | <b>Gladiator</b>   | <b>M-42</b>                                     |
| General Purpose   | <b>Gladiator</b>   | <b>Die Pro</b>                                  |
| Carbon Steel  | <b>M-42</b><br><b>Die Pro</b>  | <b>Premium Hard-Back</b><br>or <b>Flex-Back</b> |
| Structural Steels   | <b>Emperor</b>   | <b>Gladiator</b>                                |
| Aluminum  | <b>Gladiator,</b><br><b>Flex-Back</b><br><b>Die Pro</b>              | <b>Carbide Tipped</b>                           |
| Cast Aluminum   | <b>Carbide Tipped</b>  | <b>Gladiator</b>                                |
| Thin Ferrous Sections   | <b>Friction</b>  | <b>Flex-Back</b>                                |
| Composites, Fiberglass, Graphite, Ceramics, etc.                          | <b>Carbide Grit</b><br><b>Diamond Grit</b>                           |   |
| Wood & Plastic  | <b>Woodpecker XF</b><br><b>Woodpecker Premium</b>                    | <b>Flex-Back</b>                                |
| Foam, Paper Products, Rubber, etc.  | <b>Band Knives</b>   | <b>Flex-Back</b>                                |

### 2 – Blade Width

Use the widest blade your machine will take except for contour cutting. Use this chart for cutting radii:



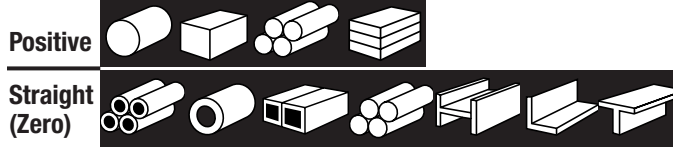


### Select the Right Band Saw Blade in Six Steps (continued)

#### 3 – Tooth Rake

Straight (Zero), Positive, or Heavy Set\*

##### Rake



\*Available with Emperor for cutting heavy beams and bundles.

#### 4 – Tooth Shape:

**Regular** – A conventional tooth used for general purpose sawing, straight or zero rake.



**Gladiator®** – Large teeth, up to 12° positive rake angle, for optimum production cutting of steels up to 42 HRC, stainless, nickel based and nonferrous alloys



**Hook** – A positive rake for fast cutting of nonferrous metals and non-metallics



**Skip** – Zero rake and shallow gullets for cutting large sections of soft, nonferrous material.



#### 5 – Type of Pitch:

**Constant** – All teeth on the blade have uniform spacing, gullet depth, rake angle throughout the full length. Typically for general purpose cutting. Identified by one pitch number.



**Variable** – Size of tooth and depth of gullet varies to substantially reduce noise levels and vibration. Helps cut all structurals, tubing and solids smoothly and quickly. Identified by two pitch numbers.



#### 6 – Pitch (Teeth-per-inch)

Pitch is generally regarded as the number of teeth per inch or 25mm. Cutting thinner sections requires a finer pitch (more teeth per inch /25mm). Thick sections require coarser pitches (less teeth per inch/25mm). The charts are good guidelines.

Because the cross section limits in the chart are broad and overlap, choose a coarser pitch if the speed of cut is most important. Choose a finer pitch if finish is most important.

#### Variable Pitch Selection

| Cross Section Thickness To Be Cut |                | Use Variable Pitch |
|-----------------------------------|----------------|--------------------|
| Inch                              | mm             |                    |
| 7/32"–7/8"                        | 6-22mm         | 14-18              |
| 1/4"–1-1/4"                       | 6.4-35mm       | 10-14              |
| 11/32"–1-1/2"                     | 9-40mm         | 8-12               |
| 3/8"–2"                           | 9.5-50mm       | 6-10               |
| 1/2"–2-3/8"                       | 13-60mm        | 5-8                |
| 1"–3"                             | 25-75mm        | 4-6                |
| 1-1/2"–4"                         | 38-100mm       | 3-4                |
| 2"–6"                             | 50-150mm       | 2-3                |
| 3"–12"                            | 75-300mm       | 1-2                |
| 8"                                | 200mm and Over | .8-1.3             |

#### Constant Pitch Selection

| Cross Section Thickness To Be Cut |           | Use Constant Pitch  |
|-----------------------------------|-----------|---|
| Inch                              | mm        |   |
| Up to 5/16"                       | Up to 8mm | 32 (Anything Thinner Than a 1/8" (3.2mm) Cross Section Should Be Angled to the Blade) |
| 5/32"–1/2"                        | 4-13mm    | 24  |
| 7/32"–5/8"                        | 6-16mm    | 18  |
| 1/4"–7/8"                         | 6.4-22mm  | 14  |
| 3/8"–1-1/4"                       | 9.5-35mm  | 10  |
| 1/2"–1-1/2"                       | 13-40mm   | 8   |
| 1"–2"                             | 25-50mm   | 6   |
| 1-1/2"–3"                         | 38-75mm   | 4   |
| 2"–4"                             | 50-100mm  | 3   |
| 3"–6"                             | 75-150mm  | 2   |
| 4-1/2"–9"                         | 114-225mm | 1-1/4   |

### Feeds and Speeds

Starrett has a Band Saw Blade Selection Slide Chart and CD available by request for a quick reference to the optimal feeds and speeds.

### Band Saw Blade Break-In Procedures

The proper break-in of a bi-metal blade assures longer blade life, faster cuts for a longer period of time and consistent performance. Refer to the slide selection chart for proper feeds and speeds.

**Easy-to-cut material** such as carbon steel and aluminum – Run the normal surface feet per minute (SFM). Adjust the feed pressure to about one-half the normal cutting rate for the first few cuts or for 50-100 square inches (323-645 sq. cm). Increase to the normal rate.

**Hard-to-cut materials** such as nickel-based alloys like Inconel, hardened steels, tool steels and stainless steels – Run the normal surface feet per minute (SFM). Adjust the feed rate to about three-quarters of the normal for the first few cuts or 25-75 sq. inches, increase the cutting rate part way to normal for the next few cuts, then increase to the normal cutting rate. Avoid vibration. **NOTE:** Be sure to remove chips on these types of materials.

### Starrett Trial Order Guarantee

Purchase any band saw blade recommended by Starrett and we will guarantee that it will match or outperform your present blade, or your money back. Contact your local Starrett distributor for further details.

## Gladiator®

The ultimate bi-metal competitor, Gladiator® delivers the utmost in sawing performance and cost effectiveness across a wide range of applications.

### Features

- ◆ Electron beam welded bi-metal construction
- ◆ Unique tooth design features triple-tempered M-42 cobalt high speed steel teeth; HRc 67-69
- ◆ Up to 12° positive rake angle
- ◆ Fatigue resistant alloy steel backing

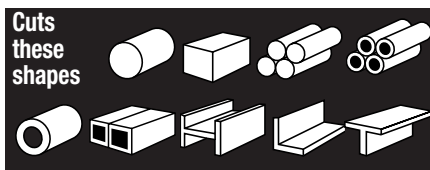
### Benefits

- ◆ Higher wear/heat resistance
- ◆ Easy penetration, excellent chip clearance, reduced noise levels
- ◆ Improved surface finish
- ◆ Faster, straighter cuts

### Applications

- ◆ High production cutting
- ◆ Full range of steels, from mild to stainless, up to 42 HRc
- ◆ Nickel based and nonferrous alloys

Coils are furnished in 150' and 250' (45 and 76m) random lengths as listed. They are also furnished welded, in convenient lengths all ready to use.



### Shape

**Gladiator** – Large teeth, up to 12° positive rake angle, for optimum production cutting of steels up to 42 HRc, stainless, nickel based and nonferrous alloys.



### Pitch

**Variable** – Reduces noise levels and vibration; cuts structurals, tubing and solids smoothly, quickly.

### Variable Pitch Selection

| Cross Section Thickness To Be Cut |          | Use Variable Pitch |
|-----------------------------------|----------|--------------------|
| Inch                              | mm       |                    |
| 3/8"–2"                           | 9.5-50mm | 6-10               |
| 1/2"–2-3/8"                       | 13-60mm  | 5-8                |
| 1"–3"                             | 25-75mm  | 4-6                |
| 1-1/2"–4"                         | 38-100mm | 3-4                |
| 2"–6"                             | 50-150mm | 2-3                |
| 3"–12"                            | 75-300mm | 1-2                |

Specifications on next page.

### Gladiator® (continued)

### Specifications

| Blade Width x Thickness |                | Tooth Shape | Tooth Pitch & Rake* | EDP No.    |            |
|-------------------------|----------------|-------------|---------------------|------------|------------|
| Inch                    | mm             |             |                     | 150' (45m) | 250' (76m) |
| 3/4" x<br>.035"         | 19 x<br>0.90mm | Gladiator®  | 3-4/P               | —          | 15849      |
|                         |                |             | 4-6/P               | —          | 20564      |
|                         |                |             | 5-8/P               | —          | 20566      |
|                         |                |             | 6-10/P              | —          | 13091      |
|                         |                |             | 8-12/P              | —          | 13988      |
|                         |                |             | 10-14/P             | —          | 15403      |
| 1" x<br>.035"           | 25 x<br>0.90mm |             | 2-3/P               | —          | 20570      |
|                         |                |             | 3-4/P               | —          | 20572      |
|                         |                |             | 4-6/P               | —          | 20574      |
|                         |                |             | 5-8/P               | —          | 20576      |
|                         |                |             | 6-10/P              | —          | 13064      |
|                         |                |             | 8-12/P              | —          | 13990      |
| 1-1/4" x<br>.042"       | 32 x<br>1.10mm | 10-14/P     | —                   | 15416      |            |
|                         |                | 1-2/P       | —                   | 20771      |            |
|                         |                | 1.4-2/P     | —                   | 20770      |            |
|                         |                | 2-3/P       | —                   | 20581      |            |
|                         |                | 3-4/P       | —                   | 20583      |            |
|                         |                | 4-6/P       | —                   | 20585      |            |
| 1-1/2" x<br>.050"       | 38 x<br>1.30mm | 5-8/P       | —                   | 20587      |            |
|                         |                | 6-10/P      | —                   | 16368      |            |
|                         |                | 1-1.2/P     | 20589               | —          |            |
|                         |                | 1-2/P       | 20590               | —          |            |
|                         |                | 1.4-2/P     | 20591               | —          |            |
|                         |                | 2-3/P       | 20592               | 20593      |            |
| 2" x<br>.063"           | 50 x<br>1.60mm | 3-4/P       | 20594               | —          |            |
|                         |                | 4-6/P       | 20595               | 20596      |            |
|                         |                | 5-8/P       | 20597               | —          |            |
|                         |                | .8-1.3/P    | 20598               | —          |            |
|                         |                | 1-1.2/P     | 20599               | —          |            |
|                         |                | 1-2/P       | 20600               | —          |            |
| 2-5/8" x<br>.063"       | 67 x<br>1.60mm | 1.4-2/P     | 20601               | —          |            |
|                         |                | 2-3/P       | 20602               | —          |            |
|                         |                | 3-4/P       | 20603               | —          |            |
|                         |                | 4-6/P       | 15884               | —          |            |
|                         |                | .8-1.3/P    | Welded Bands Only   |            |            |
|                         |                | 1-1.2/P     | Welded Bands Only   |            |            |
| 3-1/8" x<br>.063"       | 79 x<br>1.60mm | 1-2/P       | Welded Bands Only   |            |            |
|                         |                | 1.4-2/P     | Welded Bands Only   |            |            |
|                         |                | .8-1.3/P    | Welded Bands Only   |            |            |
|                         |                | 1-1.2/P     | Welded Bands Only   |            |            |

\*KEY: P = Positive Rake

**NOTE:** 150' and 250' (45, 76m) coils are shipped random lengths, which may vary plus or minus 10%.



## Gladiator Pulsator®

A high performance bi-metal band saw blade with a uniquely designed tooth edge that allows the teeth to cut in a fast, pulsating action.

### Features

- ◆ Electron beam welded bi-metal construction
- ◆ Gladiator® tooth design with variable tooth height and set
- ◆ Triple tempered M-42, cobalt high speed steel teeth, hardness Rockwell C67-69
- ◆ Fatigue resistant alloy steel backing strip
- ◆ Aggressive “surging” cutting action

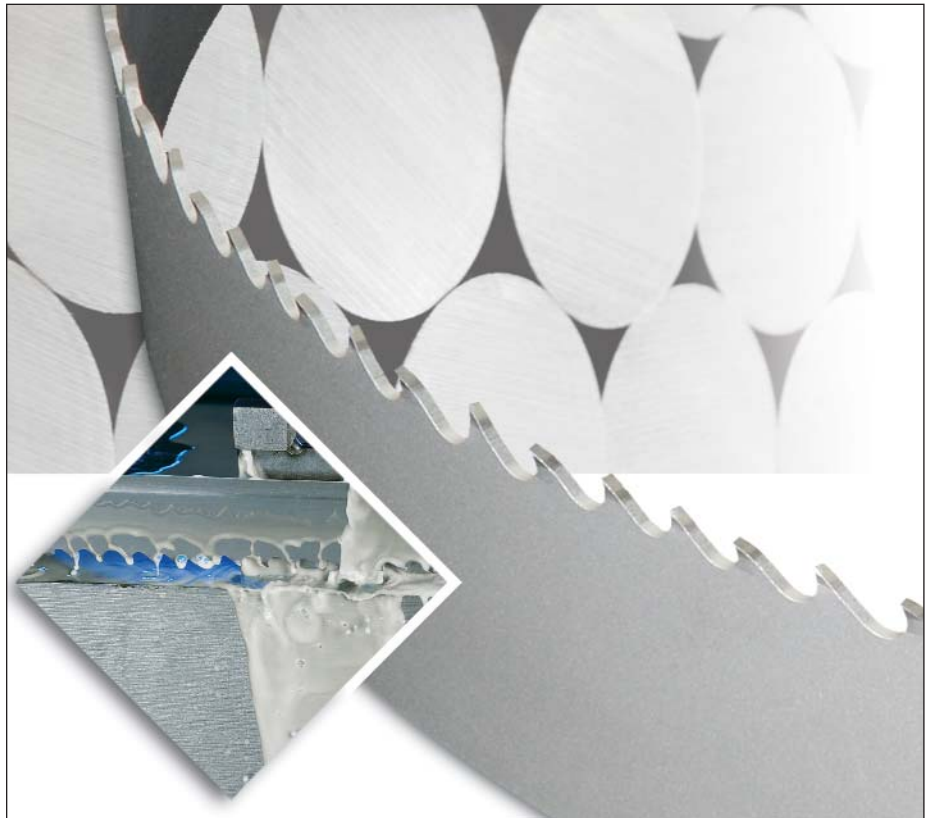
### Benefits

- ◆ Greater wear and heat resistance
- ◆ Longer blade life, increased efficiency

### Applications

- ◆ Large solid sections of exotic and nickel based alloys and high hardness steels

Coils are furnished in 150' and 250' (45 and 76m) random lengths as listed. They are also furnished welded, in convenient lengths all ready to use.



### Shape

**Gladiator®** – Large teeth, up to 12° positive rake angle, for optimum production cutting of steels up to HRC 42, stainless, nickel based and nonferrous alloys.



### Pitch

**Variable** – Reduces noise levels and vibration; cuts solids smoothly, quickly.

| Cross Section To Be Cut |                | Variable Pitch |
|-------------------------|----------------|----------------|
| Inch                    | mm             |                |
| 1"–3"                   | 25-75mm        | 4-6            |
| 1-1/2"–4"               | 38-100mm       | 3-4            |
| 2"–6"                   | 50-150mm       | 2-3            |
| 3"–12"                  | 75-300mm       | 1-2            |
| 12" and Over            | 300mm and Over | 1.4-2          |

## Specifications

| Width x Thickness |             | Tooth Shape | Pitch & Rake*     | EDP No.         |                 |
|-------------------|-------------|-------------|-------------------|-----------------|-----------------|
| Inch              | mm          |             |                   | 150' Coil (45m) | 250' Coil (76m) |
| 1" x .035"        | 25 x 0.90mm | Gladiator   | 2-3P/T            | —               | 20605           |
|                   |             |             | 3-4P/T            | —               | 20607           |
|                   |             |             | 4-6P/T            | —               | 20609           |
| 1-1/4" x .042"    | 32 x 1.10mm |             | 2-3P/T            | —               | 20772           |
|                   |             |             | 3-4P/T            | —               | 20773           |
|                   |             |             | 4-6P/T            | —               | 20774           |
| 1-1/2" x .050"    | 38 x 1.30mm |             | 1-1.2P/T          | 20764           | —               |
|                   |             |             | 1-2P/T            | 20765           | —               |
|                   |             |             | 2-3P/T            | 20612           | —               |
|                   |             |             | 3-4P/T            | 20613           | —               |
| 2" x .063"        | 50 x 1.60mm | 1-1.2P/T    | 20766             | —               |                 |
|                   |             | 1-2P/T      | 20614             | —               |                 |
|                   |             | 1.4-2P/T    | 20615             | —               |                 |
| 2-5/8" x .063"    | 67 x 1.60mm | 1-1.2P/T    | Welded Bands Only |                 |                 |
|                   |             | 1-2P/T      |                   |                 |                 |
|                   |             | 1.4-2P/T    |                   |                 |                 |
| 3-1/8" x .063"    | 79 x 1.60mm | 1-1.2P/T    | Welded Bands Only |                 |                 |
|                   |             | 1-2P/T      |                   |                 |                 |
|                   |             | 1.4-2P/T    |                   |                 |                 |

\*KEY: P/T = Positive Rake Tapered

NOTE: 150' and 250' (45, 76m) coils are shipped random lengths, which may vary plus or minus 10%.

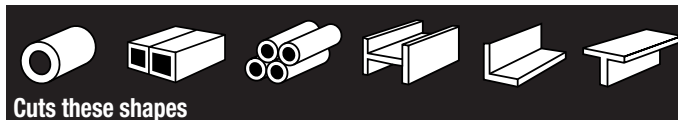
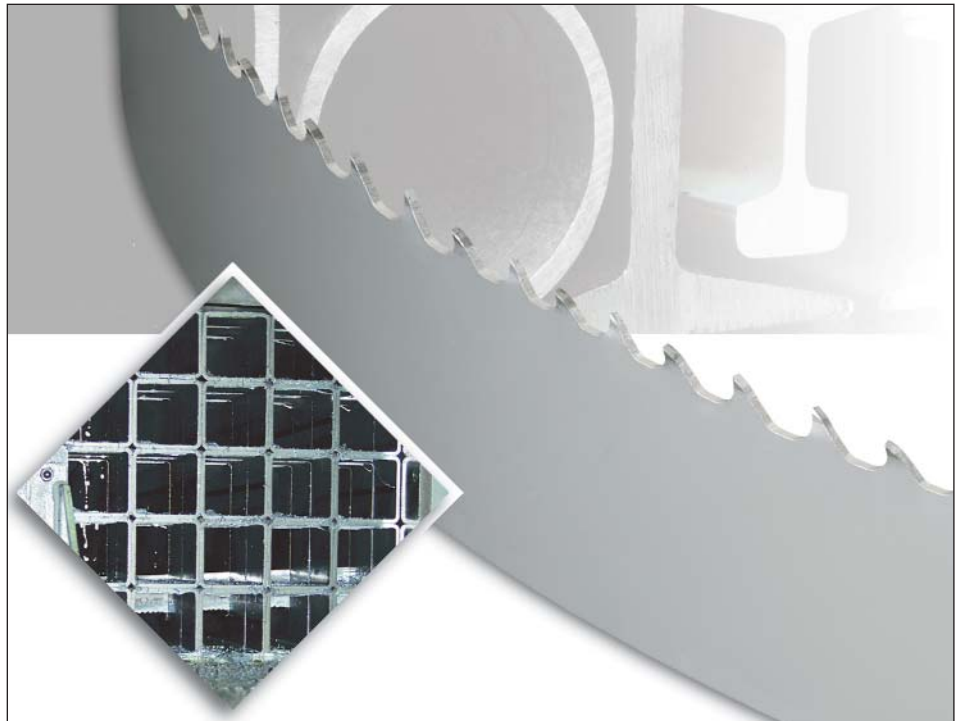
### Gladiator Emperor®

Ideal for production cutting of structurals, Emperor® is a bi-metal blade with a heavy set made of M-42 high-speed steel containing 8% cobalt.

#### Features

- ◆ Heavy set provides extra blade clearance to minimize binding or pinching when beam stresses are relieved and/or when bundles move during cutting
- ◆ Resists heat, abrasion and shock, allowing faster cutting

Coils are furnished in 150' and 250' (45 and 76m) random lengths as listed. They are also furnished welded, in convenient lengths all ready to use.



#### Shape

##### Gladiator® –

Large teeth, up to 12° positive rake angle, for optimum production cutting of steels up to HRc 42, stainless, nickel-based and nonferrous alloys



#### Pitch

**Variable** – Reduces noise levels and vibration; cuts solids smoothly, quickly.

#### Specifications

| Width x Thickness |             | Tooth Shape      | Pitch & Rake | EDP No.         |                 |
|-------------------|-------------|------------------|--------------|-----------------|-----------------|
| Inch              | mm          |                  |              | 150' Coil (45m) | 250' Coil (76m) |
| 1" x .035"        | 25 x 0.90mm | Gladiator        | 5-8/PH       | —               | 21673           |
| 1-1/4" x .042"    | 32 x 1.10mm |                  | 3-4/PH       | —               | 21677           |
|                   |             |                  | 4-6/PH       | —               | 21675           |
| 1-1/2" x .050"    | 1.30mm      |                  | 3-4/PH       | 21680           | —               |
|                   |             |                  | 4-6/PH       | 21679           | —               |
| 2" x .050"        | 50 x 1.30mm |                  | 1.4-2/PH     | 21691           | —               |
|                   |             |                  | 2-3/PH       | 21683           | —               |
|                   |             | 3-4/PH           | 21682        | —               |                 |
| 2" x .063"        | 50 x 1.60mm | 4-6/PH           | 21681        | —               |                 |
|                   |             | 2-3/PH           | 21685        | —               |                 |
| 2-5/8" x .063"    | 67 x 1.60mm | 3-4/PH           | 21684        | —               |                 |
|                   |             | 2-3/PH<br>3-4/PH | Welds Only   |                 |                 |

\*KEY: P = Positive Rake H = Heavy Set

NOTE: 150' and 250' (45, 76m) coils are shipped random lengths, which may vary plus or minus 10%.

## Die Pro

New Die Pro blades are available in a variety of variable and constant pitch configurations, with all widths 1/2" or less.

**NEW**

### Features

- ◆ Resists heat, abrasion and shock, allowing faster cutting rates in a variety of materials
- ◆ Triple-tempered M-42 high speed steel teeth with 8% cobalt; HRC 67-69
- ◆ Utilizes bi-metal unique<sup>®</sup> saw technology with the chip clearing benefits of the Split Chip Advantage<sup>®</sup>
- ◆ Can be used on both light-duty horizontal and vertical machines
- ◆ Suitable for contour and general purpose sawing, maintenance and toolrooms
- ◆ Excellent wear, heat, abrasion and shock resistance
- ◆ Long blade life and cutting efficiency

### Applications

- ◆ Tool, die and mold steels, stainless steels
- ◆ Carbon steels
- ◆ Low alloy and nonferrous materials
- ◆ Aluminum

Coils are available in 100' (30m) lengths as listed



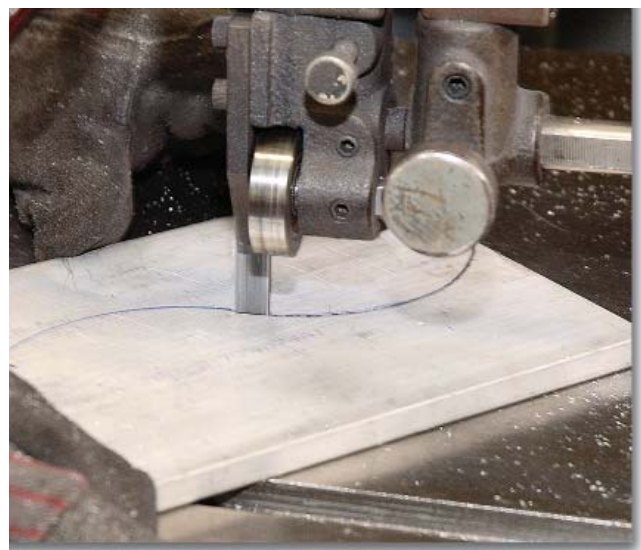
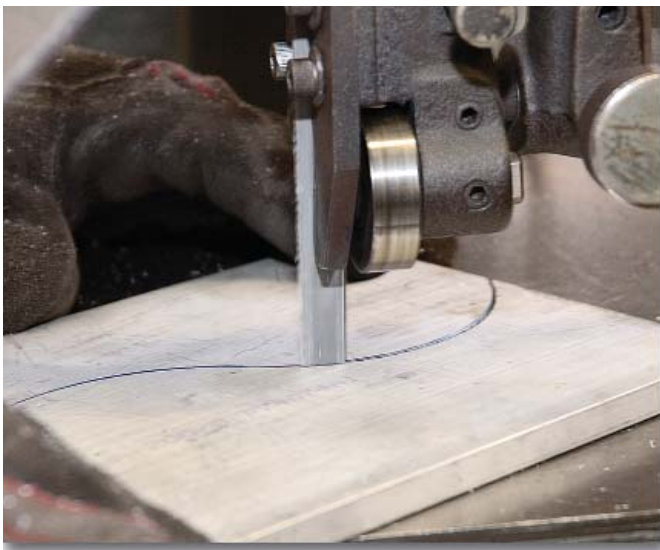
### Cuts these shapes



### Pitch

**Constant** – Good for general purpose cutting

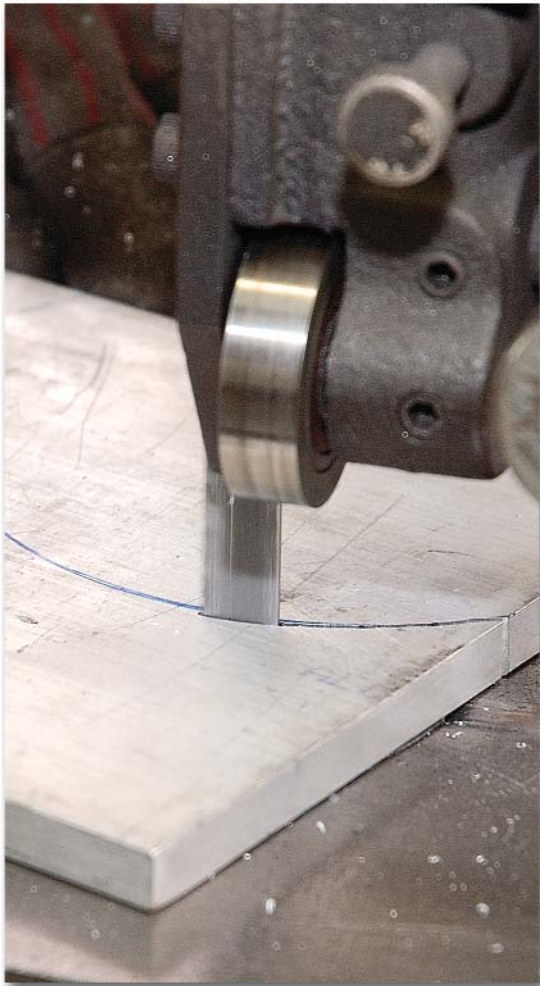
**Variable** – Reduces noise levels and vibration; cuts structurals, tubing and solids smoothly, quickly.



(Continued on next page.)



### Die Pro (continued)



### Specifications

| Width x Thickness |             | Pitch & Rake* | EDP No.         |
|-------------------|-------------|---------------|-----------------|
| Inch              | mm          |               | 100' Coil (30m) |
| 1/4" x .025"      | 6.5 x .65mm | 6/P           | 15833           |
|                   |             | 10-14/P       | 15835           |
|                   |             | 14-18/W       | 16092           |
| 1/4" x .035"      | 6.5 x .90mm | 6/P           | 15834           |
|                   |             | 10-14/P       | 15391           |
|                   |             | 14-18/W       | 20767           |
| 3/8" x .025"      | 10 x .65mm  | 6/P           | 15838           |
|                   |             | 8-12/P        | 15840           |
|                   |             | 10-14/P       | 15841           |
| 3/8" x .035"      | 10 x .90mm  | 14-18/W       | 16093           |
|                   |             | 4/P           | 15837           |
|                   |             | 6/P           | 15839           |
| 3/8" x .035"      | 10 x .90mm  | 8-12/P        | 20768           |
|                   |             | 10-14/P       | 15394           |
|                   |             | 14-18/W       | 20769           |
| 1/2" x .020"      | 13 x .50mm  | 14/S          | 19437           |
|                   |             | 18/W          | 19438           |
|                   |             | 24/W          | 19439           |
|                   |             | 10-14/S       | 19440           |
|                   |             | 14-18/W       | 19441           |
| 1/2" x .025"      | 13 x .65mm  | 4/P           | 15843           |
|                   |             | 6/P           | 15844           |
|                   |             | 18/W          | 15847           |
|                   |             | 6-10/P        | 21491           |
|                   |             | 8-12/P        | 15845           |
|                   |             | 10-14/P       | 15846           |
| 14-18/W           | 16094       |               |                 |
| 1/2" x .035"      | 13 x .90mm  | 3/P           | 15842           |
|                   |             | 4/P           | 19450           |
|                   |             | 6/P           | 19451           |
|                   |             | 10/S          | 13961           |
|                   |             | 14/S          | 13962           |
|                   |             | 6-10/P        | 13269           |
|                   |             | 8-12/P        | 13980           |
| 10-14/P           | 15395       |               |                 |

**NEW**

\*KEY: P: Positive Rake Tapered W: Wavy Set/Zero Rake  
S: Straight (Zero) Rake

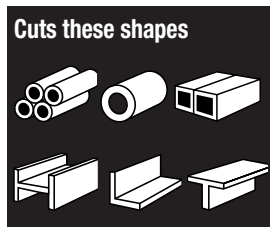
## Powerband M-42

An excellent bi-metal saw blade for fast cutting of tool and stainless steels.

**Material:** This bi-metal blade has a high speed steel cutting edge (contains 8% cobalt) welded to an alloy steel back. This steel resists heat, abrasion and shock which allows faster cutting rates over a wide range of materials.

**Versatility:** Available in a wide range of thicknesses and widths. Can be used on horizontal machines and light-duty vertical machines equally well. The blade is the choice for contour cutting and general purpose cutting.

Coils are furnished in 100', 150' and 250' (30, 45 and 76m) lengths as listed. Blades are also furnished welded, in convenient lengths ready to use.



### Pitch

**Variable** – Reduces noise levels and vibration; cuts structurals, tubing and solids smoothly, quickly.

### Shape

**Regular** – Conventional tooth for general purpose sawing, straight zero rake.



### Variable Pitch Selection

| Cross Section Thickness To Be Cut |          | Use Variable Pitch |
|-----------------------------------|----------|--------------------|
| Inch                              | mm       |                    |
| 1/2"–2-3/8"                       | 13-60mm  | 5-8                |
| 1"–3"                             | 25-75mm  | 4-6                |
| 1-1/2"–4"                         | 38-100mm | 3-4                |
| 2"–6"                             | 50-150mm | 2-3                |

### Specifications

| Width x Thickness |             | Tooth Shape | Pitch & Rake* | EDP No.      |              |              |
|-------------------|-------------|-------------|---------------|--------------|--------------|--------------|
| Inch              | mm          |             |               | 100' (30m)   | 150' (45m)   | 250' (76m)   |
| 3/4" x .035"      | 19 x 0.90mm | Regular     | 4-6/S         | <b>21242</b> | —            | <b>13089</b> |
|                   |             |             | 5-8/S         | <b>10184</b> | —            | <b>13987</b> |
| 1" x .035"        | 25 x 0.90mm | Regular     | 2-3/S         | —            | —            | <b>15790</b> |
|                   |             |             | 3-4/S         | —            | —            | <b>14934</b> |
|                   |             |             | 4-6/S         | <b>21248</b> | —            | <b>13062</b> |
|                   |             |             | 5-8/S         | —            | —            | <b>13989</b> |
| 1-1/4" x .042"    | 32 x 1.10mm | Regular     | 3-4/S         | —            | —            | <b>16363</b> |
|                   |             |             | 4-6/S         | —            | —            | <b>16365</b> |
|                   |             |             | 5-8/S         | —            | —            | <b>16367</b> |
| 1-1/2" x .05"     | 38 x 1.30mm | Regular     | 3-4/S         | —            | <b>14935</b> | <b>16370</b> |
|                   |             |             | 4-6/S         | —            | <b>13261</b> | <b>16371</b> |
|                   |             |             | 5-8/S         | —            | <b>16740</b> | —            |

**\*KEY:** P = Positive Rake HP = High Profile Teeth S = Straight (Zero) Rake LP = Low Profile Teeth W = Wavy Set, Zero Rake

**NOTE:** 150' and 250' (45, 76m) coils are shipped random lengths which may vary plus or minus 10%.

### Carbide Tipped Band Saw Blades

If our regular band saw blades won't cut it, these blades will.

#### Type I

A unique carbide cylinder, selected for its toughness, shock and wear resistance, is welded to a tough, ductile back. Together, this results in a carbide tipped blade that allows faster, smoother cutting at a lower cost on a variety of materials.

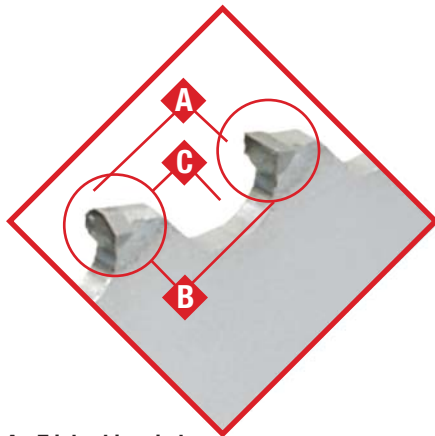
**Applications** – Aluminum castings, fiberglass, masonite, plastics, composite materials and abrasive wood.

#### Type III

A unique carbide cylinder, selected for its extreme resistance to wear and heat. High hardness teeth are welded to a tough ductile back. Together, this results in a carbide tipped band saw that allows faster and smoother cutting at a lower cost on the very difficult to machine metals.

**Applications** – Difficult to machine steels, high-alloy metals, titanium, stainless steel, Inconel, etc.

**NOTE:** These blades should be used on rugged, production-type machines.



**A** - Triple chip grind

**B** - Special carbide cylinder

**C** - Advanced tooth form with chip clearing gullet

**\*KEY:** P = Positive Rake

**NOTE:** 150' (45m) coils are shipped random lengths, which may vary plus or minus 10%.



### Specifications

| Width x Thickness |             | Pitch & Rake* | Type  | EDP No.         |                 |
|-------------------|-------------|---------------|-------|-----------------|-----------------|
| Inch              | mm          |               |       | 100' Coil (30m) | 150' Coil (45m) |
| 1/2" x .025"      | 13 x 0.65mm | 3P            | I     | —               | 20191           |
| 3/4" x .035"      | 19 x 0.90mm | 3P            | I     | —               | 19526           |
|                   |             |               | III   | —               | 19527           |
| 1" x .035"        | 25 x 0.90mm | 3P            | I     | —               | 19528           |
|                   |             |               | III   | —               | 19529           |
| 1" x .050"        | 25 x 1.30mm | 3P            | I     | —               | 19530           |
|                   |             | 2-3P          |       | —               | 19532           |
| 1-1/4" x .050"    | 32 x 1.30mm | 3P            | I     | —               | 19534           |
|                   |             | 2-3P          |       | III             | —               |
|                   |             | 2-3P          | III   | —               | 19537           |
| 1-1/2" x .050"    | 38 x 1.30mm | 1P            | III   | —               | 19538           |
|                   |             | 2-3P          | I     | —               | 19539           |
|                   |             |               | III   | —               | 19540           |
| 3P                | III         | —             | 19542 |                 |                 |
| 2" x .063"        | 50 x 1.60mm | 1P            | III   | 19551           | —               |
|                   |             | 2-3P          |       | 19552           | —               |
| 2-5/8" x .063"    | 67 x 1.60mm | 2-3P          | III   | welded only     | welded only     |
| 3-1/8" x .063"    | 79 x 1.60mm | 1P            | III   | welded only     | welded only     |
|                   |             | 2-3P          |       |                 |                 |



## Premium Hard-Back

This high carbon steel band has precisely hardened teeth, coupled with a hard, tough spring tempered back, resulting in a high tensile strength. Greater band tension and improved blade rigidity increases cutting rates and provides more accurate cuts.

**Applications** are light to medium vertical and horizontal machines, toolroom and maintenance, low alloy, nonferrous metals.

### Benefits

- ◆ Economical production cutting
- ◆ Increased tensile strength
- ◆ More accurate and straighter cuts
- ◆ Improved blade rigidity for increased cutting rates

Coils are 100', 250' and 500' (30, 76 and 152m) random lengths as listed, and welded, in convenient lengths ready to use.



### Rake

**Positive**



**Straight (Zero)**



### Shape

**Regular** – Conventional tooth for general purpose sawing, zero rake.



**Hook** – 10° positive rake for fast cutting of nonferrous metals and non-metallics.



**Skip** – Zero rake, widely spaced teeth and shallow gullets for cutting large sections.



**Pitch: Constant** – Usually for general purpose cutting.

### Constant Pitch Selection

| Cross Section To Be Cut |               | Use Pitch   |
|-------------------------|---------------|---|
| Inch                    | mm            |   |
| Up to 5/16"             | Up to 8mm     | 32 (Anything Thinner Than a 1/8" (3.2mm) Cross Section Should Be Angled to the Blade) |
| 5/32"–1/2"              | 4-13mm        | 24  |
| 7/32"–5/8"              | 6-16mm        | 18  |
| 1/4"–7/8"               | 6.4-22mm      | 14  |
| 3/8"–1-1/4"             | 9.5-35mm      | 10  |
| 1/2"–1-1/2"             | 13-40mm       | 8   |
| 1"–2"                   | 25-50mm       | 6   |
| 1-1/2"–3"               | 38-75mm       | 4   |
| 2" And Over             | 50mm And Over | 3   |

### Specifications

| Width x Thickness |              | Tooth Shape | Pitch & Rake* | EDP No.    |            |             |
|-------------------|--------------|-------------|---------------|------------|------------|-------------|
| Inch              | mm           |             |               | 100' (30m) | 250' (76m) | 500' (152m) |
| 1/4" x .025"      | 6.5 x 0.65mm | Hook        | 4P-HP         | 10995      | 11070      | —           |
|                   |              | Skip        | 4S-K          | 10985      | 11060      | —           |
|                   |              | Regular     | 6S            | 13892      | 13912      | —           |
|                   |              | Skip        | 6S-K          | 10986      | 11061      | —           |
|                   |              | Hook        | 6P-HP         | 15821      | 15822      | —           |
|                   |              | Regular     | 10S           | 13893      | 13913      | —           |
|                   |              |             | 14S           | 13894      | 13914      | —           |
|                   |              |             | 18W           | 10941      | 11016      | —           |
|                   |              |             | 24W           | 12910      | 12911      | —           |
|                   |              |             | 32W           | 10971      | 11046      | —           |

\*KEY: P = Positive Rake S = Straight (Zero) Rake W = Wavy Set, Zero Rake HP = High Profile Teeth K = Skip

(Continued on next page.)

### Premium Hard-Back Specifications (continued)

| Width x Thickness |             | Tooth Shape | Pitch & Rake* | EDP No.    |            |             |       |
|-------------------|-------------|-------------|---------------|------------|------------|-------------|-------|
| Inch              | mm          |             |               | 100' (30m) | 250' (76m) | 500' (152m) |       |
| 3/8" x .025"      | 10 x 0.65mm | Hook        | 3P-LP         | 10997      | 11072      | 11143       |       |
|                   |             |             | Skip          | 4S-K       | 10988      | 11063       | 11135 |
|                   |             | Regular     | Hook          | 4P-HP      | 10998      | 11073       | 11144 |
|                   |             |             |               | 6P-HP      | 15824      | 15825       | 15826 |
|                   |             |             | Regular       | 6S         | 13895      | 13915       | 13935 |
|                   |             |             |               | 8S         | 13896      | 13916       | 13936 |
|                   |             |             |               | 10S        | 13897      | 13917       | 13937 |
|                   |             |             |               | 14S        | 13898      | 13918       | 13938 |
| 18W               | 10946       | 11021       | 11096         |            |            |             |       |
| 1/2" x .020"      | 13 x 0.50mm | Regular     | 10S           | 10949      | 11024      | 11099       |       |
|                   |             |             | 14S           | 13900      | 13920      | 13940       |       |
|                   |             |             | 18W           | 10953      | 11028      | 12519       |       |
|                   |             |             | 24W           | 12913      | 12914      | 13032       |       |
| 1/2" x .025"      | 13 x 0.65mm | Skip        | 3S-K          | 10989      | 11064      | 11136       |       |
|                   |             |             | 4S-K          | 10990      | 11065      | 11137       |       |
|                   |             | Hook        | 4P-HP         | 11002      | 11077      | 11148       |       |
|                   |             |             | Regular       | 6S         | 13899      | 13919       | 13939 |
|                   |             | Regular     | Hook          | 6P-HP      | 15827      | 15828       | 15829 |
|                   |             |             |               | 10S        | 13322      | 13323       | 13324 |
|                   |             |             | 10W           | 10972      | 11047      | 11119       |       |
|                   |             |             | 14S           | 13901      | 13921      | 13941       |       |
|                   |             |             | 14W           | 13902      | 13922      | 13942       |       |
|                   |             |             | 18W           | 10954      | 11029      | 11103       |       |
| 24W               | 10975       | 11050       | 11122         |            |            |             |       |
| 5/8" x .032"      | 16 x 0.80mm | Regular     | 10S           | 13328      | 13329      | 13330       |       |
|                   |             |             | 14S           | 13903      | 13923      | 13943       |       |
| 3/4" x .032"      | 19 x 0.80mm | Hook        | 3P-LP         | 13905      | 13925      | 13945       |       |
|                   |             |             | 4P-HP         | 15830      | 15831      | 15832       |       |
|                   |             | Regular     | 6S            | 13906      | 13926      | 13946       |       |
|                   |             |             | 8S            | 13331      | 13332      | 13333       |       |
|                   |             |             | 10S           | 10963      | 11038      | 11111       |       |
|                   |             |             | 10W           | 10979      | 11054      | 11126       |       |
|                   |             |             | 14S           | 13907      | 13927      | 13947       |       |
|                   |             |             | 14W           | 13908      | 13928      | 13948       |       |
| 18W               | 10982       | 11057       | 11129         |            |            |             |       |
| 1" x .035"        | 25 x 0.90m  | Hook        | 3P-LP         | 13909      | 13929      | 13949       |       |
|                   |             |             | 6S            | 13910      | 13930      | 13950       |       |
|                   |             | Regular     | 8S            | 13337      | 13338      | 13339       |       |
|                   |             |             | 10S           | 13340      | 13341      | 13342       |       |
|                   |             |             | 14S           | 13911      | 13931      | 13951       |       |

**\*KEY:** P = Positive Rake    S = Straight (Zero) Rake    W = Wavy Set, Zero Rake    HP = High Profile Teeth    LP = Low Profile Teeth    K = Skip

**NOTE:** 250' and 500' (76, 152m) coils are shipped random lengths, which may vary plus or minus 10%.

## Flex-Back Band Saw Blades

### For Wood and Metal Cutting

Flex-Back, made from carbon steel with a flexible back, is recommended for general purpose cutting at an attractive cost on easy-to-machine nonferrous metal. It has an excellent fatigue factor to give long life on machines running at a high Surface Feet Per Minute (SFM), cutting nonferrous metal and wood (not recommended above 10,000 SFM [3,000m]). Its flexible feature is also suitable for absorbing contour cutting stresses.

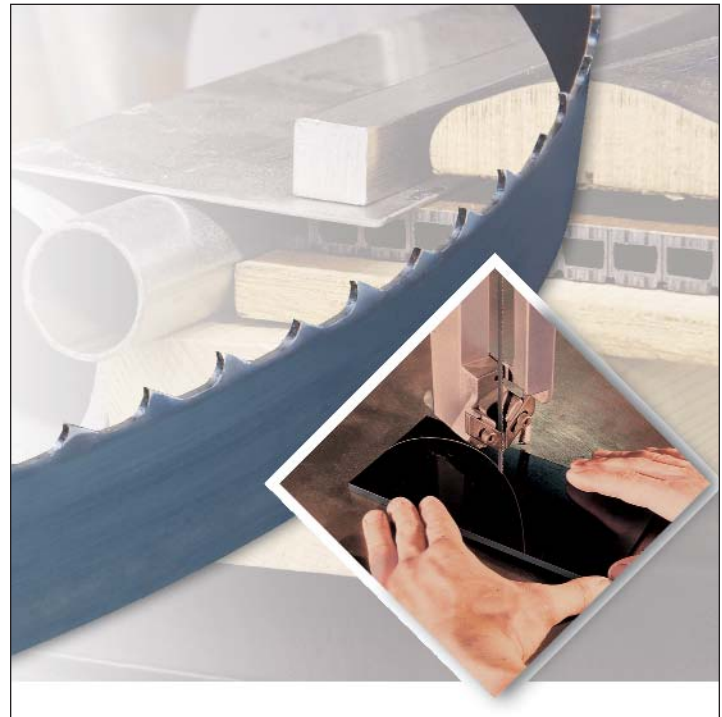
#### Benefits

- ◆ Economical, general purpose cutting
- ◆ Can be welded on standard welding equipment
- ◆ The greatest variety of widths, thicknesses and tooth shapes to suit any purpose
- ◆ Ideal for both contour and straight cutting

#### Applications

- ◆ Light duty, vertical and horizontal machines
- ◆ Furniture, composition board
- ◆ Low alloy, nonferrous metal
- ◆ Plastics of numerous types
- ◆ Nonferrous foundry materials

Blades are furnished welded in convenient lengths all ready to use. Coils are also furnished in 100' (30m) lengths and 250' and 500' (76 and 152m) random lengths as listed.

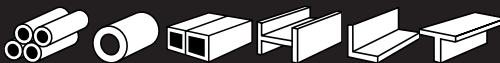


#### Rake Cuts these shapes

##### Positive



##### Straight (Zero)



#### Shape

**Regular** – Conventional tooth for general purpose sawing, zero rake.



**Hook** – 10° positive rake for fast cutting of nonferrous metals and non-metallics.



**Skip** – Zero rake, widely spaced teeth and shallow gullets for cutting large sections.



#### Specifications

| Width x Thickness |              | Tooth Shape | Pitch & Rake** | EDP No.         |                 |                  |
|-------------------|--------------|-------------|----------------|-----------------|-----------------|------------------|
| Inch              | mm           |             |                | 100' (30m) Coil | 250' (76m) Coil | 500' (152m) Coil |
| 1/16" x .025"     | 1.6 x 0.65mm | Regular     | 24/S           | 10001           | —               | —                |
| 1/8" x .025"      | 3 x 0.65mm   |             | 14/S           | 10004           | —               | —                |
| 3/16" x .014"     | 4.8 x 0.35mm |             | 18/S           | 10005           | —               | —                |
|                   |              |             | 8/S            | 15007           | 15017           | —                |
| 3/16" x .025"     | 4.8 x 0.65mm | Skip        | 14/S           | 15008           | 15018           | —                |
|                   |              |             | 4/S-K          | 10073           | 10182           | —                |
|                   |              | Regular     | 10/S           | 10007           | 10124           | —                |
| 14/S              | 10008        |             | 10125          | —               |                 |                  |

**Pitch: Constant** – Usually for general purpose cutting.

| Cross Section To Be Cut |          | Use Pitch   |
|-------------------------|----------|---|
| Inch                    | mm       |   |
| Up to 5/16"             | 8mm      | Use 32 Pitch (Anything Thinner than 1/8" Cross Section Should Be Angled to the Blade) |
| 5/32"–1/2"              | 4-13mm   | 24  |
| 7/32"–5/8"              | 6-16mm   | 18  |
| 1/4"–7/8"               | 6.4-22mm | 14  |
| 3/8"–1-1/4"             | 9.5-35mm | 10  |
| 1/2"–1-1/2"             | 13-40mm  | 8   |
| 1"–2"                   | 25-50mm  | 6   |
| 1-1/2"–3"               | 38-75mm  | 4   |
| 2"–4"                   | 50-100mm | 3   |

\*\*KEY: P = Positive Rake S = Straight (Zero) Rake W = Wavy Set, Zero Rake

(Continued on next page.)



### Flex-Back Band Saw Blades (continued)

#### Specifications

| Width x Thickness |              | Tooth Shape | Pitch & Rake** | EDP No.         |                 |                  |
|-------------------|--------------|-------------|----------------|-----------------|-----------------|------------------|
| Inch              | mm           |             |                | 100' (30m) Coil | 250' (76m) Coil | 500' (152m) Coil |
| 1/4" x .014"      | 6.5 x 0.35mm | Skip        | 6/S-K          | 15009           | 15019           | —                |
|                   |              | Regular     | 14/S           | 15011           | 15021           | —                |
| 1/4" x .025"      | 6.5 x 0.65mm | Hook        | 4/P-HP         | 10098           | 10207           | —                |
|                   |              | Skip        | 4/S-K          | 10074           | 10183           | —                |
|                   |              |             | 6/S-K          | 10076           | 10185           | —                |
|                   |              | Hook        | 6/P-HP         | 15803           | 15804           | —                |
|                   |              | Regular     | 6/S            | 13828           | 13846           | —                |
|                   |              |             | 10/S           | 13829           | 13847           | —                |
|                   |              |             | 14/S           | 13830           | 13848           | —                |
|                   |              |             | 18/W           | 10015           | 10130           | —                |
|                   |              |             | 24/W           | 12898           | 12899           | —                |
| 32/W              | 10055        | 10166       | —              |                 |                 |                  |
| 1/4" x .032"      | 6.5 x 0.80mm | Hook*       | WP-4/P-HP      | 12594           | 12603           | —                |
| 3/8" x .014"      | 10 x 0.35mm  | Skip        | 6/S-K          | 15013           | 15023           | —                |
|                   |              | Regular     | 14/S           | 15014           | 15024           | —                |
| 3/8" x .025"      | 10 x 0.65mm  | Hook*       | 3/P-LP         | 10100           | 10209           | 10314            |
|                   |              | Skip        | 4/S-K          | 10079           | 10189           | 10293            |
|                   |              | Hook        | 4/P-HP         | 10101           | 10210           | 10315            |
|                   |              |             | 6/P-HP         | 15806           | 15807           | 15808            |
|                   |              | Regular     | 6/S            | 13831           | 13849           | 13867            |
|                   |              |             | 8/S            | 13832           | 13850           | 13868            |
|                   |              |             | 10/S           | 13833           | 13851           | 13869            |
|                   |              |             | 14/S           | 13834           | 13852           | 13870            |
|                   |              |             | 18/W           | 10020           | 10135           | 10244            |
| 24/W              | 12904        | 12905       | 12906          |                 |                 |                  |
| 3/8" x .032"      | 10 x 0.80mm  | Hook*       | WP-3/P-HP      | 12595           | 12604           | 12613            |
|                   |              | Hook*       | WP-4/P-HP      | 12597           | 12606           | 12615            |
| 1/2" x .020"      | 13 x 0.50mm  | Regular     | 10/S           | 10024           | 10139           | 10248            |
|                   |              |             | 14/S           | 13836           | 13854           | 13872            |
|                   |              |             | 18/W           | 10028           | 10143           | 10252            |
|                   |              |             | 24/W           | 10057           | 10171           | 10275            |

\*Especially good on wood.

\*\*KEY: P = Positive Rake      HP = High Profile Teeth      WP = Woodpecker  
 S = Straight (Zero) Rake      LP = Low Profile Teeth  
 W = Wavy Set, Zero Rake      K = Skip

NOTE: 250' and 500' (76, 152m) coils are shipped random length, which may vary plus or minus 10%.

(Continued on next page.)

## Flex-Back Band Saw Blades (continued)

### Specifications

| Width x Thickness |             | Tooth Shape | Pitch & Rake** | EDP No.         |                 |                  |
|-------------------|-------------|-------------|----------------|-----------------|-----------------|------------------|
| Inch              | mm          |             |                | 100' (30m) Coil | 250' (76m) Coil | 500' (152m) Coil |
| 1/2" x .025       | 13 x 0.65mm | Hook        | 3/P-LP         | 10104           | 10213           | 10318            |
|                   |             | Hook*       | WP-3/P-HP      | 14477           | 14478           | 14479            |
|                   |             | Skip        | 4/S-K          | 10085           | 10195           | 10299            |
|                   |             | Hook        | 4/P-HP         | 10105           | 10214           | 10319            |
|                   |             |             | 6/P-HP         | 15809           | 15810           | 15811            |
|                   |             | Regular     | 6/S            | 13835           | 13853           | 13871            |
|                   |             |             | 10/S           | 10025           | 10140           | 10249            |
|                   |             |             | 10/W           | 10058           | 10167           | 10272            |
|                   |             |             | 14/S           | 13837           | 13855           | 13873            |
|                   |             |             | 14/W           | 13838           | 13856           | 13874            |
|                   |             |             | 18/W           | 10029           | 10144           | 10253            |
|                   |             | 24/W        | 10061          | 10172           | 10276           |                  |
| 1/2" x .032"      | 13 x 0.80mm | Hook*       | WP-3/P-HP      | 12599           | 12608           | 12617            |
|                   |             | Hook*       | WP-4/P-HP      | 12601           | 12610           | 12619            |
|                   |             | Skip*       | WP-4/S-K       | 12602           | 12611           | 12620            |
| 5/8" x .032"      | 16 x 0.80mm | Regular     | 10/S           | 10033           | 10148           | 10256            |
|                   |             |             | 14/S           | 13839           | 13857           | 13875            |
| 3/4" x .032"      | 19 x 0.80mm | Skip        | 3/S-K          | 10089           | 10199           | 10303            |
|                   |             | Hook        | 3/P-LP         | 14029           | 14030           | 14031            |
|                   |             |             | 4/P-HP         | 15815           | 15816           | 15817            |
|                   |             | Regular     | 6/S            | 13840           | 13858           | 13876            |
|                   |             | Hook        | 6/P-HP         | 15812           | 15813           | 15814            |
|                   |             |             | 8/S            | 10037           | 10152           | 10260            |
|                   |             |             | 10/S           | 10038           | 10153           | 10261            |
|                   |             |             | 10/W           | 10065           | 10176           | 10280            |
| Regular           | 14/S        | 13841       | 13859          | 13877           |                 |                  |
|                   |             |             |                |                 |                 |                  |
| 1" x .035"        | 25 x 0.90mm | Hook        | 2/P-LP         | 10112           | 10220           | 10325            |
|                   |             |             | 3/P-LP         | 13843           | 13861           | 13879            |
|                   |             | Skip        | 3/S-K          | 10094           | 10204           | 10308            |
|                   |             | Regular     | 6/S            | 13844           | 13862           | 13880            |
|                   |             |             | 8/S            | 10044           | 10159           | 10266            |
|                   |             |             | 10/S           | 10045           | 10160           | 10267            |
|                   |             |             | 14/S           | 13845           | 13863           | 13881            |
|                   |             |             |                |                 |                 |                  |
|                   |             |             |                |                 |                 |                  |
| 1-1/4" x .042"    | 32 x 1.10mm | Bearcat*    | W/P-1-1/4P     | 15859           | 15860           | 15861            |

\*Especially good on wood.

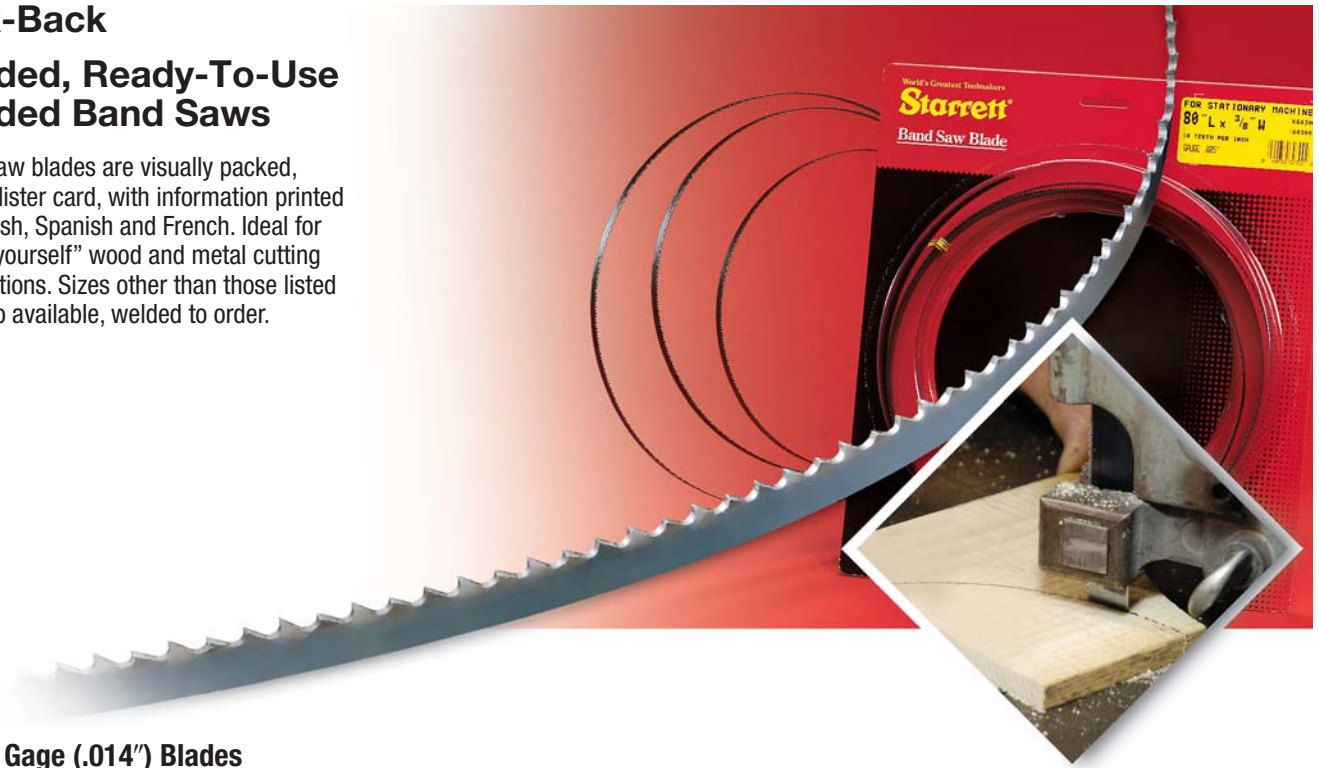
\*\*KEY: P = Positive Rake      HP = High Profile Teeth      WP = Woodpecker  
 S = Straight (Zero) Rake      LP = Low Profile Teeth  
 W = Wavy Set, Zero Rake      K = Skip

NOTE: 250' and 500' (76,152m) coils are shipped random length, which may vary plus or minus 10%.

### Flex-Back

### Welded, Ready-To-Use Welded Band Saws

Band saw blades are visually packed, 1 per blister card, with information printed in English, Spanish and French. Ideal for “do-it-yourself” wood and metal cutting applications. Sizes other than those listed are also available, welded to order.



### Thin Gage (.014") Blades for Bench Top Machines

| Fits Machine Models  | Length               | Width  | Tooth Shape | Pitch & Rake* | Catalog No.   | EDP No. |
|--|----------------------|--------|-------------|---------------|---------------|---------|
|  | Inches/Feet          | Inches |             |               |               |         |
| Black & Decker<br>74-480 & 9422  | 52-3/4" (4' 4-3/4")  | 3/16"  | Regular     | 8/S           | <b>K60270</b> | 60270   |
|  |                      | 1/4"   | Skip        | 6/S           | <b>K60252</b> | 60252   |
|  |                      |        | Regular     | 14/S          | <b>K60335</b> | 60335   |
| Shopcraft T676020, 10"<br>Craftsman VS 24453 and<br>Single speed 24460,<br>Shopcraft and Duracraft<br>VS312 & BBS412 | 57" (4' 9")          | 3/16"  | Regular     | 8/S           | <b>K60271</b> | 60271   |
|  |                      |        | 14/S        | <b>K60249</b> | 60249         |         |
|  |                      | 1/4"   | Skip        | 6/S           | <b>K60253</b> | 60253   |
|  |                      |        | Regular     | 14/S          | <b>K60336</b> | 60336   |
|  |                      | 3/8"   | Skip        | 6/S           | <b>K60264</b> | 60264   |
|  |                      |        | Regular     | 14/S          | <b>K60267</b> | 60267   |
| Black & Decker 9411,<br>Toolkraft 4500 & 4502,<br>King Feng Fu, Pro-tech 9",<br>Ryobi BS900 and<br>Delta 28-150      | 59-1/2" (4' 11-1/2") | 3/16"  | Regular     | 8/S           | <b>K60272</b> | 60272   |
|  |                      |        | 14/S        | <b>K60250</b> | 60250         |         |
|  |                      | 1/4"   | Skip        | 6/S           | <b>K60254</b> | 60254   |
|  |                      |        | Regular     | 14/S          | <b>K60337</b> | 60337   |
|  |                      | 3/8"   | Skip        | 6/S           | <b>K60265</b> | 60265   |
|  |                      |        | Regular     | 14/S          | <b>K60268</b> | 60268   |
| Skil 3104, Craftsman<br>9HT2442N, Alltrade<br>1996B3R, Rexon BS-12<br>and Walker-Turner 10"                          | 62" (5' 2")          | 3/16"  | Regular     | 8/S           | <b>K60273</b> | 60273   |
|  |                      |        | 14/S        | <b>K60251</b> | 60251         |         |
|  |                      | 1/4"   | Skip        | 6/S           | <b>K60255</b> | 60255   |
|  |                      |        | Regular     | 14/S          | <b>K60338</b> | 60338   |
|  |                      | 3/8"   | Regular     | 14/S          | <b>K60269</b> | 60269   |

\*KEY: S = Straight (Zero) Rake W = Wavy Set, Zero Rake

(Continued on next page.)



## Flex-Back Welded Bands (continued)

### Standard Gage (.025") Blades For Stationary Machines

| Fits Machine Models  | Length              | Width  | Tooth Shape | Pitch & Rake* | Catalog No.   | EDP No. |
|--|---------------------|--------|-------------|---------------|---------------|---------|
|  | Inches/Feet         | Inches |             |               |               |         |
| Wells 57, Emerson 10-1455 \$<br>10-1451, Ridgid 945, Sprunger<br>BS-45, Shopcraft T7070 and Ohio<br>Forge 510-505  | 64-1/2" (5' 4-1/2") | 1/2"   | Regular     | 10/S          | <b>K60312</b> | 60312   |
|  |                     |        |             | 14/W          | <b>K60322</b> | 60322   |
|  |                     |        |             | 18/W          | <b>K60331</b> | 60331   |
| Rockwell 28-120, 28-140<br>Craftsman 9HT2444N, Ryobi<br>BS-50N, Sprunger 10, Inca 310,<br>Wilton 3130, Skil HD3640 and<br>10" Dremel 1120  | 72-5/8" (6' 5/8")   | 3/16"  | Regular     | 14/S          | <b>K60280</b> | 60280   |
|  |                     | 1/4"   | Skip        | 6/S           | <b>K60283</b> | 60283   |
|  |                     |        | Regular     | 10/S          | <b>K60287</b> | 60287   |
|  |                     | 3/8"   | Regular     | 14/S          | <b>K60299</b> | 60299   |
| Craftsman (Sears) 9HT2433N &<br>9HT23331N, Boice-Crane 800   | 80" (6' 8")         | 3/16"  | Regular     | 14/S          | <b>K60281</b> | 60281   |
|  |                     |        | Skip        | 6/S           | <b>K60284</b> | 60284   |
|  |                     | 1/4"   | Regular     | 10/S          | <b>K60288</b> | 60288   |
|  |                     |        |             | 24/W          | <b>K60292</b> | 60292   |
|  |                     | 3/8"   | Regular     | 6/S           | <b>K60296</b> | 60296   |
|  |                     |        |             | 14/S          | <b>K60300</b> | 60300   |
|  |                     |        |             | 24/W          | <b>K60304</b> | 60304   |
|  |                     | 1/2"   | Skip        | 4/S           | <b>K60306</b> | 60306   |
| Regular  | 6/S                 |        |             | <b>K60308</b> | 60308         |         |
| Johnson (Kysor) B.M.<br>Johnson B, M, MB-1<br>Kalamazoo 610, 7A; Lenox Mobil<br>Mitre; Startrite 30T   | 89" (7' 5")         | 1/2"   | Regular     | 10/W          | <b>K60314</b> | 60314   |
|  |                     |        |             | 14/W          | <b>K60325</b> | 60325   |
|  |                     |        |             | 18/W          | <b>K60332</b> | 60332   |
| Boice Crane 800-14; Ellis 908<br>Heston & Anderson 50  | 90" (7' 6")         | 1/2"   | Regular     | 14/S          | <b>K60326</b> | 60326   |
| Delta 14 & 28285 & 28230,<br>Duracraft Sprunger 14<br>Gator 712, Grob S14<br>Rockwell 028-230,<br>28-240, 28-243,<br>28-283, 028-285<br>Ohio Forge 510-556<br>14" Ricon 10-320<br>14" Jet, 14" Enlon,<br>14" Elephant, 14" Reliant,<br>14" Grizzley, Ridgid BS1400,<br>Toolkraft 4512, 4514,<br>Wellsaw 58B (Wells),<br>Yates American W14 | 93-1/2" (7' 9-1/2") | 3/16"  | Regular     | 14/S          | <b>K60282</b> | 60282   |
|  |                     |        | Skip        | 6/S           | <b>K60285</b> | 60285   |
|  |                     | 1/4"   | Regular     | 10/S          | <b>K60290</b> | 60290   |
|  |                     |        |             | 24/W          | <b>K60293</b> | 60293   |
|  |                     | 3/8"   | Regular     | 6/S           | <b>K60297</b> | 60297   |
|  |                     |        |             | 14/S          | <b>K60301</b> | 60301   |
|  |                     |        |             | 24/W          | <b>K60015</b> | 60015   |
|  |                     | 1/2"   | Skip        | 4/S           | <b>K60307</b> | 60307   |
|  |                     |        |             | 6/S           | <b>K60309</b> | 60309   |
|  |                     |        | Regular     | 10/S          | <b>K60317</b> | 60317   |
|  |                     |        |             | 14/S          | <b>K60329</b> | 60329   |
|  |                     |        |             | 18/W          | <b>K60334</b> | 60334   |
| Boice-Crane 2300-14,<br>Ensley E-400,<br>Johnston (Kysor) V-14,<br>Montgomery Ward, Wells 5  | 98" (8' 2")         | 1/2"   | Regular     | 10/S          | <b>K60318</b> | 60318   |

\*KEY: S = Straight (Zero) Rake W = Wavy Set, Zero Rake

### Woodpecker™ Premium

A selection of ground tooth blades ideal for a variety of woodworking applications. Includes blades as thin as .020" for jobs such as contour cutting fine hardwoods to thicker blades for tough tasks including pallet work.

#### Features

- ◆ Hard Back for less operator fatigue
- ◆ Computer generated ground teeth for fast cutting
- ◆ Positive tooth angles for high production rates
- ◆ Induction high hardness teeth for longer life
- ◆ Precision set teeth – Can be re-sharpened and reset
- ◆ High carbon spring-tempered steel for fast, straight cuts
- ◆ Thin kerf available for increased yields

#### Applications

- ◆ Wood, particle board, plywood, plastics, cork, etc
- ◆ Contour cutting
- ◆ Thin kerf, extra yield cuts on expensive hardwoods
- ◆ Pallet manufacturing
- ◆ Grade lumber
- ◆ Re-saws



Coils are available in 250' (76m) lengths as listed

Cuts these shapes



#### Pitch

**Constant** – Excellent performance for most wood cutting applications.

#### Tooth Shape

**Hook** – 10° positive rake for fast cutting of nonferrous metals and non-metallics



**Skip** – Zero rake, widely spaced teeth and shallow gullets for cutting large sections.



**Regular** – Conventional tooth for general purpose sawing, zero rake.



#### Specifications

| Width x Thickness |            | Tooth Shape | Pitch & Rake* | EDP No.         |
|-------------------|------------|-------------|---------------|-----------------|
| Inch              | mm         |             |               | 250' Coil (76m) |
| 3/8" x .022"      | 10 x .55mm | Skip        | 3/S-K         | <b>19804</b>    |
|                   |            |             | 4/S-K         | <b>19807</b>    |
|                   |            |             | 6/S-K         | <b>19810</b>    |
| 1/2" x .022"      | 13 x .55mm |             | 3/S-K         | <b>19819</b>    |
|                   |            |             | 4/S-K         | <b>19822</b>    |
|                   |            |             | 6/S-K         | <b>19825</b>    |
| 5/8" x .022"      | 16 x .55mm |             | 3/S-K         | <b>19828</b>    |
| 3/4" x .022"      | 19 x .55mm |             | 4/S-K         | <b>19831</b>    |
|                   |            |             | 3/S-K         | <b>19834</b>    |
| 3/4" x .028"      | 19 x .65mm | 4/S-K       | <b>19837</b>  |                 |
|                   |            | 3/S-K       | <b>19840</b>  |                 |

\*KEY: K: Skip

Woodpecker Premium Larger sizes on next page

(Continued on next page.)

## Woodpecker™ Premium (continued)



### Specifications

| Width x Thickness |                | Tooth Shape | Pitch & Rake* | EDP No.         |
|-------------------|----------------|-------------|---------------|-----------------|
| Inch              | mm             |             |               | 250' Coil (76m) |
| 1" x .023"        | 25 x .58mm     | Hook        | 1.1/P         | <b>19843</b>    |
|                   | 25 x .58mm     |             | 1.3/P         | <b>19846</b>    |
|                   |                |             | 2/P           | <b>20321</b>    |
| 1" x .028"        | 25 x .65mm     |             | 1.1/P         | <b>19852</b>    |
|                   | 25 x .65mm     |             | 1.3/P         | <b>19855</b>    |
| 25 x .65mm        |                |             | 2/P           | <b>20324</b>    |
|                   | 1" x .035"     |             | 25 x .90mm    | 1.1/P           |
| 25 x .90mm        |                |             | 1.3/P         | <b>20330</b>    |
|                   | 25 x .90mm     |             | 2/P           | <b>20333</b>    |
| 1-1/4" x .028"    |                |             | 32 x .65mm    | 1.1/P           |
|                   | 32 x .65mm     | 1.3/P       | <b>19864</b>  |                 |
| 32 x .65mm        |                | 2/P         | <b>20348</b>  |                 |
|                   | 1-1/4" x .035" | 32 x .90mm  | 1.1/P         | <b>20351</b>    |
| 32 x .90mm        |                | 1.3/P       | <b>20354</b>  |                 |
|                   | 32 x .90mm     | 2/P         | <b>20357</b>  |                 |
| 1-1/4" x .042"    |                | 32 x 1.10mm | 1.1/P         | <b>19870</b>    |
|                   | 32 x 1.10mm    | 1.3/P       | <b>19873</b>  |                 |
|                   |                | Regular     | 5-8/S         | <b>21671**</b>  |
| 1-1/2" x .042"    | 38 x 1.10mm    | Hook        | 1.1/P         | <b>20149</b>    |
|                   |                |             | 1.3/P         | <b>20152</b>    |
| 2" x .032"        | 50 x 0.80      |             | 1.1/P         | <b>19885</b>    |
|                   |                |             | 1.3/P         | <b>19888</b>    |
| 2" x .042"        | 50 x 1.10mm    |             | 1.1/P         | <b>19891</b>    |
|                   |                |             | 1.3/P         | <b>19894</b>    |
| 2-9/16" x .032"   | 65 x 0.80      |             | 1.3/P         | <b>19900</b>    |
|                   |                |             | 65 x 1.10mm   | 1.1/P           |
| 65 x 1.10mm       | 1.3/P          |             |               | <b>19906</b>    |

\*KEY: P: Positive Rake S: Straight (Zero) Rake S: Skip

\*\* Variable Tooth blade ideal for pallet manufacturing applications

NOTE: Coil lengths greater than 100' (30m) may vary +/-10%



### Woodpecker XF™

A selection of blades ideal for sawing furniture, cabinet and woodworking products. With blades as thin as .014" (0.35mm), XF offers durable, accurate, cost effective sawing and less material loss.

#### Features

- ◆ Carbon blades feature a flexible back, are well suited for absorbing contour cutting stresses and have an excellent fatigue factor on machines running a high SFM
- ◆ Coils are furnished in 100', 250' and 500' (30, 76 and 152m) lengths as listed. Blades are also furnished welded, in convenient lengths ready to use



#### Shape

**Hook** – 10° positive rake for fast cutting of nonferrous metals and non-metallics.

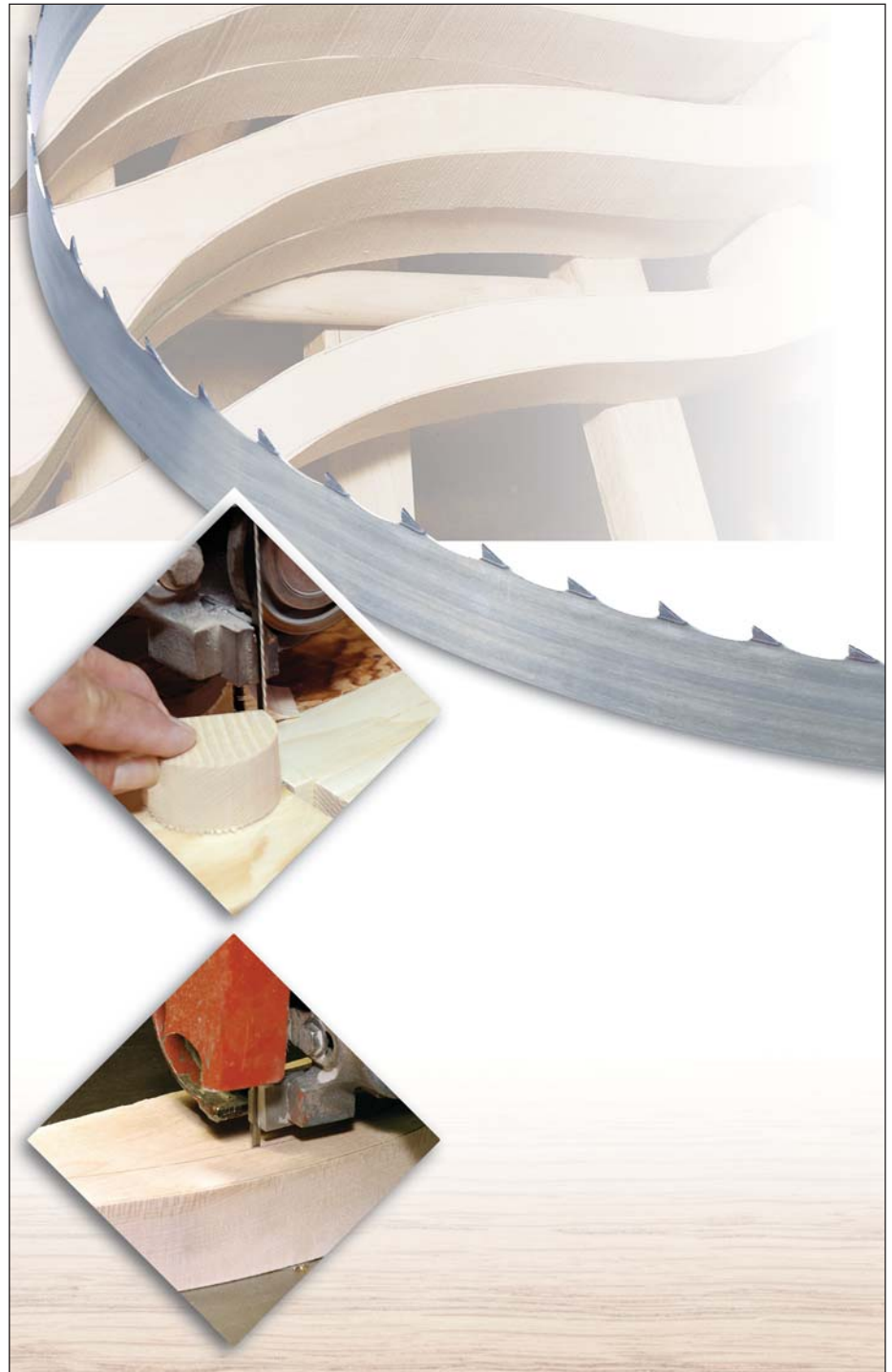


**Skip** – Zero rake, widely spaced teeth and shallow gullets for cutting large sections.



#### Pitch

**Constant** – Usually for general purpose cutting.



#### Constant Pitch Selection

| Cross Section To Be Cut |               | Use Pitch |
|-------------------------|---------------|-----------|
| Inch                    | mm            |           |
| 1"-2"                   | 25-50mm       | 6         |
| 1-1/2"-3"               | 38-75mm       | 4         |
| 2" And Over             | 50mm And Over | 2 or 3    |

## Woodpecker XF™ (continued)

### Specifications

| Width x Thickness |              | Tooth Shape | Pitch & Rake | EDP No.    |            |             |
|-------------------|--------------|-------------|--------------|------------|------------|-------------|
| Inch              | mm           |             |              | 100' (30m) | 250' (76m) | 500' (152m) |
| 1/4" x .014"      | 6.5 x 0.35mm | Skip        | 6/S-K        | 15009      | 15019      | —           |
| 1/4" x .020"      | 6.5 x 0.50mm | Skip        | 4/S-K        | 19791      | 19792      | 19793       |
|                   |              |             | 6/S-K        | 19794      | 19795      | 19796       |
| 1/4" x .032"      | 6.5 x 0.80mm | Hook        | 4/P-HP       | 12594      | 12603      | —           |
| 3/8" x .014"      | 10 x 0.35mm  | Skip        | 6/S-K        | 15013      | 15023      | —           |
| 3/8" x .022"      | 10 x 0.55mm  | Skip        | 3/S-K        | 19803      | 19804      | 19805       |
|                   |              |             | 4/S-K        | 19806      | 19807      | 19808       |
| 3/8" x .025"      | 10 x 0.65mm  | Hook        | 4/P-HP       | 10101      | 10210      | 10315       |
|                   |              | Skip        | 4S-K         | 10079      | 10189      | 10293       |
|                   |              | Hook        | 6/P-HP       | 15806      | 15807      | 15808       |
| 3/8" x .032"      | 10 x 0.80mm  | Hook        | 3/P-HP       | 12595      | 12604      | 12613       |
|                   |              |             | 4/P-HP       | 12597      | 12606      | 12615       |
| 1/2" x .022"      | 13 x 0.55mm  | Skip        | 3/S-K        | 19818      | 19819      | 19820       |
|                   |              |             | 4/S-K        | 19821      | 19822      | 19823       |
|                   |              |             | 6/S-K        | 19824      | 19825      | 19826       |
| 1/2" x .032"      | 13 x 0.80mm  | Hook        | 4/P-HP       | 12601      | 12610      | 12619       |
|                   |              | Skip        | 4/S-K        | 12602      | 12611      | 12620       |
| 5/8" x .022"      | 16 x 0.58mm  | Skip        | 3/S-K        | 19827      | 19828      | 19829       |
|                   |              |             | 4/S-K        | 19830      | 19831      | 19832       |
| 3/4" x .022"      | 19 x 0.58mm  | Skip        | 3/S-K        | 19833      | 19834      | 19835       |
|                   |              |             | 4/S-K        | 19836      | 19837      | 19838       |
| 3/4" x .028"      | 19 x 0.65mm  | Skip        | 3/S-K        | 19839      | 19840      | 19841       |
| 3/4" x .032"      | 19 x 0.80mm  | Hook        | 3/P-HP       | 14029      | 14030      | 14031       |
|                   |              | Skip        | 3/S-K        | 10089      | 10199      | 10303       |
|                   |              | Hook        | 4/P-HP       | 15815      | 15816      | 15817       |
|                   |              |             | 6/P-HP       | 15812      | 15813      | 15814       |
| 1" x .023"        | 25 x 0.58mm  | Hook        | 2/P          | 20320      | 20321      | 20322       |
|                   |              | Skip        | 3/S-K        | 19848      | 19849      | 19850       |
| 1" x .028"        | 25 x 0.65mm  | Hook        | 2/P          | 20323      | 20324      | 20325       |
|                   |              | Skip        | 3/S-K        | 19857      | 19858      | 19859       |
| 1" x .035"        | 25 x 0.90mm  | Hook        | 2/P          | 20332      | 20333      | 20334       |
|                   |              | Skip        | 3/S-K        | 20335      | 20336      | 20337       |
| 1-1/4" x .028"    | 32 x 0.65mm  | Hook        | 2/P          | 20347      | 20348      | 20349       |
|                   |              | Skip        | 3/S-K        | 19866      | 19867      | 19868       |
| 1-1/4" x .035"    | 32 x 0.90mm  | Hook        | 2/P          | 20356      | 20357      | 20358       |
| 1-1/4" x .042"    | 32 x 1.10mm  |             |              | 20359      | 20360      | 20361       |

\*KEY: P = Positive Rake      S = Straight (Zero) Rake      HP = High Profile Teeth

NOTE: 250' and 500' (76 and 152m) coils are shipped random lengths, which may vary plus or minus 10%.

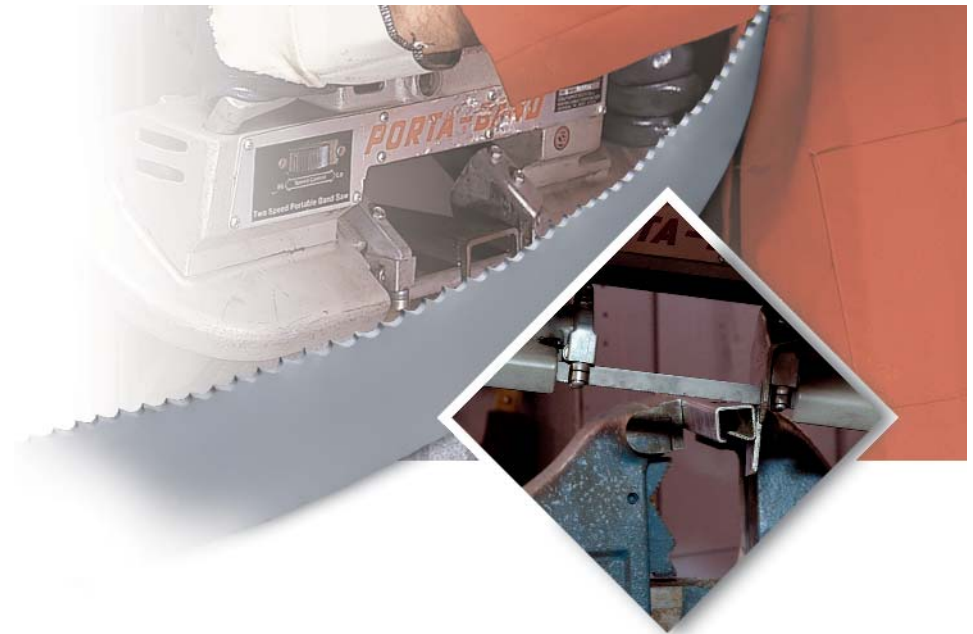
### Blades for Portable Band Saw Machines

Five Starrett blade types are offered to improve the usage of these handy power tools.

**bi-metal unique®:** These blades utilize Starrett's exclusive bi-metal unique® saw technology for faster cutting and longer blade life. HSS teeth contain 8% cobalt. Two strips of high speed steel wires are joined to a backing steel in a solid phase, using the principle of solid state diffusion bonding to provide 170% more weld contact area, significantly reducing fracture and breakage at the HSS/backing material interface. The teeth develop a groove after initial use, producing dual chips that are easily removed from the cut. This is the Split-Chip Advantage®.

**Powerband M-42:** This is an ideal bi-metal band saw blade for production cutting of abrasive exotic alloys, tool steels and stainless steels.

**Premium:** High carbon steel blade. Greater band tension and blade rigidity increase cutting



rates and provide more accurate cuts of low alloy, non-ferrous metals.

**Flex-Back:** These blades combine good, general purpose cutting with low cost – a good value.

**Carbide Grit:** These band saw blades

will easily cut through most hard and abrasive materials.

Blades are supplied welded in convenient lengths, ready to go to work. Packaged three per cardboard sleeve<sup>††</sup>. Also available in 100' and 250' (30 and 76m) coils as listed.



### Specifications: bi-metal unique® Blades

| Fits Machine Models   | Length                         | Width x Thickness            | Pitch & Rake* | 3-Blade Sleeve |         | 100 Blade Box  |         |
|---|--------------------------------|------------------------------|---------------|----------------|---------|----------------|---------|
|   |                                |                              |               | Catalog No.    | EDP No. | Catalog No.    | EDP No. |
| Black & Decker, Greenlee, Milwaukee, Ridgid, Rockwell, Porter-Cable, Skil, Unitec | 44-7/8" or 3' 8-7/8" (114cm)   | 1/2" x .020" (13mm x 0.50mm) | 10/S          | <b>BM10</b>    | 14600   | <b>BM10B</b>   | 16948   |
|   |                                |                              | 14/S          | <b>BM14</b>    | 14601   | <b>BM14B</b>   | 16948   |
|   |                                |                              | 18/W          | <b>BM18</b>    | 14602   | <b>BM18B</b>   | 16950   |
|   |                                |                              | 24/W          | <b>BM24</b>    | 14603   | <b>BM24B</b>   | 16951   |
|   |                                |                              | 10-14/S       | <b>BM1014</b>  | 15708   | <b>BM1014B</b> | 16952   |
| Greenlee, Porter-Cable, Rockwell  | 53-3/4" or 4' 5-3/4" (136.5cm) | 1/2" x .020" (13mm x 0.50mm) | 14/S          | <b>RBM14</b>   | 14605   | —              | —       |
|   |                                |                              | 18/W          | <b>RBM18</b>   | 14606   | —              | —       |
|   |                                |                              | 24/W          | <b>RBM24</b>   | 14607   | —              | —       |
|   |                                |                              | 10-14/S       | <b>RBM1014</b> | 15709   | —              | —       |
|   |                                |                              | 14-18/W       | <b>RBM1418</b> | 16089   | —              | —       |
| Ensley, Greenlee, Millers Falls, Porter-Cable,                                    | 54" or 4' 6" (137cm)           | 1/2" x .025" (13mm x 0.65mm) | 18/W          | <b>GBM18</b>   | 16635   | —              | —       |
|   |                                |                              | 8-12          | <b>GBM812</b>  | 16636   | —              | —       |
|   |                                |                              | 10-14         | <b>GBM1014</b> | 16637   | —              | —       |
|   |                                |                              | 14-18         | <b>GBM1418</b> | 16638   | —              | —       |

(Carbide Grit Blades continued on next page.)



# BAND SAW BLADES

## Blades for Portable Band Saw Machines (continued)

**44-7/8" (39' 8-7/8") x 1/2" x 0.20"**  
**(114cm x 13mm x 0.50mm)**

Carbon Steel and Bi-Metal Portable Band Saw Blades for Black & Decker, Greenlee, Milwaukee, Ridgid, Rockwell, Porter-Cable, Skil, and Unitec



### Specifications

| Pitch & Rake* | Flex-Back   |       | Premium     |       | Powerband M-42   |       |                 |       |
|---------------|-------------|-------|-------------|-------|------------------|-------|-----------------|-------|
|               | Cat. No.    | EDP   | Cat. No.    | EDP   | (3-Blade Sleeve) |       | (Box of 100)    |       |
|               |             |       |             |       | Cat. No.         | EDP   | Cat. No.        | EDP   |
| 10/S          | <b>HE10</b> | 10338 | <b>PR10</b> | 11156 | —                | —     | —               | —     |
| 14/S          | <b>HE14</b> | 10340 | <b>PR14</b> | 11157 | <b>CBM14</b>     | 19412 | <b>CBM14B</b>   | 19639 |
| 18/W          | <b>HE18</b> | 10341 | <b>PR18</b> | 11158 | <b>CBM18</b>     | 19413 | <b>CBM18B</b>   | 19640 |
| 24/W          | <b>HE24</b> | 10343 | <b>PR24</b> | 11159 | <b>CBM24</b>     | 19414 | <b>CBM24B</b>   | 19641 |
| 10-14/S       | —           | —     | —           | —     | <b>CBM1014</b>   | 19415 | <b>CBM1014B</b> | 19642 |
| 14-18/W       | —           | —     | —           | —     | <b>CBM1418</b>   | 19416 | <b>CBM1418B</b> | 19643 |

\*S = Straight (Zero) Rake W = Wavy Set, Zero Rake 3-Blade Sleeve: Flex-Back & Premium

## Carbide Grit

Welded-to-length blades for Portable Band Saw Machines

### Specifications

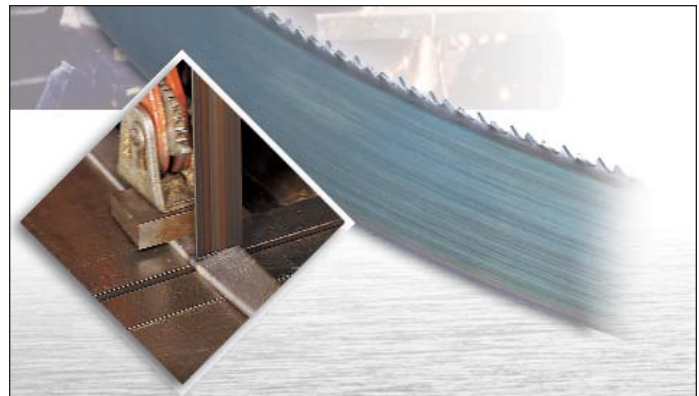
| Fits Machine Models   | Length                         | Width x Thickness           | Tooth Type | Medium Grit  |         | Medium Coarse Grit |         |
|---|--------------------------------|-----------------------------|------------|--------------|---------|--------------------|---------|
|   |                                |                             |            | Catalog No.  | EDP No. | Catalog No.        | EDP No. |
| Black & Decker, DeWalt, Greenlee, Makita, Unitec, Porter-Cable, Ridgid, Rockwell, Skil, Milwaukee | 44-7/8" or 3' 8-7/8" (114cm)   | 1/2" x.020" (13mm x 0.50mm) | Gulleted   | <b>CG4GM</b> | 19956   | <b>CG4GMC</b>      | 19957   |
|   |                                |                             | Continuous | <b>CG4CM</b> | 19954   | <b>CG4CMC</b>      | 19955   |
| Greenlee, Porter-Cable, Rockwell  | 53-3/4" or 4' 5-3/4" (136.5cm) | 1/2" x.020" (13mm x 0.50mm) | Gulleted   | <b>CG5GM</b> | 19960   | <b>CG5GMC</b>      | 19961   |
|   |                                |                             | Continuous | <b>CG5CM</b> | 19958   | <b>CG5CMC</b>      | 19959   |

Carbide Grit are one blade per box.

## Friction Cutting Blade

Made of a special fatigue resistant material, this blade is ideal for thin, ferrous sections. It is made of a high-silicon alloy and has a fully hardened tooth with a special tempered back allowing it to be run at speeds up to the 15,000 SFM (4500m) necessary to achieve the melting point of the ferrous metal to be friction cut. A heavy tooth set further enhances the fast cutting action of these blades. Teeth with "air scoop" action brings oxygen into the kerf to burn up the metal. Cuts materials up to 5/8" (16mm) thick.

Tooth shape is regular. Friction blades are furnished welded in convenient lengths, ready to use. These blades are also furnished in 100', 250' and 500' (30, 76 and 152m) coils as listed.



### Specifications

| Width x Thickness |             | Pitch & Rake* | EDP Number      |                 |                  |
|-------------------|-------------|---------------|-----------------|-----------------|------------------|
|                   |             |               | 100' (30m) Coil | 250' (76m) Coil | 500' (152m) Coil |
| Inch              | mm          |               |                 |                 |                  |
| 1" x .035"        | 25 x 0.90mm | 8S            | <b>14619</b>    | <b>14620</b>    | <b>14621</b>     |
|                   |             | 10S           | <b>10122</b>    | <b>10230</b>    | <b>10335</b>     |

\*S = Straight (Zero) Rake



### Carbide Grit Bands

These band saw blades will easily cut through most hard and abrasive materials.

Starrett carbide band saw blades are especially useful in cutting new and complex materials such as composite graphite, fiber-reinforced plastics and titanium. In some cases, they cut better than regular blades. In other cases, they're the only blades that will cut when a regular band can't.

#### Use Carbide Grit Band Saws :

- ◆ For material 1/4" (13mm) in thickness and above, use gulleted blades
- ◆ Where surface chipping is possible or on brittle materials or material thicknesses less than 1/4" (13mm), use continuous edge blades
- ◆ Coarse grit is applicable for faster cutting of thick materials or metals
- ◆ Finer grit is applicable on thin materials and fine finishing
- ◆ Minimum machine wheel diameter of 24" (600mm) is recommended for continuous band. Smaller diameters tend to increase fatigue and reduce blade life
- ◆ Use widest applicable blade for straight cutting
- ◆ 30% reductions in cut radius can be achieved using grit blades instead of standard blades



- ◆ Coolants are needed for most metal cutting and should be considered for glass and ceramics
- ◆ Start cuts at lower speeds and gradually increase until the required performance is achieved
- ◆ Metal cutting – a fine, stringy strip indicates the correct feed and band speed
- ◆ Increase the life of the blade by turning the blade inside-out from time to time. This presents a new edge to the work

| Width x Thickness |              | Tooth Type | EDP No. – Offered in 100' and 250' (30 and 76m) Coils |        |             |       |                    |       |             |       |
|-------------------|--------------|------------|---|--------|-------------|-------|--------------------|-------|-------------|-------|
|                   |              |            | Fine Grit   |        | Medium Grit |       | Medium Coarse Grit |       | Coarse Grit |       |
| Inch              | mm           |            | 100'  | 250'   | 100'        | 250'  | 100'               | 250'  | 100'        | 250'  |
| 1/4" x .020"      | 6.5 x 0.50mm | Gulleted   | 16480   | 16515  | 16481       | 16516 | —                  | —     | —           | —     |
| 3/8" x .025"      | 10 x 0.65mm  | Gulleted   | —   | —      | 16483       | 16518 | 16484              | 16519 | —           | —     |
|                   |              | Continuous | —   | —      | 16486       | 16521 | —                  | —     | —           | —     |
| 1/2" x .020"      | 13 x 0.50mm  | Gulleted   | —   | —      | 16492       | 16527 | 16493              | 16528 | —           | —     |
|                   |              | Continuous | —   | —      | 16494       | 16529 | —                  | —     | —           | —     |
| 1/2" x .025"      | 13 x 0.65mm  | Gulleted   | —   | —      | 16487       | 16522 | 16488              | 16523 | —           | —     |
|                   |              | Continuous | —   | 16524  | 16490       | 16525 | —                  | —     | —           | —     |
| 3/4" x .032"      | 19 x 0.80mm  | Gulleted   | —   | —      | 16496       | 16531 | 16497              | 16532 | 16498       | 16533 |
|                   |              | Continuous | —   | —      | 16499       | 16534 | —                  | —     | 16501       | 16536 |
| 1" x .035"        | 25 x 0.90mm  | Gulleted   | —   | —      | —           | —     | 16502              | 16537 | 16503       | 16538 |
|                   |              | Continuous | —   | 16539* | 16505       | 16540 | —                  | —     | —           | —     |
| 1" x .042"        | 25 x 1.10mm  | Gulleted   | —   | —      | —           | —     | 16508              | 16543 | 16509       | 16544 |
| 1-1/4" x .035"    | 32 x 0.90mm  | Gulleted   | —   | —      | —           | —     | —                  | —     | 16510       | 16545 |
|                   |              | Continuous | —   | —      | —           | —     | —                  | —     | 16511       | 16546 |
| 1-1/4" x .042"    | 32 x 1.10mm  | Gulleted   | —   | —      | —           | —     | 16512              | 16547 | 16513       | 16548 |

Bands furnished in coils as listed or available welded, cut to length and ready to use.

\*1" x .035" (EDP: 16539) is Extra Fine

## Diamond Grit Bands

If your material cannot be cut satisfactorily with carbide grit bands, then we recommend diamond grit bands. Typical materials that can be cut with these blades are glass-fired ceramics, stone, silicon, Pyrex, laminated fiberglass, etc.

### Cutting tips:

- ◆ Roller guides and rubber-coated idle and drive wheels are recommended
- ◆ Minimum Band Wheel Diameter: 12" (300mm) for gulleted blades
- ◆ Use continuous edge on cross sections up to 5/8" (16mm)
- ◆ The use of fine, medium or coarse grit should be determined by the finish required
- ◆ Increase the life of the blade by turning the blade inside-out from time to time. This presents a new edge to the work
- ◆ Blade Tension: 15,000-20,000 PSI (1,000-1,250kg/cm<sup>2</sup>)



### Cutting Recommendations for Diamond Grit Bands

| Materials†     | Band Speed SFM |
|----------------|----------------|
| Ceramics       | 250-1000       |
| Glass          | 500-1000       |
| Quartz (Fused) | 1000-2000      |
| Granite        | 500-3500       |
| Marble         | 2000-3000      |
| Transite       | 2000-2500      |
| Silicon        | 250-500        |
| Pyrex          | 500-1000       |

| Width x Thickness |             |            | Fine Grit<br>85/100 | Medium Grit<br>60/85 |
|-------------------|-------------|------------|---------------------|----------------------|
| Inch              | mm          | Tooth Type |                     |                      |
| 1/2" x .020"      | 13 x 0.50mm | Continuous | •                   | •                    |
| 3/4" x .020"      | 19 x 0.50mm | Continuous |                     | •                    |

Available only in welded to length sizes, ready to use.

†We recommend using a coolant when cutting these materials.

### Cutting Recommendations for Carbide Grit Bands (Previous Page)

| Materials   | Band Speed SFM | Coolant |
|---|----------------|---------|
| *Fiberglass Reinforced Plastics (Polyesters, Epoxies, Melamines, Phenolics) | 1000-3000      | None    |
| *Graphite Composites  | 1500-3000      | None    |
| *Carbon and Graphite  | 1000-4000      | None    |
| Glass   | 500-1000       | Yes     |
| Wire Reinforced Rubber  | 1200-3000      | Yes     |
| *Compressed Perlite Fiberboard  | 400-1600       | No      |

\* Start cuts at lower speeds and increase until required performance is achieved.

**CAUTION: Use respirators and dust collectors when not using coolant.**



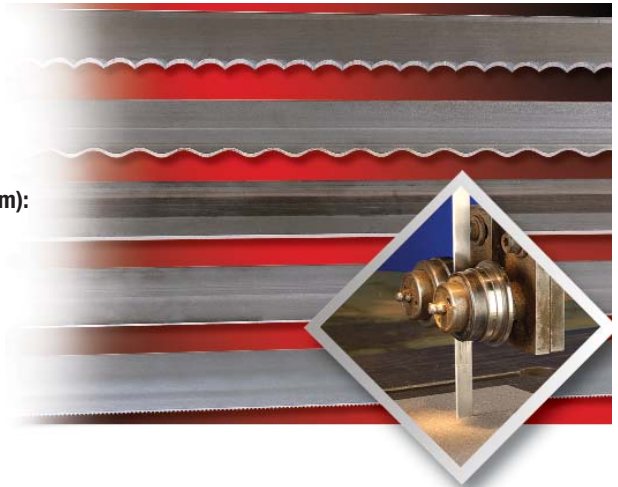
### Band Knives

Razor-edge band knives are available with either a single or double edge bevel in straight, scallop, wavy or V-tooth cutting edges. These variations enable them to cut foam, paper, rubber, soft plastic and other fibrous material quickly, smoothly and without waste because their slicing action produces no chips.

Furnished in bands, cut to length, welded and ready to use, or in 100' (30m) coils as listed.

**Band Knives with (top-to-bottom):**

- Scallop edge**
- Wavy edge**
- Straight edge, double bevel**
- Straight edge, single bevel**
- Vee tooth**



### Specifications/100' (30m) Coil Stock

| Width x Thickness |              | Scallop Edge, Double Bevel<br>1/2" (13mm) Pitch | Wavy Edge, Double Bevel<br>3/4" (19mm) Pitch | Straight Edge, Double Bevel | Straight Edge, Single Bevel | Vee Tooth Edge, Double Bevel |          |
|-------------------|--------------|---|--|-----------------------------|-----------------------------|------------------------------|----------|
|                   |              | EDP No.   | EDP No.                                      | EDP No.                     | EDP No.                     | 10 Pitch                     | 14 Pitch |
| Inch              | mm           |   |  |                             |                             |                              |          |
| 1/4" x .020"      | 6.5 x 0.50mm | —   | —  | 14861                       | —                           | —                            | —        |
| 3/8" x .022"      | 10 x 0.56mm  | 14880   | —  | —                           | —                           | —                            | —        |
| 1/2" x .018"      | 13 x 0.46mm  | 20688   | —  | —                           | —                           | —                            | —        |
| 1/2" x .022"      | 13 x 0.56mm  | 14883   | 14897  | 14864                       | 12063                       | 14911                        | 14912    |
| 3/4" x .022"      | 19 x 0.56mm  | 14886   | 14899  | 14867                       | —                           | 14915                        | 14914    |
| 3/4" x .028"      | 19 x 0.71mm  | 12215   | 12306  | 12129                       | —                           | —                            | —        |
| 1" x .025"        | 25 x 0.65mm  | 14888   | —  | 14869                       | —                           | —                            | —        |
| 1" x .035"        | 25 x 0.89mm  | 14889   | 12315  | 14870                       | —                           | —                            | —        |

### Meatkutter™ Blades

For meat, fish and poultry band saw machines, these blades are .018" (0.46mm) thick, so they produce minimal meat loss.

- ◆ Meatkutter blades are made of special steel and clean-cut stainless steel. These blades offer high levels of hygiene to the food industries when cutting meat, fish and poultry. The stainless steel blade can be washed down without risk of rusting, thereby avoiding hygiene problems
- ◆ Tooth shape is skip

Blades are furnished welded in convenient lengths all ready to use. Furnished in 100', 250' and 500' (30, 76 and 152m) coils as listed.



#### Meatkutter – Stainless Steel – With Ground Teeth

| Width x Thickness |             | Tooth Shape | Pitch & Rake | EDP Number      |                 |                  |
|-------------------|-------------|-------------|--------------|-----------------|-----------------|------------------|
|                   |             |             |              | 100' (30m) Coil | 250' (76m) Coil | 500' (152m) Coil |
| Inch              | mm          |             |              |                 |                 |                  |
| 5/8" x .018"      | 16 x 0.46mm | Skip        | 4/S          | 19941           | 19942           | 19943            |
|                   |             |             | 6/S          | 19944           | 19945           | 19946            |

#### Meatkutter – Special – With Ground Teeth

|              |             |      |     |       |       |       |
|--------------|-------------|------|-----|-------|-------|-------|
| 5/8" x .018" | 16 x 0.46mm | Skip | 4/S | 19920 | 19921 | 19922 |
|              |             |      | 6/S | 19923 | 19924 | 19925 |

\*KEY: S = Straight (Zero) Rake

NOTE: 250' and 500' (76, 152m) coils are shipped random length, which may vary plus or minus 10%.

## Flash Welders

Save money while adding convenience. Now you can do your own top quality welds on your band saw blades, the way you want it and when you want it, while making your sawing operation more profitable. Starrett Flash Welders are first-rate performers — workhorses that will help you in many ways:

- ◆ Eliminate costly, time-consuming outsourcing of welds
- ◆ Eliminate the need for excessive inventories of custom length blades — you simply stock coils at the lower cost
- ◆ Get your blade fast, right on the spot
- ◆ SW Series Welders include a built-in water cooled system, necessary on welders with anneal control. These welders use a lower voltage for a longer period of time than manual annealing, causing more heat to conduct in the jaws and carriages.



### Specifications

|                                       | Maximum Blade Width |               | Blade Thickness |                | KVA | Model             |
|---------------------------------------|---------------------|---------------|-----------------|----------------|-----|-------------------|
|                                       | Carbon              | Bi - Metal    | Minimum         | Maximum        |     |                   |
| <b>BAS Series Welders</b>             | 1-1/4" (32mm)       | 1-1/4" (32mm) | .014" (0.35mm)  | .042" (1.10mm) | 4,5 | <b>BAS-050-11</b> |
|                                       | 2" (50mm)           | 2" (50mm)     | .025" (0.65mm)  | .063" (1.60mm) | 20  | <b>BAS-065-11</b> |
|                                       | 1-1/2" (38mm)       | 1" (25mm)     | .014" (0.35mm)  | .035" (0.90mm) | 3,5 | <b>BAS-040</b>    |
| <b>SW Series Dual Shafted Welders</b> | 1" (25mm)           | 1/2" (13mm)   | .010" (0.25mm)  | .042" (1.10mm) | 8   | <b>SW-10DS</b>    |
|                                       | 1-1/2" (38mm)       | 3/4" (19mm)   | .010" (0.25mm)  | .042" (1.10mm) | 8   | <b>SW-15DS</b>    |
|                                       | 2" (50mm)           | 1" (25mm)     | .010" (0.25mm)  | .042" (1.10mm) | 8   | <b>SW-20DS</b>    |



### Band Saw Accessories

#### Pocket Laser Tachometer Kit with Case

Cat. No. S7793Z • EDP 68930

The Pocket Laser Tachometer is a digital, battery-powered portable optical tachometer that can operate up to 25 feet from a reflective target using a laser light source.

This powerful 32 function Tachometer/Ratemeter, Totalizer/Counter and Timer is programmable in both inch and metric rates. It has TTL compatible pulse output to trigger devices such as data collectors or stroboscopes.

Ergonomic design makes measurement of speed and RPM simple.

**Range:**

**Optical:**

5 to 200,000 RPM

**Contact:**

0.5 to 20,000 RPM

**Accuracy:**

**Optical:** ±0.01%

of reading

**Contact:**

±0.05% of reading.

**Kit includes:**

Tachometer, RCA, contact tips, 10cm linear contact wheel, five feet of T-5 reflective tape, (2) AA batteries, carrying case



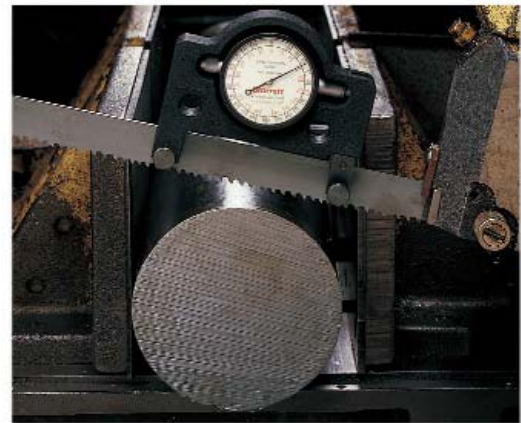
#### Saw Tension Gage

Cat. No. 682EMZ • EDP 57075

The Saw Tension Gage will check for proper blade tension in either English or metric, and is graduated both in pounds and kilograms.

The tension gage can be read directly on either band saws of any type, or power hacksaws.

It is graduated to read up to 60,000 PSI or 4,000kg per cm<sup>2</sup> and is furnished with instructions, including suggested tensions.



#### Band Saw Blade Alignment Gage

No. PT92925 • EDP 65049

The alignment of your band saw blade is a key factor to guarantee blade life and accuracy with Starrett Band Saw Blades. This gage enables you to make sure your blade is running square to the cut.



### Band Saw Selection Tools

Starrett offers two helpful guides for band saw selection for most common materials.

They recommend the pitch to be used for the cross section to be cut. There are also recommendations for surface feet per minute speed plus the optimum cutting rate.

These tools were developed by our R & D group from actual tests.

#### Selection CD

This CD is a computerized version of the band saw blade selection and operating guide.



#### Selection and Operating Guide Slide Chart

Our original and very popular band saw slide chart selection and operating guide includes a wealth of useful information printed on both sides.





## Band Saw Service & Support

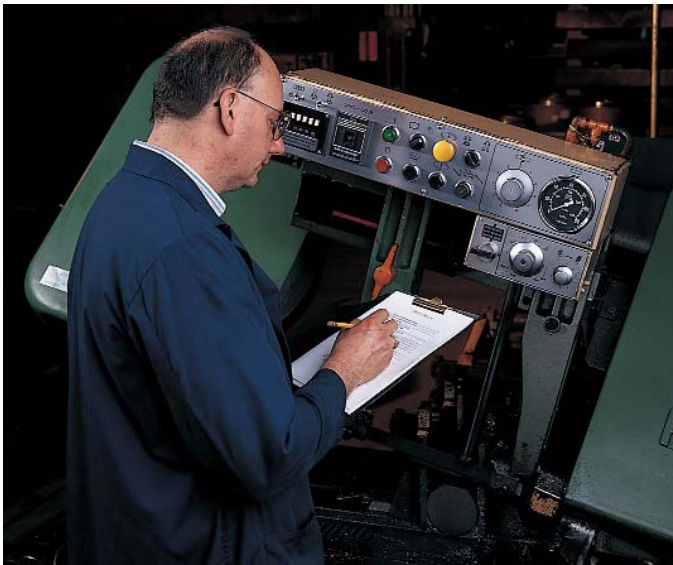
Starrett service technicians are available to tune up and perform preventative maintenance on your production sawing machine using Starrett Band Saw Blades, at no additional cost.

They fully review machine condition, blade mounting and operation in detail, making adjustments, as required, to help maintain good sawing and long life for both the machine and blades.

### Training

Starrett service technicians can also instruct saw operators on achieving the best performance of blade and machine for your applications.

Contact your Starrett Band Saw distributor about arranging a visit to your workplace by a Starrett service technician.



## Packaging

The coil stock offered by Starrett is packaged in sturdy dispensing containers in 100' (30m) lengths up to 1/2" (12.7mm) widths.

All other sizes are packaged in a box dispenser.

Starrett also packages welded blades two (2) per box or ten (10) per standard carton except portable bands which are packed three per sleeve.

All boxes are clearly marked for easy identification.



## Ordering

To expedite order fulfillment of the Starrett Band Saw coil stock or cut-to-length and welded product detailed in this catalog, please specify the following information to your local Starrett distributor.

**Welded-to-length blades:** Quantity, length, width, thickness, teeth per inch, tooth style, form and product.

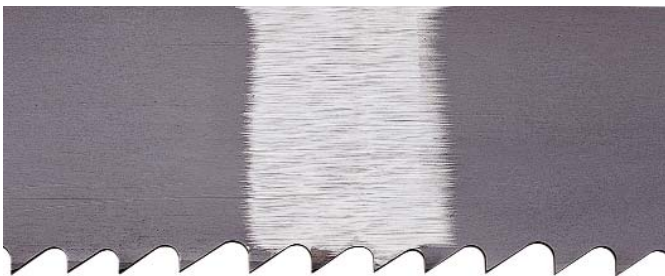
**Coil Stock:** Specify quantity and length and any other information relevant to the specific blade, per the catalog description.

## Saw Service and Welding Centers

Starrett Saw Service Centers maintain a comprehensive inventory of finished products. These centers also offer welding services, providing ready-to-use blades for your applications. They are located throughout North America as follows:

- ◆ Athol, MA
- ◆ Bensenville, IL
- ◆ Orange, CA
- ◆ Mount Airy, NC
- ◆ Houston, TX
- ◆ Mississauga, ON Canada
- ◆ Saltillo, Mexico

In addition, our network of local industrial distributors maintain a stock of Starrett saw product to meet your requirements. Many also offer welding services Contact your distributor for more information.





# “STARRETT’S MY BLADE!”

Starrett Power Tool Accessory products are found in factories and on workbenches the world over, providing quality and innovation to help skilled tradesmen and women solve problems and create value. For increasing numbers of these tradesmen who work with their heads as well as their hands, “Starrett’s My Blade.”

|   |      |
|---|------|
| Hole Saws & Accessories .....                     | .594 |
| Hole Saw Kits .....                               | .604 |
| King-Cut® Reciprocating Blades .....              | .606 |
| General Purpose & Special Reciprocating Blades .. | .607 |
| Unified Shank® Jig Saw Blades .....               | .609 |
| Power Hacksaw Blades .....                        | .611 |
| Ship Auger Drill Bits .....                       | .614 |







## Hole Saws, Accessories and Hole Saw Kits

A range of new applications, materials and saws has expanded the role of the hole saw in recent years, and the Starrett family of hole saw products has been significantly expanded to meet these requirements.

Our line now includes several new, application-specific hole saws engineered specifically for certain materials, power tools and jobs. In addition to our existing line of bi-metal, diamond edged and carbide tipped and grit saws, our expanded specialty saw line includes Smooth Cut saws for cordless drills, TCT Fast Cut Multi-Purpose saws for non-metallics and TCT Sheet Metal saws.

A full line of accessories, including Quickshot® arbors, pilot drills and a practical protective cowl enable you to optimize each job with safe, cost efficient solutions.

Our popular hole saw kits now includes a new “Super Deluxe

Electricians Kit.”



## Hole Saw Selection Guide

### Hole Saw Cutting Tips

- ◆ **ALWAYS WEAR SAFETY GLASSES**
- ◆ Keep hands, loose hair and clothing away from the rotating saws
- ◆ Use oil or coolant on most metals
- ◆ Hold the saw firmly and perpendicular to the work surface
- ◆ It is sometimes easier to drill a 1/4" (6.35 mm) hole first and use a 1/4" steel rod to guide the saw
- ◆ Use enough pressure to assure that the saw cuts and does not just “rub” the work. Clear chips frequently
- ◆ Run the saw at recommended speeds for the material to be cut and the diameter of the saw. Use a variable speed saw, if possible
- ◆ For tough cuts and production work, use our “locking arbor” to eliminate chatter and vibrations, and extend the saw life
- ◆ When sawing tough materials such as ceramics, leave the drill in only long enough to allow the saw to penetrate the material and establish its position. Then take the drill out of the saw
- ◆ For certain jobs special hole saws can increase efficiency and extend tool life
- ◆ Diamond hole saws are recommended for better life when cutting hardened steels, fired ceramics or aggregate containing (concrete) materials
- ◆ Always start with low or recommended RPMs, the increase as appropriate. Avoid extreme heat build-up on the cutting surface

| Work Piece Material  | Light to Medium Production   | Heavy Production   |
|--|--|--|
| <b>Carbon and alloy steels, stainless steels, Nonferrous Materials and Wood</b>            | FASTCUT™ Variable Pitch All-Purpose Carbide Tipped Hole Saws           | TCT FASTCUT Multi-Purpose Hole (MPH) TCT Carbide Tipped Sheet Metal Saw Assemblies |
| <b>Thin gauge Steel, Cellular Metals, Sheet Metal, Interrupted cuts, Electrical Panels</b> | Straight 6 Pitch Sheet Metal Saws, Smoothcut Cordless Hole Saws        | TCT Carbide Tipped Sheet Metal Saw Assemblies                                      |
| <b>PVC, ABS Materials, Wood, Fiberglass and other Non-Metallics</b>                        | Carbide Tipped Hole Saws TCT Carbide Tipped Sheet Metal Saw Assemblies | TCT FASTCUT Multi-Purpose Hole Saws (MPH)  |
| <b>Ceramics, marble, granite, glass, resins, formica*</b>                                  | Carbide Grit Hole Saws TCT FASTCUT Multi-Purpose Hole Saws (MPH)       | Diamond Grit Hole Saws   |

\*Coolant recommended

### Hole Saw Terminology

**Pipe Size** is designated by the Inside Diameter (ID). For example, a 7/8" diameter hole saw is used to prepare a hole through which a 1/2" pipe may be inserted

**Tubing Size** is designated by the Outside Diameter (OD). For example, when preparing an entrance hole for a given tubing diameter, select a hole saw with the same diameter

**Pipe Taps** listed are for threading holes prepared by hole sawing to receive threaded pipe. For example, a 7/8" diameter hole saw will provide a proper hole for a 3/4" pipe tap.

### Recommended RPMs by Material & Saw Diameter

| Diameter                  | Mild Steel | Tool Steel | Brass & Aluminum | Wood    |
|---------------------------|------------|------------|------------------|---------|
| <b>9/16" – 1"</b>         | 580-350    | 300-175    | 790-470          | 800-500 |
| <b>1 -1/16" – 2"</b>      | 325-170    | 160-85     | 435-230          | 500-200 |
| <b>2 -1/16" – 3"</b>      | 165-115    | 80-35      | 220-150          | 200-150 |
| <b>3 -1/8" – 4"</b>       | 110-85     | 55-40      | 140-110          | 150-100 |
| <b>4 -1/8" – 6"</b>       | 80-55      | 40-25      | 100-75           | 100-75  |
| <b>6 -5/16" – 6 -5/8"</b> | 50         | 25         | 75               | 150     |
| <b>6 -31/32"</b>          | 45         | 20         | 65               | 140     |
| <b>8 -9/32"</b>           | 40         | 20         | 60               | 125     |





### Fastcut™ Variable Pitch Hole Saws

#### All Purpose Saws With Bi-Metal High Speed Steel Teeth

Starrett Bearcat® variable pitch hole saws have been the industry standard for decades. Hardened, heat resistant and positive rake high speed steel teeth are welded to a durable alloy backing and cap.



They are exceptionally strong and shatter resistant. These tools effectively and economically cut a wide variety of materials including wood, metal and steel.

Fastcut saws are used by all industries and contracting trades. They are suitable for hand held drills or in fixed applications such as a stationary press. These saws provide a cutting depth of 1-5/8" (41mm).

### Fastcut™ Variable Pitch Hole Saws with Quickshot® Arbors

The same reliable Fastcut tool but provided as a complete assembly with arbor, pilot drill and hole saw.



The ultimate in simplicity, the Quickshot® Arbor has a solid shank for a 3/8" chuck.

### Straight 6-Pitch Hole Saws

#### Sheet Metal Saws With Bi-Metal High Speed Steel Teeth

These application specific saws are engineered to cut thin cross sections of sheet metal, corrugated or perforated steel, or any thinner gauge applications with interrupted cuts. A constant six-pitch tooth set cuts smoothly, minimizing the tendency for the tool to bite or snag in the work piece. Bi-metal construction ensures long life and fast cutting action.



(Larger sizes on the following page)

| Hole Saw Diameter |       | Fastcut Variable Pitch All-purpose Hole Saw |       | Fastcut Hole Saw w/Quickshot Arbor |       | Straight 6-Pitch Sheet Metal Saw |       |
|-------------------|-------|---|-------|------------------------------------|-------|----------------------------------|-------|
| Inch              | mm    | Cat. No.                                    | EDP   | Cat. No.                           | EDP   | Cat. No.                         | EDP   |
| 9/16"             | 14mm  | VH0096                                      | 55078 | AVH0096                            | 65501 | SH0096                           | 61000 |
| 5/8"              | 16mm  | VH0058                                      | 55079 | AVH0058                            | 65502 | SH0058                           | 61001 |
| 11/16"            | 17mm  | VH1016                                      | 55080 | AVH1016                            | 65503 | SH1016                           | 61002 |
| 3/4"              | 19mm  | VH0034                                      | 55081 | AVH0034                            | 65504 | SH0034                           | 61003 |
| 13/16"            | 21mm  | VH1036                                      | 55082 | AVH1036                            | 65505 | SH1036                           | 61005 |
| 7/8"              | 22mm  | VH0078                                      | 55083 | AVH0078                            | 65506 | SH0078                           | 61006 |
| 15/16"            | 24mm  | VH1056                                      | 55084 | AVH1056                            | 65507 | SH1056                           | 61007 |
| 1"                | 25mm  | VH0100                                      | 55085 | AVH0100                            | 65508 | SH0100                           | 61008 |
| 1-1/16"           | 27mm  | VH0116                                      | 55086 | AVH0116                            | 65509 | SH0116                           | 61009 |
| 1-1/8"            | 29mm  | VH0118                                      | 55087 | AVH0118                            | 65510 | SH0118                           | 61010 |
| 1-3/16"           | 30mm  | VH0136                                      | 55088 | AVH0136                            | 65511 | SH0136                           | 61011 |
| 1-1/4"            | 32mm  | VH0114                                      | 55089 | AVH0114                            | 65512 | SH0114                           | 61012 |
| 1-5/16"           | 33mm  | VH0156                                      | 55090 | AVH0156                            | 65513 | SH0156                           | 61013 |
| 1-3/8"            | 35mm  | VH0138                                      | 55091 | AVH0138                            | 65514 | SH0138                           | 61014 |
| 1-7/16"           | 37mm  | VH0176                                      | 55092 | AVH0176                            | 65515 | SH0176                           | 61015 |
| 1-1/2"            | 38mm  | VH0112                                      | 55093 | AVH0112                            | 65516 | SH0112                           | 61016 |
| 1-9/16"           | 40mm  | VH0196                                      | 55094 | AVH0196                            | 65517 | SH0196                           | 61017 |
| 1-5/8"            | 41mm  | VH0158                                      | 55095 | AVH0158                            | 65518 | SH0158                           | 61018 |
| 1-11/16"          | 43mm  | VH1116                                      | 55096 | AVH1116                            | 65519 | SH1116                           | 61019 |
| 1-3/4"            | 44mm  | VH0134                                      | 55097 | AVH0134                            | 65520 | SH0134                           | 61020 |
| 1-13/16"          | 46mm  | VH1136                                      | 55098 | AVH1136                            | 65521 | SH1136                           | 61021 |
| 1-7/8"            | 48mm  | VH0178                                      | 55099 | AVH0178                            | 65522 | SH0178                           | 61022 |
| 2"                | 51mm  | VH0200                                      | 55100 | AVH0200                            | 65523 | SH0200                           | 61023 |
| 2-1/16"           | 52mm  | VH0216                                      | 55101 | AVH0216                            | 65524 | SH0216                           | 61024 |
| 2-1/8"            | 54mm  | VH0218                                      | 55102 | AVH0218                            | 65525 | SH0218                           | 61025 |
| 2-1/4"            | 57mm  | VH0214                                      | 55103 | AVH0214                            | 65526 | SH0214                           | 61027 |
| 2-5/16"           | 59mm  | VH0256                                      | 55104 | AVH0256                            | 65527 | SH0256                           | 61028 |
| 2-3/8"            | 60mm  | VH0238                                      | 55105 | AVH0238                            | 65528 | SH0238                           | 61029 |
| 2-1/2"            | 64mm  | VH0212                                      | 55106 | AVH0212                            | 65529 | SH0212                           | 61030 |
| 2-9/16"           | 65mm  | VH0296                                      | 55107 | AVH0296                            | 65530 | SH0296                           | 61031 |
| 2-5/8"            | 67mm  | VH0258                                      | 55108 | AVH0258                            | 65531 | SH0258                           | 61032 |
| 2-3/4"            | 70mm  | VH0234                                      | 55109 | AVH0234                            | 65532 | SH0234                           | 61034 |
| 2-7/8"            | 73mm  | VH0278                                      | 55110 | AVH0278                            | 65533 | SH0278                           | 61035 |
| 3"                | 76mm  | VH0300                                      | 55111 | AVH0300                            | 65534 | SH0300                           | 61036 |
| 3-1/8"            | 79mm  | VH0318                                      | 55112 | AVH0318                            | 65535 | SH0318                           | 61037 |
| 3-1/4"            | 83mm  | VH0314                                      | 55113 | AVH0314                            | 65536 | SH0314                           | 61038 |
| 3-3/8"            | 86mm  | VH0338                                      | 55114 | AVH0338                            | 65537 | SH0338                           | 61039 |
| 3-1/2"            | 89mm  | VH0312                                      | 55115 | AVH0312                            | 65538 | SH0312                           | 61040 |
| 3-5/8"            | 92mm  | VH0358                                      | 55116 | AVH0358                            | 65539 | SH0358                           | 61041 |
| 3-3/4"            | 95mm  | VH0334                                      | 55117 | AVH0334                            | 65540 | SH0334                           | 61042 |
| 3-7/8"            | 98mm  | VH0378                                      | 55118 | AVH0378                            | 65541 | SH0378                           | 61043 |
| 4"                | 102mm | VH0400                                      | 55119 | AVH0400                            | 65542 | SH0400                           | 61044 |



## Bi-Metal Hole Saws

(continued from the previous page)

9/16" (14mm) through  
4" (102mm) sizes are  
on the previous page.



| Hole Saw Diameter |       | Fastcut Variable Pitch All-purpose Hole Saw |       | Fastcut Hole Saw w/Quickshot Arbor |       | Straight 6-Pitch Sheet Metal Saw |       |
|-------------------|-------|---|-------|------------------------------------|-------|----------------------------------|-------|
| Inch              | mm    | Cat. No.                                    | EDP   | Cat. No.                           | EDP   | Cat. No.                         | EDP   |
| 4-1/8"            | 105mm | VH0418                                      | 55120 | AVH0418                            | 65543 | SH0418                           | 61045 |
| 4-1/4"            | 108mm | VH0414                                      | 55121 | AVH0414                            | 65544 | SH0414                           | 61046 |
| 4-3/8"            | 111mm | VH0438                                      | 55122 | AVH0438                            | 65545 | SH0438                           | 61047 |
| 4-1/2"            | 114mm | VH0412                                      | 55123 | AVH0412                            | 65546 | SH0412                           | 61048 |
| 4-3/4"            | 121mm | VH0434                                      | 55124 | AVH0434                            | 65547 | SH0434                           | 61049 |
| 5"                | 127mm | VH0500                                      | 55125 | AVH0500                            | 65548 | SH0500                           | 61050 |
| 5-1/2"            | 140mm | VH0512                                      | 55126 | AVH0512                            | 65549 | SH0512                           | 61051 |
| 6"                | 152mm | VH0600                                      | 55127 | AVH0600                            | 65550 | SH0600                           | 61052 |
| 6-5/16"           | 160mm | VH160MM                                     | 66590 |                                    |       | SH160MM                          | 61053 |
| 6-5/8"            | 168mm | VH168MM                                     | 66591 |                                    |       | SH168MM                          | 61054 |
| 6-31/32"          | 177mm | VH177MM                                     | 66592 |                                    |       | SH177MM                          | 61055 |
| 8-9/32"           | 210mm | VH210MM                                     | 66593 |                                    |       | SH210MM                          | 61056 |

## Special Purpose Hole Saws

### Smoothcut Cordless Hole Saw Assemblies with Arbor and Pilot Drill

#### Bi-Metal High Speed Steel Hole Saws for Battery Operated Power Tools

These tools have been engineered to maximize the utility of a handheld cordless drill. A constant pitch set of eight teeth per inch and durable bi-metal construction deliver vibration-free cutting action and extend the service time of battery operated tools. Smoothcut Cordless Saws are an effective choice for most materials, including mild steel sheet, plasterboard, wood and thin non-metallics.

They include an important safety feature – a flared design of the saw at the base cap ensures that no cut will extend beyond the 1/2" cutting depth. The Smoothcut tool is a complete tool with no need to purchase a separate arbor and pilot drill.

These hole saw assemblies are compatible with No. AQC-14 Quick Change Connector, and are the perfect tools for the growing number of work sites that utilize battery charged power tools.



| Diameter |      | Cat. No. | EDP    |
|----------|------|----------|--------|
| Inch     | mm   |          |        |
| 5/8"     | 16mm | CSC16    | 11851  |
| 3/4"     | 19mm | CSC19    | 11852  |
| 25/32"   | 20mm | CSC20    | 118531 |
| 7/8"     | 22mm | CSC22    | 11854  |
| 1"       | 25mm | CSC25    | 11855  |
| 1-1/16"  | 27mm | CSC27    | 11856  |
| 1-1/8"   | 29mm | CSC29    | 11857  |
| 1-3/16"  | 30mm | CSC30    | 11858  |
| 1-1/4"   | 32mm | CSC32    | 11859  |
| 1-3/8"   | 35mm | CSC35    | 11860  |
| 1-1/2"   | 38mm | CSC38    | 11861  |



### TCT Tungsten Carbide Tipped Sheet Metal Hole Saw Assemblies

with Arbor and Pilot Drill

High Performance Saws with Positive Rake Tungsten Carbide Teeth

A tool engineered for the highest possible performance and accuracy, TCT Sheet Metal Saws are an ideal choice for production cutting high alloy and stainless steels, nonferrous metals and reinforced fabrics.

This substantial tool is sold as a complete assembly with arbor

and pilot drills. A safety stop at the base of the tool prevents cutting beyond the 1/2" depth of the tool.



### Carbide Tipped Hole Saws High Performance Triple Chip Tungsten Carbide Tipped Saws

The ultra-high hardness of these carbide tipped saws make them the ideal choice for materials too hard or too abrasive to be cut with conventional high speed steel saws.

These saws provide extended life when used to cut wood, PVC, man-made building materials and fiberglass.

| Hole Saw Diameter |      | TCT Tungsten Carbide Tipped Hole Saw Assy. |       | Carbide Tipped Holesaws |       |
|-------------------|------|--|-------|-------------------------|-------|
| Inch              | mm   | Cat. No.                                   | EDP   | Cat. No.                | EDP   |
| 19/32"            | 15mm | SM15                                       | 11863 |                         |       |
| 5/8"              | 16mm | SM16                                       | 11864 |                         |       |
| 11/16"            | 17mm | SM17                                       | 11865 |                         |       |
| 23/32"            | 18mm | SM18                                       | 11866 |                         |       |
| 3/4"              | 19mm | SM19                                       | 11867 | CT034                   | 65614 |
| 25/32"            | 20mm | SM20                                       | 11868 |                         |       |
| 13/16"            | 21mm | SM21                                       | 11869 |                         |       |
| 7/8"              | 22mm | SM22                                       | 11870 | CT078                   | 65615 |
| 29/32"            | 23mm | SM23                                       | 11871 |                         |       |
| 15/16"            | 24mm | SM24                                       | 11872 |                         |       |
| 1"                | 25mm | SM25                                       | 11873 | CT100                   | 65616 |
| 1-1/32"           | 26mm | SM26                                       | 11874 |                         |       |
| 1-1/16"           | 27mm | SM27                                       | 11875 |                         |       |
| 1-3/32"           | 28mm | SM28                                       | 11876 |                         |       |
| 1-1/8"            | 29mm | SM29                                       | 11877 | CT118                   | 65617 |
| 1-3/16"           | 30mm | SM30                                       | 11878 |                         |       |
| 1-7/32"           | 31mm | SM31                                       | 11879 |                         |       |
| 1-1/4"            | 32mm | SM32                                       | 11880 | CT114                   | 65618 |
| 1-5/16"           | 33mm | SM33                                       | 11881 |                         |       |
| 1-11/32"          | 34mm | SM34                                       | 11882 |                         |       |
| 1-3/8"            | 35mm | SM35                                       | 11883 | CT138                   | 65619 |
| 1-13/32"          | 36mm | SM36                                       | 11884 |                         |       |
| 1-7/16"           | 37mm | SM37                                       | 11885 |                         |       |
| 1-1/2"            | 38mm | SM38                                       | 11886 | CT112                   | 65620 |
| 1-17/32"          | 39mm | SM39                                       | 11887 |                         |       |
| 1-9/16"           | 40mm | SM40                                       | 11888 |                         |       |
| 1-5/8"            | 41mm |  |       | CT158                   | 65621 |
| 1-3/4"            | 44mm |  |       | CT134                   | 65622 |
| 1-25/32"          | 45mm | SM45                                       | 11889 |                         |       |
| 1-7/8"            | 48mm |  |       | CT178                   | 65623 |

| Hole Saw Diameter |       | TCT Tungsten Carbide Tipped Hole Saw Assy. |       | Carbide Tipped Holesaws |       |
|-------------------|-------|--|-------|-------------------------|-------|
| Inch              | mm    | Cat. No.                                   | EDP   | Cat. No.                | EDP   |
| 1-31/32"          | 50mm  | SM50                                       | 11890 |                         |       |
| 2"                | 51mm  | SM51                                       | 11891 | CT200                   | 65624 |
| 2-1/8"            | 54mm  |  |       | CT218                   | 65625 |
| 2-5/32"           | 55mm  | SM55                                       | 11892 |                         |       |
| 2-1/4"            | 57mm  |  |       | CT214                   | 65626 |
| 2-3/8"            | 60mm  | SM60                                       | 11893 | CT238                   | 65627 |
| 2-1/2"            | 64mm  |  |       | CT212                   | 65628 |
| 2-9/16"           | 65mm  | SM65                                       | 11894 |                         |       |
| 2-5/8"            | 67mm  |  |       | CT258                   | 65629 |
| 2-3/4"            | 70mm  | SM70                                       | 11895 | CT234                   | 65630 |
| 2-15/16"          | 75mm  | SM75                                       | 11896 |                         |       |
| 3"                | 76mm  |  |       | CT300                   | 65631 |
| 3-5/32"           | 80mm  | SM80                                       | 11897 |                         |       |
| 3-1/4"            | 83mm  |  |       | CT314                   | 65632 |
| 3-11/32"          | 85mm  | SM85                                       | 11898 |                         |       |
| 3-3/8"            | 86mm  |  |       | CT338                   | 65633 |
| 3-1/2"            | 89mm  |  |       | CT312                   | 65634 |
| 3-17/32"          | 90mm  | SM90                                       | 11899 |                         |       |
| 3-5/8"            | 92mm  |  |       | CT358                   | 65635 |
| 3-3/4"            | 95mm  | SM95                                       | 11900 | CT334                   | 65636 |
| 3-15/16"          | 100mm | SM100                                      | 11901 |                         |       |
| 4"                | 102mm |  |       | CT400                   | 65637 |
| 4-1/8"            | 105mm |  |       | CT418                   | 65638 |
| 4-1/4"            | 108mm |  |       | CT414                   | 65639 |
| 4-3/8"            | 111mm |  |       | CT438                   | 65640 |
| 4-1/2"            | 114mm |  |       | CT412                   | 65641 |
| 4-3/4"            | 121mm |  |       | CT434                   | 65642 |
| 5"                | 127mm |  |       | CT500                   | 65643 |
| 5-1/2"            | 140mm |  |       | CT512                   | 65644 |
| 6"                | 152mm |  |       | CT600                   | 65645 |





**TCT Tungsten Carbide Tipped Fastcut™ Multi-Purpose Hole Saws**

High Performance Saws for Non Metallics



Engineered with a unique tooth set for an ultra-aggressive cutting action, the TCT Fastcut Multi-purpose hole saw brings productivity to a new level. This is the tool to choose for rapid stock removal, extended life and smooth, heat-free sawing of all wood species, MDF, plastics, building bricks and ceramic tiles.

With a 2-1/8" depth of cut, TCT Fastcut saws can cut through strapping and joists with ease. They can be used on battery powered tools and fixed stationary machines and are fast becoming the tool of choice for tradesmen, production engineers and the serious do-it-yourselfer.



| Hole Saw Diameter |      | TCT Tungsten Carbide Tipped Hole Saws |       | Carbide Grit Hole Saws |       | Diamond Edge Hole Saws |       |
|-------------------|------|---------------------------------------|-------|------------------------|-------|------------------------|-------|
| Inch              | mm   | Cat. No.                              | EDP   | Cat. No.               | EDP   | Cat. No.               | EDP   |
| 9/16"             | 14mm |                                       |       |                        |       | <b>D0096</b>           | 56704 |
| 5/8"              | 16mm |                                       |       |                        |       | <b>D0058</b>           | 56705 |
| 11/16"            | 17mm |                                       |       |                        |       | <b>D1016</b>           | 56706 |
| 3/4"              | 19mm | <b>MPH0034</b>                        | 68936 |                        |       | <b>D0034</b>           | 56707 |
| 25/32"            | 20mm | <b>MPH2532</b>                        | 68937 |                        |       |                        |       |
| 13/16"            | 21mm |                                       |       |                        |       | <b>D1036</b>           | 56709 |
| 7/8"              | 22mm | <b>MPH0078</b>                        | 68938 | <b>X0078</b>           | 55919 | <b>D0078</b>           | 56710 |
| 15/16"            | 24mm |                                       |       |                        |       | <b>D1056</b>           | 56711 |
| 1"                | 25mm | <b>MPH0100</b>                        | 68939 | <b>X0100</b>           | 55920 | <b>D0100</b>           | 56712 |
| 1-1/16"           | 27mm | <b>MPH0116</b>                        | 68940 | <b>X0116</b>           | 55921 | <b>D0116</b>           | 56713 |
| 1-1/8"            | 29mm | <b>MPH0118</b>                        | 68941 |                        |       | <b>D0118</b>           | 56714 |
| 1-3/16"           | 30mm | <b>MPH0136</b>                        | 68942 |                        |       | <b>D0136</b>           | 56715 |
| 1-1/4"            | 32mm | <b>MPH0114</b>                        | 68943 | <b>X0114</b>           | 55922 | <b>D0114</b>           | 56716 |
| 1-5/16"           | 33mm |                                       |       | <b>X0156</b>           | 55923 |                        |       |
| 1-3/8"            | 35mm | <b>MPH0138</b>                        | 68944 |                        |       | <b>D0138</b>           | 56718 |
| 1-1/2"            | 38mm | <b>MPH0112</b>                        | 68945 | <b>X0112</b>           | 55924 | <b>D0112</b>           | 56720 |
| 1-9/16"           | 40mm | <b>MPH0196</b>                        | 68946 |                        |       |                        |       |
| 1-5/8"            | 41mm | <b>MPH0158</b>                        | 68947 | <b>X0158</b>           | 55925 | <b>D0158</b>           | 56722 |
| 1-3/4"            | 44mm | <b>MPH0134</b>                        | 68948 | <b>X0134</b>           | 55926 | <b>D0134</b>           | 56724 |
| 1-7/8"            | 48mm | <b>MPH0178</b>                        | 68949 |                        |       | <b>D0178</b>           | 56726 |
| 2"                | 51mm | <b>MPH0200</b>                        | 68950 | <b>X0200</b>           | 55927 | <b>D0200</b>           | 56727 |
| 2-1/8"            | 54mm | <b>MPH0218</b>                        | 68951 | <b>X0218</b>           | 55928 | <b>D0218</b>           | 56729 |
| 2-1/4"            | 57mm | <b>MPH0214</b>                        | 68952 | <b>X0214</b>           | 55929 | <b>D0214</b>           | 56730 |
| 2-3/8"            | 60mm | <b>MPH0238</b>                        | 68953 | <b>X0238</b>           | 55930 | <b>D0238</b>           | 56732 |
| 2-1/2"            | 64mm | <b>MPH0212</b>                        | 68954 | <b>X0212</b>           | 55931 | <b>D0212</b>           | 56733 |
| 2-9/16"           | 65mm | <b>MPH0296</b>                        | 69062 |                        |       |                        |       |
| 2-5/8"            | 67mm | <b>MPH0258</b>                        | 68955 |                        |       | <b>D0258</b>           | 56736 |
| 2-11/16"          | 68mm | <b>MPH68MM</b>                        | 69063 |                        |       |                        |       |
| 2-3/4"            | 70mm | <b>MPH0234</b>                        | 68956 | <b>X0234</b>           | 55932 | <b>D0234</b>           | 56737 |
| 2-7/8"            | 73mm | <b>MPH0278</b>                        | 69064 | <b>X0278</b>           | 55933 |                        |       |

(Larger sizes on the following page.)



### Special Purpose Hole Saws (continued)

#### Carbide Grit Hole Saws

High Performance Saws for Non-Metallics

This is a broad offering of saws in which tungsten carbide grit is affixed to a tooth pattern for aggressive but smooth tool cutting performance. These saws can operate at high speeds and will cut ceramics, glass resins, asbestos and other abrasive materials that are difficult to cut with conventional tools. The depth of cut of these tools is 1-5/8".



9/16" (14mm) through 2-7/8" (73mm) sizes are on the previous page.



| Hole Saw Diameter |       | TCT Tungsten Carbide Tipped Hole Saws |       | Carbide Grit Hole Saws |       | Diamond Edge Hole Saws |       |
|-------------------|-------|---------------------------------------|-------|------------------------|-------|------------------------|-------|
| Inch              | mm    | Cat. No.                              | EDP   | Cat. No.               | EDP   | Cat. No.               | EDP   |
| 3"                | 76mm  | MPH0300                               | 68957 | <b>X0300</b>           | 55934 | <b>D0300</b>           | 56739 |
| 3-1/8"            | 79mm  | MPH0318                               | 68958 |                        |       |                        |       |
| 3-1/4"            | 83mm  | MPH0314                               | 68959 | <b>X0314</b>           | 55935 | <b>D0314</b>           | 56741 |
| 3-3/8"            | 86mm  | MPH0338                               | 68960 |                        |       | <b>D0338</b>           | 56742 |
| 3-1/2"            | 89mm  | MPH0312                               | 68961 | <b>X0312</b>           | 55936 | <b>D0312</b>           | 56743 |
| 3-5/8"            | 92mm  | MPH0358                               | 68962 |                        |       |                        |       |
| 3-3/4"            | 95mm  | MPH0334                               | 68963 |                        |       | <b>D0334</b>           | 56745 |
| 3-7/8"            | 98mm  | MPH0378                               | 69065 |                        |       |                        |       |
| 4"                | 102mm | MPH0400                               | 68964 | <b>X0400</b>           | 55937 | <b>D0400</b>           | 56747 |
| 4-1/8"            | 105mm | MPH0418                               | 69066 |                        |       |                        |       |
| 4-1/4"            | 108mm | MPH0414                               | 68965 |                        |       | <b>D0414</b>           | 56749 |
| 4-5/16"           | 109mm | MPH0456                               | 69067 |                        |       |                        |       |
| 4-3/8"            | 111mm | MPH0438                               | 68966 |                        |       |                        |       |
| 4-1/2"            | 114mm | MPH0412                               | 68967 | <b>X0412</b>           | 55938 | <b>D0412</b>           | 56751 |
| 4-5/8"            | 118mm | MPH0458                               | 69068 |                        |       |                        |       |
| 4-3/4"            | 121mm | MPH0434                               | 68968 |                        |       |                        |       |
| 5"                | 127mm | MPH0500                               | 68969 |                        |       | <b>D0500</b>           | 56753 |
| 5-1/2"            | 140mm | MPH0512                               | 68970 |                        |       |                        |       |
| 6"                | 152mm | MPH0600                               | 68971 |                        |       | <b>D0600</b>           | 56755 |
| 6-1/4"            | 159mm | MPH0614                               | 69069 |                        |       |                        |       |

#### Diamond Edge Hole Saws

High Performance Saws for Non-Metallics

A uniform coating of synthetic diamond grit bonded to a durable steel platform provides exceptional performance at high speeds and effective cutting action on non-metallics and other difficult to cut materials. Diamond edge saws produce clean, accurate cuts and offer extended life well beyond that of conventional tools.



#### Recommended Cutting Speeds for Special Purpose Hole Saws

| Diamond Grit    | Carbide Grit    | Min. RPM (125 FPM) | Max. RPM (250 FPM) |
|-----------------|-----------------|--------------------|--------------------|
| 9/16" – 1"      | 7/8" – 1"       | 500                | 1,000              |
| 1-1/16" – 2"    | 1-1/16" – 2"    | 250                | 500                |
| 2-1/4" – 3 1/4" | 2-1/8" – 3-1/4" | 150                | 300                |
| 3-1/2" – 5"     | 3-1/2" – 4-1/2" | 100                | 200                |

- ◆ Coolant should be used, especially when cutting metals and fired ceramics
- ◆ Diamond hole saws are recommended for better life when cutting hardened steels, fired ceramics or aggregate containing (concrete) materials
- ◆ Always start with low (or recommended) speed (RPMs). Speed can be increased as ease of cutting is noticed. Avoid extreme heat build-up on the cutting surface



**Easy Out Core Ejector Arbors**

**NEW**

This special arbor solves the common problem of removing the slug from inside the hole saw after a cut. The right picture shows the saw and arbor after a hole has been cut (with the slug still in the hole saw).

To clear the slug from inside the saw, press the button on the arbor body and slide the body back up the shank. The core is then exposed and easy to remove, as shown in the left picture. This is particularly useful when cutting thin metal with bi-metal hole saws.



| Product Description           | Fits Hole Saw Diameter           | Fits Chuck Size | Shank Size         | Screw Thread | Catalog No. | EDP No. |
|-------------------------------|----------------------------------|-----------------|--------------------|--------------|-------------|---------|
| Easy Out Core Ejection Arbors | 9/16 to 1-3/16"<br>14 to 30mm    | 3/8"<br>9.5mm   | 5/16" Hex<br>8mm   | 1/2"-20      | E01         | 69737   |
|                               | 1-1/4" to 8-9/32"<br>32 to 210mm | 1/2"<br>32mm    | 25/64" Hex<br>10mm | 5/8" - 18    | E02         | 69738   |

**“Oops” Arbor**

Mistakes happen. That’s why pencils have erasers, keyboards have “backspace” and golfers take a Mulligan. For the professional tradesman or weekend handyman, there is the Starrett Oops Arbor.

This tool is actually a pilot drill adaptor/arbor that fits in place of the drill in Nos. A1, A2 or A10 regular hole saw arbors.

This is for use when a hole is drilled smaller than the size intended. For example, if you drilled a 1" hole in an application that calls for a 2" hole you would put a 2" saw on an A2 or A10 arbor, and then remove the pilot drill from the arbor. Using the Oops Arbor, place the 1" saw on it and insert the 1/4" shank of that arbor in the drill hole of the A2 or A10 arbor. The 1" saw will then pilot the entire assembly while the 2" saw cuts the hole you intended to drill in the first place.

The Oops Arbor is also helpful in any application where existing holes need to be increased; for example, in home or commercial property renovations.



| Regular Arbor That Fits Outer Hole Saw and Size of Enlarging Diameter | Pilot Hole Saw Diameter that Fits A19 Arbor  | Cat. No. | EDP   |
|---|--|----------|-------|
| A1<br>13/16" - 1-3/16"<br>21mm - 30mm                                 | 9/16" - 5 1/2" 14mm - 140mm<br>Minimum Hole Enlargement is 3/16" (4.7mm) Between Pilot Hole Saw and Cutting Saw Diameter | A19      | 66078 |
| A2 or A10<br>1-1/4" - 6"<br>32mm - 152mm                              |  |          |       |





### Hole Saw Arbors, Extensions & Accessories

Four standard arbor designs are available. Each is furnished with a choice of a 1/4" pilot drill of either a conventional high speed steel design or a high performance carbide tipped drill. A set screw in the body allows for easy replacement of the pilot drill. Quick-Hitch™ arbors enable instant change outs of hole saws without additional tools and without removing the arbor from the chuck.

The No. A4 model is supplied with flats to fit a 5/8" (16mm) wrench. Specify the arbor by the catalog number to suit hole saw diameter. When using carbide grit or diamond grit saws, choose carbide tipped pilot drills, which are specified by the prefix 'X' in the catalog number.

Also available are 12" (300mm) Arbor Extensions that will fit either a 1/2" (13mm) Chuck No. A5 or a 3/8" (9.5mm) Chuck No. A15.

A4 type arbors are compatible for use with the AQC-14 Quick Change Connector. The A1 and A10E type arbors are compatible with the AQC-38 Quick Change Connector.



### Arbor Selection Chart

| Fits Hole Saw Diameters           | With High Speed Steel Drill For All-Purpose and Sheet Metal Hole Saws |         | With Carbide Drill For CT, XO & DO Special Purpose Hole Saws |   | Shank Size             | Screw Thread | Fits Morse Taper Adaptor       |
|-----------------------------------|---|---------|--|---|------------------------|--------------|--------------------------------|
|                                   | Catalog No.   | EDP No. | Catalog No.  | EDP No.                                 |                        |              |                                |
| 9/16" – 1-3/16"<br>(14-30 mm)     | <b>A1</b><br>(3/8" Chuck)   | 55141   | <b>XA1</b><br>(3/8" Chuck)                                   | 56758                                   | 11/32"<br>(8.75mm) Hex | 1/2-20       | MA05,<br>MA06                  |
|                                   | <b>A4</b><br>(1/4" Chuck)   | 55144   |  | 1/4"<br>(6.5mm) Round                   |                        |              |                                |
| 1-1/4" – 8-9/32"<br>(32 - 210 mm) | <b>A2 Quick-Hitch</b><br>(1/2" Chuck)                                 | 55142   | <b>XA2 Quick-Hitch</b><br>(1/2" Chuck)                       | 56759                                   | 7/16"<br>(11mm) Hex    | 5/8-18       | MA02,<br>MA03<br>MA05,<br>MA06 |
|                                   | <b>A10 Quick-Hitch</b><br>(3/8" Chuck)                                | 56615   |  | <b>XA10 Quick-Hitch</b><br>(3/8" Chuck) | 56763                  |              |                                |

### Hole Saw & Arbor Accessories

| Product                           | Cat. No.   | EDP   |
|-----------------------------------|------------|-------|
| Arbor Adaptor with 5/8"-18 Thread | <b>A12</b> | 63260 |
| Ejector Spring                    | <b>A7</b>  | 55151 |



### Arbor Extensions – 12"/300mm

| Fits Starrett Arbor Numbers | Fits Chuck Size | Cat. No.   | EDP   |
|-----------------------------|-----------------|------------|-------|
| A2, A17-12, XA2             | 1/2"/13mm       | <b>A5</b>  | 55145 |
| A1, A10, A17-38             | 3/8"/9.5mm      | <b>A15</b> | 56651 |





**Heavy Duty Locking Arbors**

Starrett Locking Arbors lock a hole saw firmly to the arbor on saws 1-1/2" diameter and larger. This arbor will minimize vibration and is particularly useful when cutting difficult materials or in high production applications. It includes a 1/4" high speed steel pilot drill. Using a Starrett Locking Arbor can significantly extend tool life.



Recommended for use with our carbide tipped hole saws.

| Description                              | Fits Hole Saw Diameter           | Fits Chuck Size | Shank Size           | Screw Thread | Cat. No.       | EDP   |
|--|----------------------------------|-----------------|----------------------|--------------|----------------|-------|
| <b>With High Speed Steel Pilot Drill</b> | 1-1/2" – 8-9/32"<br>38mm – 210mm | 3/8"<br>9.5mm   | 11/32" Hex<br>8.75mm | 5/8"-18      | <b>A17-38</b>  | 17519 |
|  | 1-1/2" – 8-9/32"<br>38mm – 210mm | 1/2"<br>13mm    | 7/16" Hex<br>11mm    | 5/8"-18      | <b>A17-12</b>  | 17520 |
| <b>With Carbide Tipped Pilot Drill</b>   | 1-1/2" – 8-9/32"<br>38mm – 210mm | 3/8"<br>9.5mm   | 11/32" Hex<br>8.75mm | 5/8"-18      | <b>XA17-38</b> | 64199 |

**Extended Length Arbors**

Several Hole Saw Arbors and a Locking Arbor are now available with an extended length pilot drill.



Left: A17-38E  
Right: A2-E

| Description  | Fits Hole Saw Diameter           | Fits Chuck Size     | Shank Size             | Screw Thread | Cat. No.                    | EDP   |
|--|----------------------------------|---------------------|------------------------|--------------|-----------------------------|-------|
| <b>Hole Saw Arbor With Extended Length HSS Pilot Drill</b> | 9/16" – 1-3/16"<br>14mm – 30mm   | 3/8"<br>9.5mm       | 11/32" Hex<br>8.75mm   | 1/2"-20      | <b>A1-E</b>                 | 11925 |
|  | 1-1/4" – 8-9/32"<br>32mm – 210mm | 1/2"<br>13mm        | 7/16" Hex<br>11mm      | 5/8"-18      | <b>A2-E</b><br>Quick-Hitch  | 11928 |
|  | 9/16" – 1-3/16"<br>14mm – 30mm   | 1/4" Round<br>6.5mm | 1/4"-20 Round<br>6.5mm | 1/2"-20      | <b>A4-E</b>                 | 11931 |
|  | 1-1/4" – 8-9/32"<br>32mm – 210mm | 3/8"<br>9.5mm       | 11/32" Hex<br>8.75mm   | 5/8"-18      | <b>A10-E</b><br>Quick-Hitch | 11934 |
| <b>Locking Arbor With Extended Length HSS Pilot Drill</b>  | 1-1/4" – 6-1/4"<br>32mm – 159mm  | 3/8"<br>9.5mm       | 11/32" Hex<br>8.75mm   | 5/8"-18      | <b>A17-38E</b>              | 11937 |

**Arbor Pilot Drills**

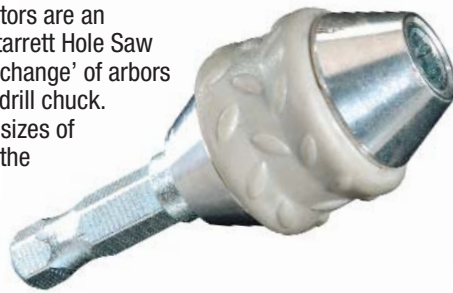


| Product Description                        | Fits Starrett Arbor Nos.                                  | For Use with Saw Types               | Cat. No.      | EDP   |
|--|---|--------------------------------------|---------------|-------|
| <b>High Speed Steel Arbor Pilot Drills</b> | All Arbors  | For All VH, AVH, and SH Series Saws  | <b>A014C</b>  | 56616 |
|  | This Extended Length Pilot Drill Fits All Starrett Arbors | For TCT FASTCUT™ Wood Saws           | <b>A014CE</b> | 11825 |
|  | All Arbors with Through-Hole in Hex Shank                 | For All VH, AVH, and SH Series Saws  | <b>A014D</b>  | 55147 |
|  | SM Arbor  | For SM Series Saws                   | <b>SMD6</b>   | 12153 |
| <b>Carbide Tipped Arbor Pilot Drills</b>   | All Arbors  | For All CT, FCW, X and D Series Saws | <b>XA014C</b> | 56617 |



### Quick Change Connectors

The Quick Change Connectors are an excellent addition to the Starrett Hole Saw offering, allowing a 'quick change' of arbors without adjustment of the drill chuck. Change between different sizes of hole saws by sliding back the collar on the connector.



| Fits Starrett Arbor Numbers  | Fits Shank Size      | Cat. No.      | EDP   |
|--|----------------------|---------------|-------|
| Fits all Cordless Smooth Cut Hole Saws                                       | 1/4" Hex<br>6.5mm    | <b>AQC-14</b> | 11939 |
| Fits A1, XA1, A10, XA10, A17-38, XA17-38, plus the complete Quickshot® Range | 11/32" Hex<br>8.75mm | <b>AQC-38</b> | 11940 |

### Morse Taper Connectors

These adaptors enable Starrett hole saw arbors to fit machines spindles that have a Morse taper. Four adaptors are available.



| Fits Starrett Arbor Numbers                               | Morse Taper No. | Cat. No.    | EDP   |
|---|-----------------|-------------|-------|
| A2, XA2, A17-12, A2-E                                     | 2               | <b>MA02</b> | 55148 |
|   | 3               | <b>MA03</b> | 55149 |
| A1, XA1, A10, XA10, A17-38, XA17-38, A1-E, A10-E, A17-38E | 2               | <b>MA05</b> | 56652 |
|   | 3               | <b>MA06</b> | 56653 |

### Hole Saw Cowl Kit

The Starrett Hole Saw Cowl Kit collects dust, swarf and debris generated by sawing and is especially useful on vertical sawing applications. It is compatible with the complete range of Starrett hole saws. This tool removes the need to cover work areas prior to sawing and eliminates extensive clean up when the job is done. The Starrett Hole Saw Cowl Kit is packaged in a sturdy carrying case.

| Description                 | Cat. No.     | EDP   |
|-----------------------------|--------------|-------|
| Hole Saw Cowl Kit with Case | <b>KHC1</b>  | 11941 |
| Cowl Assembly Arbor         | <b>AHC1</b>  | 11942 |
| 1/2" Snap-On Adaptor        | <b>AHC12</b> | 11944 |
| 5/8" Snap-On Adaptor        | <b>AHC58</b> | 11945 |
| Cowl Cover Only             | <b>AHC2</b>  | 11943 |







## Hole Saw Kits

Starrett offers fourteen different hole saw kits designed to serve the specific needs of various trades and end use applications.

These include kits designed for use by electricians, plumbers and locksmiths, as well as kits for general maintenance use, utility and automotive trades and general industrial applications.

Each kit is designed with a sturdy carrying case that protects the investment you have made in your tools. They include hole saws and accessory items pre-selected to cover a full range of applications to ensure you arrive on the job with the right tools at your disposal.

### Fastcut™ Bi-Metal Hole Saw Kits

#### (A) Electricians' and Plumbers' Hole Saw Kit No. KV290

Nine of the most popular sizes of our bi-metal high speed steel hole saws engineered for installing piping, tubing, conduit and cable in residential, commercial, industrial plumbing and electrical fields. Kit includes two arbors, complete with pilot drills, one arbor extension and one ejector spring.



#### (B) Industrial Hole Saw Kit No. KV291

Eleven sizes of our bi-metal high speed steel hole saws for toolroom, production and plant maintenance use. Kit includes two arbors, complete with pilot drills, one arbor extension and one ejector spring.



#### (C) Lockset Hole Saw Kit No. KV292

Six sizes of our bi-metal high speed steel hole saws suitable for a broad range of lockset work. Kit includes two arbors, complete with pilot drills and one arbor adaptor.



#### (D) Plumbing Hole Saw Kit No. KV1091

Six sizes of our bi-metal high speed steel hole saws that are used in the plumbing trades. Kit includes two arbors, complete with pilot drills and one arbor adaptor.



#### (E) Utility Hole Saw Kit No. KV1092

This is a general purpose kit which includes six of the most commonly used saws and includes two arbors, complete with pilot drills and one arbor adaptor.



#### (F) Electrical Hole Saw Kit No. KV1094

Six sizes of our bi-metal high speed steel hole saws that are used by the electrical trades. Kit includes two arbors, complete with pilot drills and one arbor adaptor.



#### (G) Deluxe Electricians' Hole Saw Kit No. KV1095

This is an expanded offering of ten sizes of our bi-metal high speed steel hole saws used in the electrical trades. Kit includes three arbors, complete with pilot drills covering a range of chuck sizes.



#### (H) Super Deluxe Electricians' Hole Saw Kit No. KV1095-1

This is an expanded offering of fifteen sizes of our bi-metal high speed steel hole saws used in the electrical trades. Kit includes three arbors, complete with pilot drills covering a range of chuck sizes, and one extension.



#### (J) Automotive Hole Saw Kit No. KS1090

Five sizes of our bi-metal high speed steel hole saws common to the automotive trades. Kit includes one arbor, complete with pilot drill and arbor adaptor.



#### (K) Door Lock Installation Hole Saw Kit No. KS288

This carded (unboxed) kit contains two of the most common bi-metal high speed steel straight pitch hole saws used in door installation applications, as well as an arbor and arbor adaptor.



#### (L) Quick-Hitch Lockset Installation Hole Saw Kit No. KAV1093

Three sizes of our bi-metal high speed steel hole saws furnished as This includes a 1/4" drill with a hex shank for fast saw changes, a 1/4" Quick-Hitch Connection clamped directly into the drill chuck and one 4" #2 Phillips headed bit.



#### (N) Mechanics' Quickshot® Arbored Hole Saw Kit No. KAV1096

Five sizes of our bi-metal high speed steel hole saws furnished as a complete assembly, including saw, arbor and pilot drill.





### Hole Saw Kits Specifications

| Hole Saw Kit Description                                | Saws in Kit | Hole Saw Diameters - Inches  | Hole Saw Diameters - mm  | Arbors and Accessories  | Cat. No.        | EDP   |
|---|-------------|--|--|---|-----------------|-------|
| <b>A</b> Electricians' & Plumbers' Kit                  | 9           | 3/4", 7/8", 1-1/8", 1-3/8", 1-1/2", 1-3/4", 2", 2-1/4", 2-1/2"   | 19mm, 22mm, 29mm, 35mm, 38mm, 44mm, 51mm, 57mm, 64mm                                       | A1, A2, A5, A7  | <b>KV290</b>    | 56011 |
| <b>B</b> Industrial Kit                                 | 11          | 3/4", 7/8", 1", 1-1/4", 1-3/8", 1-1/2", 1-3/4", 2", 2-1/4", 2-1/2", 3"                                     | 19mm, 22mm, 25mm, 32mm, 35mm, 38mm, 44mm, 51mm, 57mm, 64mm, 76mm                           | A1, A2, A5, A7  | <b>KV291</b>    | 56012 |
| <b>C</b> Lockset Kit                                    | 6           | 7/8", 1", 1-1/4", 1-1/2", 1-3/4", 2-1/8"   | 22mm, 25mm, 32mm, 38mm, 44mm, 54mm   | A1, A10, A12  | <b>KV292</b>    | 56811 |
| <b>D</b> Plumbing Kit                                   | 6           | 3/4", 7/8", 1-1/8", 1-1/2", 1-3/4", 2-1/4"   | 19mm, 22mm, 29mm, 38mm, 44mm, 57mm   | A1, A2, A12   | <b>KV1091</b>   | 63617 |
| <b>E</b> Utility Kit                                    | 6           | 3/4", 7/8", 1-1/8", 1-1/2", 1-3/4", 2-1/2"   | 19mm, 22mm, 29mm, 38mm, 44mm, 64mm   | A1, A2, A12   | <b>KV1092</b>   | 63619 |
| <b>F</b> Electrical Kit                                 | 6           | 7/8", 1-1/8", 1-3/8", 1-3/4", 2", 2-1/2"   | 22mm, 29mm, 35mm, 44mm, 51mm, 64mm   | A1, A2, A12   | <b>KV1094</b>   | 63620 |
| <b>G</b> Deluxe Electricians' Kit                       | 10          | 7/8", 1-1/8", 1-3/8", 1-3/4", 2", 2-1/2", 3", 3-5/8", 4-1/8", 4-3/4"                                       | 22mm, 29mm, 35mm, 44mm, 51mm, 64mm, 76mm, 92mm, 105mm, 121mm                               | A1, A2, A4  | <b>KV1095</b>   | 63621 |
| <b>H</b> Super Deluxe Electricians' Kit                 | 15          | 3/4", 7/8", 1-1/8", 1-3/8", 1-1/2", 1-3/4", 2", 2-1/4", 2-1/2", 3", 3-1/4", 3-5/8", 3-3/4", 4-1/4", 4-1/2" | 19mm, 22mm, 29mm, 35mm, 38mm, 44mm, 51mm, 57mm, 64mm, 76mm, 82mm, 92mm, 95mm, 108mm, 114mm | A1, A2, A4, A5  | <b>KV1095-1</b> | 63643 |
| <b>J</b> Automotive Kit                                 | 5           | 3/4", 7/8", 1", 1-1/8", 1-1/4"   | 19mm, 22mm, 25mm, 29mm, 32mm   | A1, A12   | <b>KS1090</b>   | 60703 |
| <b>K</b> Door Lock Installation Kit                     | 2           | 1", 2-1/8"   | 25mm, 54mm   | A1, A12   | <b>KS288</b>    | 65083 |
| <b>L</b> Quick-Hitch Lockset/Door Lock Installation Kit | 3           | 7/8", 1", 2-1/8"   | 22mm, 25mm, 54mm   | PT28143 Quick Change Connector and PT28144 4" #2 Phillips Bit | <b>KAV1093</b>  | 67156 |
| <b>N</b> Mechanics' Quickshot® Arbored Kit              | 5           | 7/8", 1", 1-1/8", 1-1/4", 1-1/2"   | 22mm, 25mm, 29mm, 32mm, 38mm   | No Accessories Required                                       | <b>KAV1096</b>  | 65606 |
| <b>P</b> Maintenance Quickshot® Arbored Kit             | 9           | 3/4", 7/8", 1-1/8", 1-3/8", 1-1/2", 1-3/4", 2", 2-1/4", 2-1/2"   | 19mm, 22mm, 29mm, 35mm, 38mm, 44mm, 51mm, 57mm, and 64mm                                   | A15 Arbor Extension   | <b>KAV1097</b>  | 65607 |
| <b>Q</b> Carbide Tipped Maintenance Kit                 | 9           | 3/4", 7/8", 1-1/8", 1-3/8", 1-1/2", 1-3/4", 2", 2-1/4", 2-1/2"   | 19mm, 22mm, 29mm, 35mm, 38mm, 44mm, 51mm, 57mm, and 64mm                                   | XA1, XA17-38, A7 and A15                                      | <b>KCT1098</b>  | 65646 |

**(P) Maintenance Quickshot® Arbored Hole Saw Kit No. KAV1097**

Nine sizes of our bi-metal high speed steel hole saws furnished as a complete assembly, including saw, arbor and pilot drill. Kit also includes one arbor extension.



**(Q) Carbide Tipped Maintenance Hole Saw Kit No. KCT 1098**

Nine of the most popular sizes of carbide tipped hole saws cover a wide range of general purpose maintenance applications. Kit includes one arbor with carbide tipped drill, one locking arbor with carbide tipped drill, one ejector spring and one arbor extension.







# POWER TOOL ACCESSORIES KING CUT RECIPROCATING BLADES



## King Cut® Fire, Rescue and Demolition Reciprocating Blades Now Available in 6", 8", 9" & 12" Lengths

The King Cut® line of reciprocating blades was recently expanded to more than twice its original depth. The line now includes new lengths, widths, shapes and tooth designs and is now the broadest offering of Fire, Rescue and Demolition blades available.

A new, bright fluorescent yellow paint and unique marking system also distinguishes the King Cut line from competitive blades – and so does its performance.

Each King Cut Fire, Rescue and Demolition blade is made from a bi-metal construction

that joins a high speed steel cutting edge to a durable steel back. This design provides exceptional strength and extended blade life, while the vacuum hardened HSS tooth edge delivers rapid cutting action. These blades are built for the most demanding applications.

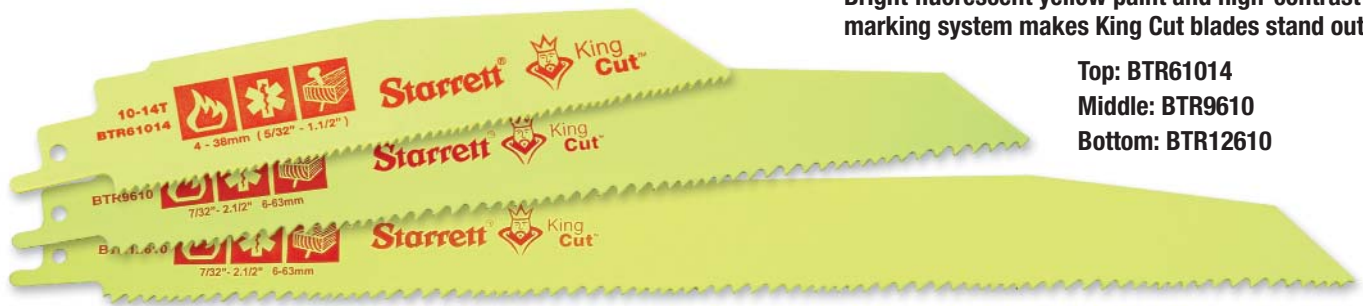
The product line now includes four different lengths, – 6", 8", 9" and 12" – three different blade thicknesses, – .035", .050" and .063" – three different tooth pitches – 6-10, 10-14 and 18 TPI and two blade shapes – tapered and straight, that will effectively cut through a variety of materials in any type of end-use application.

King Cut is now available in cards of 2 or 5 blades each or in durable, resealable plastic packs in quantities of 5, 20 or 50 blades each.



Bright fluorescent yellow paint and high-contrast marking system makes King Cut blades stand out.

Top: BTR61014  
Middle: BTR9610  
Bottom: BTR12610



| Dimensions<br>(Length x Width x Thickness)  | TPI<br>(25mm) | Shape* | 2 Blade Packs |       | 5 Blade Packs |       | 20 Blade Packs |       | 50 Blade Packs |       |
|---|---------------|--------|---------------|-------|---------------|-------|----------------|-------|----------------|-------|
|   |               |        | Cat. No.      | EDP   | Cat. No.      | EDP   | Cat. No.       | EDP   | Cat. No.       | EDP   |
| 6" x 3/4" x .035"<br>152mm x 19mm x 0.90mm  | 18            | S      | BR618-2       | 11947 | BR618-5       | 11948 | BR618-20       | 11949 | BR618-50       | 11950 |
|   | 10-14         | S      | BR61014-2     | 11450 | BR61014-5     | 11451 | BR61014-20     | 11452 | BR61014-50     | 11909 |
| 6" x 1" x .063"<br>152mm x 25mm x 1.60mm    | 10-14         | T      | BTR61014-2    | 11453 | BTR61014-5    | 11454 | BTR61014-20    | 11455 | BTR61014-50    | 11910 |
|   | 6-10          | T      | BTR6610-2     | 11456 | BTR6610-5     | 11457 | BTR6610-20     | 11458 | BTR6610-50     | 11911 |
| 8" x 3/4" x .035"<br>203mm x 19mm x 0.90mm  | 18            | S      | BR818-2       | 11951 | BR818-5       | 11952 | BR818-20       | 11953 | BR818-50       | 11954 |
| 8" x 3/4" x .050"<br>203mm x 19mm x 1.30mm  | 10-14         | S      | BR81014-2     | 11459 | BR81014-5     | 11460 | BR81014-20     | 11461 | BR81014-50     | 11912 |
| 8" x 1" x .063"<br>203mm x 25mm x 1.60mm    | 10-14         | T      | BTR81014-2    | 11462 | BTR81014-5    | 11463 | BTR81014-20    | 11464 | BTR81014-50    | 11913 |
|   | 6-10          | T      | BTR8610-2     | 11465 | BTR8610-5     | 11466 | BTR8610-20     | 11467 | BTR8610-50     | 11914 |
| 9" x 3/4" x .050"<br>228mm x 19mm x 1.30mm  | 10-14         | S      | BR91014-2     | 11468 | BR91014-5     | 11469 | BR91014-20     | 11470 | BR91014-50     | 11915 |
| 9" x 1" x .063"<br>228mm x 25mm x 1.60mm    | 10-14         | T      | BTR91014-2    | 11471 | BTR91014-5    | 11472 | BTR91014-20    | 11473 | BTR91014-50    | 11916 |
|   | 6-10          | T      | BTR9610-2     | 11474 | BTR9610-5     | 11475 | BTR9610-20     | 11476 | BTR9610-50     | 11917 |
| 12" x 3/4" x .050"<br>300mm x 19mm x 1.30mm | 10-14         | S      | BR121014-2    | 11477 | BR121014-5    | 11478 | BR121014-20    | 11479 | BR121014-50    | 11918 |
| 12" x 1" x .063"<br>300mm x 25mm x 1.60mm   | 10-14         | T      | BTR121014-2   | 11480 | BTR121014-5   | 11481 | BTR121014-20   | 11482 | BTR121014-50   | 11919 |
|   | 6-10          | T      | BTR12610-2    | 11483 | BTR12610-5    | 11484 | BTR12610-20    | 11485 | BTR12610-50    | 11920 |

\* S= Straight. T= Tapered





### Fastcut™ General Purpose Reciprocating Blades

Fastcut General Purpose reciprocating blades provide a comprehensive set of sawing solutions to professional trades people and do-it-yourselfers.

With a breadth of sizes, shapes and specifications of our bi-metal HSS saws, you are assured of a reliable tool for your application.



### General Purpose Straight Shape Reciprocating Blade



| Dimensions<br>(Length x Width x Thickness) | TPI<br>(25mm) | Shape* | 2 Blade Packs |       | 5 Blade Packs |       | 20 Blade Packs |       | 50 Blade Packs |       |
|--|---------------|--------|---------------|-------|---------------|-------|----------------|-------|----------------|-------|
|  |               |        | Cat. No.      | EDP   | Cat. No.      | EDP   | Cat. No.       | EDP   | Cat. No.       | EDP   |
| 4" x 3/4" x .035"<br>100mm x 19mm x 0.90mm | 14            | S      | <b>B414-2</b> | 16970 | <b>B414-5</b> | 15319 | <b>B414-20</b> | 20104 | <b>B414-50</b> | 15436 |
|  | 18            | S      | <b>B418-2</b> | 16971 | <b>B418-5</b> | 15320 | <b>B418-20</b> | 20105 | <b>B418-50</b> | 15437 |
|  | 24            | S      | <b>B424-2</b> | 16972 | <b>B424-5</b> | 15321 | <b>B424-20</b> | 20106 | <b>B424-50</b> | 15438 |
| 6" x 3/4" x .035"<br>152mm x 19mm x 0.90mm | 6             | S      | <b>B66-2</b>  | 16976 | <b>B66-5</b>  | 15329 | <b>B66-20</b>  | 20110 | <b>B66-50</b>  | 15440 |
|  | 10            | S      | <b>B610-2</b> | 16977 | <b>B610-5</b> | 15330 | <b>B610-20</b> | 20111 | <b>B610-50</b> | 15441 |
|  | 14            | S      | <b>B614-2</b> | 16978 | <b>B614-5</b> | 15331 | <b>B614-20</b> | 20112 | <b>B614-50</b> | 15442 |
|  | 18            | S      | <b>B618-2</b> | 16979 | <b>B618-5</b> | 15332 | <b>B618-20</b> | 20113 | <b>B618-50</b> | 15443 |
| 8" x 3/4" x .035"<br>203mm x 19mm x 0.90mm | 24            | S      | <b>B624-2</b> | 16980 | <b>B624-5</b> | 15333 | <b>B624-20</b> | 20114 | <b>B624-50</b> | 15444 |
|  | 18            | S      | <b>B818-2</b> | 16991 | <b>B818-5</b> | 16035 | <b>B818-20</b> | 20127 | <b>B818-50</b> | 16047 |

### Assortment Pack No. SB6-A EDP 17018

#### 6" General Purpose Blade Assortment Pack

Includes one each: B66, B610, B614, B618 and B624



\* S= Straight. T= Tapered



# POWER TOOL ACCESSORIES RECIPROCATING BLADES



## General Purpose Tapered Shape Reciprocating Blade



| Dimensions<br>(Length x Width x Thickness) | TPI<br>(25mm) | Shape | 2 Blade Packs |       | 5 Blade Packs |       | 20 Blade Packs |       | 50 Blade Packs |       |
|--|---------------|-------|---------------|-------|---------------|-------|----------------|-------|----------------|-------|
|  |               |       | Cat. No.      | EDP   | Cat. No.      | EDP   | Cat. No.       | EDP   | Cat. No.       | EDP   |
| 6" x 3/4" x .050"<br>152mm x 19mm x 1.3mm  | 3             | T     | BT63-2        | 16984 | BT63-5        | 15338 | BT63-20        | 20118 | BT63-50        | 15445 |
|  | 6             | T     | BT66-2        | 16985 | BT66-5        | 15339 | BT66-20        | 20119 | BT66-50        | 15446 |
|  | 6-10          | T     | BT6610-2      | 16989 | BT6610-5      | 15692 | BT6610-20      | 20123 | BT6610-50      | 15693 |
| 9" x 3/4" x .050"<br>228mm x 19mm x 1.3mm  | 6             | T     | BT96-2        | 17011 | BT96-5        | 16955 | BT96-20        | 20130 | BT96-50        | 17014 |
|  | 10            | T     | BT910-2       | 17012 | BT910-5       | 17013 | BT910-20       | 20131 | BT910-50       | 17015 |
| 12" x 3/4" x .050"<br>300mm x 19mm x 1.3mm | 3             | T     | BT123-2       | 16999 | BT123-5       | 15351 | BT123-20       | 20138 | BT123-50       | 15452 |
|  | 6             | T     | BT126-2       | 17000 | BT126-5       | 15352 | BT126-20       | 20139 | BT126-50       | 15453 |
|  | 6-10          | T     | BT12610-2     | 17002 | BT12610-5     | 15700 | BT12610-20     | 20141 | BT12610-50     | 15701 |
|  | 10-14         | T     | BT121014-2    | 17003 | BT121014-5    | 15704 | BT121014-20    | 20142 | BT121014-50    | 15705 |

\* S= Straight. T= Tapered

## Special Purpose Reciprocating Blades

|                    | Dimensions<br>(Length x Width x Thickness) | TPI<br>(25mm) | Shape    | 2 Blade Packs |       | 5 Blade Packs |       | 20 Blade Packs |       |
|--------------------|--|---------------|----------|---------------|-------|---------------|-------|----------------|-------|
|                    |  |               |          | Cat. No.      | EDP   | Cat. No.      | EDP   | Cat. No.       | EDP   |
| Scroll<br>Cutting  | 4" x 5/16" x .035"<br>100mm x 8mm x 0.90mm | 14            | Scroll   | SB414-2       | 11679 | SB414-5       | 11680 | SB414-20       | 11681 |
|                    |  | 24            | Scroll   | SB424-2       | 17009 | SB424-5       | 16032 | SB424-20       | 20146 |
| Plaster<br>Cutting | 6" x 3/4" x .035"<br>152mm x 19mm x 0.90mm | 6V            | Straight | VB66-2        | 17004 | VB66-5        | 15722 |                |       |
| Carbide<br>Cutting | 6" x 3/4" x .035"<br>152mm x 19mm x 0.90mm | #30 Coarse    | Straight | XR6-1         | 15788 |               |       | XR6-20         | 20147 |



VB66 Plaster Cutting Blade



SB414 Scroll Cutting Blade



XR6 Carbide Grit Blade





### Unified Shank® Jig Saw Blades

#### The only blades that fit both Universal and Bosch tools

Keep it simple. Easy to say but not always easy to do. The ingenuity behind Starrett's Unified Shank® design for jig saws eliminates the need to stock and use two different blades for the exact same job.

Starrett's exclusive, patented design has changed the shape of one of the most commonly used tools in the industry – literally. Our Unified Shank jig saws are the first and only blades that fit both Universal and Bosch jig saws. This eliminates the troublesome, costly requirement of stocking two different saws to do the same job.

Our Unified Shank product line consists of "only" 16 blades, but this offering covers every jig sawing application from metal to wood – and any multi-purpose application.

These blades are perfect for contractors who have multiple saws in use and are especially helpful to the distributors who serve them.

Starrett Unified Shank jig saws also incorporate the Starrett exclusive bi-metal unique® process technology. Blades made from this process resist breakage, cut faster and last longer than conventional saws. Unified Shank jig saws are available in five-blade packs, twenty-blade packs and in various assortment packs.



### Unified Shank Jig Saws for Wood Cutting



Six blades, marked by a distinctive yellow tang, cut a variety of wood species and other non-metallics. Blades handle a range of applications, including contour, straight and fast cutting jobs. A five-blade assortment package is also offered.

| Dimensions<br>(Length x Width x Thickness) | TPI (25mm) | Tooth   | Set                        | 5 Blades per Pack |       | 20 Blades per Pack |       |
|--|------------|---------|----------------------------|-------------------|-------|--------------------|-------|
|  |            |         |                            | Cat. No.          | EDP   | Cat. No.           | EDP   |
| 3" x 5/16" x .050"<br>75mm x 7.5mm x 1.3mm | 6          | Ground  | Tapered                    | BU36T             | 68717 | BU36T-20           | 68733 |
|  | 6          | Skip    | Alternate                  | BU36              | 68718 | BU36-20            | 68734 |
|  | 8          | Regular | Alternate                  | BU38              | 68720 | BU38-20            | 68736 |
|  | 10         | Ground  | Tapered                    | BU310T            | 68721 | BU310T-20          | 68737 |
| 4" x 3/8" x .050"<br>100mm x 9.5mm x 1.3mm | 10         | Ground  | Tapered,<br>Downstroke Cut | BU310DT           | 68722 | BU310DT-20         | 68738 |
|  | 6          | Skip    | Alternate                  | BU46              | 68719 | BU46-20            | 68735 |

\* Length dimension references tooth-bearing section of jig saw. The total length, including the blade tang, is approximately 1" longer.





# POWER TOOL ACCESSORIES JIG SAW BLADES

# Starrett®

## Unified Shank Jig Saws for Metal Cutting

Four milled tooth blades, marked by a distinctive blue tang, are offered in both scroll and regular tooth designs. A five-blade assortment package is also offered.



| Dimensions<br>(Length x Width x Thickness) | TPI (25mm) | Tooth | Set     | 5 Blades per Pack |       | 20 Blades per Pack |       |
|--|------------|-------|---------|-------------------|-------|--------------------|-------|
|  |            |       |         | Cat. No.          | EDP   | Cat. No.           | EDP   |
| 2" x 5/16" x .040"<br>50mm x 7.5mm x 1mm   | 24         | Wavy  | Regular | <b>BU224</b>      | 68728 | <b>BU224-20</b>    | 68744 |
|  | 32         | Wavy  | Regular | <b>BU232</b>      | 68731 | <b>BU232-20</b>    | 68747 |
| 2" x 3/16" x .040"<br>50mm x 4.5mm x 1mm   | 24         | Wavy  | Scroll  | <b>BU224S</b>     | 68729 | <b>BU224S-20</b>   | 68745 |
| 4" x 3/8" x .040"<br>100mm x 9.5mm x 1mm   | 24         | Wavy  | Regular | <b>BU424</b>      | 68730 | <b>BU424-20</b>    | 68746 |

## Multi-Purpose Unified Shank Jig Saws

Six blades, marked by a distinctive red tang, incorporate a variety of tooth configurations to cover a multitude of applications. A coarse carbide grit blade is included in the Multi-Purpose line. A five-blade assortment package is also offered.



| Dimensions<br>(Length x Width x Thickness) | TPI (25mm) | Tooth      | Set       | 5 Blades per Pack |       | 20 Blades per Pack |       |
|--|------------|------------|-----------|-------------------|-------|--------------------|-------|
|  |            |            |           | Cat. No.          | EDP   | Cat. No.           | EDP   |
| 2" x 5/16" x .040"<br>50mm x 7.5mm x 1mm   | Coarse CG  | Cont. Grit |           | <b>BU230X</b>     | 68753 | <b>BU230X-20</b>   | 68754 |
|  | 14         | Wavy       | Regular   | <b>BU214</b>      | 68724 | <b>BU214-20</b>    | 68740 |
| 2" x 3/8" x .040"<br>50mm x 9.5mm x 1mm    | 18         | Wavy       | Regular   | <b>BU218</b>      | 68726 | <b>BU218-20</b>    | 68742 |
| 2" x 3/16" x .040"<br>50mm x 9.5mm x 1mm   | 14         | Wavy       | Scroll    | <b>BU214S</b>     | 68725 | <b>BU214S-20</b>   | 68741 |
| 4" x 3/8" x .040"<br>100mm x 9.5mm x 1mm   | 10-14      | Wavy       | Varipitch | <b>BU41014</b>    | 68723 | <b>BU41014-20</b>  | 68739 |
| 4" x 3/8" x .040"<br>100mm x 9.5mm x 1mm   | 18         | Wavy       | Regular   | <b>BU418</b>      | 68727 | <b>BU418-20</b>    | 68743 |

## Unified Shank Jig Saw Assortment Packs

Four application-specific assortment packs of saws are offered to provide a single source of blades for a range of applications. Each Woodworking, Metalworking and Multi-Purpose pack contains five different blades.

The Unified Shank Assortment pack has all 16 blades in the full product line, plus a BU56 six tooth woodworking saw. The blades are contained in a durable, tri-fold wallet that is a great addition to any tool box.



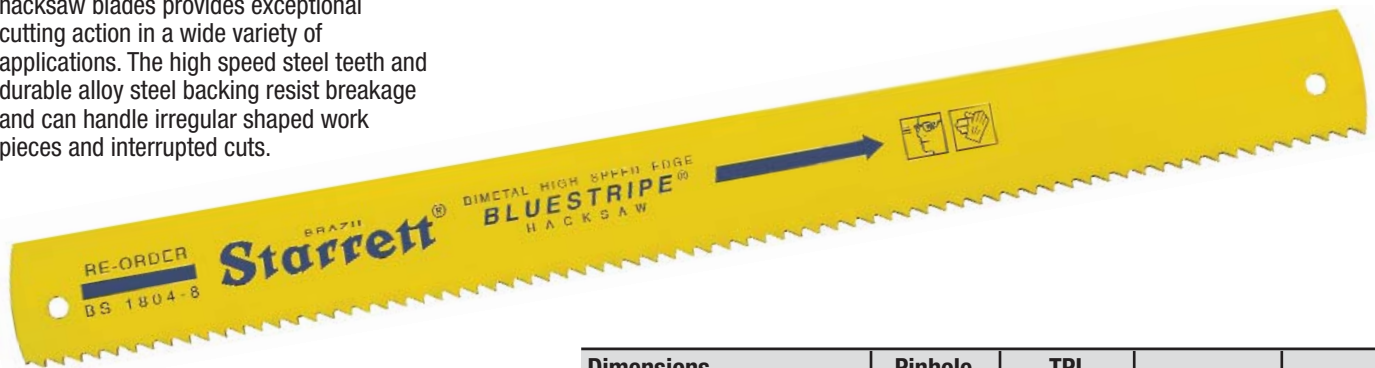
| Description   | Cat. No.   | EDP   |
|---|------------|-------|
| <b>WOOD CUTTING Assortment Pack:</b> Includes one each: BU36, BU46, BU38, BU310T and BU214S           | <b>BU1</b> | 68748 |
| <b>MULTI-PURPOSE Assortment Pack:</b> Includes one each: BU46, BU310T, BU214, BU224S and BU232        | <b>BU2</b> | 68749 |
| <b>METALCUTTING Assortment Pack:</b> Includes one each: BU41014, BU214, BU224, BU224S and BU232       | <b>BU3</b> | 68750 |
| <b>UNIFIED SHANK Assortment Pack:</b> Includes one each all Unified Shank Jigs, plus BU56 6T for Wood | <b>BU4</b> | 11974 |

\* Length dimension references tooth-bearing section of jig saw. The total length, including the blade tang, is approximately 1" longer.



### Bluestripe® Bi-Metal HSS Power Hacksaw Blade

The bi-metal construction of these power hacksaw blades provides exceptional cutting action in a wide variety of applications. The high speed steel teeth and durable alloy steel backing resist breakage and can handle irregular shaped work pieces and interrupted cuts.



| Dimensions<br>(Length x Width x Thickness)      | Pinhole<br>Diameter | TPI<br>(TP/25mm) | Cat. No. | EDP   |
|---|---------------------|------------------|----------|-------|
| 12" x 1-1/8" x .050"<br>300mm x 28.6mm x 1.25mm | .281"<br>(7.00mm)   | 10               | BS1210-5 | 40097 |
|   |                     | 14               | BS1214-5 | 40098 |
| 14" x 1-1/8" x .050"<br>350mm x 28.6mm x 1.25mm |                     | 10               | BS1410-5 | 40099 |
|   |                     | 14               | BS1414-5 | 40100 |
| 14" x 1-3/8" x .062"<br>350mm x 35mm x 1.6mm    |                     | 6                | BS1406-6 | 40101 |
|   |                     | 10               | BS1410-6 | 40102 |
| 14" x 1-5/8" x .075"<br>350mm x 41mm x 2mm      |                     | 6                | BS1406-7 | 40105 |
| 17" x 1-3/8" x .062"<br>425mm x 35mm x 1.6mm    |                     | 6                | BS1706-6 | 40113 |
|   |                     | 10               | BS1710-6 | 40114 |
| 18" x 1-3/8" x .062"<br>450mm x 35mm x 1.6mm    |                     | 6                | BS1806-6 | 40115 |
|   |                     | 10               | BS1810-6 | 40116 |
| 18" x 1-5/8" x .075"<br>450mm x 41mm x 2mm      |                     | 4                | BS1804-7 | 40118 |
|   |                     | 6                | BS1806-7 | 40119 |
| 18" x 1-7/8" x .088"<br>450mm x 48mm x 2.25mm   |                     | 4                | BS1804-8 | 40121 |
|   | 6                   | BS1806-8         | 40122    |       |
| 21" x 1-7/8" x .088"<br>525mm x 48mm x 2.25mm   | 4                   | BS2104-8         | 40126    |       |
|   | 6                   | BS2106-8         | 40127    |       |
| 24" x 2-1/8" x .100"<br>600mm x 54mm x 2.5mm    | 3                   | BS2403-0         | 40131    |       |
|   | 4                   | BS2404-0         | 40132    |       |
| 30" x 2-5/8" x .100"<br>750mm x 67mm x 2.50mm   | 4                   | BS3004-0         | 40172    |       |

**NOTE:** Packed and sold 10 blades per box

### Tooth Pitch (TPI) Guide\* For All Power Hacksaws

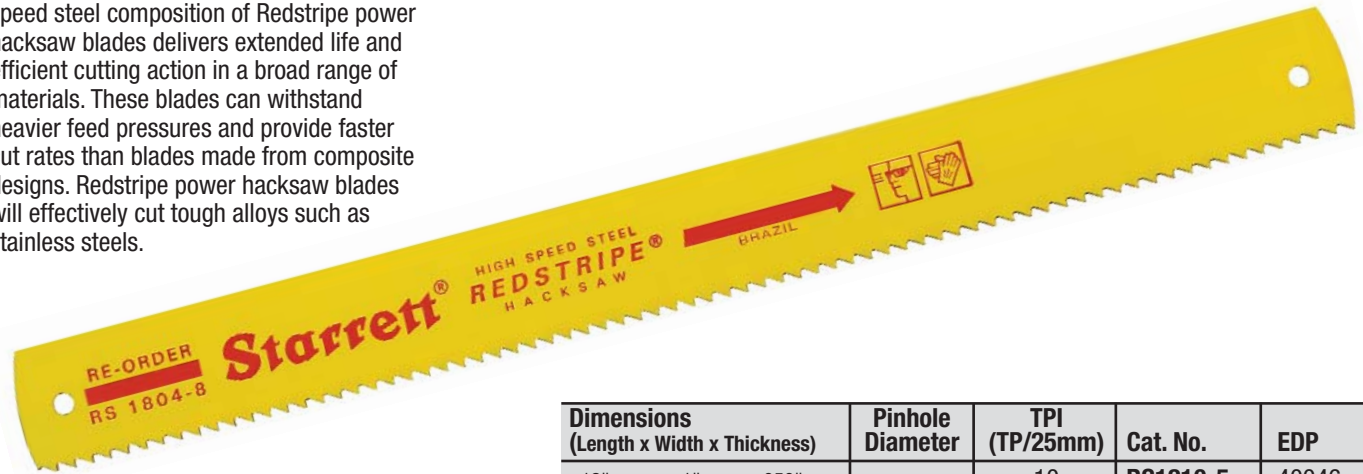
| Cross Section To Be Cut          | Use Pitch |
|----------------------------------|-----------|
| Inch/mm                          |           |
| 1.5" and above<br>38mm and above | 2         |
| 1" - 3"<br>25 - 75mm             | 3         |
| 3/4" - 2-1/2"<br>19 - 63mm       | 4         |
| 1/2" - 1-1/2"<br>13 - 38mm       | 6         |
| 5/16" - 1"<br>8 - 25mm           | 10        |
| 7/32" - 3/4"<br>6 - 19mm         | 14        |
| 3/16" - 1/2"<br>5 - 13mm         | 18        |

**\*NOTE:** Because of the wide overlap, use coarser pitches for faster cutting and finer pitches for smoother cutting.



**Redstripe® Solid HSS Power Hacksaw Blade**

The solid, fully hardened molybdenum high speed steel composition of Redstripe power hacksaw blades delivers extended life and efficient cutting action in a broad range of materials. These blades can withstand heavier feed pressures and provide faster cut rates than blades made from composite designs. Redstripe power hacksaw blades will effectively cut tough alloys such as stainless steels.



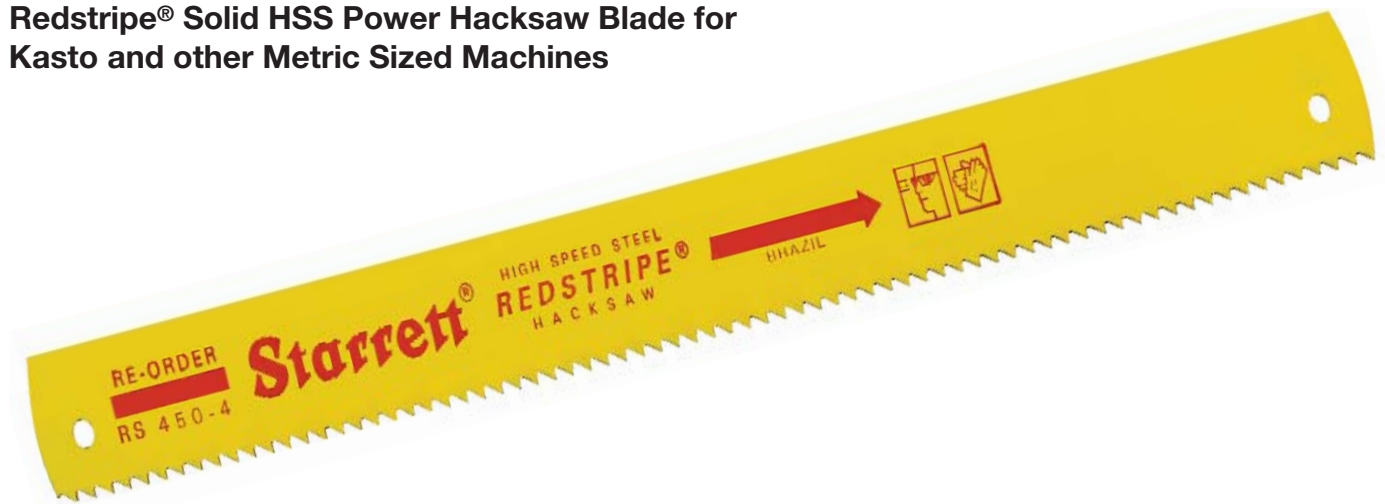
| Dimensions<br>(Length x Width x Thickness)    | Pinhole<br>Diameter | TPI<br>(TP/25mm) | Cat. No. | EDP   |
|---|---------------------|------------------|----------|-------|
| 12" x 1" x .050"<br>300mm x 25mm x 1.25mm     | .281"<br>(7.00MM)   | 10               | RS1210-5 | 40046 |
|   |                     | 14               | RS1214-5 | 40047 |
| 14" x 1" x .050"<br>350mm x 25mm x 1.25mm     |                     | 10               | RS1410-5 | 40049 |
|   |                     | 14               | RS1414-5 | 40050 |
| 14" x 1-1/4" x .062"<br>350mm x 32mm x 1.6mm  |                     | 6                | RS1406-6 | 40051 |
|   |                     | 10               | RS1410-6 | 40052 |
| 14" x 1-1/2" x .075"<br>350mm x 38mm x 2mm    |                     | 6                | RS1406-7 | 40054 |
| 16" x 1-1/4" x .062"<br>425mm x 32mm x 1.25mm |                     | 6                | RS1606-6 | 40057 |
|   |                     | 10               | RS1610-6 | 40058 |
| 17" x 1" x .050"<br>425mm x 25mm x 1.25mm     |                     | 10               | RS1710-5 | 40059 |
|   |                     | 14               | RS1714-5 | 40060 |
| 17" x 1-1/4" x .062"<br>425mm x 32mm x 1.5mm  |                     | 6                | RS1706-6 | 40062 |
|   |                     | 10               | RS1710-6 | 40063 |
| 18" x 1-1/4" x .062"<br>450mm x 32mm x 1.6mm  |                     | 6                | RS1806-6 | 40064 |
|   |                     | 10               | RS1810-6 | 40065 |
| 18" x 1-1/2" x .075"<br>450mm x 38mm x 2mm    |                     | 4                | RS1804-7 | 40067 |
| 18" x 1-3/4" x .088"<br>450mm x 45mm x 2.25mm |                     | 6                | RS1806-7 | 40068 |
|   |                     | 4                | RS1804-8 | 40070 |
| 21" x 1-3/4" x .088"<br>525mm x 45mm x 2.25mm |                     | 6                | RS1806-8 | 40071 |
|   |                     | 4                | RS2104-8 | 40075 |
| 24" x 2" x .100"<br>600mm x 50mm x 2.5mm      | 6                   | RS2106-8         | 40076    |       |
|   | 4                   | RS2404-0         | 40081    |       |
| 30" x 2-1/2" x .100"<br>750mm x 63mm x 2.50mm | 4                   | RS3004-0         | 40083    |       |

**NOTE:** Packed and sold 10 blades per box





### Redstripe® Solid HSS Power Hacksaw Blade for Kasto and other Metric Sized Machines



| Dimensions<br>Length x Width x Thickness      | Pinhole<br>Diameter | Teeth per 25mm<br>(Inch) | Catalog<br>Number | EDP     | Fits Kasto<br>Machine Model No. |         |
|---|---------------------|--------------------------|-------------------|---------|---------------------------------|---------|
| 300mm x 32mm x 2mm<br>12" x 1-1/4" x .075"    | 8.5mm<br>(.334")    | 6                        | RS300-6           | 16168   | WBS 150-170                     |         |
|   |                     | 10                       | RS300-10          | 16169   | WBS 150-170                     |         |
|   |                     | 6                        | RS350-6           | 40177   | UBS 200                         |         |
| 10  |                     | RS350-10                 | 40178             | UBS 200 |                                 |         |
| 400mm x 32mm x 2mm<br>16" x 1-1/4" x .075"    |                     | 4                        | RS400-4           | 40179   | VBS242                          |         |
|   |                     | 6                        | RS400-6           | 40180   | VBS242                          |         |
|   |                     | 10                       | RS400-10          | 40181   | VBS242                          |         |
| 450mm x 38mm x 2mm<br>18" x 1-1/2" x .075"    |                     | 4                        | RS450-4           | 40182   | UBS 280                         |         |
|   |                     | 6                        | RS450-6           | 40183   | UBS 280                         |         |
|   |                     | 10                       | RS450-10          | 40184   | UBS 280                         |         |
| 500mm x 45mm x 2mm<br>20" x 1-3/4" x .075"    |                     | 10.5mm<br>(.413")        | 4                 | RS500-4 | 16170                           | BSM 323 |
|   |                     |                          | 6                 | RS500-6 | 16171                           | BSM 323 |
|   | 10                  |                          | RS500-10          | 16172   | BSM 323                         |         |
| 550mm x 45mm x 2mm<br>22" x 1-3/4" x .075"    | 4                   |                          | RS550-4           | 40173   | UBS 320                         |         |
|   | 6                   |                          | RS550-6           | 40174   | UBS 320                         |         |
|   | 10                  |                          | RS550-10          | 40185   | UBS 320                         |         |
| 575mm x 50mm x 2.5mm<br>23" x 2" x .100"      | 4                   |                          | RS575-4           | 40175   | EBS 320                         |         |
|   | 6                   |                          | RS575-6           | 40176   | EBS 320                         |         |
| 600mm x 50mm x 2.5mm<br>24" x 2" x .100"      | 4                   |                          | RS600-4           | 16173   | EBS 320AU                       |         |
|   | 6                   |                          | RS600-6           | 16174   | EBS 320AU                       |         |
| 650mm x 55mm x 2.5mm<br>26" x 2-3/16" x .100" | 4                   |                          | RS650-4           | 40186   | EBS 400                         |         |
|   | 6                   |                          | RS650-6           | 40187   | EBS 400                         |         |
| 700mm x 55mm x 2.5mm<br>28" x 2-3/16" x .100" | 4                   | RS700-4                  | 40188             | EBS 450 |                                 |         |
|   | 6                   | RS700-6                  | 40189             | EBS 450 |                                 |         |
| 850mm x 60mm x 3mm<br>34" x 2-3/8" x .118"    | 4                   | RS850-4                  | 16175             | EBS 550 |                                 |         |
|   | 6                   | RS850-6                  | 16176             | EBS 550 |                                 |         |
| 900mm x 114mm x 3.5mm<br>36" x 4-1/2" x .138" | 12.5mm<br>(.492")   | 2 1/2 TPI                | RS900-2-1/2       | 68716   | Marvel #24*                     |         |
| 1000mm x 126mm x 3.5mm<br>40" x 5" x .138"    |                     | 2 1/2 TPI                | RS1000-2-1/2      | 16177   | PBS 630                         |         |

**NOTE:** Packed and sold 10 blades per box

\* Replacement for Marvel Cat. 3625-E



### Ship Auger Drill Bits For Wood Boring

Starrett Ship Auger Drill Bits are heavy-duty professional grade tools. Shank size is 7/16" on all drills and fits 1/2" capacity drills.

The product offering is broad and deep with a total of 25 drills available from stock. The 7-1/2" bits are ideal for tighter spots and can easily clear three two by fours. Deeper hole applications are done with the 18" offering, which includes 13 different drill diameters.

Each drill bit has precision ground cutting edges that provide smooth, deep cutting action with a fine finish.

Drills feature a hollow center twist which acts to quickly clear chips from the bored hole. This feature works especially well when drilling into gummy wood species.



| Length                   | Diameter              |         | Cat. No. | EDP               |                   |
|--------------------------|-----------------------|---------|----------|-------------------|-------------------|
|                          | Inch (mm)             | Inch    |          |                   | mm                |
| <b>7-1/2"</b><br>(190mm) |                       | 5/8"    | 16mm     | <b>SAB0058-7</b>  | 20043             |
|                          |                       | 11/16"  | 17.5mm   | <b>SAB1116-7</b>  | 20044             |
|                          |                       | 3/4"    | 19mm     | <b>SAB0034-7</b>  | 20045             |
|                          |                       | 13/16"  | 20.6mm   | <b>SAB1316-7</b>  | 20046             |
|                          |                       | 7/8"    | 22mm     | <b>SAB0078-7</b>  | 20047             |
|                          |                       | 15/16"  | 24mm     | <b>SAB1516-7</b>  | 20048             |
|                          |                       | 1"      | 25.4mm   | <b>SAB0100-7</b>  | 20049             |
|                          |                       | 1-1/16" | 27mm     | <b>SAB0116-7</b>  | 20050             |
|                          |                       | 1-1/8"  | 28.5mm   | <b>SAB0118-7</b>  | 20051             |
|                          |                       | 1-1/4"  | 32mm     | <b>SAB0114-7</b>  | 20052             |
|                          |                       | 1-3/8"  | 35mm     | <b>SAB0138-7</b>  | 20053             |
|                          |                       | 1-1/2"  | 38mm     | <b>SAB0112-7</b>  | 20054             |
|                          | <b>18"</b><br>(457mm) |         | 9/16"    | 14mm              | <b>SAB0916-18</b> |
|                          |                       | 5/8"    | 16mm     | <b>SAB0058-18</b> | 20056             |
|                          |                       | 11/16"  | 17.5mm   | <b>SAB1116-18</b> | 20057             |
|                          |                       | 3/4"    | 19mm     | <b>SAB0034-18</b> | 20058             |
|                          |                       | 13/16"  | 20.6mm   | <b>SAB1316-18</b> | 20059             |
|                          |                       | 7/8"    | 22mm     | <b>SAB0078-18</b> | 20060             |
|                          |                       | 15/16"  | 24mm     | <b>SAB1516-18</b> | 20061             |
|                          |                       | 1"      | 25.4mm   | <b>SAB0100-18</b> | 20062             |
|                          |                       | 1-1/16" | 27mm     | <b>SAB0116-18</b> | 20063             |
|                          |                       | 1-1/8"  | 28.5mm   | <b>SAB0118-18</b> | 20064             |
|                          |                       | 1-1/4"  | 32mm     | <b>SAB0114-18</b> | 20065             |
|                          |                       | 1-3/8"  | 35mm     | <b>SAB0138-18</b> | 20066             |
|                          |                       | 1-1/2"  | 38mm     | <b>SAB0112-18</b> | 20067             |

**NOTE:** Shank size is 7/16" on all sizes.  
Use with 1/2" capacity drills.



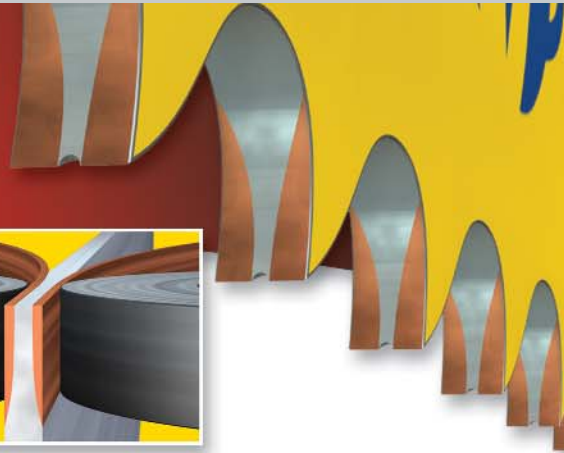
This section shows our line of hand hacksaws, including bi-metal unique® blades, hacksaw frames, PVC and compass saws.







# bi-metal unique<sup>®</sup> saw technology



Right: 170% more weld contact area significantly reduces fracture and breakage at the HSS/backing material interface.



Ordinary Blades:  
Traditional weld or laser bonding.



Bi-Metal Unique:  
170% more weld contact area



170% more weld contact area significantly reduces fracture and breakage at the HSS/backing material interface.



The teeth develop a groove after initial use, altering the blade area engaged in the cut for Multi-Edge Performance.

Over a period of six years, Starrett focused major resources into creating a new sawing technology, including the development and installation of state-of-the-art equipment for electron beam and laser fusion welding. The result is a new generation of better performing products that utilize —

**Starrett Bi-Metal Unique<sup>®</sup> Saw Technology.**

This technology joins two strips of high-speed steel wires to a backing steel in a solid phase, using the principle of solid-state diffusion bonding agent – totally different from traditional weld or laser bonding processes that rely on metal diffusion as the union agent at the interface.

**170% More Weld Contact Area**

The proprietary (patent pending) solid-state diffusion process generates 170% more weld contact area compared to the existing bi-metal high-speed steels.

The result is significantly reduced fracture and breakage at the HSS/backing material interface.

Soon after initial use, the teeth develop a groove in the very thin center of backing material at the cutting edge.

This alters the blade area engaged in the cut to create — **Multi-Edge Performance<sup>®</sup>.**

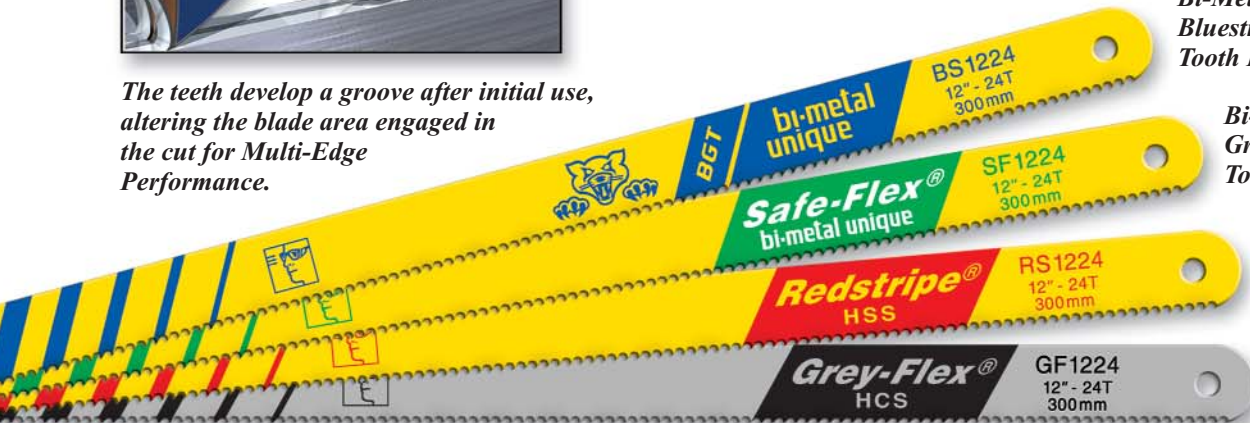
As a result, the cutting stroke produces dual chips that are more easily removed from the cut. For applications utilizing coolant, more of it flows to the cutting surface. This is the **Split-Edge Advantage<sup>®</sup>.**

**The Result – Faster Cuts & Longer Blade Life**

Compared to other premium blades, Bi-Metal Unique provides faster cuts, longer blade life, and lower cost-per-cut.

Bi-Metal Unique  
Bluestripe Ground  
Tooth Hacksaw Blades.

Bi-Metal Unique  
Greenstripe Milled  
Tooth Hacksaw Blades.





### Hacksaw Blades

#### Bluestripe® bi-metal unique® Ground Tooth Hacksaw Blades

A patented solid-state diffusion process produces the industry's most advanced bi-metal hand hacksaw. With 170% more high-speed steel weld area and a precision ground tooth profile, blade fracture and breakage is greatly reduced. Blades cut faster and last longer.



| Dimensions<br>(Length x Width x Thickness) | TPI | 2 Blades on card (1) |       | 10-Blade Pack (2) |       | 50-Blade Pack (3) |       | Single Blade 10 Pack (4) |       |
|--|-----|----------------------|-------|-------------------|-------|-------------------|-------|--------------------------|-------|
|  |     | Cat. No.             | EDP   | Cat. No.          | EDP   | Cat. No.          | EDP   | Cat. No.                 | EDP   |
| 10" x 1/2" x .025"<br>250mm x 13mm x .65mm | 18  | KBS1018-2            | 40333 | KBS1018-10        | 40339 | BS1018-50         | 69677 | BS1018                   | 40327 |
|  | 24  | KBS1024-2            | 40334 | KBS1024-10        | 40340 | BS1024-50         | 69678 | BS1024                   | 40328 |
| 12" x 1/2" x .025"<br>300mm x 13mm x .65mm | 14  | KBS1214-2            | 40335 | KBS1214-10        | 40341 | BS1214-50         | 69679 | BS1214                   | 40329 |
|  | 18  | KBS1218-2            | 40336 | KBS1218-10        | 40342 | BS1218-50         | 69680 | BS1218                   | 40330 |
|  | 24  | KBS1224-2            | 40337 | KBS1224-10        | 40343 | BS1224-50         | 69681 | BS1224                   | 40331 |
|  | 32  | KBS1232-2            | 40338 | KBS1232-10        | 40344 | BS1232-50         | 69682 | BS1232                   | 40332 |

#### Greenstripe® bi-metal unique® Milled Tooth Hacksaw Blades

These blades offer all the benefits of bi-metal unique®, plus hardened milled teeth and a shock-absorbing back. They are shatter resistant and the best blade for interrupted cuts or when the blade is subject to excessive stresses.



| Dimensions<br>(Length x Width x Thickness) | TPI | 2 Blades on card (1) |       | 10-Blade Pack (2) |       | 50-Blade Pack (3) |       | Single Blade 10 Pack (4) |       |
|--|-----|----------------------|-------|-------------------|-------|-------------------|-------|--------------------------|-------|
|  |     | Cat. No.             | EDP   | Cat. No.          | EDP   | Cat. No.          | EDP   | Cat. No.                 | EDP   |
| 10" x 1/2" x .025"<br>250mm x 13mm x .65mm | 18  | KSF1018-2            | 60142 | KSF1018-10        | 60227 | SF1018-50         | 69683 | SF1018                   | 40028 |
|  | 24  | KSF1024-2            | 60143 | KSF1024-10        | 60228 | SF1024-50         | 69684 | SF1024                   | 40029 |
|  | 32  | KSF1032-2            | 60144 | KSF1032-10        | 60229 | SF1032-50         | 69685 | SF1032                   | 40030 |
| 12" x 1/2" x .025"<br>300mm x 13mm x .65mm | 14  | KSF1214-2            | 60145 | KSF1214-10        | 60230 | SF1214-50         | 69686 | SF1214                   | 40031 |
|  | 18  | KSF1218-2            | 60146 | KSF1218-10        | 60231 | SF1218-50         | 69687 | SF1218                   | 40032 |
|  | 24  | KSF1224-2            | 60147 | KSF1224-10        | 60232 | SF1224-50         | 69688 | SF1224                   | 40033 |
|  | 32  | KSF1232-2            | 60148 | KSF1232-10        | 60233 | SF1232-50         | 69689 | SF1232                   | 40034 |

- (1) Blades affixed on carded mount suitable for display
- (2) Packaged in protective tube suitable for display
- (3) Packaged in protective contractor packs of 50 blades
- (4) Sold tape-wrapped in packs of ten



## Redstripe® High Speed Steel Hacksaw Blades

Constructed of a uniformly hardened HSS body, these blades maintain their cutting edge on the most difficult to cut materials.



| Dimensions<br>(Length x Width x Thickness) | TPI | 2 Blades on card (1) |       | 10-Blade Pack (2) |       | 50-Blade Pack (3) |       | Single Blade 10 Pack (4) |       |
|--|-----|----------------------|-------|-------------------|-------|-------------------|-------|--------------------------|-------|
|  |     | Cat. No.             | EDP   | Cat. No.          | EDP   | Cat. No.          | EDP   | Cat. No.                 | EDP   |
| 10" x 1/2" x .025"<br>250mm x 13mm x .65mm | 18  | <b>KRS1018-2</b>     | 60234 | <b>KRS1018-10</b> | 60235 | <b>RS1018-50</b>  | 69690 | <b>RS1018</b>            | 40019 |
|  | 24  | <b>KRS1024-2</b>     | 60236 | <b>KRS1024-10</b> | 60237 | <b>RS1024-50</b>  | 69691 | <b>RS1024</b>            | 40020 |
|  | 32  | <b>KRS1032-2</b>     | 60238 | <b>KRS1032-10</b> | 60239 | <b>RS1032-50</b>  | 69692 | <b>RS1032</b>            | 40021 |
| 12" x 1/2" x .025"<br>300mm x 13mm x .65mm | 14  | <b>KRS1214-2</b>     | 60240 | <b>KRS1214-10</b> | 60241 | <b>RS1214-50</b>  | 69693 | <b>RS1214</b>            | 40022 |
|  | 18  | <b>KRS1218-2</b>     | 60242 | <b>KRS1218-10</b> | 60243 | <b>RS1218-50</b>  | 69694 | <b>RS1218</b>            | 40023 |
|  | 24  | <b>KRS1224-2</b>     | 60244 | <b>KRS1224-10</b> | 60245 | <b>RS1224-50</b>  | 69695 | <b>RS1224</b>            | 40024 |
|  | 32  | <b>KRS1232-2</b>     | 60246 | <b>KRS1232-10</b> | 60247 | <b>RS1232-50</b>  | 69696 | <b>RS1232</b>            | 40025 |

## Grey-Flex® Carbon Steel Hacksaw Blades

These all-purpose blades are an economical alternative when cutting mild steel, copper, brass, aluminum and other like materials. The blades feature an all carbon construction with a hardened cutting edge and flexible back.



| Dimensions<br>(Length x Width x Thickness) | TPI | 2 Blades on card (1) |       | 10-Blade Pack (2) |       | 50-Blade Pack (3) |       | Single Blade 10 Pack (4) |       |
|--|-----|----------------------|-------|-------------------|-------|-------------------|-------|--------------------------|-------|
|  |     | Cat. No.             | EDP   | Cat. No.          | EDP   | Cat. No.          | EDP   | Cat. No.                 | EDP   |
| 10" x 1/2" x .025"<br>250mm x 13mm x .65mm | 18  | <b>KGF1018-2</b>     | 60135 | <b>KGF1018-10</b> | 60214 | <b>GF1018-50</b>  | 69697 | <b>GF1018</b>            | 40011 |
|  | 24  | <b>KGF1024-2</b>     | 60136 | <b>KGF1024-10</b> | 60215 | <b>GF1024-50</b>  | 69698 | <b>GF1024</b>            | 40012 |
|  | 32  | <b>KGF1032-2</b>     | 60137 | <b>KGF1032-10</b> | 60216 | <b>GF1032-50</b>  | 69699 | <b>GF1032</b>            | 40013 |
| 12" x 1/2" x .025"<br>300mm x 13mm x .65mm | 14  | <b>KGF1214-2</b>     | 60138 | <b>KGF1214-10</b> | 60217 | <b>GF1214-50</b>  | 69700 | <b>GF1214</b>            | 40014 |
|  | 18  | <b>KGF1218-2</b>     | 60139 | <b>KGF1218-10</b> | 60218 | <b>GF1218-50</b>  | 69701 | <b>GF1218</b>            | 40015 |
|  | 24  | <b>KGF1224-2</b>     | 60140 | <b>KGF1224-10</b> | 60219 | <b>GF1224-50</b>  | 69702 | <b>GF1224</b>            | 40016 |
|  | 32  | <b>KGF1232-2</b>     | 60141 | <b>KGF1232-10</b> | 60220 | <b>GF1232-50</b>  | 69703 | <b>GF1232</b>            | 40017 |





### Heavy-Duty Hacksaw Blades

#### Bluestripe® Heavy-Duty Bi-Metal Hacksaw Blades

These conventional bi-metal hacksaw blades offer a sturdier construction. An excellent choice for demanding off-hand use or light power-assisted machine applications.

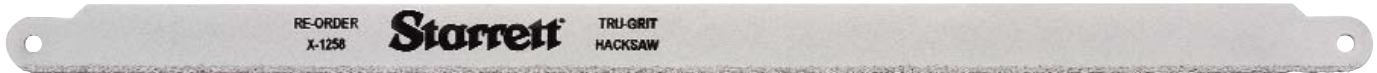
| Dimensions<br>(Length x Width x Thickness) | TPI | 10-Blade Pack   |       |
|--|-----|-----------------|-------|
|  |     | Cat. No.        | EDP   |
| 12" x 5/8" x .032"<br>300mm x 16mm x .80mm | 14  | <b>BS1214-3</b> | 40289 |
|  | 18  | <b>BS1218-3</b> | 40290 |



#### Carbide Grit Hand Hacksaw Blade

These blades feature a durable steel construction with a uniform application of carbide grit bonded to the cutting edge. An ideal tool for cutting ceramics, fiberglass, plastics, asbestos, glass resins or any other abrasive materials that can not be effectively cut by conventional blades. Packed one blade to a card.

| Dimensions<br>(Length x Width x Thickness) | Tooth Type | Cat. No.     | EDP   |
|--|------------|--------------|-------|
| 12" x 5/8" x .032"<br>300mm x 16mm x .80mm | Grit       | <b>X1258</b> | 40204 |



#### Carbide Grit Rod Saw Blade

Constructed of a tough steel alloy rod that has been coated by carbide grit, this unique rod saw blade effectively cuts abrasive materials. The flexible design makes this tool a good choice for awkward cutting applications or in hard to reach applications. Packed one blade to a card.

| Dimensions<br>(Length x Width) | Tooth Type | Cat. No.     | EDP   |
|--------------------------------|------------|--------------|-------|
| 12" x 3/32"<br>300mm x 2.4mm   | Grit       | <b>X1200</b> | 40203 |





## Heavy-Duty Hack Saw Frames

### Model No. K145 Closed Grip Heavy Duty High-Tension Hacksaw Frame

#### No. K145 EDP 67818

The K145 is a professional quality high-tension frame that provides an easy to use and efficient adjustment lever. Its comfortable rubber handle and thumb hold provide a sure, ergonomic grip. Four permanently angled mounting pins allow for both straight and angle cutting. The mounting pins keep the blade secure even when tension is released.

This 12" (300mm) frame has a throat depth of 4-3/8" (110mm).

With just six turns, blade tension is approximately 28,000 psi (2,000 kg/cm<sup>2</sup>) which keeps the blade from twisting and binding in even the most aggressive applications.

Each K145 Heavy Duty High Tension Frame is shipped with a Starrett Bluestripe® bi-metal unique® Ground Tooth Hacksaw Blade.



### Model No. K153 Closed Grip Heavy Duty High-Tension Hacksaw Frame

#### No. K153 EDP 64147

The K153 is a rugged, professional quality high-tension frame constructed of cast aluminum with an extra-thick tubular steel bar for added strength. The steel tube also provides on-hand storage for spare blades.

This 12" (300mm) frame has a throat depth of 4-3/8" (110mm).

The K153 High-Tension Frame is engineered for use with Starrett bi-metal Bluestripe® and Greenstripe® blades.

With just three 360° turns, the easy to use adjusting screw will tension the blade up to 28,000 psi (2,000 kg/cm<sup>2</sup>) which prevents the blade from twisting and binding when bearing down on the cut. Each K153 Heavy

Duty High-Tension Frame is shipped with a Starrett Bluestripe® bi-metal unique® Ground Tooth Hacksaw Blade.





### Adjustable Hack Saw Frames

#### Heavy-Duty Adjustable Hacksaw Frames

**Closed Grip Frame**  
No. K152 EDP 60134

**Open Grip Frame**  
No. K151 EDP 60133

The K152 and K151 are each versatile, heavy duty frames that accept 8", 10" and 12" blades, which can be mounted in any one of four cutting directions. Blades can be tensioned by a single wing nut.

The distinctive red handles allow for good visibility in a crowded workplace.

The K152 and K151 have throat depths of 3-3/4" (95mm).

Each K152 and K151 Heavy Duty Adjustable Hacksaw Frame is shipped with a Starrett Greenstripe® bi-metal unique® Milled Tooth Hacksaw Blade.



### Non Adjustable Frame

#### Closed Grip Light Duty Close Grip Hacksaw Frame

No. K140 EDP 12184

The K140 is a light-weight closed grip non-adjustable frame that accepts 12" (300mm) blades.

It includes a Starrett bi-metal unique® Bluestripe blade.



**NEW**





## PVC Saw

### No. 148

This application-specific saw is a popular item in the tool boxes of the professional contractor and weekend handyman. It is effective in a wide variety of general purpose applications.

- ◆ Easy and fast cutting of PVC and ABS plastic pipe
- ◆ Professional quality saw, featuring cast aluminum handle with blade
- ◆ Also for use in cutting plasterboard, plywood and general purpose cutting
- ◆ Available in 12" and 18" blade lengths
- ◆ Replacement blades available



| Description           | Catalog No. | EDP No. |
|-----------------------|-------------|---------|
| Handle with 12" Blade | 148-12      | 66185   |
| Handle with 18" Blade | 148-18      | 66186   |
| 12" Replacement Blade | PVC-12      | 66187   |
| 18" Replacement Blade | PVC-18      | 66188   |

## Bi-Metal Compass Saw

### No. K147

The K147 Compass Saw is a versatile tool that provides a variety of cutting solutions.

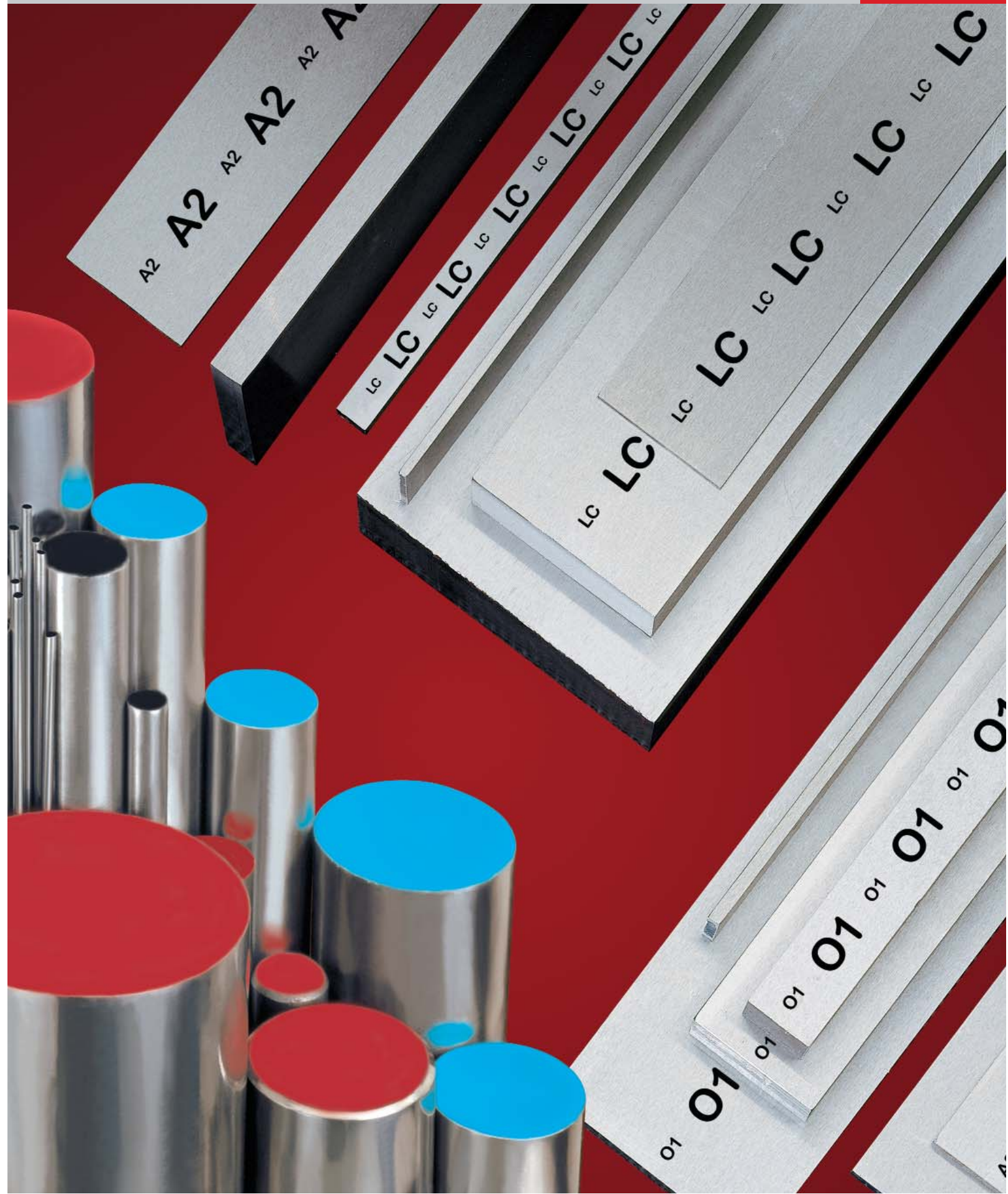
- ◆ Heavy-duty, variable pitch, bi-metal blade cuts most materials and has extra-long cutting life
- ◆ Blade rotates full 360° to easily cut at any angle
- ◆ Has rugged, ergonomic handle for ideal comfort and the best cutting leverage
- ◆ Replacement blade available
- ◆ Starrett carbide grit and V-tooth reciprocating saw blades will also fit the handle



| Description               | Catalog No. | EDP No. |
|---------------------------|-------------|---------|
| Compass Saw with 9" Blade | K147        | 67193   |
| 9" Replacement Blade      | PT26689     | 67194   |

**Starrett®**

**PRECISION GROUND  
FLAT STOCK & DRILL ROD**







*Cut costs and save time - make your own parts like these from Flat Stock.*

## Precision Ground Flat Stock and Drill Rod

### Standard and Oversize

Starrett Precision Ground Flat Stock and Drill Rod can save time in your shop ... no more time hunting lost stock ... no more slow, costly grinding to size. Just lay it out and saw it out and save valuable machinery, downtime and man hours.

- ◆ Machine parts
- ◆ Fixtures
- ◆ Dies
- ◆ Test gages
- ◆ Shims
- ◆ Stamps
- ◆ Templates
- ◆ Jigs
- ◆ Parallels
- ◆ Test tools
- ◆ Flat gages
- ◆ Punches
- ◆ Cutters
- ◆ Buttons

**Five types of material** in a complete range of sizes is available to meet your specific needs:

**Nos. 495 and 496** are (AISI 01) oil hardening tool steels. These steels are dimensionally stable and can be used for all intricate work, including work with thin sections, with a minimum danger of cracking.

**Nos. 497 and 499** are A-2 5% chromium air-hardening steel. These steels have high wear and abrasion resistance.

**No. 498** Low carbon steel is used where deep hardening is not necessary, although it can be carburized or case hardened.

**No. 344** is a medium alloyed air hardening tool steel that provides an excellent balance of machinability, toughness and wear resistance.

**W1 Carbon** (Available only in Drill Rod) is (AISI/SAE W1) a versatile and less expensive carbon steel with excellent machinability, good wear resistance and toughness.

### Packaging

Starrett Precision Ground Flat Stock is individually wrapped in brown paper and clearly marked with size dimensions, analysis and correct hardening and tempering information. Drill rods are bundled together and tagged with a description that includes the size and EDP number. Color coding by grade on the ends of each piece allows for easy identification.





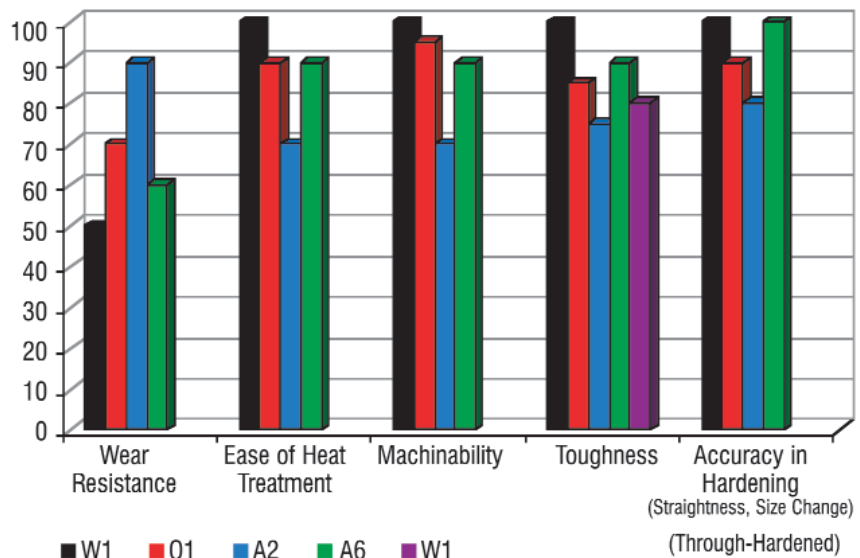


*Cut costs and save time - make your own parts like these from Drill Rod.*

### Flat Stock Tolerances

|   |   |
|---|---|
| <b>Standard:</b>  | Thickness $\pm .001''$<br>Widths Up through 8",<br>$+.000/.005''$<br>9" and Over, $+.000/.015''$<br>Squares, $\pm .001''$ |
| <b>Oversize:</b>  | Thickness, $+.010/.015''$<br>Width, $+.010/.015''$<br>Squares, $+.010/.015''$   |
| <b>Length:</b><br>Saw Cut<br>Oversize to<br>Allow for<br>Finish Cutting | 18", $+1/4''$<br>24", $+1/2''$<br>36", $+5/8''$   |
| <b>Squareness<br/>Edge All:</b>   | .003 Per Inch   |
| <b>Finish:</b>  | 35 Microinch or Finer   |

### Comparative Feature Properties



### Drill Rod Tolerances

| Size Range           | Diameter Tolerance | Length Tolerance |
|----------------------|--------------------|------------------|
| .124" round and less | $\pm .0003''$      | $+1/8'' - 0$     |
| .125" to .499"       | $\pm .0005''$      |                  |
| .500" to 2"          | $\pm .0010''$      |                  |



**No. 496 Oil Hardening  
Standard**

**No. 495 Oil Hardening  
Oversize**

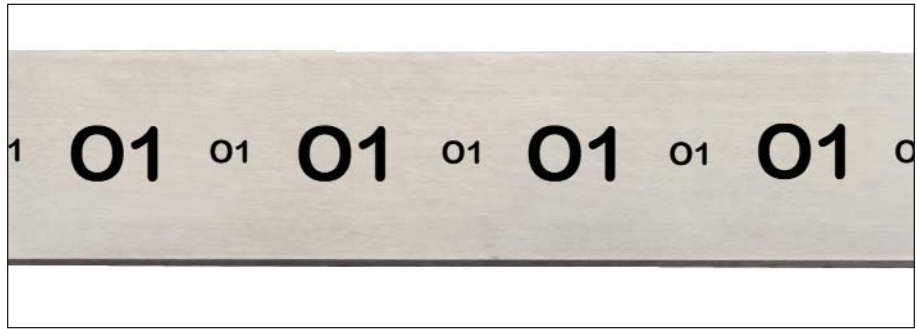
- ◆ Stock is dimensionally stable – use it for the most intricate work
- ◆ Deep hardening characteristics and fine grain structure
- ◆ Machines freely – fully spheroidized, annealed
- ◆ Full length identification – eliminates confusion with other steels
- ◆ The Starrett Company uses its own ground flat stock and die stock for many of its fine precision tool parts

**Specifications**

Furnished in 18" and 36" lengths, ground straight and parallel.

**Nominal Analysis (AISI 01)**

|                     |      |
|---------------------|------|
| Carbon . . . . .    | .90  |
| Chromium . . . . .  | .50  |
| Manganese . . . . . | 1.20 |
| Tungsten . . . . .  | .50  |
| Vanadium . . . . .  | .20  |



**Hardening**

It is recommended that stock be heated uniformly to 1450°-1500° F and quenched in oil. Temperature of the quenching oil should be 120°-140° F for best results. Do not quench in water because this is an oil hardening steel.

| Size      | Temperature   | Quench | Rockwell C |
|-----------|---------------|--------|------------|
| All Sizes | 1450°-1500° F | Oil    | 63-65      |

**Tempering**

For maximum toughness, a tempering time of one hour at temperature is recommended. Use chart for selecting desired Rockwell C hardness and corresponding tempering temperature. The following table may also be used as a guide depending on type of work.

**Cutting Tools**

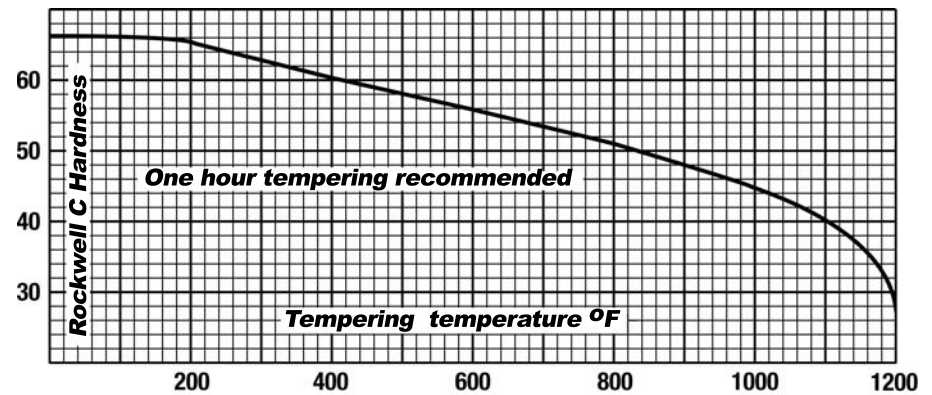
- ◆ 300°-350° F (Light Straw)

**Solid Punches and Dies**

- ◆ 400°-450° F (Straw)

**Spring Temper**

- ◆ 750°-800° F (Blue)



**NOTE:** Lengths, widths and thicknesses other than what are listed can also be quoted by request.



**No. 496 Oil Hardening (Standard Tolerance) 18" and 36" Lengths**

| Thickness    | Width        | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|--------------|--------------|-----------------------|-----------------------|
| <b>1/64"</b> | 1/2"         | 53924                 | 59139                 |
|              | 3/4"         | 53925                 |                       |
|              | 1"           | 53926                 |                       |
|              | 1-1/4"       | 53927                 |                       |
|              | 1-1/2"       | 53928                 |                       |
|              | 2"           | 53929                 | 59140                 |
|              | 2-1/2"       | 53930                 |                       |
|              | 3"           | 53931                 |                       |
|              | 4"           | 53932                 | 59141                 |
|              | <b>1/32"</b> | 1/2"                  | 53933                 |
| 3/4"         |              | 53934                 | 59143                 |
| 1"           |              | 53935                 | 59144                 |
| 1-1/4"       |              | 53936                 |                       |
| 1-1/2"       |              | 53937                 | 59145                 |
| 2"           |              | 53938                 | 58901                 |
| 2-1/2"       |              | 53939                 |                       |
| 3"           |              | 53940                 | 59147                 |
| 4"           |              | 53941                 | 59148                 |
| 6"           |              | 53942                 |                       |
| <b>3/64"</b> | 1/2"         | 53943                 | 59149                 |
|              | 3/4"         | 53944                 | 59150                 |
|              | 1"           | 53945                 | 58902                 |
|              | 1-1/4"       | 53946                 | 59171                 |
|              | 1-1/2"       | 53947                 | 57685                 |
|              | 2"           | 53948                 | 59152                 |
|              | 2-1/2"       | 53949                 |                       |
|              | 3"           | 53950                 |                       |
|              | 3-1/2"       | 53951                 |                       |
|              | 4"           | 53952                 | 59153                 |
| 6"           | 53953        |                       |                       |
| <b>1/16"</b> | 1/4"         | 57226                 | 58891                 |
|              | 3/8"         | 57227                 |                       |
|              | 1/2"         | 53954                 | 54257                 |
|              | 3/4"         | 53955                 | 54258                 |
|              | 1"           | 53956                 | 54259                 |
|              | 1-1/4"       | 53957                 | 54260                 |
|              | 1-1/2"       | 53958                 | 54261                 |
|              | 1-3/4"       | 53959                 | 54262                 |
|              | 2"           | 53960                 | 54263                 |
|              | 2-1/2"       | 53961                 | 54264                 |
|              | 3"           | 53962                 | 54265                 |
|              | 3-1/2"       | 53963                 | 54266                 |
|              | 4"           | 53964                 | 54267                 |
|              | 5"           | 53965                 | 54268                 |
|              | 6"           | 53966                 | 54269                 |
|              | 8"           | 53967                 | 57236                 |
| 10"          | 53968        | 57237                 |                       |
| <b>5/64"</b> | 1/2"         | 53969                 | 54270                 |
|              | 3/4"         | 53970                 | 58905                 |
|              | 1"           | 53971                 | 58890                 |
|              | 1-1/2"       | 53972                 |                       |
|              | 2"           | 53973                 |                       |
|              | 2-1/2"       | 53974                 |                       |
|              | 3"           | 53975                 |                       |
|              | 4"           | 53976                 |                       |
| 6"           | 53977        |                       |                       |

| Thickness    | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|--------------|--------|-----------------------|-----------------------|
| <b>3/32"</b> | 1/4"   |                       | 58899                 |
|              | 3/8"   | 58903                 |                       |
|              | 1/2"   | 53978                 | 54279                 |
|              | 3/4"   | 53979                 | 54280                 |
|              | 1"     | 53980                 | 54281                 |
|              | 1-1/4" | 53981                 | 54282                 |
|              | 1-1/2" | 53982                 | 54283                 |
|              | 2"     | 53983                 | 54284                 |
|              | 2-1/2" | 53984                 | 54285                 |
|              | 3"     | 53985                 | 54286                 |
|              | 4"     | 53986                 | 54287                 |
|              | 5"     | 53987                 | 54288                 |
|              | 6"     | 53988                 | 54289                 |
|              | 8"     | 53989                 | 57682                 |
| <b>7/64"</b> | 1/2"   | 53990                 |                       |
|              | 3/4"   | 53991                 |                       |
|              | 1"     | 53992                 |                       |
|              | 1-1/4" | 53993                 |                       |
|              | 1-1/2" | 53994                 |                       |
|              | 2"     | 53995                 |                       |
|              | 3"     | 53996                 |                       |
|              | 4"     | 53997                 |                       |
| <b>1/8"</b>  | 1/8"   | 53998                 | 59154                 |
|              | 1/4"   | 57228                 | 58894                 |
|              | 5/16"  | 59127                 | 58897                 |
|              | 3/8"   | 57229                 | 58892                 |
|              | 1/2"   | 53999                 | 54298                 |
|              | 5/8"   | 54000                 | 54299                 |
|              | 3/4"   | 54001                 | 54300                 |
|              | 1"     | 54002                 | 54301                 |
|              | 1-1/4" | 54003                 | 54302                 |
|              | 1-1/2" | 54004                 | 54303                 |
|              | 1-3/4" | 54005                 | 54304                 |
|              | 2"     | 54006                 | 54305                 |
|              | 2-1/2" | 54007                 | 54306                 |
|              | 3"     | 54008                 | 54307                 |
|              | 3-1/2" | 54009                 | 54308                 |
|              | 4"     | 54010                 | 54309                 |
|              | 4-1/2" | 54011                 | 54310                 |
|              | 5"     | 54012                 | 54311                 |
| 6"           | 54013  | 54312                 |                       |
| 7"           | 54014  | 54313                 |                       |
| 8"           | 54015  | 54314                 |                       |
| 10"          | 54016  | 54315                 |                       |
| 12"          | 54017  | 54316                 |                       |
| 14"          | 54018  | 57238                 |                       |
| <b>9/64"</b> | 9/64"  | 54019                 |                       |
|              | 1/2"   | 54020                 |                       |
|              | 3/4"   | 54021                 |                       |
|              | 1"     | 54022                 |                       |
|              | 1-1/2" | 54023                 |                       |
|              | 2"     | 54024                 |                       |
|              | 3"     | 54025                 |                       |
| 4"           | 54026  |                       |                       |
| <b>5/32"</b> | 5/32"  | 54027                 |                       |
|              | 1/2"   | 54028                 | 54324                 |
|              | 3/4"   | 54029                 | 54325                 |
|              | 1"     | 54030                 | 54326                 |
|              | 1-1/4" | 54031                 | 54327                 |
|              | 1-1/2" | 54032                 | 54328                 |
|              |        |                       |                       |

| Thickness                | Width        | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|--------------------------|--------------|-----------------------|-----------------------|
| <b>5/32"<br/>(Cont.)</b> | 1-3/4"       | 54033                 | 54329                 |
|                          | 2"           | 54034                 | 54330                 |
|                          | 2-1/2"       | 54035                 | 54331                 |
|                          | 3"           | 54036                 | 54332                 |
|                          | 3-1/2"       | 54037                 | 54333                 |
|                          | 4"           | 54038                 | 54334                 |
|                          | 5"           | 54039                 | 54335                 |
|                          | 6"           | 54040                 | 54336                 |
|                          | 8"           | 54041                 | 54337                 |
|                          | <b>3/16"</b> | 3/16"                 | 54042                 |
| 1/4"                     |              | 57230                 |                       |
| 3/8"                     |              | 57231                 |                       |
| 1/2"                     |              | 54043                 | 54338                 |
| 3/4"                     |              | 54044                 | 54339                 |
| 1"                       |              | 54045                 | 54340                 |
| 1-1/4"                   |              | 54046                 | 54341                 |
| 1-1/2"                   |              | 54047                 | 54342                 |
| 1-3/4"                   |              | 54048                 | 54343                 |
| 2"                       |              | 54049                 | 54344                 |
| 2-1/2"                   |              | 54050                 | 54345                 |
| 3"                       | 54051        | 54346                 |                       |
| 3-1/2"                   | 54052        | 54347                 |                       |
| 4"                       | 54053        | 54348                 |                       |
| 5"                       | 54054        | 54349                 |                       |
| 6"                       | 54055        | 54350                 |                       |
| 8"                       | 54056        | 54351                 |                       |
| 10"                      | 54057        | 54352                 |                       |
| <b>7/32"</b>             | 7/32"        | 54058                 |                       |
|                          | 1/2"         | 54059                 | 54353                 |
|                          | 3/4"         | 54060                 | 54354                 |
|                          | 1"           | 54061                 | 54355                 |
|                          | 1-1/4"       | 54062                 | 54356                 |
|                          | 1-1/2"       | 54063                 | 54357                 |
|                          | 2"           | 54064                 | 54358                 |
|                          | 3"           | 54065                 | 54359                 |
| 4"                       | 54066        | 54360                 |                       |
| 6"                       | 54067        |                       |                       |
| <b>1/4"</b>              | 1/4"         | 54068                 | 56517                 |
|                          | 3/8"         | 54069                 | 58900                 |
|                          | 1/2"         | 54070                 | 54362                 |
|                          | 5/8"         | 58904                 | 58893                 |
|                          | 3/4"         | 54071                 | 54363                 |
|                          | 1"           | 54072                 | 54364                 |
|                          | 1-1/4"       | 54073                 | 54365                 |
|                          | 1-1/2"       | 54074                 | 54366                 |
|                          | 1-3/4"       | 54075                 | 54367                 |
|                          | 2"           | 54076                 | 54368                 |
|                          | 2-1/2"       | 54077                 | 54369                 |
|                          | 3"           | 54078                 | 54370                 |
|                          | 3-1/2"       | 54079                 | 54371                 |
|                          | 4"           | 54080                 | 54372                 |
|                          | 4-1/2"       | 54081                 | 54373                 |
|                          | 5"           | 54082                 | 54374                 |
| 5-1/2"                   | 54083        | 54375                 |                       |
| 6"                       | 54084        | 54376                 |                       |
| 7"                       | 54085        | 54377                 |                       |
| 8"                       | 54086        | 54378                 |                       |
| 10"                      | 54087        | 54379                 |                       |
| 12"                      | 54088        | 54380                 |                       |
| 14"                      | 54089        | 57239                 |                       |

**NOTE:** Prices on application for other lengths, widths and thicknesses.

(Continued on next page.)





**No. 496 Oil Hardening (Standard Tolerance) 18" and 36" Lengths (continued)**

| Thickness    | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|--------------|--------|-----------------------|-----------------------|
| <b>9/32"</b> | 9/32"  | 54090                 |                       |
|              | 1/2"   | 54091                 |                       |
|              | 3/4"   | 54092                 |                       |
|              | 1"     | 54093                 |                       |
|              | 1-1/4" | 54094                 |                       |
|              | 1-1/2" | 54095                 |                       |
|              | 2"     | 54096                 |                       |
|              | 2-1/2" | 54097                 |                       |
|              | 3"     | 54098                 |                       |
|              | 4"     | 54099                 |                       |
| 6"           | 54100  | 54390                 |                       |
| <b>5/16"</b> | 5/16"  | 54101                 | 54391                 |
|              | 3/8"   | 57232                 |                       |
|              | 1/2"   | 54102                 | 54392                 |
|              | 5/8"   |                       | 58896                 |
|              | 3/4"   | 54103                 | 54393                 |
|              | 1"     | 54104                 | 54394                 |
|              | 1-1/4" | 54105                 | 54395                 |
|              | 1-1/2" | 54106                 | 54396                 |
|              | 1-3/4" | 57233                 | 57240                 |
|              | 2"     | 54107                 | 54397                 |
|              | 2-1/2" | 54108                 | 54398                 |
|              | 3"     | 54109                 | 54399                 |
|              | 3-1/2" | 54110                 | 54400                 |
|              | 4"     | 54111                 | 54401                 |
|              | 4-1/2" | 54112                 | 54402                 |
| 5"           | 54113  | 54403                 |                       |
| 6"           | 54114  | 54404                 |                       |
| 8"           | 54115  | 54405                 |                       |
| <b>3/8"</b>  | 3/8"   | 54116                 | 54406                 |
|              | 1/2"   | 54117                 | 54407                 |
|              | 5/8"   |                       | 58898                 |
|              | 3/4"   | 54118                 | 54408                 |
|              | 1"     | 54119                 | 54409                 |
|              | 1-1/4" | 54120                 | 54410                 |
|              | 1-1/2" | 54121                 | 54411                 |
|              | 1-3/4" | 54122                 | 54412                 |
|              | 2"     | 54123                 | 54413                 |
|              | 2-1/2" | 54124                 | 54414                 |
|              | 3"     | 54125                 | 54415                 |
|              | 3-1/2" | 54126                 | 54416                 |
|              | 4"     | 54127                 | 54417                 |
|              | 4-1/2" | 54128                 | 54418                 |
|              | 5"     | 54129                 | 54419                 |
| 5-1/2"       | 54130  | 54420                 |                       |
| 6"           | 54131  | 54421                 |                       |
| 7"           | 54132  | 54422                 |                       |
| 8"           | 54133  | 54423                 |                       |
| 10"          | 54134  | 54424                 |                       |
| 12"          | 54135  | 54425                 |                       |
| <b>7/16"</b> | 7/16"  | 54136                 | 54426                 |
|              | 1/2"   | 54137                 | 54427                 |
|              | 3/4"   | 54138                 | 54428                 |
|              | 1"     | 54139                 | 54429                 |
|              | 1-1/4" | 54140                 | 54430                 |
|              | 1-1/2" | 54141                 | 54431                 |
|              | 2"     | 54142                 | 54432                 |
|              | 2-1/2" | 54143                 | 54433                 |
|              | 3"     | 54144                 | 54434                 |
|              | 4"     | 54145                 | 54435                 |
| 6"           | 54146  | 54436                 |                       |

| Thickness    | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|--------------|--------|-----------------------|-----------------------|
| <b>1/2"</b>  | 1/2"   | 54147                 | 54437                 |
|              | 5/8"   | 54148                 | 54438                 |
|              | 3/4"   | 54149                 | 54439                 |
|              | 1"     | 54150                 | 54440                 |
|              | 1-1/4" | 54151                 | 54441                 |
|              | 1-1/2" | 54152                 | 54442                 |
|              | 1-3/4" | 57234                 | 57241                 |
|              | 2"     | 54153                 | 54443                 |
|              | 2-1/2" | 54154                 | 54444                 |
|              | 3"     | 54155                 | 54445                 |
|              | 3-1/2" | 54156                 | 54446                 |
|              | 4"     | 54157                 | 54447                 |
|              | 4-1/2" | 54158                 | 54448                 |
|              | 5"     | 54159                 | 54449                 |
|              | 6"     | 54160                 | 54450                 |
| 7"           | 54161  | 54451                 |                       |
| 8"           | 54162  | 54452                 |                       |
| 10"          | 54163  | 54453                 |                       |
| 12"          | 54164  | 59159                 |                       |
| 14"          | 54165  |                       |                       |
| <b>9/16"</b> | 9/16"  | 54166                 | 54455                 |
|              | 3/4"   | 54167                 | 54456                 |
|              | 1"     | 54168                 | 54457                 |
|              | 1-1/4" | 54169                 | 54458                 |
|              | 1-1/2" | 54170                 | 54459                 |
| 2"           | 54171  | 54460                 |                       |
| <b>5/8"</b>  | 5/8"   | 54172                 | 54461                 |
|              | 3/4"   | 54173                 | 54462                 |
|              | 1"     | 54174                 | 54463                 |
|              | 1-1/4" | 54175                 | 54464                 |
|              | 1-1/2" | 54176                 | 54465                 |
|              | 2"     | 54177                 | 54466                 |
|              | 2-1/2" | 54178                 | 54467                 |
|              | 3"     | 54179                 | 54468                 |
|              | 3-1/2" | 54180                 | 54469                 |
|              | 4"     | 54181                 | 54470                 |
| 5"           | 54182  | 54471                 |                       |
| 6"           | 54183  | 54472                 |                       |
| 8"           | 54185  | 54474                 |                       |
| 10"          | 54186  | 54475                 |                       |
| 12"          | 57235  | 57242                 |                       |
| <b>3/4"</b>  | 3/4"   | 54187                 | 54476                 |
|              | 1"     | 54188                 | 54477                 |
|              | 1-1/4" | 54189                 | 54478                 |
|              | 1-1/2" | 54190                 | 54479                 |
|              | 2"     | 54191                 | 54480                 |
|              | 2-1/2" | 54192                 | 54481                 |
|              | 3"     | 54193                 | 54482                 |
|              | 3-1/2" | 54194                 | 54483                 |
|              | 4"     | 54195                 | 54484                 |
|              | 4-1/2" | 54196                 | 54485                 |
|              | 5"     | 54197                 | 54486                 |
|              | 6"     | 54198                 | 54487                 |
|              | 8"     | 54199                 | 54488                 |
|              | 10"    | 54200                 | 54489                 |
|              | 12"    | 54201                 | 54490                 |

| Thickness     | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|---------------|--------|-----------------------|-----------------------|
| <b>7/8"</b>   | 7/8"   | 54202                 | 54491                 |
|               | 1"     | 54203                 | 54492                 |
|               | 1-1/4" | 54204                 | 54493                 |
|               | 1-1/2" | 54205                 | 54494                 |
|               | 2"     | 54206                 | 54495                 |
|               | 2-1/2" | 54207                 | 54496                 |
|               | 3"     | 54208                 | 54497                 |
|               | 4"     | 54209                 | 54498                 |
| 6"            | 54210  | 54499                 |                       |
| <b>1"</b>     | 1"     | 54211                 | 54500                 |
|               | 1-1/4" | 54212                 | 54501                 |
|               | 1-1/2" | 54213                 | 54502                 |
|               | 2"     | 54214                 | 54503                 |
|               | 2-1/2" | 54215                 | 54504                 |
|               | 3"     | 54216                 | 54505                 |
|               | 3-1/2" | 54217                 | 54506                 |
|               | 4"     | 54218                 | 54507                 |
|               | 4-1/2" | 54219                 | 54508                 |
|               | 5"     | 54220                 | 54509                 |
|               | 6"     | 54221                 | 54510                 |
|               | 8"     | 54222                 | 54511                 |
| 10"           | 54223  | 54512                 |                       |
| 12"           | 54224  | 54513                 |                       |
| <b>1-1/8"</b> | 1-1/2" | 54225                 | 54514                 |
|               | 2"     | 54226                 | 54515                 |
|               | 3"     | 54227                 | 54516                 |
|               | 4"     | 54228                 | 54517                 |
| 6"            | 54229  | 54518                 |                       |
| <b>1-1/4"</b> | 1-1/4" | 54230                 | 54519                 |
|               | 1-1/2" | 54231                 | 54520                 |
|               | 2"     | 54232                 | 54521                 |
|               | 2-1/2" | 54233                 | 54522                 |
|               | 3"     | 54234                 | 54523                 |
|               | 4"     | 54235                 | 54524                 |
|               | 5"     | 54236                 | 54525                 |
|               | 6"     | 54237                 | 54526                 |
|               | 8"     | 54238                 | 54527                 |
|               | 10"    | 54239                 | 54528                 |
| <b>1-1/2"</b> | 1-1/2" | 54240                 | 54529                 |
|               | 2"     | 54241                 | 54530                 |
|               | 2-1/2" | 54242                 | 54531                 |
|               | 3"     | 54243                 | 54532                 |
|               | 3-1/2" | 54244                 | 54533                 |
|               | 4"     | 54245                 | 54534                 |
|               | 5"     | 54246                 | 54535                 |
|               | 6"     | 54247                 | 54536                 |
|               | 8"     | 54248                 | 54537                 |
|               | 10"    | 54249                 | 54538                 |
| 12"           | 59189  |                       |                       |
| <b>2"</b>     | 2"     | 54250                 | 54539                 |
|               | 3"     | 54251                 | 54540                 |
|               | 4"     | 54252                 | 54541                 |
|               | 6"     | 54253                 | 54542                 |

NOTE: Prices on application for other lengths, widths and thicknesses.

(Continued on next page.)



**No. 495 Oil Hardening (Oversize Tolerance) 18" and 36" Lengths**

| Thickness    | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|--------------|--------|-----------------------|-----------------------|
| <b>3/16"</b> | 3/16"  | 56957                 | 57677                 |
|              | 1/2"   | 56958                 | 56813                 |
|              | 3/4"   | 56959                 | 56814                 |
|              | 1"     | 56960                 | 56815                 |
|              | 1-1/4" | 56961                 | 56816                 |
|              | 1-1/2" | 56962                 | 56817                 |
|              | 2"     | 56963                 | 56818                 |
|              | 2-1/2" | 56964                 | 56819                 |
|              | 3"     | 56965                 | 56820                 |
|              | 4"     | 56966                 | 56821                 |
|              | 5"     | 56967                 |                       |
|              | 6"     | 56968                 | 56822                 |
|              | 8"     | 56969                 |                       |
|              | 10"    | 56970                 |                       |
| <b>1/4"</b>  | 1/4"   | 56971                 | 57678                 |
|              | 1/2"   | 56972                 | 56823                 |
|              | 3/4"   | 56973                 | 56824                 |
|              | 1"     | 56974                 | 56825                 |
|              | 1-1/4" | 56975                 | 56826                 |
|              | 1-1/2" | 56976                 | 56827                 |
|              | 1-3/4" | 56977                 |                       |
|              | 2"     | 56978                 | 56828                 |
|              | 2-1/2" | 56979                 | 56829                 |
|              | 3"     | 56980                 | 56830                 |
|              | 3-1/2" | 56981                 | 56831                 |
|              | 4"     | 56982                 | 56832                 |
|              | 4-1/2" | 56983                 |                       |
| 5"           | 56984  | 56833                 |                       |
| 6"           | 56985  | 56834                 |                       |
| 8"           | 56986  |                       |                       |
| <b>5/16"</b> | 5/16"  | 56987                 |                       |
|              | 1/2"   | 56988                 | 56835                 |
|              | 3/4"   | 56989                 | 56836                 |
|              | 1"     | 56990                 | 56837                 |
|              | 1-1/4" | 56991                 | 56838                 |
|              | 1-1/2" | 56992                 | 56839                 |
|              | 2"     | 56993                 | 56840                 |
|              | 2-1/2" | 56994                 | 56841                 |
|              | 3"     | 56995                 | 56842                 |
|              | 4"     | 56996                 | 56843                 |
|              | 5"     | 56997                 | 56844                 |
| 6"           |        | 56845                 |                       |

| Thickness   | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|-------------|--------|-----------------------|-----------------------|
| <b>3/8"</b> | 3/8"   | 56998                 |                       |
|             | 1/2"   | 56999                 | 56846                 |
|             | 3/4"   | 57000                 | 56847                 |
|             | 1"     | 57001                 | 56848                 |
|             | 1-1/4" | 57002                 | 56849                 |
|             | 1-1/2" | 57003                 | 56850                 |
|             | 2"     | 57004                 | 56851                 |
|             | 2-1/2" | 57005                 | 56852                 |
|             | 3"     | 57006                 | 56853                 |
|             | 3-1/2" | 57007                 |                       |
|             | 4"     | 57008                 | 56854                 |
|             | 4-1/2" | 57009                 |                       |
| 5"          | 57010  | 56855                 |                       |
| 6"          | 57011  | 56856                 |                       |
| 8"          | 57012  | 56857                 |                       |
| 12"         | 57013  |                       |                       |
| <b>1/2"</b> | 1/2"   | 57014                 | 56858                 |
|             | 3/4"   | 57015                 | 56859                 |
|             | 1"     | 57016                 | 56860                 |
|             | 1-1/4" | 57017                 | 56861                 |
|             | 1-1/2" | 57018                 | 56862                 |
|             | 2"     | 57019                 | 56863                 |
|             | 2-1/2" | 57020                 | 56864                 |
|             | 3"     | 57021                 | 56865                 |
|             | 3-1/2" | 57022                 |                       |
|             | 4"     | 57023                 | 56866                 |
|             | 4-1/2" | 57024                 |                       |
|             | 5"     | 57025                 | 56867                 |
|             | 6"     | 57026                 | 56868                 |
|             | 8"     | 57027                 | 56869                 |
| 10"         | 57028  | 56870                 |                       |
| 12"         | 57029  |                       |                       |

| Thickness   | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|-------------|--------|-----------------------|-----------------------|
| <b>5/8"</b> | 5/8"   | 57030                 | 56871                 |
|             | 3/4"   | 57031                 | 57680                 |
|             | 1"     | 57032                 | 56872                 |
|             | 1-1/4" | 57033                 | 56873                 |
|             | 1-1/2" | 57034                 | 56874                 |
|             | 2"     | 57035                 | 56875                 |
|             | 2-1/2" | 57036                 | 56876                 |
|             | 3"     | 57037                 | 56877                 |
|             | 3-1/2" | 57038                 |                       |
|             | 4"     | 57039                 | 56878                 |
| 5"          | 57040  | 56879                 |                       |
| 6"          | 57041  | 56880                 |                       |
| <b>3/4"</b> | 3/4"   | 57042                 | 56881                 |
|             | 1"     | 57043                 | 56882                 |
|             | 1-1/4" | 57044                 |                       |
|             | 1-1/2" | 57045                 | 56883                 |
|             | 2"     | 57046                 | 56884                 |
|             | 2-1/2" | 57047                 | 56885                 |
|             | 3"     | 57048                 | 56886                 |
|             | 3-1/2" | 57049                 |                       |
| 4"          | 57050  | 56887                 |                       |
| 5"          | 57051  |                       |                       |
| 6"          | 57052  | 56888                 |                       |
| 8"          | 57053  |                       |                       |
| <b>1"</b>   | 1"     | 57054                 | 56889                 |
|             | 1-1/4" | 57055                 | 57681                 |
|             | 1-1/2" | 57056                 | 56890                 |
|             | 2"     | 57057                 | 56891                 |
|             | 2-1/2" | 57058                 | 56892                 |
|             | 3"     | 57059                 | 56893                 |
|             | 3-1/2" | 57060                 |                       |
|             | 4"     | 57061                 | 56894                 |
| 5"          | 57062  |                       |                       |
| 6"          | 57063  | 56895                 |                       |

**NOTE:** Prices on application for other lengths, widths and thicknesses.



**No. 497 Air Hardening  
Standard**

**No. 499 Air Hardening  
Oversize**

**Dimensionally stable...**

- ◆ The 5% chromium content makes this steel especially desirable for punches and dies to be used in long production runs since it gives the tools far longer life. Up to 50% more pieces per sharpening can be produced than with oil hardening steel
- ◆ High wear resistance is also ideal for punches and dies to stamp silicon, stainless steels, monel metal and other types of abrasive material
- ◆ Maintains close dimensional accuracy throughout the heat treating process. The wide 75° hardening range make this virtually foolproof
- ◆ Full-length identification eliminates confusion with other steels
- ◆ The Starrett Company uses its own ground flat stock for many of its precision tool parts

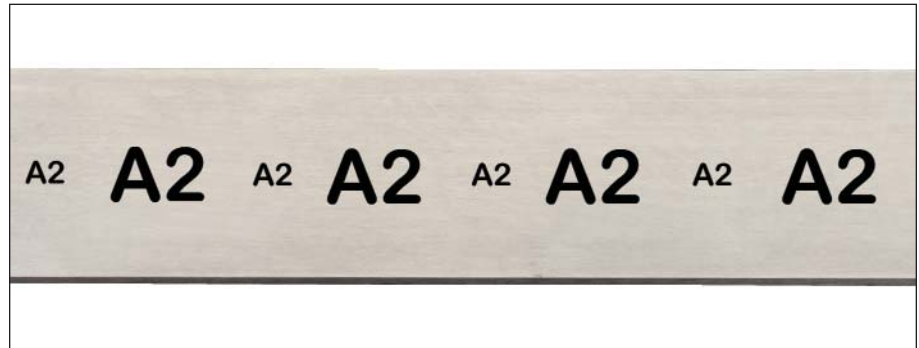
**Specifications**

Furnished in 18" and 36" lengths, ground straight and parallel.

**Nominal Analysis (AISI A2)**

|                  |      |
|------------------|------|
| Carbon .....     | 1.00 |
| Chromium .....   | 5.25 |
| Manganese .....  | .60  |
| Molybdenum ..... | 1.00 |
| Vanadium .....   | .25  |

**NOTE:** No. 499, 1-1/4" and over is Blanchard ground with saw cut edges.



**Hardening**

Nos. 497 and 499 Air Hardening Ground Flat Stock have a wide hardening range of 1700° F to 1775° F, with 1750° F recommended for most work. For heavier sections use the high side of the range. Heat uniformly throughout but do not soak longer than necessary. Cool in still air. No pre-heat is required if pack or atmosphere controlled furnace methods are used, but with the open furnace method a pre-heat of 1450° F is recommended.

| Size      | Temperature   | Cool      | Rockwell C |
|-----------|---------------|-----------|------------|
| All Sizes | 1700°-1775° F | Still Air | 63.5-65    |

**Tempering**

A tempering time of two hours at temperature is recommended. Use chart for selecting the desired Rockwell C hardness and corresponding tempering temperature. For maximum toughness, double temper for two hours at each temperature recommended. The following table may also be used as a guide, depending on the type of work.

**Light Blanking Punches and Dies**

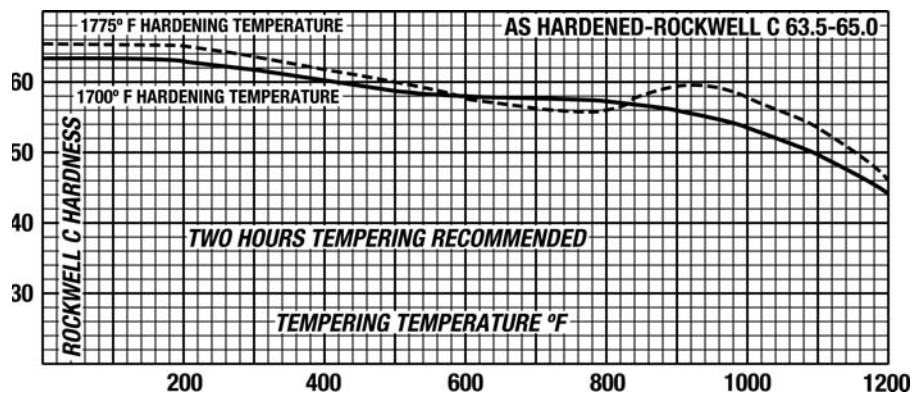
- ◆ 400°-425° F

**Heavy Blanking Punches and Dies**

- ◆ 700° F

**Annealing**

- ◆ 1525°-1575° F. Furnace cool at no more than 50° per hour to 800° for maximum softness.







**No. 497 Air Hardening (Standard Tolerance) 18" and 36" Lengths**

| Thickness | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. | Thickness | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. | Thickness | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|-----------|--------|-----------------------|-----------------------|-----------|--------|-----------------------|-----------------------|-----------|--------|-----------------------|-----------------------|
| 1/16"     | 1/2"   | 57489                 | 57301                 | 3/16"     | 3/16"  | 57517                 | 57329                 | 3/8"      | 3/8"   | 57531                 | 57343                 |
|           | 3/4"   | 57490                 | 57302                 |           | 1/2"   | 57518                 | 57330                 |           | 1/2"   | 57532                 | 57344                 |
|           | 1"     | 57491                 | 57303                 |           | 3/4"   | 57519                 | 57331                 |           | 3/4"   | 57533                 | 57345                 |
|           | 1-1/4" | 57492                 | 57304                 |           | 1"     | 54610                 | 54567                 |           | 1"     | 54728                 | 54643                 |
|           | 1-1/2" | 57493                 | 57305                 |           | 1-1/4" | 54611                 | 54568                 |           | 1-1/4" | 54729                 | 54644                 |
|           | 2"     | 57494                 | 57306                 |           | 1-1/2" | 54612                 | 54569                 |           | 1-1/2" | 54730                 | 54645                 |
|           | 2-1/2" | 57495                 | 57307                 |           | 1-3/4" | 57520                 | 57332                 |           | 1-3/4" | 57534                 | 57346                 |
|           | 3"     | 57496                 | 57308                 |           | 2"     | 54613                 | 54570                 |           | 2"     | 54731                 | 54646                 |
|           | 4"     | 57497                 | 57309                 |           | 2-1/2" | 54614                 | 54571                 |           | 2-1/2" | 54732                 | 54647                 |
| 3/32"     | 1/2"   | 57498                 | 57310                 |           | 3"     | 54615                 | 54572                 |           | 3"     | 54733                 | 54648                 |
|           | 3/4"   | 57499                 | 57311                 |           | 3-1/2" | 54616                 | 54573                 |           | 3-1/2" | 54734                 | 54649                 |
|           | 1"     | 57500                 | 57312                 |           | 4"     | 54617                 | 54574                 |           | 4"     | 54735                 | 54650                 |
|           | 1-1/4" | 57501                 | 57313                 | 5"        | 54618  | 54575                 | 5"                    | 54737     | 54652  |                       |                       |
|           | 1-1/2" | 57502                 | 57314                 | 6"        | 54619  | 54576                 | 6"                    | 54739     | 54654  |                       |                       |
|           | 2"     | 57503                 | 57315                 | 7"        | 57521  | 57333                 | 8"                    | 59133     | 59165  |                       |                       |
|           | 2-1/2" | 57504                 | 57316                 | 8"        | 57522  | 57334                 | 12"                   | 59134     | 59166  |                       |                       |
|           | 3"     | 57505                 | 57317                 | 12"       | 59129  | 59161                 | 1/2"                  | 1/2"      | 56495  | 56505                 |                       |
| 4"        | 57506  | 57318                 | 1/4"                  | 1/4"      | 57523  | 57335                 |                       | 5/8"      | 57535  | 57347                 |                       |
| 1/8"      | 1/2"   | 57243                 |                       | 57245     | 1/2"   | 57524                 |                       | 57336     | 3/4"   | 56494                 | 56506                 |
|           | 5/8"   | 57507                 |                       | 57319     | 3/4"   | 57525                 |                       | 57337     | 1"     | 56493                 | 56507                 |
|           | 3/4"   | 57244                 |                       | 57246     | 1"     | 54620                 |                       | 54577     | 1-1/4" | 57536                 | 57348                 |
|           | 1"     | 54589                 |                       | 54546     | 1-1/4" | 54621                 |                       | 54578     | 1-1/2" | 57537                 | 57349                 |
|           | 1-1/4" | 54590                 |                       | 54547     | 1-1/2" | 54622                 |                       | 54579     | 1-3/4" | 57538                 | 57350                 |
|           | 1-1/2" | 54591                 |                       | 54548     | 1-3/4" | 57526                 |                       | 57338     | 2"     | 54748                 | 54663                 |
|           | 1-3/4" | 57508                 |                       | 57320     | 2"     | 54623                 |                       | 54580     | 2-1/2" | 54749                 | 54664                 |
|           | 2"     | 54592                 |                       | 54549     | 2-1/2" | 54624                 |                       | 54581     | 3"     | 54750                 | 54665                 |
|           | 2-1/2" | 54593                 |                       | 54550     | 3"     | 54625                 |                       | 54582     | 3-1/2" | 54751                 | 54666                 |
|           | 3"     | 54594                 |                       | 54551     | 3-1/2" | 54626                 |                       | 54583     | 4"     | 54752                 | 54667                 |
|           | 3-1/2" | 54595                 |                       | 54552     | 4"     | 54627                 | 54584                 | 5"        | 54754  | 54669                 |                       |
|           | 4"     | 54596                 | 54553                 | 5"        | 54629  | 54586                 | 6"                    | 54755     | 54670  |                       |                       |
| 5"        | 54598  | 54555                 | 6"                    | 54631     | 54588  | 8"                    | 54757                 | 54672     |        |                       |                       |
| 6"        | 54599  | 54556                 | 8"                    | 59130     | 59162  | 12"                   | 59135                 | 59167     |        |                       |                       |
| 7"        | 57509  | 57321                 | 12"                   | 59131     | 59163  | 5/8"                  | 5/8"                  | 56499     | 56508  |                       |                       |
| 8"        | 57510  | 57322                 | 5/16"                 | 5/16"     | 57527  |                       | 57339                 | 3/4"      | 56498  | 56509                 |                       |
| 10"       | 57511  | 57323                 |                       | 1/2"      | 57528  |                       | 57340                 | 1"        | 56497  | 56510                 |                       |
| 12"       | 57512  | 57324                 |                       | 3/4"      | 57529  |                       | 57341                 | 1-1/2"    | 56496  | 56511                 |                       |
| 5/32"     | 1/2"   | 57513                 |                       | 57325     | 1"     |                       | 54717                 | 54632     | 2"     | 54760                 | 54675                 |
|           | 3/4"   | 57514                 |                       | 57326     | 1-1/4" |                       | 54718                 | 54633     | 2-1/2" | 54761                 | 54676                 |
|           | 1"     | 54600                 |                       | 54557     | 1-1/2" |                       | 54719                 | 54634     | 3"     | 54762                 | 54677                 |
|           | 1-1/4" | 54601                 |                       | 54558     | 1-3/4" |                       | 57530                 | 57342     | 3-1/2" | 54763                 | 54678                 |
|           | 1-1/2" | 54602                 |                       | 54559     | 2"     | 54720                 | 54635                 | 4"        | 54764  | 54679                 |                       |
|           | 1-3/4" | 57515                 | 57327                 | 2-1/2"    | 54721  | 54636                 | 5"                    | 54765     | 54680  |                       |                       |
|           | 2"     | 54603                 | 54560                 | 3"        | 54722  | 54637                 | 6"                    | 54766     | 54681  |                       |                       |
|           | 2-1/2" | 54604                 | 54561                 | 3-1/2"    | 54723  | 54638                 | 8"                    | 59136     | 59168  |                       |                       |
| 3"        | 54605  | 54562                 | 4"                    | 54724     | 54639  | 3/4"                  | 3/4"                  | 54770     | 54685  |                       |                       |
| 3-1/2"    | 54606  | 54563                 | 5"                    | 54726     | 54641  |                       | 1"                    | 56501     | 56512  |                       |                       |
| 4"        | 54607  | 54564                 | 6"                    | 54727     | 54642  |                       | 1-1/4"                | 57539     | 57351  |                       |                       |
| 5"        | 54608  | 54565                 | 8"                    | 59132     | 59164  |                       | 1-1/2"                | 56500     | 56513  |                       |                       |
| 6"        | 54609  | 54566                 |                       |           |        |                       | 2"                    | 54771     | 54686  |                       |                       |
| 8"        | 57516  | 57328                 |                       |           |        |                       | 2-1/2"                | 54772     | 54687  |                       |                       |
|           |        |                       |                       |           |        | 3"                    | 54773                 | 54688     |        |                       |                       |
|           |        |                       |                       |           |        | 4"                    | 54775                 | 54690     |        |                       |                       |
|           |        |                       |                       |           |        | 5"                    | 54777                 | 54692     |        |                       |                       |
|           |        |                       |                       |           |        | 6"                    | 54778                 | 54693     |        |                       |                       |

(Continued on next page.)



**No. 497 Air Hardening (Standard Tolerance) 18" and 36" Lengths (continued)**

| Thickness                          | Width  | 18" Length EDP No. | 36" Length EDP No. |
|------------------------------------|--------|--------------------|--------------------|
| <b>7/8"</b>                        | 7/8"   | 54781              | 54696              |
|                                    | 1"     | 56503              | 56514              |
|                                    | 1-1/2" | 56502              | 56515              |
|                                    | 2"     | 54782              | 54697              |
|                                    | 2-1/2" |                    | 54698              |
|                                    | 3"     | 54784              | 54699              |
|                                    | 4"     | 54785              | 54700              |
| <b>1"</b><br><i>(1" to 2-1/2")</i> | 6"     | 54786              | 54701              |
|                                    | 1"     | 54787              | 54702              |
|                                    | 1-1/4" | 57540              | 57352              |
|                                    | 1-1/2" | 56504              | 56516              |
|                                    | 2"     | 54788              | 54703              |
| 2-1/2"                             | 54789  | 54704              |                    |

| Thickness                      | Width  | 18" Length EDP No. | 36" Length EDP No. |
|--------------------------------|--------|--------------------|--------------------|
| <b>1"</b><br><i>(3" to 6")</i> | 3"     | 54790              | 54705              |
|                                | 4"     | 54792              | 54707              |
|                                | 5"     | 54794              | 54709              |
|                                | 6"     | 54795              | 54710              |
| <b>1-1/4"</b>                  | 1-1/4" | 54834              | 57684              |
|                                | 1-1/2" | 57683              | 57686              |
|                                | 2"     | 54835              | 57687              |
|                                | 2-1/2" | 54836              | 57688              |
|                                | 3"     | 54837              | 57689              |
|                                | 4"     | 54838              | 57690              |
|                                | 5"     | 54839              | 57691              |
|                                | 6"     | 54840              | 57692              |

| Thickness     | Width  | 18" Length EDP No. | 36" Length EDP No. |
|---------------|--------|--------------------|--------------------|
| <b>1-1/2"</b> | 1-1/2" | 54843              | 57693              |
|               | 2"     | 54844              | 57694              |
|               | 2-1/2" | 54845              | 57695              |
|               | 3"     | 54846              | 57696              |
|               | 3-1/2" | 54847              | 57697              |
|               | 4"     | 54848              | 57698              |
| <b>2"</b>     | 6"     | 54850              | 57699              |
|               | 2"     | 54853              | 57700              |
|               | 2-1/2" | 54854              | 57701              |
|               | 3"     | 54855              | 57702              |
| 4"            | 54857  | 57703              |                    |

**No. 499 Air Hardening (Oversize Tolerance) 18" and 36" Lengths**

| Thickness    | Width  | 18" Length EDP No. | 36" Length EDP No. |
|--------------|--------|--------------------|--------------------|
| <b>1/8"</b>  | 1/2"   | 57541              | 57353              |
|              | 5/8"   | 57542              | 57354              |
|              | 3/4"   | 57543              | 57355              |
|              | 1"     | 57544              | 57356              |
|              | 1-1/4" | 57545              | 57357              |
|              | 1-1/2" | 57546              | 57358              |
|              | 1-3/4" | 57547              | 57359              |
|              | 2"     | 57548              | 57360              |
|              | 2-1/2" | 57549              | 57361              |
|              | 3"     | 57550              | 57362              |
|              | 3-1/2" | 57551              | 57363              |
|              | 4"     | 57552              | 57364              |
|              | 5"     | 57553              | 57365              |
|              | 6"     | 57554              | 57366              |
| <b>5/32"</b> | 7"     | 57555              | 57367              |
|              | 8"     | 57556              | 57368              |
|              | 10"    | 57557              | 57369              |
|              | 12"    | 57558              | 57370              |
|              | 1/2"   | 57559              | 57371              |
|              | 3/4"   | 57560              | 57372              |
|              | 1"     | 57561              | 57373              |
|              | 1-1/4" | 57562              | 57374              |
|              | 1-1/2" | 57563              | 57375              |
|              | 2"     | 57564              | 57376              |
| 2-1/2"       | 57565  | 57377              |                    |
| 3"           | 57566  | 57378              |                    |
| 4"           | 57567  | 57379              |                    |
| 5"           | 57568  | 57380              |                    |
| 6"           | 57569  | 57381              |                    |
| 8"           | 57570  | 57382              |                    |

| Thickness    | Width  | 18" Length EDP No. | 36" Length EDP No. |
|--------------|--------|--------------------|--------------------|
| <b>3/16"</b> | 3/16"  | 57571              | 57383              |
|              | 1/2"   | 57572              | 57384              |
|              | 3/4"   | 57573              | 57385              |
|              | 1"     | 57162              | 56896              |
|              | 1-1/4" | 57163              | 56897              |
|              | 1-1/2" | 57164              | 56898              |
|              | 1-3/4" | 57574              | 57386              |
|              | 2"     | 57165              | 56899              |
|              | 2-1/2" | 57166              | 56900              |
|              | 3"     | 57167              | 56901              |
|              | 3-1/2" | 57575              | 57387              |
|              | 4"     | 57168              | 56902              |
| <b>1/4"</b>  | 5"     | 57576              | 57388              |
|              | 6"     | 57577              | 57389              |
|              | 8"     | 57578              | 57390              |
|              | 10"    | 57579              | 57391              |
|              | 1/4"   | 57580              | 57392              |
|              | 3/8"   | 58906              |                    |
|              | 1/2"   | 57581              | 57393              |
|              | 3/4"   | 57582              | 57394              |
|              | 1"     | 57169              | 56903              |
|              | 1-1/4" | 57170              | 56904              |
|              | 1-1/2" | 57171              | 56905              |
|              | 1-3/4" | 57583              | 57395              |
|              | 2"     | 57172              | 56906              |
|              | 2-1/2" | 57173              | 56907              |
|              | 3"     | 57174              | 56908              |
|              | 3-1/2" | 57584              | 57396              |
| 4"           | 57175  | 56909              |                    |
| 5"           | 57176  | 56910              |                    |
| 6"           | 57177  | 56911              |                    |
| 7"           | 57585  | 57397              |                    |
| 8"           | 57586  | 57398              |                    |
| 10"          | 57587  | 57399              |                    |
| 12"          | 57588  | 57400              |                    |

| Thickness    | Width  | 18" Length EDP No. | 36" Length EDP No. |
|--------------|--------|--------------------|--------------------|
| <b>5/16"</b> | 5/16"  | 57589              | 57401              |
|              | 1/2"   | 57590              | 57402              |
|              | 3/4"   | 57591              | 57403              |
|              | 1"     | 57178              | 56912              |
|              | 1-1/4" | 57179              | 56913              |
|              | 1-1/2" | 57180              | 56914              |
|              | 1-3/4" | 57592              | 57404              |
|              | 2"     | 57181              | 56915              |
|              | 2-1/2" | 57593              | 57405              |
|              | 3"     | 57182              | 56916              |
| <b>3/8"</b>  | 3-1/2" | 57594              | 57406              |
|              | 4"     | 57183              | 56917              |
|              | 5"     | 57184              | 56918              |
|              | 6"     | 57595              | 57407              |
|              | 8"     | 57596              | 57408              |
|              | 3/8"   | 57597              | 57409              |
|              | 1/2"   | 57598              | 57410              |
|              | 3/4"   | 57599              | 57411              |
|              | 1"     | 57185              | 56919              |
|              | 1-1/4" | 57186              | 56920              |
|              | 1-1/2" | 57187              | 56921              |
|              | 1-3/4" | 57600              | 57412              |
| 2"           | 57188  | 56922              |                    |
| 2-1/2"       | 57189  | 56923              |                    |
| 3"           | 57190  | 56924              |                    |
| 3-1/2"       | 57191  | 56925              |                    |
| 4"           | 57192  | 56926              |                    |
| 4-1/2"       | 57601  | 57413              |                    |
| 5"           | 57193  | 56927              |                    |
| 6"           | 57194  | 56928              |                    |
| 7"           | 57602  | 57414              |                    |
| 8"           | 57603  | 57415              |                    |
| 10"          | 57604  | 57416              |                    |
| 12"          | 57605  | 57417              |                    |

**NOTE:** No. 499, 1-1/4" and over is Blanchard ground with saw cut edges.

(Continued on next page.)



**No. 499 Air Hardening (Oversize Tolerance) 18" and 36" Lengths (continued)**

| Thickness    | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|--------------|--------|-----------------------|-----------------------|
| <b>1/2"</b>  | 1/2"   | 57195                 | 56929                 |
|              | 5/8"   | 57606                 | 57418                 |
|              | 3/4"   | 57196                 | 56930                 |
|              | 1"     | 57197                 | 56931                 |
|              | 1-1/4" | 57607                 | 57419                 |
|              | 1-1/2" | 57608                 | 57420                 |
|              | 1-3/4" | 57609                 | 57421                 |
|              | 2"     | 57198                 | 56932                 |
|              | 2-1/2" | 57199                 | 56933                 |
|              | 3"     | 57200                 | 56934                 |
|              | 3-1/2" | 57201                 | 56935                 |
|              | 4"     | 57202                 | 56936                 |
|              | 4-1/2" | 57610                 | 57422                 |
|              | 5"     | 57203                 | 56937                 |
| 6"           | 57204  | 56938                 |                       |
| 7"           | 57611  | 57423                 |                       |
| 8"           | 57612  | 57424                 |                       |
| 10"          | 57613  | 57425                 |                       |
| 12"          | 57614  | 57426                 |                       |
| <b>9/16"</b> | 2"     | 57615                 | 57427                 |
|              | 2-1/2" | 57616                 | 57428                 |
|              | 3"     | 57617                 | 57429                 |
|              | 4"     | 57618                 | 57430                 |
| <b>5/8"</b>  | 5/8"   | 57205                 | 56939                 |
|              | 3/4"   | 57206                 | 56940                 |
|              | 1"     | 57207                 | 56941                 |
|              | 1-1/4" | 57619                 | 57431                 |
|              | 1-1/2" | 57208                 | 56942                 |
|              | 2"     | 57209                 | 56943                 |
|              | 2-1/2" | 57210                 | 56944                 |
|              | 3"     | 57211                 | 56945                 |
|              | 3-1/2" | 57212                 | 56946                 |
|              | 4"     | 57620                 | 57432                 |
|              | 5"     | 57621                 | 57433                 |
| 6"           | 57622  | 57434                 |                       |
| 8"           | 57623  | 57435                 |                       |
| 10"          | 57624  | 57436                 |                       |

| Thickness   | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|-------------|--------|-----------------------|-----------------------|
| <b>3/4"</b> | 3/4"   | 57213                 | 56947                 |
|             | 1"     | 57214                 | 56948                 |
|             | 1-1/4" | 57625                 | 57437                 |
|             | 1-1/2" | 57215                 | 56949                 |
|             | 1-3/4" | 57626                 | 57438                 |
|             | 2"     | 57216                 | 56950                 |
|             | 2-1/2" | 57627                 | 57439                 |
|             | 3"     | 57217                 | 56951                 |
|             | 3-1/2" | 57628                 | 57440                 |
|             | 4"     | 57218                 | 56952                 |
|             | 4-1/2" | 57629                 | 57441                 |
|             | 5"     | 57630                 | 57442                 |
| 6"          | 57631  | 57443                 |                       |
| 8"          | 57632  | 57444                 |                       |
| 10"         | 57633  | 57445                 |                       |
| 12"         | 57634  | 57446                 |                       |
| <b>7/8"</b> | 7/8"   | 57635                 | 57447                 |
|             | 1"     | 57636                 | 57448                 |
|             | 1-1/4" | 57637                 | 57449                 |
|             | 1-1/2" | 57638                 | 57450                 |
|             | 2"     | 57639                 | 57451                 |
|             | 2-1/2" | 57640                 | 57452                 |
|             | 3"     | 57641                 | 57453                 |
| 3-1/2"      | 57642  | 57454                 |                       |
| 4"          | 57643  | 57455                 |                       |
| 5"          | 57644  | 57456                 |                       |
| 6"          | 57645  | 57457                 |                       |
| <b>1"</b>   | 1"     | 57219                 | 56953                 |
|             | 1-1/4" | 57646                 | 57458                 |
|             | 1-1/2" | 57220                 | 56954                 |
|             | 1-3/4" | 57647                 | 57459                 |
|             | 2"     | 57221                 | 56955                 |
|             | 2-1/2" | 57648                 | 57460                 |
|             | 3"     | 57222                 | 56956                 |
|             | 3-1/2" | 57649                 | 57461                 |
|             | 4"     | 57650                 | 57462                 |
|             | 4-1/2" | 57651                 | 57463                 |
|             | 5"     | 57652                 | 57464                 |
|             | 6"     | 57653                 | 57465                 |
|             | 8"     | 57654                 | 57466                 |
| 12"         | 57655  | 57467                 |                       |

| Thickness     | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|---------------|--------|-----------------------|-----------------------|
| <b>1-1/4"</b> | 1-1/4" | 57656                 | 57468                 |
|               | 1-1/2" | 57657                 | 57469                 |
|               | 2"     | 57658                 | 57470                 |
|               | 2-1/2" | 57659                 | 57471                 |
|               | 3"     | 57660                 | 57472                 |
|               | 4"     | 57661                 | 57473                 |
| <b>1-1/2"</b> | 5"     | 57662                 | 57474                 |
|               | 6"     | 57663                 | 57475                 |
|               | 1-1/2" | 57664                 | 57476                 |
|               | 2"     | 57665                 | 57477                 |
|               | 2-1/2" | 57666                 | 57478                 |
|               | 3"     | 57667                 | 57479                 |
|               | 3-1/2" | 57668                 | 57480                 |
|               | 4"     | 57669                 | 57481                 |
| 6"            | 57670  | 57482                 |                       |
| 8"            | 59137  | 59169                 |                       |
| 12"           | 59138  | 59170                 |                       |
| <b>2"</b>     | 2"     | 57671                 | 57483                 |
|               | 2-1/2" | 57672                 | 57484                 |
|               | 3"     | 57673                 | 57485                 |
|               | 4"     | 57674                 | 57486                 |
| <b>2-1/2"</b> | 2-1/2" | 57675                 | 57487                 |
| <b>3"</b>     | 3"     | 57676                 | 57488                 |

**NOTE:** No. 499, 1-1/4" and over is  
Blanchard ground with  
saw cut edges.

**NOTE:** Prices on application for other lengths, widths and thicknesses.





**No. 344  
A6 Air Hardening**

A6 is a medium alloyed air hardening tool steel that provides an excellent balance of machinability, toughness and wear resistance. Its lower heat treating temperature, which is similar to that of oil hardening steel, results in deep hardness and minimum distortion.

**Specifications**

Furnished in 36" lengths, ground straight and parallel.

**Nominal Analysis (AISI A6)**

|            |      |
|------------|------|
| Carbon     | .70  |
| Chromium   | 1.00 |
| Manganese  | 2.00 |
| Molybdenum | 1.25 |
| Vanadium   | —    |
| Tungsten   | —    |



Heat Treatment and Tempering Data available upon request.

**No. 344, A6 Air Hardening 36" Lengths**

| Thickness    | Width        | 36" Length EDP No. |
|--------------|--------------|--------------------|
| <b>1/16"</b> | 1/4"         | <b>58907</b>       |
|              | 5/16"        | <b>58908</b>       |
|              | 3/8"         | <b>58909</b>       |
|              | 1/2"         | <b>58910</b>       |
|              | 5/8"         | <b>58911</b>       |
|              | 3/4"         | <b>58912</b>       |
|              | 7/8"         | <b>58913</b>       |
|              | 1"           | <b>58914</b>       |
|              | 1-1/4"       | <b>58915</b>       |
|              | 1-1/2"       | <b>58916</b>       |
|              | 1-3/4"       | <b>58917</b>       |
|              | 2"           | <b>58918</b>       |
|              | 2-1/2"       | <b>58919</b>       |
|              | 3"           | <b>58920</b>       |
|              | 3-1/2"       | <b>58921</b>       |
|              | 4"           | <b>58922</b>       |
| 5"           | <b>58923</b> |                    |
| 6"           | <b>58924</b> |                    |

| Thickness    | Width        | 36" Length EDP No. |
|--------------|--------------|--------------------|
| <b>3/32"</b> | 1/4"         | <b>58925</b>       |
|              | 5/16"        | <b>58926</b>       |
|              | 3/8"         | <b>58927</b>       |
|              | 1/2"         | <b>58928</b>       |
|              | 5/8"         | <b>58929</b>       |
|              | 3/4"         | <b>58930</b>       |
|              | 7/8"         | <b>58931</b>       |
|              | 1"           | <b>58932</b>       |
|              | 1-1/4"       | <b>58933</b>       |
|              | 1-1/2"       | <b>58934</b>       |
|              | 1-3/4"       | <b>58935</b>       |
|              | 2"           | <b>58936</b>       |
|              | 2-1/2"       | <b>58937</b>       |
|              | 3"           | <b>58938</b>       |
|              | 3-1/2"       | <b>58939</b>       |
|              | 4"           | <b>58940</b>       |
| 5"           | <b>58941</b> |                    |
| 6"           | <b>58942</b> |                    |

| Thickness   | Width        | 36" Length EDP No. |
|-------------|--------------|--------------------|
| <b>1/8"</b> | 1/4"         | <b>58943</b>       |
|             | 5/16"        | <b>58944</b>       |
|             | 3/8"         | <b>58945</b>       |
|             | 1/2"         | <b>58946</b>       |
|             | 5/8"         | <b>58947</b>       |
|             | 3/4"         | <b>58948</b>       |
|             | 7/8"         | <b>58949</b>       |
|             | 1"           | <b>58950</b>       |
|             | 1-1/4"       | <b>58951</b>       |
|             | 1-1/2"       | <b>58952</b>       |
|             | 1-3/4"       | <b>58953</b>       |
|             | 2"           | <b>58954</b>       |
|             | 2-1/2"       | <b>58955</b>       |
|             | 3"           | <b>58956</b>       |
|             | 3-1/2"       | <b>58957</b>       |
|             | 4"           | <b>58958</b>       |
| 5"          | <b>58959</b> |                    |
| 6"          | <b>58960</b> |                    |
| 7"          | <b>58961</b> |                    |
| 8"          | <b>58962</b> |                    |
| 10"         | <b>58963</b> |                    |
| 12"         | <b>58964</b> |                    |

**NOTE:** No. 499, 1-1/4" and over is Blanchard ground with saw cut edges.

**NOTE:** Prices on application for other lengths, widths and thicknesses.

(Continued on next page.)



**No. 344, A6 Air Hardening 36" Lengths (continued)**

| Thickness    | Width  | 36" Length EDP No. | Thickness                | Width  | 36" Length EDP No. | Thickness   | Width  | 36" Length EDP No. |
|--------------|--------|--------------------|--------------------------|--------|--------------------|-------------|--------|--------------------|
| <b>3/16"</b> | 3/16"  | 58965              | <b>5/16"<br/>(cont.)</b> | 2"     | 59020              | <b>5/8"</b> | 5/8"   | 59074              |
|              | 1/4"   | 58966              |                          | 2-1/2" | 59021              |             | 3/4"   | 59075              |
|              | 5/16"  | 58967              |                          | 3"     | 59022              |             | 7/8"   | 59076              |
|              | 3/8"   | 58968              |                          | 3-1/2" | 59023              |             | 1"     | 59077              |
|              | 1/2"   | 58969              |                          | 4"     | 59024              |             | 1-1/4" | 59078              |
|              | 5/8"   | 58970              |                          | 4-1/2" | 59025              |             | 1-1/2" | 59079              |
|              | 3/4"   | 58971              |                          | 5"     | 59026              |             | 1-3/4" | 59080              |
|              | 7/8"   | 58972              |                          | 5-1/2" | 59027              |             | 2"     | 59081              |
|              | 1"     | 58973              |                          | 6"     | 59028              |             | 2-1/2" | 59082              |
|              | 1-1/4" | 58974              |                          | 8"     | 59029              |             | 3"     | 59083              |
|              | 1-1/2" | 58975              |                          | 10"    | 59030              | 3-1/2"      | 59084  |                    |
|              | 1-3/4" | 58976              |                          | 12"    | 59031              | 4"          | 59085  |                    |
|              | 2"     | 58977              | <b>3/8"</b>              | 3/8"   | 59032              | 4-1/2"      | 59086  |                    |
|              | 2-1/2" | 58978              |                          | 1/2"   | 59033              | 5"          | 59087  |                    |
|              | 3"     | 58979              |                          | 5/8"   | 59034              | 5-1/2"      | 59088  |                    |
|              | 3-1/2" | 58980              |                          | 3/4"   | 59035              | 6"          | 59089  |                    |
|              | 4"     | 58981              |                          | 7/8"   | 59036              | 7"          | 59090  |                    |
|              | 5"     | 58982              |                          | 1"     | 59037              | 8"          | 59091  |                    |
|              | 6"     | 58983              |                          | 1-1/4" | 59038              | 10"         | 59092  |                    |
|              | 7"     | 58984              |                          | 1-1/2" | 59039              | <b>3/4"</b> | 3/4"   | 59093              |
| 8"           | 58985  | 1-3/4"             |                          | 59040  | 7/8"               |             | 59094  |                    |
| 10"          | 58986  | 2"                 |                          | 59041  | 1"                 |             | 59095  |                    |
| 12"          | 58987  | 2-1/2"             | 59042                    | 1-1/4" | 59096              |             |        |                    |
| <b>1/4"</b>  | 1/4"   | 58988              | 3"                       | 59043  | 1-1/2"             |             | 59097  |                    |
|              | 5/16"  | 58989              | 3-1/2"                   | 59044  | 1-3/4"             |             | 59098  |                    |
|              | 3/8"   | 58990              | 4"                       | 59045  | 2"                 |             | 59099  |                    |
|              | 1/2"   | 58991              | 4-1/2"                   | 59046  | 2-1/2"             |             | 59100  |                    |
|              | 5/8"   | 58992              | 5"                       | 59047  | 3"                 |             | 59101  |                    |
|              | 3/4"   | 58993              | 6"                       | 59048  | 3-1/2"             |             | 59102  |                    |
|              | 7/8"   | 58994              | 7"                       | 59049  | 4"                 | 59103       |        |                    |
|              | 1"     | 58995              | 8"                       | 59050  | 4-1/2"             | 59104       |        |                    |
|              | 1-1/4" | 58996              | 10"                      | 59051  | 5"                 | 59105       |        |                    |
|              | 1-1/2" | 58997              | 12"                      | 59052  | 5-1/2"             | 59106       |        |                    |
|              | 1-3/4" | 58998              | <b>1/2"</b>              | 1/2"   | 59053              | 6"          | 59107  |                    |
|              | 2"     | 58999              |                          | 5/8"   | 59054              | 7"          | 59108  |                    |
|              | 2-1/2" | 59000              |                          | 3/4"   | 59055              | 8"          | 59109  |                    |
|              | 3"     | 59001              |                          | 7/8"   | 59056              | 10"         | 59110  |                    |
|              | 3-1/2" | 59002              |                          | 1"     | 59057              | <b>1"</b>   | 1"     | 59111              |
|              | 4"     | 59003              |                          | 1-1/4" | 59058              |             | 1-1/4" | 59112              |
| 5"           | 59004  | 1-1/2"             |                          | 59059  | 1-1/2"             |             | 59113  |                    |
| 6"           | 59005  | 1-3/4"             |                          | 59060  | 1-3/4"             |             | 59114  |                    |
| 7"           | 59006  | 2"                 |                          | 59061  | 2"                 |             | 59115  |                    |
| 8"           | 59007  | 2-1/2"             |                          | 59062  | 2-1/2"             |             | 59116  |                    |
| 10"          | 59008  | 3"                 | 59063                    | 3"     | 59117              |             |        |                    |
| 12"          | 59009  | 3-1/2"             | 59064                    | 3-1/2" | 59118              |             |        |                    |
| <b>5/16"</b> | 5/16"  | 59010              | 4"                       | 59065  | 4"                 |             | 59119  |                    |
|              | 3/8"   | 59011              | 4-1/2"                   | 59066  | 4-1/2"             |             | 59120  |                    |
|              | 1/2"   | 59012              | 5"                       | 59067  | 5"                 | 59121       |        |                    |
|              | 5/8"   | 59013              | 5-1/2"                   | 59068  | 5-1/2"             | 59122       |        |                    |
|              | 3/4"   | 59014              | 6"                       | 59069  | 6"                 | 59123       |        |                    |
|              | 7/8"   | 59015              | 7"                       | 59070  | 7"                 | 59124       |        |                    |
|              | 1"     | 59016              | 8"                       | 59071  | 8"                 | 59125       |        |                    |
|              | 1-1/4" | 59017              | 10"                      | 59072  | 10"                | 59126       |        |                    |
|              | 1-1/2" | 59018              | 12"                      | 59073  |                    |             |        |                    |
|              | 1-3/4" | 59019              |                          |        |                    |             |        |                    |

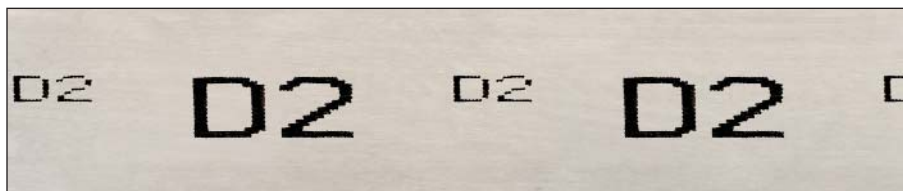
**NOTE:** Prices on application for other lengths, widths and thicknesses.



**NEW**

**No. 401 & 402**

- ◆ High carbon, high chromium steel
- ◆ For applications that demand the highest wear resistance
- ◆ 401 is standard tolerance
- ◆ 402 is oversize tolerance



**Specifications**

Furnished in 18" (610mm) and 36" lengths, ground straight and parallel.

**No. 401 High Carbon, High Chromium  
(Standard Tolerance)  
18" & 36" Lengths**

| Thickness    | Width  | 18" Length EDP No. | 36" Length EDP No. |
|--------------|--------|--------------------|--------------------|
| <b>1/16"</b> | 1/2"   | 69097              | 69232              |
|              | 3/4"   | 69098              | 69233              |
|              | 1"     | 69099              | 69234              |
|              | 1-1/4" | 69100              | 69235              |
|              | 1-1/2" | 69101              | 69236              |
|              | 2"     | 69102              | 69237              |
|              | 2-1/2" | 69103              | 69238              |
|              | 3"     | 69104              | 69239              |
|              | 4"     | 69105              | 69240              |
|              | 5"     | 69106              | 69241              |
| 6"           | 69107  | 69242              |                    |
| <b>3/32"</b> | 1/2"   | 69108              | 69243              |
|              | 3/4"   | 69109              | 69244              |
|              | 1"     | 69110              | 69245              |
|              | 1-1/4" | 69111              | 69246              |
|              | 1-1/2" | 69112              | 69247              |
|              | 2"     | 69113              | 69248              |
|              | 2-1/2" | 69114              | 69249              |
|              | 3"     | 69115              | 69250              |
|              | 4"     | 69116              | 69251              |
|              | 5"     | 69117              | 69252              |
| 6"           | 69118  | 69253              |                    |
| <b>1/8"</b>  | 1/2"   | 69119              | 69254              |
|              | 3/4"   | 69120              | 69255              |
|              | 1"     | 69121              | 69256              |
|              | 1-1/4" | 69122              | 69257              |
|              | 1-1/2" | 69123              | 69258              |
|              | 2"     | 69124              | 69259              |
|              | 2-1/2" | 69125              | 69260              |
|              | 3"     | 69126              | 69261              |
|              | 4"     | 69127              | 69262              |
|              | 5"     | 69128              | 69263              |
| 6"           | 69129  | 69264              |                    |
| <b>5/32"</b> | 1/2"   | 69130              | 69265              |
|              | 3/4"   | 69131              | 69266              |
|              | 1"     | 69132              | 69267              |
|              | 1-1/4" | 69133              | 69268              |
|              | 1-1/2" | 69134              | 69269              |
|              | 2"     | 69135              | 69270              |
|              | 2-1/2" | 69136              | 69271              |
|              | 3"     | 69137              | 69272              |
|              | 4"     | 69138              | 69273              |
|              | 5"     | 69139              | 69274              |
| 6"           | 69140  | 69275              |                    |

| Thickness    | Width  | 18" Length EDP No. | 36" Length EDP No. |
|--------------|--------|--------------------|--------------------|
| <b>3/16"</b> | 1/2"   | 69141              | 69276              |
|              | 3/4"   | 69142              | 69277              |
|              | 1"     | 69143              | 69278              |
|              | 1-1/4" | 69144              | 69279              |
|              | 1-1/2" | 69145              | 69280              |
|              | 2"     | 69146              | 69281              |
|              | 2-1/2" | 69147              | 69282              |
|              | 3"     | 69148              | 69283              |
|              | 4"     | 69149              | 69284              |
|              | 5"     | 69150              | 69285              |
| 6"           | 69151  | 69286              |                    |
| <b>1/4"</b>  | 1/2"   | 69152              | 69287              |
|              | 3/4"   | 69153              | 69288              |
|              | 1"     | 69154              | 69289              |
|              | 1-1/4" | 69155              | 69290              |
|              | 1-1/2" | 69156              | 69291              |
|              | 2"     | 69157              | 69292              |
|              | 2-1/2" | 69158              | 69293              |
|              | 3"     | 69159              | 69294              |
|              | 4"     | 69160              | 69295              |
|              | 5"     | 69161              | 69296              |
| 6"           | 69162  | 69297              |                    |
| <b>5/16"</b> | 1/2"   | 69163              | 69298              |
|              | 3/4"   | 69164              | 69299              |
|              | 1"     | 69165              | 69300              |
|              | 1-1/4" | 69166              | 69301              |
|              | 1-1/2" | 69167              | 69302              |
|              | 2"     | 69168              | 69303              |
|              | 2-1/2" | 69169              | 69304              |
|              | 3"     | 69170              | 69305              |
|              | 4"     | 69171              | 69306              |
|              | 5"     | 69172              | 69307              |
| 6"           | 69173  | 69308              |                    |
| <b>3/8"</b>  | 1/2"   | 69174              | 69309              |
|              | 3/4"   | 69175              | 69310              |
|              | 1"     | 69176              | 69311              |
|              | 1-1/4" | 69177              | 69312              |
|              | 1-1/2" | 69178              | 69313              |
|              | 2"     | 69179              | 69314              |
|              | 2-1/2" | 69180              | 69315              |
|              | 3"     | 69181              | 69316              |
|              | 4"     | 69182              | 69317              |
|              | 5"     | 69183              | 69318              |
| 6"           | 69184  | 69319              |                    |

| Thickness   | Width  | 18" Length EDP No. | 36" Length EDP No. |
|-------------|--------|--------------------|--------------------|
| <b>1/2"</b> | 3/4"   | 69185              | 69320              |
|             | 1"     | 69186              | 69321              |
|             | 1-1/4" | 69187              | 69322              |
|             | 1-1/2" | 69188              | 69323              |
|             | 2"     | 69189              | 69324              |
|             | 2-1/2" | 69190              | 69325              |
|             | 3"     | 69191              | 69326              |
|             | 4"     | 69192              | 69327              |
|             | 5"     | 69193              | 69328              |
|             | 6"     | 69194              | 69329              |
| <b>5/8"</b> | 5/8"   | 69195              | 69330              |
|             | 3/4"   | 69196              | 69331              |
|             | 1"     | 69197              | 69332              |
|             | 1-1/4" | 69198              | 69333              |
|             | 1-1/2" | 69199              | 69334              |
|             | 2"     | 69200              | 69335              |
|             | 2-1/2" | 69201              | 69336              |
|             | 3"     | 69202              | 69337              |
|             | 4"     | 69203              | 69338              |
|             | 5"     | 69204              | 69339              |
| 6"          | 69205  | 69340              |                    |
| <b>3/4"</b> | 3/4"   | 69206              | 69341              |
|             | 1"     | 69207              | 69342              |
|             | 1-1/4" | 69208              | 69343              |
|             | 1-1/2" | 69209              | 69344              |
|             | 2"     | 69210              | 69345              |
|             | 2-1/2" | 69211              | 69346              |
|             | 3"     | 69212              | 69347              |
|             | 4"     | 69213              | 69348              |
|             | 5"     | 69214              | 69349              |
|             | 6"     | 69215              | 69350              |
| <b>7/8"</b> | 7/8"   | 69216              | 69351              |
|             | 1"     | 69217              | 69352              |
|             | 2"     | 69218              | 69353              |
|             | 3"     | 69219              | 69354              |
|             | 4"     | 69220              | 69355              |
|             | 5"     | 69221              | 69356              |
|             | 6"     | 69222              | 69357              |
| <b>1"</b>   | 1"     | 69223              | 69358              |
|             | 1-1/4" | 69224              | 69359              |
|             | 1-1/2" | 69225              | 69360              |
|             | 2"     | 69226              | 69361              |
|             | 2-1/2" | 69227              | 69362              |
|             | 3"     | 69228              | 69363              |
|             | 4"     | 69229              | 69364              |
|             | 5"     | 69230              | 69365              |
| 6"          | 69231  | 69366              |                    |





**No. 402 High Carbon, High Chromium (Oversize) 18" & 36" Lengths**

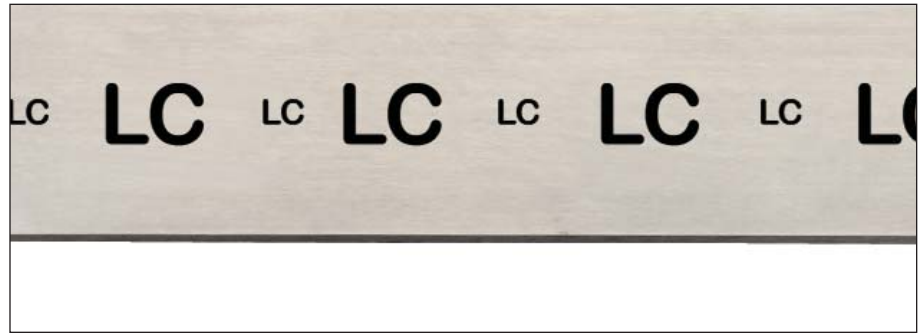
| Thickness    | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. | Thickness    | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. | Thickness   | Width  | 18" Length<br>EDP No. | 36" Length<br>EDP No. |
|--------------|--------|-----------------------|-----------------------|--------------|--------|-----------------------|-----------------------|-------------|--------|-----------------------|-----------------------|
| <b>1/8"</b>  | 1/2"   | 69367                 | 69481                 | <b>5/16"</b> | 1/2"   | 69411                 | 69525                 | <b>3/4"</b> | 3/4"   | 69455                 | 69569                 |
|              | 3/4"   | 69368                 | 69482                 |              | 3/4"   | 69412                 | 69526                 |             | 1"     | 69456                 | 69570                 |
|              | 1"     | 69369                 | 69483                 |              | 1"     | 69413                 | 69527                 |             | 1-1/4" | 69457                 | 69571                 |
|              | 1-1/4" | 69370                 | 69484                 |              | 1-1/4" | 69414                 | 69528                 |             | 1-1/2" | 69458                 | 69572                 |
|              | 1-1/2" | 69371                 | 69485                 |              | 1-1/2" | 69415                 | 69529                 |             | 2"     | 69459                 | 69573                 |
|              | 2"     | 69372                 | 69486                 |              | 2"     | 69416                 | 69530                 |             | 2-1/2" | 69460                 | 69574                 |
|              | 2-1/2" | 69373                 | 69487                 |              | 2-1/2" | 69417                 | 69531                 |             | 3"     | 69461                 | 69575                 |
|              | 3"     | 69374                 | 69488                 |              | 3"     | 69418                 | 69532                 |             | 4"     | 69462                 | 69576                 |
|              | 4"     | 69375                 | 69489                 |              | 4"     | 69419                 | 69533                 |             | 5"     | 69463                 | 69577                 |
|              | 5"     | 69376                 | 69490                 |              | 5"     | 69420                 | 69534                 |             | 6"     | 69464                 | 69578                 |
| 6"           | 69377  | 69491                 | 6"                    | 69421        | 69535  |                       |                       |             |        |                       |                       |
| <b>5/32"</b> | 1/2"   | 69378                 | 69492                 | <b>3/8"</b>  | 1/2"   | 69422                 | 69536                 | <b>7/8"</b> | 7/8"   | 69465                 | 69579                 |
|              | 3/4"   | 69379                 | 69493                 |              | 3/4"   | 69423                 | 69537                 |             | 1"     | 69466                 | 69580                 |
|              | 1"     | 69380                 | 69494                 |              | 1"     | 69424                 | 69538                 |             | 1-1/2" | 69467                 | 69581                 |
|              | 1-1/4" | 69381                 | 69495                 |              | 1-1/4" | 69425                 | 69539                 |             | 2"     | 69468                 | 69582                 |
|              | 1-1/2" | 69382                 | 69496                 |              | 1-1/2" | 69426                 | 69540                 |             | 3"     | 69469                 | 69583                 |
|              | 2"     | 69383                 | 69497                 |              | 2"     | 69427                 | 69541                 |             | 4"     | 69470                 | 69584                 |
|              | 2-1/2" | 69384                 | 69498                 |              | 2-1/2" | 69428                 | 69542                 | 6"          | 69471  | 69585                 |                       |
|              | 3"     | 69385                 | 69499                 |              | 3"     | 69429                 | 69543                 | <b>1"</b>   | 1"     | 69472                 | 69586                 |
|              | 4"     | 69386                 | 69500                 |              | 4"     | 69430                 | 69544                 |             | 1-1/4" | 69473                 | 69587                 |
|              | 5"     | 69387                 | 69501                 |              | 5"     | 69431                 | 69545                 |             | 1-1/2" | 69474                 | 69588                 |
| 6"           | 69388  | 69502                 | 6"                    | 69432        | 69546  | 2"                    | 69475                 |             | 69589  |                       |                       |
|              |        |                       |                       |              |        | 2-1/2"                | 69476                 |             | 69590  |                       |                       |
|              |        |                       |                       |              |        | 3"                    | 69477                 |             | 69591  |                       |                       |
| <b>3/16"</b> | 3/16"  | 69389                 | 69503                 | <b>1/2"</b>  | 1/2"   | 69433                 | 69547                 | 4"          | 69478  | 69592                 |                       |
|              | 1/2"   | 69390                 | 69504                 |              | 3/4"   | 69434                 | 69548                 | 5"          | 69479  | 69593                 |                       |
|              | 3/4"   | 69391                 | 69505                 |              | 1"     | 69435                 | 69549                 | 6"          | 69480  | 69594                 |                       |
|              | 1"     | 69392                 | 69506                 |              | 1-1/4" | 69436                 | 69550                 |             |        |                       |                       |
|              | 1-1/4" | 69393                 | 69507                 |              | 1-1/2" | 69437                 | 69551                 |             |        |                       |                       |
|              | 1-1/2" | 69394                 | 69508                 |              | 2"     | 69438                 | 69552                 |             |        |                       |                       |
|              | 2"     | 69395                 | 69509                 |              | 2-1/2" | 69439                 | 69553                 |             |        |                       |                       |
|              | 2-1/2" | 69396                 | 69510                 |              | 3"     | 69440                 | 69554                 |             |        |                       |                       |
|              | 3"     | 69397                 | 69511                 |              | 4"     | 69441                 | 69555                 |             |        |                       |                       |
|              | 4"     | 69398                 | 69512                 |              | 5"     | 69442                 | 69556                 |             |        |                       |                       |
| 5"           | 69399  | 69513                 | 6"                    | 69443        | 69557  |                       |                       |             |        |                       |                       |
| <b>1/4"</b>  | 1/2"   | 69400                 | 69514                 | <b>5/8"</b>  | 5/8"   | 69444                 | 69558                 |             |        |                       |                       |
|              | 3/4"   | 69401                 | 69515                 |              | 3/4"   | 69445                 | 69559                 |             |        |                       |                       |
|              | 1"     | 69402                 | 69516                 |              | 1"     | 69446                 | 69560                 |             |        |                       |                       |
|              | 1-1/4" | 69403                 | 69517                 |              | 1-1/4" | 69447                 | 69561                 |             |        |                       |                       |
|              | 1-1/2" | 69404                 | 69518                 |              | 1-1/2" | 69448                 | 69562                 |             |        |                       |                       |
|              | 2"     | 69405                 | 69519                 |              | 2"     | 69449                 | 69563                 |             |        |                       |                       |
|              | 2-1/2" | 66406                 | 69520                 |              | 2-1/2" | 69450                 | 69564                 |             |        |                       |                       |
|              | 3"     | 69407                 | 69521                 |              | 3"     | 69451                 | 69565                 |             |        |                       |                       |
|              | 4"     | 69408                 | 69522                 |              | 4"     | 69452                 | 69566                 |             |        |                       |                       |
|              | 5"     | 69409                 | 69523                 |              | 5"     | 69453                 | 69567                 |             |        |                       |                       |
| 6"           | 69410  | 69524                 | 6"                    | 69454        | 69568  |                       |                       |             |        |                       |                       |

**NEW**



## No. 498 Low Carbon

- ◆ **Substantial cost reductions over tool steel ground flat stock.** There are savings up to 60% because this is a low carbon steel and furnished in 24" lengths. This means that you get one-third more steel at less cost
- ◆ **Ideal for a wide variety of parts that don't require more expensive heat treated steels,** such as stripper plates, jigs, fixtures, machine and component parts, templates, etc.
- ◆ **This steel can be carburized or case hardened.**  
After hardening, its physical properties, especially tensile strength, yield point, and Brinell hardness, are substantially higher
- ◆ **NOTE:** Thicknesses of 1/8" and under are made from AISI 1010 material
- ◆ The Starrett Company uses its own ground flat stock for many of its precision tool parts



### Analysis

Starrett No. 498 Low Carbon Precision Ground Flat Stock is a .20 carbon fine-grained, killed steel, which can be carburized or case hardened. Very similar to AISI 1018.

### Heat Treatment

For many applications, stock can be used unhardened. However, if surface hardening is desired, it can be carburized or case hardened. If carburized, a case of 1/32" will be obtained if the steel is held in carburizing salt at 1700° F for three hours.

### Specifications

Furnished in 24" (610mm) lengths, ground straight and parallel.

## No. 498 Low Carbon 24" Lengths

| Thickness | Width  | 24" Length EDP No. |
|-----------|--------|--------------------|
| 1/16"     | 1/2"   | 54866              |
|           | 3/4"   | 54867              |
|           | 1"     | 54868              |
|           | 1-1/4" | 54869              |
|           | 1-1/2" | 54870              |
|           | 2"     | 54871              |
|           | 2-1/2" | 54872              |
|           | 3"     | 54873              |
|           | 3-1/2" | 54874              |
|           | 4"     | 54875              |
|           | 5"     | 54876              |
|           | 6"     | 54877              |
|           | 8"     | 54878              |
| 10"       | 54879  |                    |
| 12"       | 54880  |                    |

| Thickness | Width  | 24" Length EDP No. |
|-----------|--------|--------------------|
| 3/32"     | 1/2"   | 54881              |
|           | 3/4"   | 54882              |
|           | 1"     | 54883              |
|           | 1-1/4" | 54884              |
|           | 1-1/2" | 54885              |
|           | 2"     | 54886              |
|           | 2-1/2" | 54887              |
|           | 3"     | 54888              |
|           | 3-1/2" | 58285              |
|           | 4"     | 54889              |
|           | 5"     | 54890              |
|           | 6"     | 54891              |
|           | 8"     | 54892              |
| 10"       | 58286  |                    |
| 12"       | 58287  |                    |

| Thickness | Width  | 24" Length EDP No. |
|-----------|--------|--------------------|
| 1/8"      | 1/2"   | 54893              |
|           | 3/4"   | 54894              |
|           | 1"     | 54895              |
|           | 1-1/4" | 54896              |
|           | 1-1/2" | 54897              |
|           | 2"     | 54898              |
|           | 2-1/2" | 54899              |
|           | 3"     | 54900              |
|           | 3-1/2" | 54901              |
|           | 4"     | 54902              |
|           | 5"     | 54903              |
|           | 6"     | 54904              |
|           | 8"     | 54905              |
| 10"       | 54906  |                    |
| 12"       | 54907  |                    |

NOTE: Prices on application for other lengths, widths and thicknesses.

(Continued on next page.)







## 01 Ground & Polished Drill Rod

### No. 480 3' Lengths

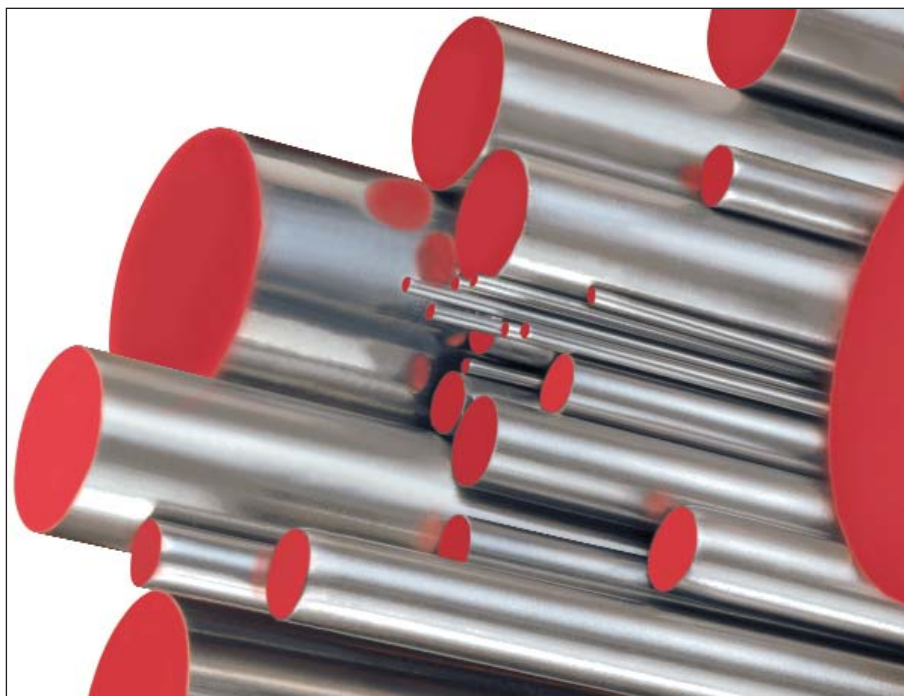
AISI/SAE 01 is a general purpose tool steel with good wear resistance, toughness and machinability.

#### Tolerances

| Size Range           | Diameter | Length     |
|----------------------|----------|------------|
| .124" round and less | ± .0003" | + 1/8" - 0 |
| .125" to 1.499"      | ± .0005" | + 1/8" - 0 |
| 1.50" to 2"          | ± .0075" | + 1/8" - 0 |

#### Nominal Analysis (AISI 01)

|                 |      |
|-----------------|------|
| Carbon .....    | .90  |
| Chromium .....  | .50  |
| Manganese ..... | 1.20 |
| Tungsten .....  | .50  |
| Vanadium .....  | .20  |



Heat Treatment and Tempering Data available upon request.

## 01 No. 480 Drill Rod 36" Lengths

#### Fractional Sizes

| Diameter | Decimal | 36" Length<br>EDP No. |
|----------|---------|-----------------------|
| 1/16"    | 0.0625  | <b>68303</b>          |
| 5/64"    | 0.0781  | <b>68304</b>          |
| 3/32"    | 0.0938  | <b>68305</b>          |
| 7/64"    | 0.1094  | <b>68306</b>          |
| 1/8"     | 0.1250  | <b>68307</b>          |
| 9/64"    | 0.1406  | <b>68308</b>          |
| 5/32"    | 0.1563  | <b>68309</b>          |
| 11/64"   | 0.1719  | <b>68310</b>          |
| 3/16"    | 0.1875  | <b>68311</b>          |
| 13/64"   | 0.2031  | <b>68312</b>          |
| 7/32"    | 0.2188  | <b>68313</b>          |
| 15/64"   | 0.2344  | <b>68314</b>          |
| 1/4"     | 0.2500  | <b>68315</b>          |
| 17/64"   | 0.2656  | <b>68316</b>          |
| 9/32"    | 0.2813  | <b>68317</b>          |
| 19/64"   | 0.2969  | <b>68318</b>          |
| 5/16"    | 0.3125  | <b>68319</b>          |
| 21/64"   | 0.3281  | <b>68320</b>          |
| 11/32"   | 0.3438  | <b>68321</b>          |
| 23/64"   | 0.3594  | <b>68322</b>          |
| 3/8"     | 0.3750  | <b>68323</b>          |
| 25/64"   | 0.3906  | <b>68324</b>          |
| 13/32"   | 0.4063  | <b>68325</b>          |
| 27/64"   | 0.4219  | <b>68326</b>          |
| 7/16"    | 0.4375  | <b>68327</b>          |
| 29/64"   | 0.4531  | <b>68328</b>          |

#### Fractional Sizes

| Diameter | Decimal | 36" Length<br>EDP No. |
|----------|---------|-----------------------|
| 15/32"   | 0.4688  | <b>68329</b>          |
| 31/64"   | 0.4844  | <b>68330</b>          |
| 1/2"     | 0.5000  | <b>68331</b>          |
| 33/64"   | 0.5156  | <b>68332</b>          |
| 17/32"   | 0.5313  | <b>68333</b>          |
| 35/64"   | 0.5469  | <b>68334</b>          |
| 9/16"    | 0.5625  | <b>68335</b>          |
| 37/64"   | 0.5781  | <b>68336</b>          |
| 19/32"   | 0.5938  | <b>68337</b>          |
| 39/64"   | 0.6094  | <b>68338</b>          |
| 5/8"     | 0.6250  | <b>68339</b>          |
| 41/64"   | 0.6406  | <b>68340</b>          |
| 21/32"   | 0.6563  | <b>68341</b>          |
| 43/64"   | 0.6719  | <b>68342</b>          |
| 11/16"   | 0.6875  | <b>68343</b>          |
| 45/64"   | 0.7031  | <b>68344</b>          |
| 23/32"   | 0.7188  | <b>68345</b>          |
| 47/64"   | 0.7344  | <b>68346</b>          |
| 3/4"     | 0.7500  | <b>68347</b>          |
| 49/64"   | 0.7656  | <b>68348</b>          |
| 25/32"   | 0.7813  | <b>68349</b>          |
| 51/64"   | 0.7969  | <b>68350</b>          |
| 13/16"   | 0.8125  | <b>68351</b>          |
| 53/64"   | 0.8281  | <b>68352</b>          |
| 27/32"   | 0.8438  | <b>68353</b>          |

#### Fractional Sizes

| Diameter | Decimal | 36" Length<br>EDP No. |
|----------|---------|-----------------------|
| 55/64"   | 0.8594  | <b>68354</b>          |
| 7/8"     | 0.8750  | <b>68355</b>          |
| 57/64"   | 0.8906  | <b>68356</b>          |
| 29/32"   | 0.9063  | <b>68357</b>          |
| 59/64"   | 0.9219  | <b>68358</b>          |
| 15/16"   | 0.9375  | <b>68359</b>          |
| 61/64"   | 0.9531  | <b>68360</b>          |
| 31/32"   | 0.9688  | <b>68361</b>          |
| 63/64"   | 0.9844  | <b>68362</b>          |
| 1"       | 1.0000  | <b>68363</b>          |
| 1-1/64"  | 1.0156  | <b>68364</b>          |
| 1-1/32"  | 1.0313  | <b>68365</b>          |
| 1-3/64"  | 1.0469  | <b>68366</b>          |
| 1-1/16"  | 1.0625  | <b>68367</b>          |
| 1-5/64"  | 1.0781  | <b>68368</b>          |
| 1-3/32"  | 1.0938  | <b>68369</b>          |
| 1-7/64"  | 1.1094  | <b>68370</b>          |
| 1-1/8"   | 1.1250  | <b>68371</b>          |
| 1-9/64"  | 1.1406  | <b>68372</b>          |
| 1-5/32"  | 1.1563  | <b>68373</b>          |
| 1-11/64" | 1.1719  | <b>68374</b>          |
| 1-3/16"  | 1.1875  | <b>68375</b>          |
| 1-13/64" | 1.2031  | <b>68376</b>          |
| 1-7/32"  | 1.2188  | <b>68377</b>          |
| 1-15/64" | 1.2344  | <b>68378</b>          |

NOTE: Prices on application for other lengths, widths and thicknesses.

(Continued on next page.)



**01 No. 480 Drill Rod 36" Lengths (continued)**

**Fractional Sizes (Cont.)**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 1-1/4"   | 1.2500  | 68379              |
| 1-17/64" | 1.2656  | 68380              |
| 1-9/32"  | 1.2813  | 68381              |
| 1-19/64" | 1.2969  | 68382              |
| 1-5/16"  | 1.3125  | 68383              |
| 1-21/64" | 1.3281  | 68384              |
| 1-11/32" | 1.3438  | 68385              |
| 1-23/64" | 1.3594  | 68386              |
| 1-3/8"   | 1.3750  | 68387              |
| 1-25/64" | 1.3906  | 68388              |
| 1-13/32" | 1.4063  | 68389              |
| 1-27/64" | 1.4219  | 68390              |
| 1-7/16"  | 1.4375  | 68391              |
| 1-29/64" | 1.4531  | 68392              |
| 1-15/32" | 1.4688  | 68393              |
| 1-31/64" | 1.4844  | 68394              |
| 1-1/2"   | 1.5000  | 68395              |
| 1-9/16"  | 1.5625  | 68396              |
| 1-5/8"   | 1.6250  | 68397              |
| 1-11/16" | 1.6875  | 68398              |
| 1-3/4"   | 1.7500  | 68399              |
| 1-13/16" | 1.8125  | 68400              |
| 1-7/8"   | 1.8750  | 68401              |
| 1-15/16" | 1.9375  | 68402              |
| 2"       | 2.0000  | 68403              |

**Letter Sizes**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| A        | 0.2340  | 68201              |
| B        | 0.2380  | 68202              |
| C        | 0.2420  | 68203              |
| D        | 0.2460  | 68204              |
| E        | 0.2500  | 68205              |
| F        | 0.2570  | 68206              |
| G        | 0.2610  | 68207              |
| H        | 0.2660  | 68208              |
| I        | 0.2720  | 68209              |
| J        | 0.2770  | 68210              |
| K        | 0.2810  | 68211              |
| L        | 0.2902  | 68212              |
| M        | 0.2950  | 68213              |
| N        | 0.3020  | 68214              |
| O        | 0.3160  | 68215              |
| P        | 0.3230  | 68216              |
| Q        | 0.3320  | 68217              |
| R        | 0.3390  | 68218              |
| S        | 0.3480  | 68219              |

**Letter Sizes (Cont.)**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| T        | 0.3580  | 68220              |
| U        | 0.3680  | 68221              |
| V        | 0.3770  | 68222              |
| W        | 0.3860  | 68223              |
| X        | 0.3970  | 68224              |
| Y        | 0.4040  | 68225              |
| Z        | 0.4130  | 68226              |

**Number Sizes**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 52       | 0.063   | 68251              |
| 51       | 0.066   | 68252              |
| 50       | 0.069   | 68253              |
| 49       | 0.072   | 68254              |
| 48       | 0.075   | 68255              |
| 47       | 0.077   | 68256              |
| 46       | 0.079   | 68257              |
| 45       | 0.081   | 68258              |
| 44       | 0.085   | 68259              |
| 43       | 0.088   | 68260              |
| 42       | 0.092   | 68261              |
| 41       | 0.095   | 68262              |
| 40       | 0.097   | 68263              |
| 39       | 0.099   | 68264              |
| 38       | 0.101   | 68265              |
| 37       | 0.103   | 68266              |
| 36       | 0.106   | 68267              |
| 35       | 0.108   | 68268              |
| 34       | 0.110   | 68269              |
| 33       | 0.112   | 68270              |
| 32       | 0.115   | 68271              |
| 31       | 0.120   | 68272              |
| 30       | 0.127   | 68273              |
| 29       | 0.134   | 68274              |
| 28       | 0.139   | 68275              |
| 27       | 0.143   | 68276              |
| 26       | 0.146   | 68277              |
| 25       | 0.148   | 68278              |
| 24       | 0.151   | 68279              |
| 23       | 0.153   | 68280              |
| 22       | 0.155   | 68281              |
| 21       | 0.157   | 68282              |
| 20       | 0.161   | 68283              |

**Number Sizes (Cont.)**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 19       | 0.164   | 68284              |
| 18       | 0.168   | 68285              |
| 17       | 0.172   | 68286              |
| 16       | 0.175   | 68287              |
| 15       | 0.178   | 68288              |
| 14       | 0.180   | 68289              |
| 13       | 0.182   | 68290              |
| 12       | 0.185   | 68291              |
| 11       | 0.188   | 68292              |
| 10       | 0.191   | 68293              |
| 9        | 0.194   | 68294              |
| 8        | 0.197   | 68295              |
| 7        | 0.199   | 68296              |
| 6        | 0.201   | 68297              |
| 5        | 0.204   | 68298              |
| 4        | 0.207   | 68299              |
| 3        | 0.212   | 68300              |
| 2        | 0.219   | 68301              |
| 1        | 0.227   | 68302              |

**Metric Sizes**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 2mm      | 0.0787  | 68227              |
| 3mm      | 0.1181  | 68228              |
| 4mm      | 0.1575  | 68229              |
| 5mm      | 0.1969  | 68230              |
| 6mm      | 0.2362  | 68231              |
| 7mm      | 0.2756  | 68232              |
| 8mm      | 0.3150  | 68233              |
| 9mm      | 0.3543  | 68234              |
| 10mm     | 0.3937  | 68235              |
| 11mm     | 0.4331  | 68236              |
| 12mm     | 0.4724  | 68237              |
| 13mm     | 0.5118  | 68238              |
| 14mm     | 0.5512  | 68239              |
| 15mm     | 0.5906  | 68240              |
| 16mm     | 0.6299  | 68241              |
| 17mm     | 0.6693  | 68242              |
| 18mm     | 0.7087  | 68243              |
| 19mm     | 0.7480  | 68244              |
| 20mm     | 0.7874  | 68245              |
| 21mm     | 0.8268  | 68246              |
| 22mm     | 0.8661  | 68247              |
| 23mm     | 0.9055  | 68248              |
| 24mm     | 0.9449  | 68249              |
| 25mm     | 0.9843  | 68250              |

**NOTE:** Prices on application for other lengths, widths and thicknesses.



## A2 Ground & Polished Drill Rod

### No. 482 3' Lengths

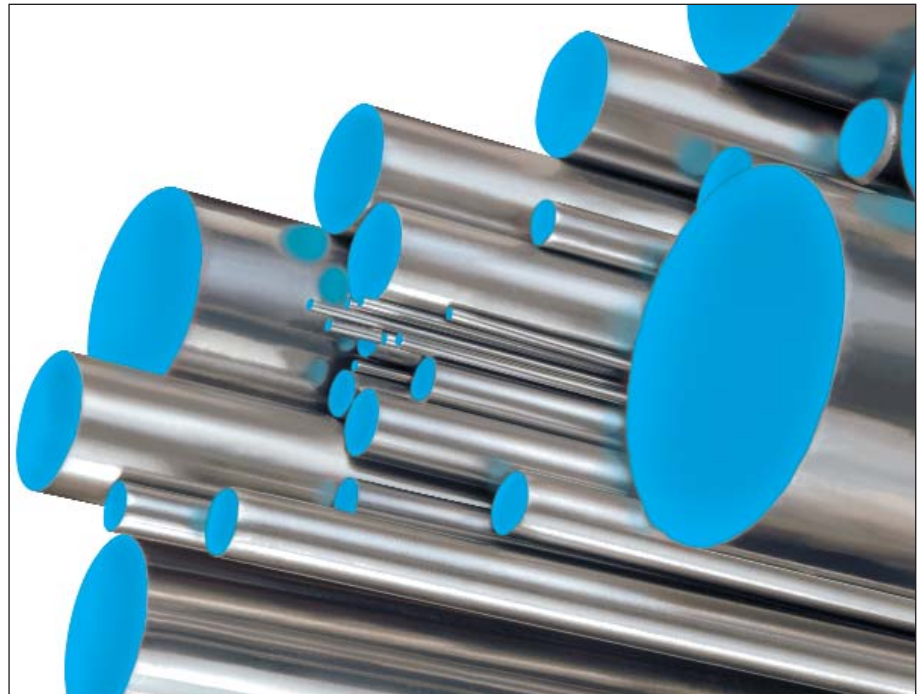
AISI/SAE A2 is a more highly alloyed tool steel that provides excellent wear resistance and toughness and good machinability.

#### Tolerances

| Size Range           | Diameter | Length   |
|----------------------|----------|----------|
| .124" round and less | ±.0003"  | +1/8"- 0 |
| .125" to 1.499"      | ±.0005"  | +1/8"- 0 |
| 1.50" to 2"          | ±.0075"  | +1/8"- 0 |

#### Nominal Analysis (AISI A2)

|                      |      |
|----------------------|------|
| Carbon . . . . .     | 1.00 |
| Chromium . . . . .   | 5.25 |
| Manganese . . . . .  | .60  |
| Molybdenum . . . . . | 1.00 |
| Silicon . . . . .    | .40  |
| Vanadium . . . . .   | .25  |



Heat Treatment and Tempering Data available upon request.

## A2 No. 482 Drill Rod 36" Lengths

#### Fractional Sizes

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 1/16"    | 0.0625  | <b>68662</b>       |
| 5/64"    | 0.0871  | <b>68663</b>       |
| 3/32"    | 0.0938  | <b>68664</b>       |
| 7/64"    | 0.1094  | <b>68665</b>       |
| 1/8"     | 0.1250  | <b>68583</b>       |
| 9/64"    | 0.1406  | <b>68666</b>       |
| 5/32"    | 0.1563  | <b>68631</b>       |
| 11/64"   | 0.1719  | <b>68667</b>       |
| 3/16"    | 0.1875  | <b>68584</b>       |
| 13/64"   | 0.2031  | <b>68668</b>       |
| 7/32"    | 0.2188  | <b>68632</b>       |
| 15/64"   | 0.2344  | <b>68669</b>       |
| 1/4"     | 0.2500  | <b>68585</b>       |
| 17/64"   | 0.2656  | <b>68670</b>       |
| 9/32"    | 0.2813  | <b>68633</b>       |
| 19/64"   | 0.2969  | <b>68671</b>       |

#### Fractional Sizes

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 5/16"    | 0.3125  | <b>68586</b>       |
| 21/64"   | 0.3281  | <b>68672</b>       |
| 11/32"   | 0.3438  | <b>68634</b>       |
| 23/64"   | 0.3594  | <b>68673</b>       |
| 3/8"     | 0.3450  | <b>68587</b>       |
| 25/64"   | 0.3906  | <b>68674</b>       |
| 13/32"   | 0.4063  | <b>68675</b>       |
| 27/64"   | 0.4219  | <b>68676</b>       |
| 7/16"    | 0.4375  | <b>68588</b>       |
| 29/64"   | 0.4531  | <b>68677</b>       |
| 15/32"   | 0.4688  | <b>68678</b>       |
| 31/64"   | 0.4844  | <b>68679</b>       |
| 1/2"     | 0.5000  | <b>68589</b>       |
| 17/32"   | 0.5313  | <b>68680</b>       |
| 9/16"    | 0.5625  | <b>68590</b>       |
| 19/32"   | 0.5938  | <b>68681</b>       |

#### Fractional Sizes

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 5/8"     | 0.6250  | <b>68591</b>       |
| 21/32"   | 0.6563  | <b>68682</b>       |
| 11/16"   | 0.6875  | <b>68592</b>       |
| 23/32"   | 0.7188  | <b>68683</b>       |
| 3/4"     | 0.7500  | <b>68593</b>       |
| 13/16"   | 0.8125  | <b>68594</b>       |
| 7/8"     | 0.8750  | <b>68595</b>       |
| 15/16"   | 0.9375  | <b>68684</b>       |
| 1"       | 1.0000  | <b>68596</b>       |
| 1-1/16"  | 1.0625  | <b>68685</b>       |
| 1-1/8"   | 1.1250  | <b>68597</b>       |
| 1-1/4"   | 1.2500  | <b>68598</b>       |
| 1-3/8"   | 1.3750  | <b>68686</b>       |
| 1-1/2"   | 1.5000  | <b>68599</b>       |
| 1-3/4"   | 1.7500  | <b>68687</b>       |
| 2"       | 2.0000  | <b>68688</b>       |

**NOTE:** Prices on application for other lengths, widths and thicknesses.





**W1 Ground & Polished  
Drill Rod**

**No. 481 3' Lengths**

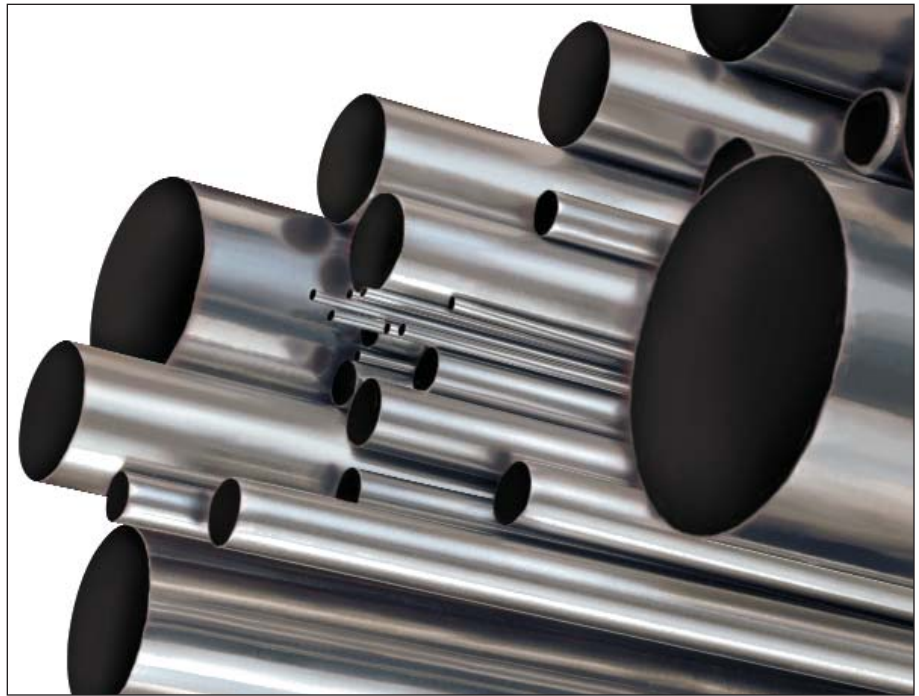
AISI/SAE W1 is a versatile and less expensive tool steel that has superior machinability and maintains good wear resistance and toughness characteristics.

**Tolerances**

| Size Range           | Diameter | Length   |
|----------------------|----------|----------|
| .124" round and less | ±.0003"  | +1/8"- 0 |
| .125" to 1.499"      | ±.0005"  | +1/8"- 0 |
| 1.50" to 2"          | ±.0075"  | +1/8"- 0 |

**Nominal Analysis (AISI W1)**

Carbon ..... .90-1.05  
Manganese ..... .30-.50



Heat Treatment and Tempering Data available upon request.

**W1 No. 481 Drill Rod 36" Lengths**

**Fractional Sizes**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 1/16"    | 0.0625  | <b>68482</b>       |
| 5/64"    | 0.0781  | <b>68483</b>       |
| 3/32"    | 0.0938  | <b>68484</b>       |
| 7/64"    | 0.1094  | <b>68485</b>       |
| 1/8"     | 0.1250  | <b>68486</b>       |
| 9/64"    | 0.1406  | <b>68487</b>       |
| 5/32"    | 0.1563  | <b>68488</b>       |
| 11/64"   | 0.1719  | <b>68489</b>       |
| 3/16"    | 0.1875  | <b>68490</b>       |
| 13/64"   | 0.2031  | <b>68491</b>       |
| 7/32"    | 0.2188  | <b>68492</b>       |
| 15/64"   | 0.2344  | <b>68493</b>       |
| 1/4"     | 0.2500  | <b>68494</b>       |
| 17/64"   | 0.2656  | <b>68495</b>       |
| 9/32"    | 0.2813  | <b>68496</b>       |
| 19/64"   | 0.2969  | <b>68497</b>       |
| 5/16"    | 0.3125  | <b>68498</b>       |
| 21/64"   | 0.3281  | <b>68499</b>       |
| 11/32"   | 0.3438  | <b>68500</b>       |
| 23/64"   | 0.3594  | <b>68501</b>       |
| 3/8"     | 0.3750  | <b>68502</b>       |
| 25/64"   | 0.3906  | <b>68503</b>       |
| 13/32"   | 0.4063  | <b>68504</b>       |
| 27/64"   | 0.4219  | <b>68505</b>       |
| 7/16"    | 0.4375  | <b>68506</b>       |
| 29/64"   | 0.4531  | <b>68507</b>       |

**Fractional Sizes**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 15/32"   | 0.4688  | <b>68508</b>       |
| 31/64"   | 0.4844  | <b>68509</b>       |
| 1/2"     | 0.5000  | <b>68510</b>       |
| 33/64"   | 0.5156  | <b>68511</b>       |
| 17/32"   | 0.5313  | <b>68512</b>       |
| 35/64"   | 0.5469  | <b>68513</b>       |
| 9/16"    | 0.5625  | <b>68514</b>       |
| 37/64"   | 0.5781  | <b>68515</b>       |
| 19/32"   | 0.5938  | <b>68516</b>       |
| 39/64"   | 0.6094  | <b>68517</b>       |
| 5/8"     | 0.6250  | <b>68518</b>       |
| 41/64"   | 0.6406  | <b>68519</b>       |
| 21/32"   | 0.6563  | <b>68520</b>       |
| 43/64"   | 0.6719  | <b>68521</b>       |
| 11/16"   | 0.6875  | <b>68522</b>       |
| 45/64"   | 0.7031  | <b>68523</b>       |
| 23/32"   | 0.7188  | <b>68524</b>       |
| 47/64"   | 0.7344  | <b>68525</b>       |
| 3/4"     | 0.7500  | <b>68526</b>       |
| 49/64"   | 0.7656  | <b>68527</b>       |
| 25/32"   | 0.7813  | <b>68528</b>       |
| 51/64"   | 0.7969  | <b>68529</b>       |
| 13/16"   | 0.8125  | <b>68530</b>       |
| 53/64"   | 0.8281  | <b>68531</b>       |
| 27/32"   | 0.8438  | <b>68532</b>       |
| 55/64"   | 0.8594  | <b>68533</b>       |

**Fractional Sizes**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 7/8"     | 0.8750  | <b>68534</b>       |
| 57/64"   | 0.8906  | <b>68535</b>       |
| 29/32"   | 0.9063  | <b>68536</b>       |
| 59/64"   | 0.9219  | <b>68537</b>       |
| 15/16"   | 0.9375  | <b>68538</b>       |
| 61/64"   | 0.9531  | <b>68539</b>       |
| 31/32"   | 0.9688  | <b>68540</b>       |
| 63/64"   | 0.9844  | <b>68541</b>       |
| 1"       | 1.0000  | <b>68542</b>       |
| 1-1/64"  | 1.0156  | <b>68543</b>       |
| 1-1/32"  | 1.0313  | <b>68544</b>       |
| 1-3/64"  | 1.0469  | <b>68545</b>       |
| 1-1/16"  | 1.0625  | <b>68546</b>       |
| 1-5/64"  | 1.0781  | <b>68547</b>       |
| 1-3/32"  | 1.0938  | <b>68548</b>       |
| 1-7/64"  | 1.1094  | <b>68549</b>       |
| 1-1/8"   | 1.1250  | <b>68550</b>       |
| 1-9/64"  | 1.1406  | <b>68551</b>       |
| 1-5/32"  | 1.1563  | <b>68552</b>       |
| 1-11/64" | 1.1719  | <b>68553</b>       |
| 1-3/16"  | 1.1875  | <b>68554</b>       |
| 1-13/64" | 1.2031  | <b>68555</b>       |
| 1-7/32"  | 1.2188  | <b>68556</b>       |
| 1-15/64" | 1.2344  | <b>68557</b>       |
| 1-1/4"   | 1.2500  | <b>68558</b>       |
| 1-17/64" | 1.2656  | <b>68559</b>       |

NOTE: Prices on application for other lengths, widths and thicknesses.

(Continued on next page.)



**W1 No. 481 Drill Rod 36" Lengths (continued)**

**Fractional Sizes**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 1-9/32"  | 1.2813  | <b>68560</b>       |
| 1-19/64" | 1.2969  | <b>68561</b>       |
| 1-5/16"  | 1.3125  | <b>68562</b>       |
| 1-21/64" | 1.3281  | <b>68563</b>       |
| 1-11/32" | 1.3438  | <b>68564</b>       |
| 1-23/64" | 1.3594  | <b>68565</b>       |
| 1-3/8"   | 1.3750  | <b>68566</b>       |
| 1-25/64" | 1.3906  | <b>68567</b>       |
| 1-13/32" | 1.4063  | <b>68568</b>       |
| 1-27/64" | 1.4219  | <b>68569</b>       |
| 1-7/16"  | 1.4375  | <b>68570</b>       |
| 1-29/64" | 1.4531  | <b>68571</b>       |
| 1-15/32" | 1.4688  | <b>68572</b>       |
| 1-31/64" | 1.4844  | <b>68573</b>       |
| 1-1/2"   | 1.5000  | <b>68574</b>       |
| 1-9/16"  | 1.5625  | <b>68575</b>       |
| 1-5/8"   | 1.6250  | <b>68576</b>       |
| 1-11/16" | 1.6875  | <b>68577</b>       |
| 1-3/4"   | 1.7500  | <b>68578</b>       |
| 1-13/16" | 1.8125  | <b>68579</b>       |
| 1-7/8"   | 1.8750  | <b>68580</b>       |
| 1-15/16" | 1.9375  | <b>68581</b>       |
| 2"       | 2.0000  | <b>68582</b>       |

**Letter Sizes**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| A        | 0.2340  | <b>68404</b>       |
| B        | 0.2380  | <b>68405</b>       |
| C        | 0.2420  | <b>68406</b>       |
| D        | 0.2460  | <b>68407</b>       |
| E        | 0.2500  | <b>68408</b>       |
| F        | 0.2570  | <b>68409</b>       |
| G        | 0.2610  | <b>68410</b>       |
| H        | 0.2660  | <b>68411</b>       |
| I        | 0.2720  | <b>68412</b>       |
| J        | 0.2770  | <b>68413</b>       |
| K        | 0.2810  | <b>68414</b>       |
| L        | 0.2900  | <b>68415</b>       |
| M        | 0.2950  | <b>68416</b>       |
| N        | 0.3020  | <b>68417</b>       |
| O        | 0.3160  | <b>68418</b>       |
| P        | 0.3230  | <b>68419</b>       |
| Q        | 0.3320  | <b>68420</b>       |
| R        | 0.3390  | <b>68421</b>       |
| S        | 0.3480  | <b>68422</b>       |
| T        | 0.3580  | <b>68423</b>       |
| U        | 0.3680  | <b>68424</b>       |
| V        | 0.3770  | <b>68425</b>       |
| W        | 0.3860  | <b>68426</b>       |
| X        | 0.3970  | <b>68427</b>       |
| Y        | 0.4040  | <b>68428</b>       |
| Z        | 0.4130  | <b>68429</b>       |

**Number Sizes**

| Diameter | Decimal | 36" Length EDP No. |
|----------|---------|--------------------|
| 52       | 0.0630  | <b>68430</b>       |
| 51       | 0.0660  | <b>68431</b>       |
| 50       | 0.0690  | <b>68432</b>       |
| 49       | 0.0720  | <b>68433</b>       |
| 48       | 0.0750  | <b>68434</b>       |
| 47       | 0.0770  | <b>68435</b>       |
| 46       | 0.0790  | <b>68436</b>       |
| 45       | 0.0810  | <b>68437</b>       |
| 44       | 0.0850  | <b>68438</b>       |
| 43       | 0.0880  | <b>68439</b>       |
| 42       | 0.0920  | <b>68440</b>       |
| 41       | 0.0950  | <b>68441</b>       |
| 40       | 0.0970  | <b>68442</b>       |
| 39       | 0.0990  | <b>68443</b>       |
| 38       | 0.1010  | <b>68444</b>       |
| 37       | 0.1030  | <b>68445</b>       |
| 36       | 0.1060  | <b>68446</b>       |
| 35       | 0.1080  | <b>68447</b>       |
| 34       | 0.1100  | <b>68448</b>       |
| 33       | 0.1120  | <b>68449</b>       |
| 32       | 0.1150  | <b>68450</b>       |
| 31       | 0.1200  | <b>68451</b>       |
| 30       | 0.1270  | <b>68452</b>       |
| 29       | 0.1340  | <b>68453</b>       |
| 28       | 0.1390  | <b>68454</b>       |
| 27       | 0.1430  | <b>68455</b>       |
| 26       | 0.1460  | <b>68456</b>       |
| 25       | 0.1480  | <b>68457</b>       |
| 24       | 0.1510  | <b>68458</b>       |
| 23       | 0.1530  | <b>68459</b>       |
| 22       | 0.1550  | <b>68460</b>       |
| 21       | 0.1570  | <b>68461</b>       |
| 20       | 0.1610  | <b>68462</b>       |
| 19       | 0.1640  | <b>68463</b>       |
| 18       | 0.1680  | <b>68464</b>       |
| 17       | 0.1720  | <b>68465</b>       |
| 16       | 0.1750  | <b>68466</b>       |
| 15       | 0.1780  | <b>68467</b>       |
| 14       | 0.1800  | <b>68468</b>       |
| 13       | 0.1820  | <b>68469</b>       |
| 12       | 0.1850  | <b>68470</b>       |
| 11       | 0.1880  | <b>68471</b>       |
| 10       | 0.1910  | <b>68472</b>       |
| 9        | 0.1940  | <b>68473</b>       |
| 8        | 0.1970  | <b>68474</b>       |
| 7        | 0.1990  | <b>68475</b>       |
| 6        | 0.2010  | <b>68476</b>       |
| 5        | 0.2040  | <b>68477</b>       |
| 4        | 0.2070  | <b>68478</b>       |
| 3        | 0.2120  | <b>68479</b>       |
| 2        | 0.2190  | <b>68480</b>       |
| 1        | 0.2270  | <b>68481</b>       |

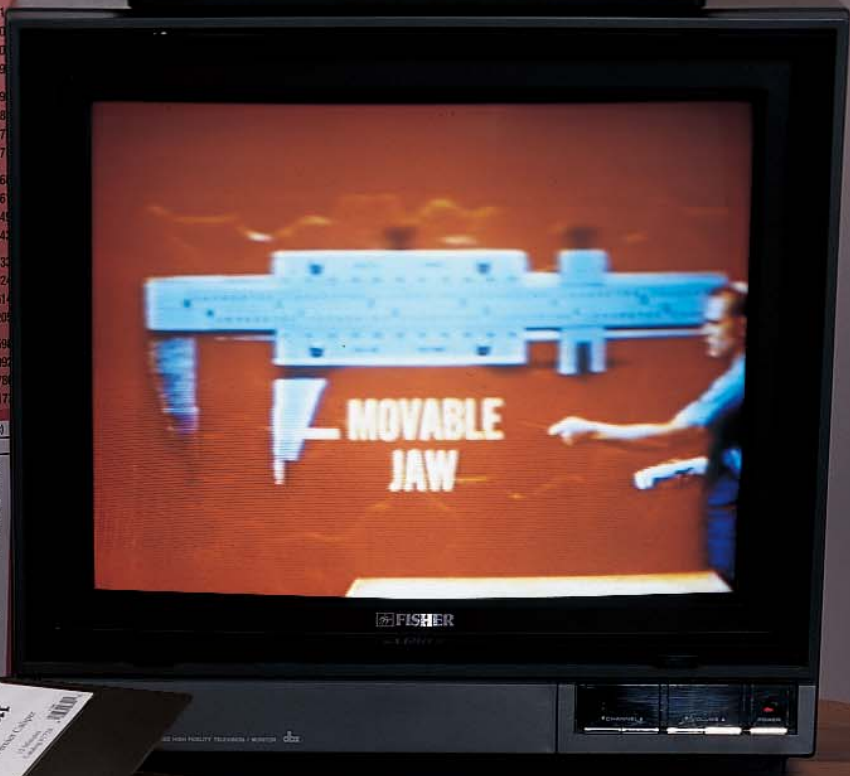
**NOTE:** Prices on application for other lengths, widths and thicknesses.





The L.S. Starrett Company has continually, throughout its history, offered instruction materials to assist in teaching metrology principles. We continue to offer a number of these items in reasonable quantities at no charge. The balance of the aids are available at reasonable prices.

- ◆ Videos
- ◆ Training Aid Kit
- ◆ Publications
- ◆ Charts
- ◆ Reference Cards



|    |       |      |       |       |           |        |              |
|----|-------|------|-------|-------|-----------|--------|--------------|
| 59 | .0410 | 8    | .1990 | .5250 | M16 x 2   | 14.00  | 55           |
| 58 | .0420 | 7    | .2010 | .5406 | M16 x 1.5 | 14.50  | 570          |
| 57 | .0430 | 13   | .2021 | .5562 | M18 x 2.5 | 15.50  | 610          |
| 56 | .0465 |      |       |       | M18 x 1.5 | 15.50  | 549          |
|    | .0469 |      |       |       | M20 x 2.5 | 17.50  | 589          |
| 55 | .0520 |      |       |       | M20 x 1.5 | 18.50  | 728          |
| 54 | .0550 |      |       |       | M22 x 2.5 | 19.50  | 787          |
| 53 | .0595 |      |       |       | M22 x 1.5 | 20.50  | 807          |
| 1  | .0625 |      |       |       | M24 x 3   | 21.00  | 826          |
| 16 | .0635 |      |       |       | M24 x 2   | 22.00  | 866          |
| 52 | .0670 |      |       |       | M27 x 3   | 24.00  | 944          |
| 51 | .0700 |      |       |       | M27 x 2   | 25.00  | 984          |
| 50 | .0730 |      |       |       | M30 x 3.5 | 26.50  | 1,043        |
| 49 | .0760 |      |       |       | M30 x 2   | 28.00  | 1,102        |
| 48 | .0781 |      |       |       | M33 x 3.5 | 29.50  | 1,161        |
| 47 | .0785 |      |       |       | M33 x 2   | 31.00  | 1,220        |
| 46 | .0810 |      |       |       | M36 x 4   | 32.00  | 1,294        |
| 45 | .0820 |      |       |       | M36 x 3   | 33.00  | 1,299        |
| 44 | .0860 |      |       |       | M39 x 4   | 35.00  | 1,378        |
| 43 | .0890 |      |       |       | M39 x 3   | 36.00  | 1,417        |
| 42 | .0935 |      |       |       |           |        |              |
| 3  | .0938 |      |       |       |           |        |              |
| 32 | .0960 |      |       |       |           |        |              |
| 40 | .0980 |      |       |       |           |        |              |
| 39 | .0995 |      |       |       |           |        |              |
| 38 | .1015 | 5-40 | M     | .2950 | 17/64     | 1.1094 | 11/4-7       |
| 37 | .1040 | 5-44 | N     | .3020 | 1 1/8     | 1.1250 | 3/8-18       |
| 36 | .1065 | 6-32 | 5     | .3125 | 1 1/16    | 1.1719 | 1/2-14       |
|    | .1094 |      | 16    | .3160 | 1 1/32    | 1.2188 | 3/4-14       |
| 35 | .1100 |      | O     | .3230 | 1 1/4     | 1.2500 | 1-11 1/2     |
| 34 | .1110 |      | P     | .3281 | 1 1/8     | 1.2500 | 1 1/4-11 1/2 |
| 33 | .1130 | 6-40 | 21    | .3320 | 1 1/8     | 1.2969 | 1 1/2-11 1/2 |
| 32 | .1160 |      | 64    | .3390 | 1 1/16    | 1.3438 | 2-11 1/2     |
| 31 | .1200 |      | Q     | .3438 | 1 1/8     | 1.3438 | 2 1/2-8      |
| 30 | .1250 |      | R     | .3438 | 1 1/2     | 1.3438 | 3-8          |
|    |       |      |       |       | 1 1/2     | 1.3438 | 3 1/2-8      |
|    |       |      |       |       |           |        | 4-8          |







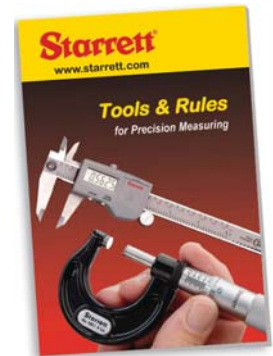
**Tools & Rules for Precision Measuring No. 1211 EDP 56604**

This valuable and popular training aid has been updated for 2007. The new full color edition includes coverage of newer tools as well as the familiar reference material to traditional topics. This booklet tells the story of precision measurements in down-to-earth language that has been popular over the years.

Information includes: linear measuring standards; measuring and transferring measurements; steel rules; calipers and dividers; how to read vernier tools

and the micrometer; types of micrometers; gage blocks and digital measuring tools; dial indicators; layout with accuracy; measuring lathe work; measuring screw threads; facts about fit; limits of tolerance; electronic tools; and also includes a helpful reference section – decimal equivalents, squares, cubes, square and cube roots, tap drill and screw thread information.

This 80 page book with over 150 color illustrations is available by request without charge.



**The Starrett Book for Student Machinists No. 1700 EDP 53218**

This familiar handbook for machine shop beginners is written in clear, simple language, contains 160 pages including 200 diagrams, illustrations, reference tables, and is fully indexed. Printed on coated paper with soil-resistant binding for durable machine shop use.

**Chapter Headings:** Mechanical Drawings; Fits and Terminology; Bench Work; How to Make Measurements; Cutting Speed and Cutting Fluids; Drilling and Related Operations; Lathe Operations; Grinding; Metal Sawing; Toolmaking; Geometry; Mechanics.

This book is a priced item.



**The Starrett Story No. 1216 EDP 56601**

A brief history of the Starrett company which was founded over 125 years ago by an early mechanical genius, Laroy S. Starrett. It reviews the founder's boyhood years, business problems and successes, tools introduced, personal philosophy and community service. A fascinating story of ambition, perseverance, accomplishment and contribution to industry and his fellow man.

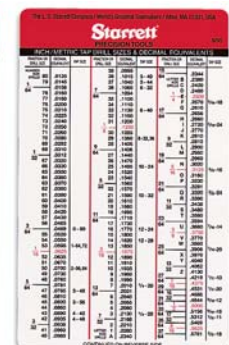
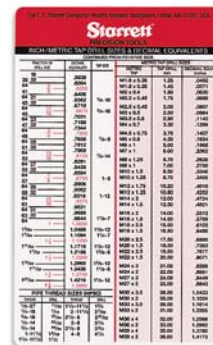
36 pages with over 50 illustrations. Available by request without charge.



**Inch/Metric Tap Drill Sizes and Decimal Equivalents Card**

Card shows decimal equivalents of 8ths, 16ths, 32nds and 64ths of an inch; decimal equivalents of letter size drills (A-Z) and

number size drills (1-80); drill sizes for standard taps from #0-80 to 1-1/2-12 (approximately 65% thread); and pipe taps from 1/8-27 to 4-8. Metric tap/drill sizes section. Printed on two sides in red and black. Pocket size 3" x 5" (75 x 125mm).



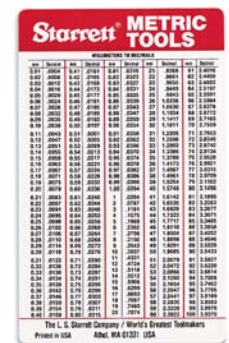
| Description  | Catalog No. | EDP No. |
|--------------|-------------|---------|
| Decimal Card | 1317        | 56607   |

**NOTE:** Available on request at no charge.

**Millimeter/Inch Equivalents Card**

Card shows millimeters to decimals equivalents from 0.01 mm to 100mm (.0004"-3.9370"); decimals-to-

millimeters from .001" to 1.00" (0.03-25.40mm); and fractions-to-decimals-to-millimeters from 1/64" to 1" (0.40-25.40mm). Printed on two sides in red and black. Pocket size 3" x 5" (75 x 125mm).



| Description | Catalog No. | EDP No. |
|-------------|-------------|---------|
| Metric Card | 1318        | 56608   |

**NOTE:** Available on request at no charge.




### Wall Chart No. 1214 EDP 56605

Suited for factory-machine areas and tool cribs, as well as classroom use. Charts are packed one per tube.

#### Inch/Metric Tap Drill Sizes and Decimal Equivalents

Decimal equivalents of 8ths, 16ths, 32nds and 64ths of an inch; decimal equivalents

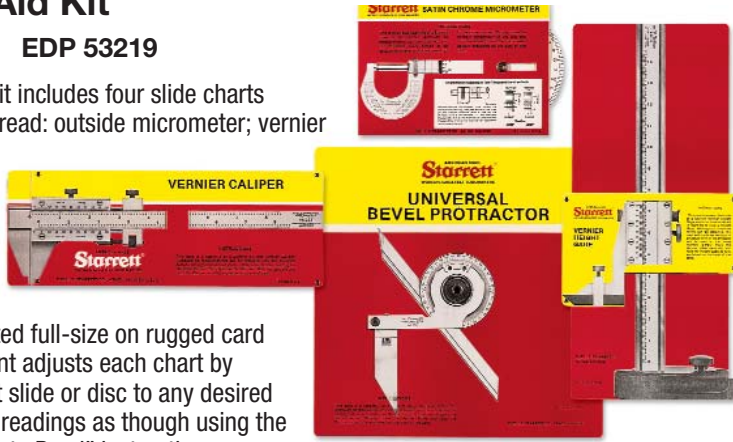
of letter size drills (A-Z) and number size drills (1-80); drill sizes for standard taps from #0-80 to 1-1/2 – 12 (approximately 65% thread); and pipe taps from 1/8-27 to 4-8. Metric tap/drill sizes section. Size 25" x 41-1/2" (635 x 1054mm).



| INCH / METRIC TAP DRILL SIZES & DECIMAL EQUIVALENTS |                 |
|---|-----------------|
| INCH TAP SIZE                                       | METRIC TAP SIZE |
| 1/16  | M2.5            |
| 1/8   | M3.2            |
| 3/16  | M4.0            |
| 1/4   | M5.0            |
| 5/16  | M6.3            |
| 3/8   | M7.5            |
| 7/16  | M9.0            |
| 1/2   | M11.0           |
| 9/16  | M12.5           |
| 5/8   | M15.0           |
| 11/16   | M17.5           |
| 3/4   | M20.0           |
| 13/16   | M22.5           |
| 7/8   | M25.0           |
| 15/16   | M27.5           |
| 1   | M30.0           |
| 1 1/16  | M32.0           |
| 1 1/8   | M36.0           |
| 1 1/4   | M42.0           |
| 1 3/8   | M48.0           |
| 1 1/2   | M54.0           |

### Training Aid Kit No. 1701 EDP 53219

This Training Aid Kit includes four slide charts showing how to read: outside micrometer; vernier caliper; vernier height gage with 50-division vernier plates; and a vernier protractor.



Each tool is printed full-size on rugged card stock. The student adjusts each chart by moving a die-cut slide or disc to any desired setting to obtain readings as though using the actual tool. "How to Read" instructions are printed on the back of each chart.

### Educational Charts Set of 17

Wall Size  
No. 1702  
18-5/8" x 14-5/8"  
(473 x 371mm)

Three-Ring Notebook Size  
No. 1715  
11" x 8-1/2"  
(280 x 216mm)

Seventeen whiteprint charts help learners recognize basic tools, their principal parts and uses. Tools illustrated: outside and inside micrometers; micrometer depth gage; vernier caliper and height gage; electronic micrometer and caliper; hook rule; combination square and bevel protractor; dial indicator and dial test indicators; dial caliper; magnetic base indicator holders; surface gage.

The set includes sheets on "How to Read Metric Measuring Tools" and "How to Read English Measuring Tools."

The No. 1702 and No. 1715 are identical except for size. The notebook size is 3-hole punched.



| Description      | Size                            | Catalog No. | EDP No. |
|------------------|---------------------------------|-------------|---------|
| Set of 17 charts | 18-5/8" x 14-5/8" (473 x 371mm) | 1702        | 56172   |
|                  | 11" x 8-1/2" (280 x 216mm)      | 1715        | 53220   |

NOTE: Charts are priced items.





## Videos

Starrett training videos are ideal for individuals or training classes. Six videos take students through extensive step-by-step use and care of precision measuring tools and include hands-on demonstrations. Available individually, or as one video with all six tapes combined.

- ◆ VHS format
- ◆ 12-1/2 minutes running time

## Outside Micrometer No. 1716

This presentation shows and demonstrates the principle parts, zero setting and tensioning, holding, cleaning of measuring faces, opening rapidly, developing "feel," using screw thread to obtain linear measurements, decimal equivalents, reading to .001" and .0001", and correct handling and storage of the outside micrometer.

## Combination Square No. 1722

This presentation demonstrates the setting of readings on blade, scribing lines, cross lines, 45° angles on work, transferring measurements, locating hole centers, using as height gage, setting up work on angle iron, checking alignment of assembled part, locating work in drill press vise, lining up milling machine vise and inspecting machined part to shop drawing.

## Combination Set No. 1719

This presentation shows and demonstrates the principal parts, assembling square head to blade, reversibility of square head on blade, 90° and 45° angles, spirit level, built-in scribe, blade graduations, reversible lock bolt, assembling center head to blade, finding center of round stock, assembling protractor head to blade, reading angles and locking turret.

## Vernier Height Gage No. 1731

This presentation defines the main parts of the vernier height gage and vernier principle, how to read in the English and metric systems, layout and inspection procedures plus tests on readings in inches and millimeters.

## Vernier Caliper No. 1728

- ◆ Outside Measurements
- ◆ Inside Measurements

This demonstration shows how to hold and use a caliper with 50-division vernier plate, how to adjust slide, make fine adjustments and lock slide in final position, setting the caliper to various readings, measuring actual workpiece inside and outside diameters, slot widths and overall dimensions.

## Bevel Protractor No. 1725

This video illustrates how to set and use scale of degrees, setting acute and obtuse angles, measuring an unknown angle, laying out angles, transferring angles from drawing to work, setting work at vertical angle, using spirit level, setting work on fixture, vise on milling machine and shaft in dividing head, and checking work dimensions after machining.

## Complete Tool Training Series No. 1732

One complete Tool Training Series. All six individual tool videos have been combined on a single tape.

- ◆ Outside Micrometer
- ◆ Combination Set
- ◆ Combination Square
- ◆ Bevel Protractor
- ◆ Vernier Caliper
- ◆ Vernier Height Gage
- ◆ VHS format
- ◆ 78 minutes running time

## Tools & Rules for Precision Measuring No. 1734

The "Tools and Rules" VHS cassette can be purchased and is also available on a loan basis for a short period of time FREE OF CHARGE. Only the return postage is required. Fax or write to The L.S. Starrett Company on your company or school letterhead stating date required.

### Features:

- ◆ History of precision measuring
- ◆ Simplified instruction on how to read, use and care for precision measuring tools
- ◆ Instruction is by voice, hands-on demonstrating and technique by which screen close-ups are shown simultaneously with demonstrations
- ◆ VHS format
- ◆ 38 minutes running time

| Description                                    | Catalog No. | EDP No. |
|--|-------------|---------|
| Video, Outside Micrometer                      | 1716        | 55897   |
| Video, Combination Set                         | 1719        | 56093   |
| Video, Combination Square                      | 1722        | 56095   |
| Video, Bevel Protractor                        | 1725        | 56097   |
| Video, Vernier Caliper                         | 1728        | 56340   |
| Video, Vernier Height Gage                     | 1731        | 56438   |
| Video, Tool Training Series on One Tape        | 1732        | 64435   |
| Video, Tools and Rules for Precision Measuring | 1734        | 57123   |

**NOTE:** Videos are priced items.

## Tools Sets

We offer Tool Sets that are a great way for apprentices and students to begin their careers with the highest quality measuring tools. See the Tool Sets section of this catalog beginning on page 237 for full details.



**Left: Basic  
Precision Measuring  
Tool Set  
No. 909 and 909M.**

**Right: Select  
Precision Measuring  
Tool Set  
No. 905 and 905M.**





$\pm [ .0001 ]$

FPM

$\pm$  Inch

mm

$- \times \div =$



**Metric and English Equivalents**

| Linear Measure  |   |
|---|---|
| Metric to Inch  | Inch to Metric  |
| 1 millimeter = 0.03937 inch<br>1 centimeter = 0.3937 inch<br>1 meter = $\begin{cases} 39.37 \text{ inches} \\ 3.2808 \text{ feet} \\ 1.0936 \text{ yards} \end{cases}$<br>1 kilometer = 0.6214 mile | 1 inch = $\begin{cases} 25.4 \text{ millimeters} \\ 2.54 \text{ centimeters} \end{cases}$<br>1 foot = $\begin{cases} 304.8 \text{ millimeters} \\ 0.3048 \text{ meter} \end{cases}$<br>1 yard = 0.9144 meter<br>1 mile = 1.609 kilometers |

| Square Measure   |   |
|--|---|
| Metric to Inch   | Inch to Metric  |
| 1 square millimeter = 0.00155 square inch<br>1 square centimeter = 0.155 square inch<br>1 square meter = 10.764 square feet = 1.196 square yards<br>1 are = 0.0247 acre = 1076.4 square feet<br>1 hectare = 2.471 acres = 107,639 square feet<br>1 square kilometer = 0.3861 square mile = 247.1 acres | 1 square inch = 6.452 square centimeters = 645.2 square millimeters<br>1 square foot = 0.0929 square meter = 929 square centimeters<br>1 square yard = 0.836 square meter<br>1 acre = 0.4047 hectare = 40.47 ares<br>1 square mile = 2.5900 square kilometers |

| Cubic Measure  |   |
|--|---|
| Metric to English  | English to Metric   |
| 1 liter = 0.2642 U.S. gallon = 1.0567 U.S. quarts<br>1 liter (cubic decimeter) = 0.0353 cubic foot = 61.024 cubic inches<br>1 cubic centimeter = 0.061 cubic inch<br>1 cubic meter = 264.2 U.S. gallons<br>1 cubic meter = 35.315 cubic feet = 1.308 cubic yards | 1 U.S. quart = 0.946 liter<br>1 U.S. gallon = 3.785 liters = 231 cubic inches<br>1 cubic inch = 16.38706 cubic centimeters<br>1 cubic foot = 0.02832 cubic meter = 28.317 liters<br>1 cubic yard = 0.7646 cubic meter |

| Weight   |   |
|--|---|
| Metric to English  | English to Metric   |
| 1 gram = 15.432 grains<br>1 gram = 0.03527 ounce avoirdupois (Commercial)<br>1 kilogram = 2.2046 pounds = 35.274 ounces avoirdupois (Commercial)<br>1 metric ton = 0.9842 ton (of 2240 pounds) = 2204.6 pounds | 1 grain = 0.0648 gram<br>1 ounce avoirdupois (Commercial) = 28.35 grams<br>1 pound = 0.4536 kilogram = 453.6 grams<br>1 short ton (2,000 pounds) = .907 metric ton = 907 kilograms<br>1 long ton (2,240 pounds) = 1.016 metric ton = 1016 kilograms |

**Inch to Millimeter Conversion Table**

| Decimals to Millimeters |         |         |         | Fractions to Decimals to Millimeters |         |         |          |         |         |
|-------------------------|---------|---------|---------|--------------------------------------|---------|---------|----------|---------|---------|
| Decimal                 | mm      | Decimal | mm      | Fraction                             | Decimal | mm      | Fraction | Decimal | mm      |
| 0.001                   | 0.0254  | 0.500   | 12.7000 | 1/64                                 | 0.0156  | 0.3969  | 33/64    | 0.5156  | 13.0969 |
| 0.002                   | 0.0508  | 0.510   | 12.9540 | 1/32                                 | 0.0312  | 0.7938  | 17/32    | 0.5312  | 13.4938 |
| 0.003                   | 0.0762  | 0.520   | 13.2080 | 3/64                                 | 0.0469  | 1.1906  | 35/64    | 0.5469  | 13.8906 |
| 0.004                   | 0.1016  | 0.530   | 13.4620 |                                      |         |         |          |         |         |
| 0.005                   | 0.1270  | 0.540   | 13.7160 | 1/16                                 | 0.0625  | 1.5875  | 9/16     | 0.5625  | 14.2875 |
| 0.006                   | 0.1524  | 0.550   | 13.9700 |                                      |         |         |          |         |         |
| 0.007                   | 0.1778  | 0.560   | 14.2240 | 5/64                                 | 0.0781  | 1.9844  | 37/64    | 0.5781  | 14.6844 |
| 0.008                   | 0.2032  | 0.570   | 14.4780 | 3/32                                 | 0.0938  | 2.3812  | 19/32    | 0.5938  | 15.0812 |
| 0.009                   | 0.2286  | 0.580   | 14.7320 | 7/64                                 | 0.1094  | 2.7781  | 39/64    | 0.6094  | 15.4781 |
| 0.010                   | 0.2540  | 0.590   | 14.9860 |                                      |         |         |          |         |         |
| 0.020                   | 0.5080  |         |         | 1/8                                  | 0.1250  | 3.1750  | 5/8      | 0.6250  | 15.8750 |
| 0.030                   | 0.7620  | 0.600   | 15.2400 |                                      |         |         |          |         |         |
| 0.040                   | 1.0160  | 0.610   | 15.4940 | 9/64                                 | 0.1406  | 3.5719  | 41/64    | 0.6406  | 16.2719 |
| 0.050                   | 1.2700  | 0.620   | 15.7480 | 5/32                                 | 0.1562  | 3.9688  | 21/32    | 0.6562  | 16.6688 |
| 0.060                   | 1.5240  | 0.630   | 16.0020 | 11/64                                | 0.1719  | 4.3656  | 43/64    | 0.6719  | 17.0656 |
| 0.070                   | 1.7780  | 0.640   | 16.2560 |                                      |         |         |          |         |         |
| 0.080                   | 2.0320  | 0.650   | 16.5100 | 3/16                                 | 0.1875  | 4.7625  | 11/16    | 0.6875  | 17.4625 |
| 0.090                   | 2.2860  | 0.660   | 16.7640 |                                      |         |         |          |         |         |
| 0.100                   | 2.5400  | 0.670   | 17.0180 | 13/64                                | 0.2031  | 5.1594  | 45/64    | 0.7031  | 17.8594 |
| 0.110                   | 2.7940  | 0.680   | 17.2720 | 7/32                                 | 0.2188  | 5.5562  | 23/32    | 0.7188  | 18.2562 |
| 0.120                   | 3.0480  | 0.690   | 17.5260 | 15/64                                | 0.2344  | 5.9531  | 47/64    | 0.7344  | 18.6531 |
| 0.130                   | 3.3020  |         |         | 1/4                                  | 0.2500  | 6.3500  | 3/4      | 0.7500  | 19.0500 |
| 0.140                   | 3.5560  | 0.700   | 17.7800 |                                      |         |         |          |         |         |
| 0.150                   | 3.8100  | 0.710   | 18.0340 | 17/64                                | 0.2656  | 6.7469  | 49/64    | 0.7656  | 19.4469 |
| 0.160                   | 4.0640  | 0.720   | 18.2880 | 9/32                                 | 0.2812  | 7.1438  | 25/32    | 0.7812  | 19.8438 |
| 0.170                   | 4.3180  | 0.730   | 18.5420 | 19/64                                | 0.2969  | 7.5406  | 51/64    | 0.7969  | 20.2406 |
| 0.180                   | 4.5720  | 0.740   | 18.7960 |                                      |         |         |          |         |         |
| 0.190                   | 4.8260  | 0.750   | 19.0500 | 5/16                                 | 0.3125  | 7.9375  | 13/16    | 0.8125  | 20.6375 |
| 0.200                   | 5.0800  | 0.760   | 19.3040 |                                      |         |         |          |         |         |
| 0.210                   | 5.3340  | 0.770   | 19.5580 | 21/64                                | 0.3281  | 8.3344  | 53/64    | 0.8281  | 21.0344 |
| 0.220                   | 5.5880  | 0.780   | 19.8120 | 11/32                                | 0.3438  | 8.7312  | 27/32    | 0.8438  | 21.4312 |
| 0.230                   | 5.8420  | 0.790   | 20.0660 | 23/64                                | 0.3594  | 9.1281  | 55/64    | 0.8594  | 21.8281 |
| 0.240                   | 6.0960  |         |         |                                      |         |         |          |         |         |
| 0.250                   | 6.3500  | 0.800   | 20.3200 | 3/8                                  | 0.3750  | 9.5250  | 7/8      | 0.8750  | 22.2250 |
| 0.260                   | 6.6040  | 0.810   | 20.5740 |                                      |         |         |          |         |         |
| 0.270                   | 6.8580  | 0.820   | 20.8280 | 25/64                                | 0.3906  | 9.9219  | 57/64    | 0.8906  | 22.6219 |
| 0.280                   | 7.1120  | 0.830   | 21.0820 | 13/32                                | 0.4062  | 10.3188 | 29/32    | 0.9062  | 23.0188 |
| 0.290                   | 7.3660  | 0.840   | 21.3360 | 27/64                                | 0.4219  | 10.7156 | 59/64    | 0.9219  | 23.4156 |
| 0.300                   | 7.6200  | 0.850   | 21.5900 |                                      |         |         |          |         |         |
| 0.310                   | 7.8740  | 0.860   | 21.8440 | 7/16                                 | 0.4375  | 11.1125 | 15/16    | 0.9375  | 23.8125 |
| 0.320                   | 8.1280  | 0.870   | 22.0980 |                                      |         |         |          |         |         |
| 0.330                   | 8.3820  | 0.880   | 22.3520 | 29/64                                | 0.4531  | 11.5094 | 61/64    | 0.9531  | 24.2094 |
| 0.340                   | 8.6360  | 0.890   | 22.6060 | 15/32                                | 0.4688  | 11.9062 | 31/32    | 0.9688  | 24.6062 |
| 0.350                   | 8.8900  |         |         | 31/64                                | 0.4844  | 12.3031 | 63/64    | 0.9844  | 25.0031 |
| 0.360                   | 9.1440  | 0.900   | 22.8600 |                                      |         |         |          |         |         |
| 0.370                   | 9.3980  | 0.910   | 23.1140 | 1/2                                  | 0.5000  | 12.700  | 1        | 1.0000  | 25.4000 |
| 0.380                   | 9.6520  | 0.920   | 23.3680 |                                      |         |         |          |         |         |
| 0.390                   | 9.9060  | 0.930   | 23.6220 |                                      |         |         |          |         |         |
| 0.400                   | 10.1600 | 0.940   | 23.8760 |                                      |         |         |          |         |         |
| 0.410                   | 10.4140 | 0.950   | 24.1300 |                                      |         |         |          |         |         |
| 0.420                   | 10.6680 | 0.960   | 24.3840 |                                      |         |         |          |         |         |
| 0.430                   | 10.9220 | 0.970   | 24.6380 |                                      |         |         |          |         |         |
| 0.440                   | 11.1760 | 0.980   | 24.8920 |                                      |         |         |          |         |         |
| 0.450                   | 11.4300 | 0.990   | 25.1460 |                                      |         |         |          |         |         |
| 0.460                   | 11.6840 | 1.000   | 25.4000 |                                      |         |         |          |         |         |
| 0.470                   | 11.9380 |         |         |                                      |         |         |          |         |         |
| 0.480                   | 12.1920 |         |         |                                      |         |         |          |         |         |
| 0.490                   | 12.4460 |         |         |                                      |         |         |          |         |         |



**Millimeter to Inch Conversion Table**

| mm   | Decimal | mm   | Decimal | mm   | Decimal | mm | Decimal | mm  | Decimal |
|------|---------|------|---------|------|---------|----|---------|-----|---------|
| 0.01 | .00039  | 0.41 | .01614  | 0.81 | .03189  | 21 | .82677  | 61  | 2.40157 |
| 0.02 | .00079  | 0.42 | .01654  | 0.82 | .03228  | 22 | .86614  | 62  | 2.44094 |
| 0.03 | .00118  | 0.43 | .01693  | 0.83 | .03268  | 23 | .90551  | 63  | 2.48031 |
| 0.04 | .00157  | 0.44 | .01732  | 0.84 | .03307  | 24 | .94488  | 64  | 2.51969 |
| 0.05 | .00197  | 0.45 | .01772  | 0.85 | .03346  | 25 | .98425  | 65  | 2.55906 |
| 0.06 | .00236  | 0.46 | .01811  | 0.86 | .03386  | 26 | 1.02362 | 66  | 2.59843 |
| 0.07 | .00276  | 0.47 | .01850  | 0.87 | .03425  | 27 | 1.06299 | 67  | 2.63780 |
| 0.08 | .00315  | 0.48 | .01890  | 0.88 | .03465  | 28 | 1.10236 | 68  | 2.67717 |
| 0.09 | .00354  | 0.49 | .01929  | 0.89 | .03504  | 29 | 1.14173 | 69  | 2.71654 |
| 0.10 | .00394  | 0.50 | .01969  | 0.90 | .03543  | 30 | 1.18110 | 70  | 2.75591 |
| 0.11 | .00433  | 0.51 | .02008  | 0.91 | .03583  | 31 | 1.22047 | 71  | 2.79528 |
| 0.12 | .00472  | 0.52 | .02047  | 0.92 | .03622  | 32 | 1.25984 | 72  | 2.83465 |
| 0.13 | .00512  | 0.53 | .02087  | 0.93 | .03661  | 33 | 1.29921 | 73  | 2.87402 |
| 0.14 | .00551  | 0.54 | .02126  | 0.94 | .03701  | 34 | 1.33858 | 74  | 2.91339 |
| 0.15 | .00591  | 0.55 | .02165  | 0.95 | .03740  | 35 | 1.37795 | 75  | 2.95276 |
| 0.16 | .00630  | 0.56 | .02205  | 0.96 | .03780  | 36 | 1.41732 | 76  | 2.99213 |
| 0.17 | .00669  | 0.57 | .02244  | 0.97 | .03819  | 37 | 1.45669 | 77  | 3.03150 |
| 0.18 | .00709  | 0.58 | .02283  | 0.98 | .03858  | 38 | 1.49606 | 78  | 3.07087 |
| 0.19 | .00748  | 0.59 | .02323  | 0.99 | .03898  | 39 | 1.53543 | 79  | 3.11024 |
| 0.20 | .00787  | 0.60 | .02362  | 1.00 | .03937  | 40 | 1.57480 | 80  | 3.14961 |
| 0.21 | .00827  | 0.61 | .02402  | 1    | .03937  | 41 | 1.61417 | 81  | 3.18898 |
| 0.22 | .00866  | 0.62 | .02441  | 2    | .07874  | 42 | 1.65354 | 82  | 3.22835 |
| 0.23 | .00906  | 0.63 | .02480  | 3    | .11811  | 43 | 1.69291 | 83  | 3.26772 |
| 0.24 | .00945  | 0.64 | .02520  | 4    | .15748  | 44 | 1.73228 | 84  | 3.30709 |
| 0.25 | .00984  | 0.65 | .02559  | 5    | .19685  | 45 | 1.77165 | 85  | 3.34646 |
| 0.26 | .01024  | 0.66 | .02598  | 6    | .23622  | 46 | 1.81102 | 86  | 3.38583 |
| 0.27 | .01063  | 0.67 | .02638  | 7    | .27559  | 47 | 1.85039 | 87  | 3.42520 |
| 0.28 | .01102  | 0.68 | .02677  | 8    | .31496  | 48 | 1.88976 | 88  | 3.46457 |
| 0.29 | .01142  | 0.69 | .02717  | 9    | .35433  | 49 | 1.92913 | 89  | 3.50394 |
| 0.30 | .01181  | 0.70 | .02756  | 10   | .39370  | 50 | 1.96850 | 90  | 3.54331 |
| 0.31 | .01220  | 0.71 | .02795  | 11   | .43307  | 51 | 2.00787 | 91  | 3.58268 |
| 0.32 | .01260  | 0.72 | .02835  | 12   | .47244  | 52 | 2.04724 | 92  | 3.62205 |
| 0.33 | .01299  | 0.73 | .02874  | 13   | .51181  | 53 | 2.08661 | 93  | 3.66142 |
| 0.34 | .01339  | 0.74 | .02913  | 14   | .55118  | 54 | 2.12598 | 94  | 3.70079 |
| 0.35 | .01378  | 0.75 | .02953  | 15   | .59055  | 55 | 2.16535 | 95  | 3.74016 |
| 0.36 | .01417  | 0.76 | .02992  | 16   | .62992  | 56 | 2.20472 | 96  | 3.77953 |
| 0.37 | .01457  | 0.77 | .03031  | 17   | .66929  | 57 | 2.24409 | 97  | 3.81890 |
| 0.38 | .01496  | 0.78 | .03071  | 18   | .70866  | 58 | 2.28346 | 98  | 3.85827 |
| 0.39 | .01535  | 0.79 | .03110  | 19   | .74803  | 59 | 2.32283 | 99  | 3.89764 |
| 0.40 | .01575  | 0.80 | .03150  | 20   | .78740  | 60 | 2.36220 | 100 | 3.93701 |

### Decimal Equivalents of 8ths, 16ths, 32nds, 64ths

| 8ths       | 32nds          | 64ths           | 64ths           |
|------------|----------------|-----------------|-----------------|
| 1/8 = .125 | 1/32 = .03125  | 1/64 = .015625  | 33/64 = .515625 |
| 1/4 = .250 | 3/32 = .09375  | 3/64 = .046875  | 35/64 = .546875 |
| 3/8 = .375 | 5/32 = .15625  | 5/64 = .078125  | 37/64 = .578125 |
| 1/2 = .500 | 7/32 = .21875  | 7/64 = .109375  | 39/64 = .609375 |
| 5/8 = .625 | 9/32 = .28125  | 9/64 = .140625  | 41/64 = .640625 |
| 3/4 = .750 | 11/32 = .34375 | 11/64 = .171875 | 43/64 = .671875 |
| 7/8 = .875 | 13/32 = .40625 | 13/64 = .203125 | 45/64 = .703125 |
|            | 15/32 = .46875 | 15/64 = .234375 | 47/64 = .734375 |
|            | 17/32 = .53125 | 17/64 = .265625 | 49/64 = .765625 |
|            | 19/32 = .59375 | 19/64 = .296875 | 51/64 = .796875 |
|            | 21/32 = .65625 | 21/64 = .328125 | 53/64 = .828125 |
|            | 23/32 = .71875 | 23/64 = .359375 | 55/64 = .859375 |
|            | 25/32 = .78125 | 25/64 = .390625 | 57/64 = .890625 |
|            | 27/32 = .84375 | 27/64 = .421875 | 59/64 = .921875 |
|            | 29/32 = .90625 | 29/64 = .453125 | 61/64 = .953125 |
|            | 31/32 = .96875 | 31/64 = .484375 | 63/64 = .984375 |

### Decimal Equivalents of Letter Size Drills

| Letter   | Size of Drill in Inches |
|----------|-------------------------|
| <b>A</b> | .234                    |
| <b>B</b> | .238                    |
| <b>C</b> | .242                    |
| <b>D</b> | .246                    |
| <b>E</b> | .250                    |
| <b>F</b> | .257                    |
| <b>G</b> | .261                    |
| <b>H</b> | .266                    |
| <b>I</b> | .272                    |
| <b>J</b> | .277                    |
| <b>K</b> | .281                    |
| <b>L</b> | .290                    |
| <b>M</b> | .295                    |

| Letter   | Size of Drill in Inches |
|----------|-------------------------|
| <b>N</b> | .302                    |
| <b>O</b> | .316                    |
| <b>P</b> | .323                    |
| <b>Q</b> | .332                    |
| <b>R</b> | .339                    |
| <b>S</b> | .348                    |
| <b>T</b> | .358                    |
| <b>U</b> | .368                    |
| <b>V</b> | .377                    |
| <b>W</b> | .386                    |
| <b>X</b> | .397                    |
| <b>Y</b> | .404                    |
| <b>Z</b> | .413                    |

# REFERENCE TABLES

## Decimal Equivalents of Number Size Drills

| No. | Size of Drill in Inches | No. | Size of Drill in Inches | No. | Size of Drill in Inches | No. | Size of Drill in Inches |
|-----|-------------------------|-----|-------------------------|-----|-------------------------|-----|-------------------------|
| 1   | .2280                   | 21  | .1590                   | 41  | .0960                   | 61  | .0390                   |
| 2   | .2210                   | 22  | .1570                   | 42  | .0935                   | 62  | .0380                   |
| 3   | .2130                   | 23  | .1540                   | 43  | .0890                   | 63  | .0370                   |
| 4   | .2090                   | 24  | .1520                   | 44  | .0860                   | 64  | .0360                   |
| 5   | .2055                   | 25  | .1495                   | 45  | .0820                   | 65  | .0350                   |
| 6   | .2040                   | 26  | .1470                   | 46  | .0810                   | 66  | .0330                   |
| 7   | .2010                   | 27  | .1440                   | 47  | .0785                   | 67  | .0320                   |
| 8   | .1990                   | 28  | .1405                   | 48  | .0760                   | 68  | .0310                   |
| 9   | .1960                   | 29  | .1360                   | 49  | .0730                   | 69  | .0292                   |
| 10  | .1935                   | 30  | .1285                   | 50  | .0700                   | 70  | .0280                   |
| 11  | .1910                   | 31  | .1200                   | 51  | .0670                   | 71  | .0260                   |
| 12  | .1890                   | 32  | .1160                   | 52  | .0635                   | 72  | .0250                   |
| 13  | .1850                   | 33  | .1130                   | 53  | .0595                   | 73  | .0240                   |
| 14  | .1820                   | 34  | .1110                   | 54  | .0550                   | 74  | .0225                   |
| 15  | .1800                   | 35  | .1100                   | 55  | .0520                   | 75  | .0210                   |
| 16  | .1770                   | 36  | .1065                   | 56  | .0465                   | 76  | .0200                   |
| 17  | .1730                   | 37  | .1040                   | 57  | .0430                   | 77  | .0180                   |
| 18  | .1695                   | 38  | .1015                   | 58  | .0420                   | 78  | .0160                   |
| 19  | .1660                   | 39  | .0995                   | 59  | .0410                   | 79  | .0145                   |
| 20  | .1610                   | 40  | .0980                   | 60  | .0400                   | 80  | .0135                   |

## American Standard Pipe Thread and Tap Drill Sizes

| Pipe Size Inches | Threads Per Inch | Root Diameter Small End of Pipe and Gage | Tap Drill |              |
|------------------|------------------|--|-----------|--------------|
|                  |                  |  | Taper NPT | Straight NPS |
| 1/8              | 27               | .3339"                                   | Q         | 11/32"       |
| 1/4              | 18               | .4329"                                   | 7/16"     | 7/16"        |
| 3/8              | 18               | .5676"                                   | 9/16"     | 37/64"       |
| 1/2              | 14               | .7013"                                   | 45/64"    | 23/32"       |
| 3/4              | 14               | .9105"                                   | 29/32"    | 59/64"       |
| 1                | 11-1/2           | 1.1441"                                  | 1-9/64"   | 1-5/32"      |
| 1-1/4            | 11-1/2           | 1.4876"                                  | 1-31/64"  | 1-1/2"       |
| 1-1/2            | 11-1/2           | 1.7265"                                  | 1-47/64"  | 1-3/4"       |
| 2                | 11-1/2           | 2.1995"                                  | 2-13/64"  | 2-7/32"      |



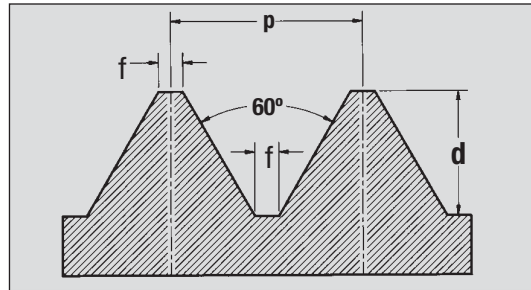
### American National and Unified Coarse and Fine Thread Dimensions and Tap Drill Sizes

$$p = \text{pitch} = \frac{1}{\text{No. thread per inch}}$$

$$d = \text{depth} = p \times .649519$$

$$f = \text{flat} = \frac{p}{8}$$

$$\text{pitch diameter} = D - \frac{.6495}{N}$$



| Size  | Threads per inch |        | Outside Diameter Inches | Pitch Diameter Inches | Root Diameter Inches | Tap Drill Approx. 75% Full Thread | Decimal Equiv. of Tap Drill |
|-------|------------------|--------|-------------------------|-----------------------|----------------------|-----------------------------------|-----------------------------|
|       | NC UNC           | NF UNF |                         |                       |                      |                                   |                             |
| 0     | —                | 80     | .0600                   | .0519                 | .0438                | 3/64"                             | .0469                       |
| 1     | 64               | —      | .0730                   | .0629                 | .0527                | 53                                | .0595                       |
| 1     | —                | 72     | .0730                   | .0640                 | .0550                | 53                                | .0595                       |
| 2     | 56               | —      | .0860                   | .0744                 | .0628                | 50                                | .0700                       |
| 2     | —                | 64     | .0860                   | .0759                 | .0657                | 50                                | .0700                       |
| 3     | 48               | —      | .0990                   | .0855                 | .0719                | 47                                | .0785                       |
| 3     | —                | 56     | .0990                   | .0874                 | .0758                | 46                                | .0810                       |
| 4     | 40               | —      | .1120                   | .0958                 | .0795                | 43                                | .0890                       |
| 4     | —                | 48     | .1120                   | .0985                 | .0849                | 42                                | .0935                       |
| 5     | 40               | —      | .1250                   | .1088                 | .0925                | 38                                | .1015                       |
| 5     | —                | 44     | .1250                   | .1102                 | .0955                | 37                                | .1040                       |
| 6     | 32               | —      | .1380                   | .1177                 | .0974                | 36                                | .1065                       |
| 6     | —                | 40     | .1380                   | .1218                 | .1055                | 33                                | .1130                       |
| 8     | 32               | —      | .1640                   | .1437                 | .1234                | 29                                | .1360                       |
| 8     | —                | 36     | .1640                   | .1460                 | .1279                | 29                                | .1360                       |
| 10    | 24               | —      | .1900                   | .1629                 | .1359                | 26                                | .1470                       |
| 10    | —                | 32     | .1900                   | .1697                 | .1494                | 21                                | .1590                       |
| 12    | 24               | —      | .2160                   | .1889                 | .1619                | 16                                | .1770                       |
| 12    | —                | 28     | .2160                   | .1928                 | .1696                | 15                                | .1800                       |
| 1/4"  | 20               | —      | .2500                   | .2175                 | .1850                | 7                                 | .2010                       |
| 1/4"  | —                | 28     | .2500                   | .2268                 | .2036                | 3                                 | .2130                       |
| 5/16" | 18               | —      | .3125                   | .2764                 | .2403                | F                                 | .2570                       |
| 5/16" | —                | 24     | .3125                   | .2854                 | .2584                | I                                 | .2720                       |
| 3/8"  | 16               | —      | .3750                   | .3344                 | .2938                | 5/16"                             | .3125                       |
| 3/8"  | —                | 24     | .3750                   | .3479                 | .3209                | Q                                 | .3320                       |
| 7/16" | 14               | —      | .4375                   | .3911                 | .3447                | U                                 | .3680                       |
| 7/16" | —                | 20     | .4375                   | .4050                 | .3726                | 25/64"                            | .3906                       |
| 1/2"  | 13               | —      | .5000                   | .4500                 | .4001                | 27/64"                            | .4219                       |
| 1/2"  | —                | 20     | .5000                   | .4675                 | .4351                | 29/64"                            | .4531                       |
| 9/16" | 12               | —      | .5625                   | .5084                 | .4542                | 31/64"                            | .4844                       |
| 9/16" | —                | 18     | .5625                   | .5264                 | .4903                | 33/64"                            | .5156                       |
| 5/8"  | 11               | —      | .6250                   | .5660                 | .5069                | 17/32"                            | .5312                       |
| 5/8"  | —                | 18     | .6250                   | .5889                 | .5528                | 37/64"                            | .5781                       |
| 3/4"  | 10               | —      | .7500                   | .6850                 | .6201                | 21/32"                            | .6562                       |
| 3/4"  | —                | 16     | .7500                   | .7094                 | .6688                | 11/16"                            | .6875                       |
| 7/8"  | 9                | —      | .8750                   | .8028                 | .7307                | 49/64"                            | .7656                       |
| 7/8"  | —                | 14     | .8750                   | .8286                 | .7822                | 13/16"                            | .8125                       |

(Continued on next page.)

**American National and Unified Coarse and Fine Thread Dimensions and Tap Drill Sizes (continued)**

| Size   | Threads per inch |        | Outside Diameter Inches | Pitch Diameter Inches | Root Diameter Inches | Tap Drill Approx. 75% Full Thread | Decimal Equiv. of Tap Drill |
|--------|------------------|--------|-------------------------|-----------------------|----------------------|-----------------------------------|-----------------------------|
|        | NC UNC           | NF UNF |                         |                       |                      |                                   |                             |
| 1"     | 8                | —      | 1.0000                  | .9188                 | .8376                | 7/8"                              | .8750                       |
| 1"     | —                | 12     | 1.0000                  | .9459                 | .8917                | 59/64"                            | .9219                       |
| 1-1/8" | 7                | —      | 1.1250                  | 1.0322                | .9394                | 63/64"                            | .9844                       |
| 1-1/8" | —                | 12     | 1.1250                  | 1.0709                | 1.0168               | 1-3/64"                           | 1.0469                      |
| 1-1/4" | 7                | —      | 1.2500                  | 1.1572                | 1.0644               | 1-7/64"                           | 1.1094                      |
| 1-1/4" | —                | 12     | 1.2500                  | 1.1959                | 1.1418               | 1-11/64"                          | 1.1719                      |
| 1-3/8" | 6                | —      | 1.3750                  | 1.2667                | 1.1585               | 1-7/32"                           | 1.2187                      |
| 1-3/8" | —                | 12     | 1.3750                  | 1.3209                | 1.2668               | 1-19/64"                          | 1.2969                      |
| 1-1/2" | 6                | —      | 1.5000                  | 1.3917                | 1.2835               | 1-11/32"                          | 1.3437                      |
| 1-1/2" | —                | 12     | 1.5000                  | 1.4459                | 1.3918               | 1-27/64"                          | 1.4219                      |
| 1-3/4" | 5                | —      | 1.7500                  | 1.6201                | 1.4902               | 1-9/16"                           | 1.5625                      |
| 2"     | 4-1/2            | —      | 2.0000                  | 1.8557                | 1.7113               | 1-25/32"                          | 1.7812                      |
| 2-1/4" | 4-1/2            | —      | 2.2500                  | 2.1057                | 1.9613               | 2-1/32"                           | 2.0313                      |
| 2-1/2" | 4-1/2            | —      | 2.5000                  | 2.3376                | 2.1752               | 2-1/4"                            | 2.2500                      |
| 2 3/4" | 4                | —      | 2.7500                  | 2.5876                | 2.4252               | 2-1/2"                            | 2.5000                      |
| 3"     | 4                | —      | 3.0000                  | 2.8376                | 2.6752               | 2-3/4"                            | 2.7500                      |
| 3-1/4" | 4                | —      | 3.2500                  | 3.0876                | 2.9252               | 3"                                | 3.0000                      |
| 3-1/2" | 4                | —      | 3.5000                  | 3.3376                | 3.1752               | 3-1/4"                            | 3.2500                      |
| 3-3/4" | 4                | —      | 3.7500                  | 3.5876                | 3.4252               | 3-1/2"                            | 3.5000                      |
| 4"     | 4                | —      | 4.0000                  | 3.3786                | 3.6752               | 3-3/4"                            | 3.7500                      |

**Millimeter Tap Drill Sizes**

| Metric Tap  | Tap Drill mm | Decimal Equiv. Inches | Metric Tap | Tap Drill mm | Decimal Equiv. Inches | Metric Tap | Tap Drill mm | Decimal Equiv. Inches | Metric Tap | Tap Drill mm | Decimal Equiv. Inches |
|-------------|--------------|-----------------------|------------|--------------|-----------------------|------------|--------------|-----------------------|------------|--------------|-----------------------|
| M1.6 x 0.35 | 1.25         | .0492                 | M6 x 1     | 5.00         | .1968                 | M16 x 2    | 14.00        | .5512                 | M27 x 3    | 24.00        | .9449                 |
| M1.8 x 0.35 | 1.45         | .0571                 | M7 x 1     | 6.00         | .2362                 | M16 x 1.5  | 14.50        | .5709                 | M27 x 2    | 25.00        | .9843                 |
| M2 x 0.4    | 1.60         | .0630                 | M8 x 1.25  | 6.70         | .2638                 | M18 x 2.5  | 15.50        | .6102                 | M30 x 3.5  | 26.50        | 1.0433                |
| M2.2 x 0.45 | 1.75         | .0689                 | M8 x 1     | 7.00         | .2756                 | M18 x 1.5  | 16.50        | .6496                 | M30 x 2    | 28.00        | 1.1024                |
| M2.5 x 0.45 | 2.05         | .0807                 | M10 x 1.5  | 8.50         | .3346                 | M20 x 2.5  | 17.50        | .6890                 | M33 x 3.5  | 29.50        | 1.1614                |
| M3 x 0.5    | 2.50         | .0984                 | M10 x 1.25 | 8.70         | .3425                 | M20 x 1.5  | 18.50        | .7283                 | M33 x 2    | 31.00        | 1.2205                |
| M3.5 x 0.6  | 2.90         | .1142                 | M12 x 1.75 | 10.20        | .4016                 | M22 x 2.5  | 19.50        | .7677                 | M36 x 4    | 32.00        | 1.2598                |
| M4 x 0.7    | 3.30         | .1299                 | M12 x 1.25 | 10.80        | .4252                 | M22 x 1.5  | 20.50        | .8071                 | M36 x 3    | 33.00        | 1.2992                |
| M4.5 x 0.75 | 3.70         | .1457                 | M14 x 2    | 12.00        | .4724                 | M24 x 3    | 21.00        | .8268                 | M39 x 4    | 35.00        | 1.3780                |
| M5 x 0.8    | 4.20         | .1654                 | M14 x 1.5  | 12.50        | .4921                 | M24 x 2    | 22.00        | .8661                 | M39 x 3    | 36.00        | 1.4173                |

**Tap Drill Sizes For Fractional Size Threads**  
**Approximately 65% Depth Thread / AMERICAN NATIONAL THREAD FORM**

| Tap Size | Threads per Inch | Hole Diameter | Drill |
|----------|------------------|---------------|-------|
| 1/16     | 72               | .049          | 3/64  |
| 1/16     | 64               | .047          | 3/64  |
| 1/16     | 60               | .046          | 56    |
| 5/64     | 72               | .065          | 52    |
| 5/64     | 64               | .063          | 1/16  |
| 5/64     | 60               | .062          | 1/16  |
| 5/64     | 56               | .061          | 53    |
| 3/32     | 60               | .077          | 5/64  |
| 3/32     | 56               | .076          | 48    |
| 3/32     | 50               | .074          | 49    |
| 3/32     | 48               | .073          | 49    |
| 7/64     | 56               | .092          | 42    |
| 7/64     | 50               | .090          | 43    |
| 7/64     | 48               | .089          | 43    |
| 1/8      | 48               | .105          | 36    |
| 1/8      | 40               | .101          | 38    |
| 1/8      | 36               | .098          | 40    |
| 1/8      | 32               | .095          | 3/32  |
| 9/64     | 40               | .116          | 32    |
| 9/64     | 36               | .114          | 33    |
| 9/64     | 32               | .110          | 35    |
| 5/32     | 40               | .132          | 30    |
| 5/32     | 36               | .129          | 30    |
| 5/32     | 32               | .126          | 1/8   |
| 11/64    | 36               | .145          | 27    |
| 11/64    | 32               | .141          | 9/64  |
| 3/16     | 36               | .161          | 20    |
| 3/16     | 32               | .157          | 22    |
| 3/16     | 30               | .155          | 23    |
| 3/16     | 24               | .147          | 26    |
| 13/64    | 32               | .173          | 17    |
| 13/64    | 30               | .171          | 11/64 |
| 13/64    | 24               | .163          | 20    |
| 7/32     | 32               | .188          | 12    |
| 7/32     | 28               | .184          | 13    |
| 7/32     | 24               | .178          | 16    |
| 15/64    | 32               | .204          | 6     |
| 15/64    | 28               | .200          | 8     |
| 15/64    | 24               | .194          | 10    |
| 1/4      | 32               | .220          | 7/32  |
| 1/4      | 28               | .215          | 3     |
| 1/4      | 27               | .214          | 3     |
| 1/4      | 24               | .209          | 4     |
| 1/4      | 20               | .201          | 7     |
| 5/16     | 32               | .282          | 9/32  |
| 5/16     | 27               | .276          | J     |
| 5/16     | 24               | .272          | I     |
| 5/16     | 20               | .264          | 17/64 |
| 5/16     | 18               | .258          | F     |
| 3/8      | 27               | .339          | R     |
| 3/8      | 24               | .334          | Q     |
| 3/8      | 20               | .326          | 21/64 |
| 3/8      | 16               | .314          | 5/16  |
| 7/16     | 27               | .401          | Y     |
| 7/16     | 24               | .397          | X     |
| 7/16     | 20               | .389          | 25/64 |
| 7/16     | 14               | .368          | U     |
| 1/2      | 27               | .464          | 15/32 |
| 1/2      | 24               | .460          | 29/64 |

| Tap Size | Threads per Inch | Hole Diameter | Drill   |
|----------|------------------|---------------|---------|
| 1/2      | 20               | .451          | 29/64   |
| 1/2      | 13               | .425          | 27/64   |
| 1/2      | 12               | .419          | 27/64   |
| 9/16     | 27               | .526          | 17/32   |
| 9/16     | 18               | .508          | 33/64   |
| 9/16     | 12               | .481          | 31/64   |
| 5/8      | 27               | .589          | 19/32   |
| 5/8      | 18               | .571          | 37/64   |
| 5/8      | 12               | .544          | 35/64   |
| 5/8      | 11               | .536          | 17/32   |
| 11/16    | 16               | .627          | 5/8     |
| 11/16    | 11               | .599          | 19/32   |
| 3/4      | 27               | .714          | 23/32   |
| 3/4      | 16               | .689          | 11/16   |
| 3/4      | 12               | .669          | 43/64   |
| 3/4      | 10               | .653          | 21/32   |
| 13/16    | 12               | .731          | 47/64   |
| 13/16    | 10               | .715          | 23/32   |
| 7/8      | 27               | .839          | 27/32   |
| 7/8      | 18               | .821          | 53/64   |
| 7/8      | 14               | .805          | 13/16   |
| 7/8      | 12               | .794          | 51/64   |
| 7/8      | 9                | .767          | 49/64   |
| 15/16    | 12               | .856          | 55/64   |
| 15/16    | 9                | .829          | 53/64   |
| 1        | 27               | .964          | 31/32   |
| 1        | 14               | .930          | 15/16   |
| 1        | 12               | .919          | 59/64   |
| 1        | 8                | .878          | 7/8     |
| 1-1/16   | 8                | .941          | 15/16   |
| 1-1/8    | 12               | 1.044         | 1-3/64  |
| 1-1/8    | 7                | .986          | 63/64   |
| 1-3/16   | 7                | 1.048         | 1-3/64  |
| 1-1/4    | 12               | 1.169         | 1-11/64 |
| 1-1/4    | 7                | 1.111         | 1-7/64  |
| 1-5/16   | 7                | 1.173         | 1-11/64 |
| 1-3/8    | 12               | 1.294         | 1-19/64 |
| 1-3/8    | 6                | 1.213         | 1-7/32  |
| 1-1/2    | 12               | 1.419         | 1-27/64 |
| 1-1/2    | 6                | 1.338         | 1-11/32 |
| 1-5/8    | 5 1/2            | 1.448         | 1-29/64 |
| 1-3/4    | 5                | 1.555         | 1-9/16  |
| 1-7/8    | 5                | 1.680         | 1-11/16 |
| 2        | 4 1/2            | 1.783         | 1-25/32 |
| 2-1/8    | 4 1/2            | 1.909         | 1-29/32 |
| 2-1/4    | 4 1/2            | 2.034         | 2-1/32  |
| 2-3/8    | 4                | 2.131         | 2-1/8   |
| 2-1/2    | 4                | 2.256         | 2-1/4   |
| 2-5/8    | 4                | 2.381         | 2-3/8   |
| 2-3/4    | 4                | 2.506         | 2-1/2   |
| 2-7/8    | 3 1/2            | 2.597         | 2-19/32 |
| 3        | 3 1/2            | 2.722         | 2-23/32 |
| 3-1/8    | 3 1/2            | 2.847         | 2-27/32 |
| 3-1/4    | 3 1/2            | 2.972         | 2-31/32 |
| 3-3/8    | 3 1/4            | 3.075         | 3-1/16  |
| 3-1/2    | 3 1/4            | 3.200         | 3-3/16  |
| 3-5/8    | 3 1/4            | 3.325         | 3-5/16  |
| 3-3/4    | 3                | 3.425         | 3-7/16  |
| 4        | 3                | 3.675         | 3-11/16 |



## REFERENCE TABLES

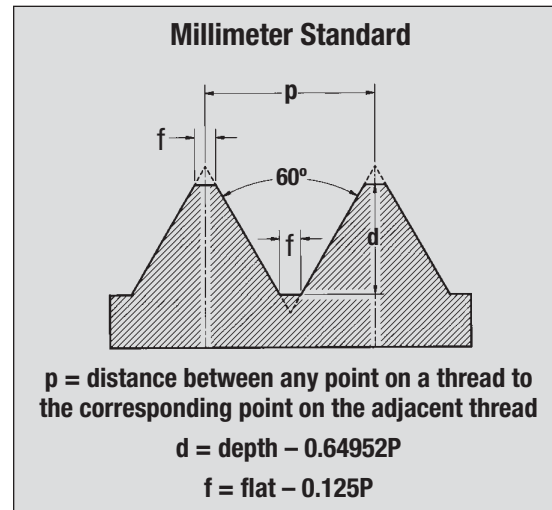
### Double Depth of Screw Threads

$$\text{D.D.} = \frac{1.732}{N} \text{ For V Thread}$$

$$\text{D.D.} = \frac{1.299}{N} \text{ For American Nat. Form, U.S. Std.}$$

$$\text{D.D.} = \frac{1.28}{N} \text{ For Whitworth Standard}$$

| Threads per Inch | V Threads | Am. Nat. Form U.S. Standard | Whitworth Standard |
|------------------|-----------|-----------------------------|--------------------|
| N                | D.D.      | D.D.                        | D.D.               |
| 2                | .86600    | .64950                      | .64000             |
| 3                | .57733    | .43300                      | .42666             |
| 4                | .43300    | .32475                      | .32000             |
| 10               | .17320    | .12990                      | .12800             |
| 13               | .13323    | .09992                      | .09846             |
| 18               | .09622    | .07216                      | .07111             |
| 20               | .08660    | .06495                      | .06400             |
| 22               | .07872    | .05904                      | .05818             |
| 24               | .07216    | .05412                      | .05333             |
| 26               | .06661    | .04996                      | .04923             |
| 27               | .06415    | .04811                      | .04740             |
| 28               | .06185    | .04639                      | .04571             |
| 30               | .05773    | .04330                      | .04266             |
| 32               | .05412    | .04059                      | .04000             |
| 34               | .05094    | .03820                      | .03764             |
| 36               | .04811    | .03608                      | .03555             |
| 38               | .04558    | .03418                      | .03368             |
| 40               | .04330    | .03247                      | .03200             |
| 56               | .03093    | .02319                      | .02285             |
| 60               | .02887    | .02165                      | .02133             |
| 80               | .02165    | .01623                      | .01600             |



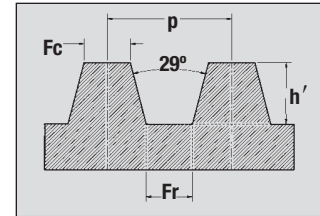
### ISO External Threads Medium Fit

| Designation | mm Diameter | mm Pitch |
|-------------|-------------|----------|
| M2 x 0.4    | 2           | 0.4      |
| M3 x 0.5    | 3           | 0.5      |
| M4 x 0.7    | 4           | 0.7      |
| M5 x 0.8    | 5           | 0.8      |
| M6 x 1      | 6           | 1.0      |
| M8 x 1.25   | 8           | 1.25     |
| M10 x 1.5   | 10          | 1.5      |
| M12 x 1.75  | 12          | 1.75     |
| M16 x 2     | 16          | 2.0      |
| M20 x 2.5   | 20          | 2.5      |
| M24 x 3     | 24          | 3.0      |
| M30 x 3.5   | 30          | 3.5      |

### American Standard Acme Screw Thread Dimensions

**h** = Basic depth of thread  
**h'** = Depth of thread with clearance  
**K** = Tap drill  
     Basic minor diameter of nut  
**Fc** = Width of flat at crest of thread  
**Fr** = Width of flat at bottom of space

**n** = Number of threads per inch  
**p** = Pitch of thread  
**Kr** = Minor diameter of screw  
**D** = Major diameter of screw  
**T** = Major diameter of tap



FOR 10 OR LESS THREADS PER INCH

$$h' = \frac{p}{2} \text{ plus } .010$$

$$Fr = \frac{.3707}{n} \text{ minus } .0052$$

$$T = D \text{ plus } .020$$

FOR MORE THAN 10 THREADS PER INCH

$$h' = \frac{p}{2} \text{ plus } .005$$

$$Fr = \frac{.3707}{n} \text{ minus } .0026$$

$$T = D \text{ plus } .010$$

$$p = \frac{1}{n} \quad Fc = \frac{.3707}{n}$$

$$K = D \text{ minus } p \quad Kr = D \text{ minus } 2h'$$

| Threads per inch (n) | Depth of Thread with Clearance (h') | Flat at Top of Thread (Fc) | Flat at Bottom of Space (Fr) | Space at Top of Thread | Thickness at Root of Thread |
|----------------------|-------------------------------------|----------------------------|------------------------------|------------------------|-----------------------------|
| 1                    | .5100                               | .3707                      | .3655                        | .6293                  | .6345                       |
| 1-1/3                | .3850                               | .2780                      | .2728                        | .4720                  | .4772                       |
| 2                    | .2600                               | .1854                      | .1802                        | .3146                  | .3198                       |
| 3                    | .1767                               | .1236                      | .1184                        | .2097                  | .2149                       |
| 4                    | .1350                               | .0927                      | .0875                        | .1573                  | .1625                       |
| 5                    | .1100                               | .0741                      | .0689                        | .1259                  | .1311                       |
| 6                    | .0933                               | .0618                      | .0566                        | .1049                  | .1101                       |
| 7                    | .0814                               | .0530                      | .0478                        | .0899                  | .0951                       |
| 8                    | .0725                               | .0463                      | .0411                        | .0787                  | .0839                       |
| 9                    | .0655                               | .0412                      | .0360                        | .0699                  | .0751                       |
| 10                   | .0600                               | .0371                      | .0319                        | .0629                  | .0681                       |
| 12                   | .0467                               | .0309                      | .0283                        | .0524                  | .0550                       |
| 14                   | .0407                               | .0265                      | .0239                        | .0449                  | .0475                       |
| 16                   | .0363                               | .0232                      | .0206                        | .0393                  | .0419                       |

### Tapers and Angles

| Taper per Foot | Included Angle |        |        | Angle With Center Line |        |        | Taper per inch | Taper per inch from Center Line |
|----------------|----------------|--------|--------|------------------------|--------|--------|----------------|---------------------------------|
|                | Degree         | Minute | Second | Degree                 | Minute | Second |                |                                 |
| 1/8"           | 0              | 35     | 49     | 0                      | 17     | 54     | .010417        | .005208                         |
| 1/4"           | 1              | 11     | 37     | 0                      | 35     | 49     | .020833        | .010417                         |
| 3/8"           | 1              | 47     | 25     | 0                      | 53     | 43     | .031250        | .015625                         |
| 1/2"           | 2              | 23     | 13     | 1                      | 11     | 37     | .041667        | .020833                         |
| 5/8"           | 2              | 59     | 1      | 1                      | 29     | 30     | .052083        | .026042                         |
| 3/4"           | 3              | 34     | 47     | 1                      | 47     | 24     | .062500        | .031250                         |
| 7/8"           | 4              | 10     | 33     | 2                      | 5      | 17     | .072917        | .036458                         |
| 1"             | 4              | 46     | 19     | 2                      | 23     | 9      | .083333        | .041667                         |
| 1-1/4"         | 5              | 57     | 47     | 2                      | 58     | 53     | .104167        | .052084                         |
| 1-1/2"         | 7              | 9      | 10     | 3                      | 34     | 35     | .125000        | .062500                         |
| 1-3/4"         | 8              | 20     | 27     | 4                      | 10     | 14     | .145833        | .072917                         |
| 2"             | 9              | 31     | 38     | 4                      | 45     | 49     | .166667        | .083333                         |
| 2-1/2"         | 11             | 53     | 37     | 5                      | 56     | 49     | .208333        | .104167                         |
| 3"             | 14             | 2      | 0      | 7                      | 1      | 30     | .250000        | .125000                         |
| 3-1/2"         | 16             | 35     | 39     | 8                      | 17     | 50     | .291667        | .145833                         |
| 4"             | 18             | 55     | 29     | 9                      | 27     | 44     | .333333        | .166667                         |
| 4-1/2"         | 21             | 14     | 22     | 10                     | 37     | 11     | .375000        | .187500                         |
| 5"             | 23             | 32     | 12     | 11                     | 46     | 6      | .416667        | .208333                         |
| 6"             | 28             | 4      | 21     | 14                     | 2      | 10     | .500000        | .250000                         |

# REFERENCE TABLES

## Pitch Diameter Tables – American National Thread Form For Nos. 575 and 585 Screw Thread Micrometers

### Number Sizes

$$\text{Caliper Reading or Pitch Diameter} = D - \frac{.6495}{N}$$

| No. | Basic and Max. Outside Diameter | Threads Per Inch | Caliper Reading or Max. Pitch Diameter | Single Depth of Thread |
|-----|---------------------------------|------------------|--|------------------------|
|     | D                               | N                | $D - \frac{.6495}{N}$                  | $\frac{.6495}{N}$      |
| 0   | .060                            | 80               | .0519                                  | .0081                  |
| 1   | .073                            | 72               | .0640                                  | .0090                  |
| 2   | .086                            | 64               | .0759                                  | .0101                  |
| 3   | .099                            | 56               | .0874                                  | .0116                  |
| 4   | .112                            | 48               | .0985                                  | .0135                  |
| 5   | .125                            | 44               | .1102                                  | .0148                  |
| 6   | .138                            | 40               | .1218                                  | .0162                  |
| 7   | .151                            | 36               | .1330                                  | .0180                  |
| 8   | .164                            | 36               | .1460                                  | .0180                  |
| 9   | .177                            | 32               | .1567                                  | .0203                  |
| 10  | .190                            | 30               | .1684                                  | .0217                  |
| 12  | .216                            | 28               | .1928                                  | .0232                  |
| 14  | .242                            | 24               | .2149                                  | .0271                  |
| 16  | .268                            | 22               | .2385                                  | .0295                  |
| 18  | .294                            | 20               | .2615                                  | .0325                  |
| 20  | .320                            | 20               | .2875                                  | .0325                  |
| 22  | .346                            | 18               | .3099                                  | .0361                  |
| 24  | .372                            | 16               | .3314                                  | .0406                  |
| 26  | .398                            | 16               | .3574                                  | .0406                  |
| 28  | .424                            | 14               | .3776                                  | .0464                  |
| 30  | .450                            | 14               | .4036                                  | .0464                  |

### Fractional Sizes

$$\text{Caliper Reading or Pitch Diameter} = D - \frac{.6495}{N}$$

| Diameter Inches  | Threads per Inch | Caliper Reading of Pitch Diameter | Single Depth of Thread |
|--|------------------|-----------------------------------|------------------------|
|  | N                | $D - \frac{.6495}{N}$             | $\frac{.6495}{N}$      |
| <b>Note:</b> As there is no standard of diameter for the finer pitches, this column is left blank. | 64               | —                                 | .0101                  |
|  | 62               | —                                 | .0105                  |
|  | 60               | —                                 | .0108                  |
|  | 58               | —                                 | .0112                  |
|  | 56               | —                                 | .0116                  |
|  | 54               | —                                 | .0120                  |
|  | 52               | —                                 | .0125                  |
|  | 50               | —                                 | .0130                  |
|  | 48               | —                                 | .0135                  |
|  | 46               | —                                 | .0141                  |
|  | 44               | —                                 | .0148                  |
|  | 42               | —                                 | .0155                  |
|  | 40               | —                                 | .0162                  |
|  | 38               | —                                 | .0171                  |
|  | 36               | —                                 | .0180                  |
|  | 34               | —                                 | .0191                  |
|  | 32               | —                                 | .0203                  |
|  | 30               | —                                 | .0217                  |
|  | 28               | —                                 | .0232                  |
|  | 26               | —                                 | .0250                  |
|  | 24               | —                                 | .0271                  |
|  | 22               | —                                 | .0295                  |
| 1/4  | 20               | .2175                             | .0325                  |
| 5/16   | 18               | .2764                             | .0361                  |
| 3/8  | 16               | .3344                             | .0406                  |
| 7/16   | 14               | .3911                             | .0464                  |
| 1/2  | 13               | .4501                             | .0499                  |
| 9/16   | 12               | .5084                             | .0541                  |
| 5/8  | 11               | .5660                             | .0590                  |
| 3/4  | 10               | .6851                             | .0649                  |
| 7/8  | 9                | .8029                             | .0721                  |
| 1  | 8                | .9188                             | .0812                  |
| 1-1/8  | 7                | 1.0322                            | .0928                  |
| 1-1/4  | 7                | 1.1572                            | .0928                  |
| 1-3/8  | 6                | 1.2668                            | .1082                  |
| 1-1/2  | 6                | 1.3918                            | .1082                  |
| 1-5/8  | 5-1/2            | 1.5070                            | .1180                  |
| 1-3/4  | 5                | 1.6201                            | .1299                  |
| 1-7/8  | 5                | 1.7451                            | .1299                  |
| 2  | 4-1/2            | 1.8557                            | .1443                  |
| 2-1/2  | 4                | 2.3376                            | .1624                  |
| 3  | 3-1/2            | 2.8145                            | .1855                  |
| 3-1/2  | 3-1/4            | 3.3002                            | .1998                  |
| 4  | 3                | 3.7835                            | .2165                  |

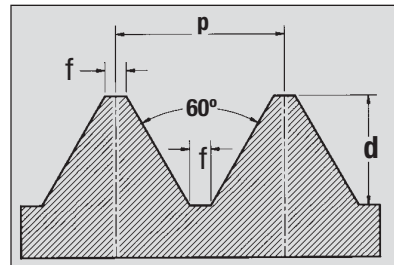


### Pitch Diameter Tables For Nos. 575 and 585 Screw Thread Micrometers

#### Whitworth Standard

Caliper Reading or Pitch Diameter for Whitworth Threads =  $D - \frac{.640}{N}$

| Diameter Inches | Threads per Inch | Caliper Reading or Pitch Diameter | Single Depth of Thread |
|-----------------|------------------|-----------------------------------|------------------------|
| D               | N                | $D - \frac{.640}{N}$              | $\frac{.640}{N}$       |
| —               | 48               | —                                 | .0133                  |
| —               | 46               | —                                 | .0139                  |
| —               | 44               | —                                 | .0146                  |
| —               | 42               | —                                 | .0152                  |
| —               | 40               | —                                 | .0160                  |
| —               | 38               | —                                 | .0168                  |
| —               | 36               | —                                 | .0178                  |
| —               | 34               | —                                 | .0188                  |
| —               | 32               | —                                 | .0200                  |
| —               | 30               | —                                 | .0213                  |
| —               | 28               | —                                 | .0229                  |
| —               | 26               | —                                 | .0246                  |
| —               | 24               | —                                 | .0267                  |
| —               | 22               | —                                 | .0291                  |
| 1/4             | 20               | .2180                             | .0320                  |
| 5/16            | 18               | .2769                             | .0355                  |
| 3/8             | 16               | .3350                             | .0400                  |
| 7/16            | 14               | .3918                             | .0457                  |
| 1/2             | 12               | .4467                             | .0533                  |
| 9/16            | 12               | .5092                             | .0533                  |
| 5/8             | 11               | .5668                             | .0582                  |
| 11/16           | 11               | .6293                             | .0582                  |
| 3/4             | 10               | .6860                             | .0640                  |
| 13/16           | 10               | .7485                             | .0640                  |
| 7/8             | 9                | .8039                             | .0711                  |
| 15/16           | 9                | .8664                             | .0711                  |
| 1               | 8                | .9200                             | .0800                  |
| 1-1/8           | 7                | 1.0336                            | .0914                  |
| 1-1/4           | 7                | 1.1586                            | .0914                  |
| 1-3/8           | 6                | 1.2684                            | .1066                  |
| 1-1/2           | 6                | 1.3934                            | .1066                  |
| 1-5/8           | 5                | 1.4970                            | .1280                  |
| 1-3/4           | 5                | 1.6220                            | .1280                  |
| 1-7/8           | 4-1/2            | 1.7328                            | .1422                  |
| 2               | 4-1/2            | 1.8578                            | .1422                  |
| 2-1/8           | 4-1/2            | 1.9828                            | .1422                  |



Metric Standard

$p = \text{pitch} = \frac{1}{\text{No. thread per inch}}$

$d = \text{depth} = p \times .6495$

$f = \text{flat} = \frac{\text{pitch}}{8}$

| Size Mm | Pitch      |             |
|---------|------------|-------------|
|         | Intl. Std. | French Std. |
| 2       | .45        | .50         |
| 3       | .55        | .50         |
| 4       | .70        | .75         |
| 5       | .85        | .75         |
| 6       | 1.00       | 1.00        |
| 7       | 1.00       | 1.00        |
| 8       | 1.25       | 1.00        |
| 9       | 1.25       | 1.00        |
| 10      | 1.50       | 1.50        |
| 11      | 1.50       | —           |
| 12      | 1.75       | 1.50        |
| 14      | 2.00       | 2.00        |
| 16      | 2.00       | 2.00        |
| 18      | 2.50       | 2.50        |
| 20      | 2.50       | 2.50        |
| 22      | 2.50       | 2.50        |
| 24      | 3.00       | 3.00        |
| 26      | —          | 3.00        |
| 27      | 3.00       | —           |
| 28      | —          | 3.00        |
| 30      | 3.50       | 3.50        |
| 32      | —          | 3.50        |
| 33      | 3.50       | 3.50        |
| 34      | —          | 3.50        |
| 36      | 4.00       | 4.00        |
| 38      | —          | 4.00        |
| 39      | 4.00       | —           |
| 40      | —          | 4.00        |

# REFERENCE TABLES

## Pitch Diameter Table

For Nos. 575 and 585 Screw Thread Micrometers "V" Standard Thread Form

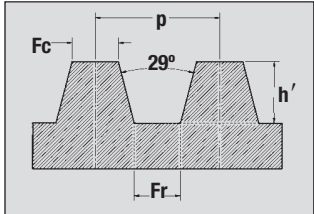
$$\text{Caliper Reading or Pitch Diameter for "V" Threads} = D - \frac{.866}{N}$$

| Diameter Inches   | Threads per Inch | Caliper Reading or Pitch Diameter | Single Depth of Thread | Diameter Inches* | Threads per Inch | Caliper Reading or Pitch Diameter | Single Depth of Thread |
|---|------------------|-----------------------------------|------------------------|------------------|------------------|-----------------------------------|------------------------|
| D   | N                | $D - \frac{.866}{N}$              | $\frac{.866}{N}$       | D                | N                | $D - \frac{.866}{N}$              | $\frac{.866}{N}$       |
| Note: As there is no standard of diameter for the finer pitches, this column is left blank. | 64               | —                                 | .0135                  | 1/4              | 24               | .2139                             | .0361                  |
|   | 62               | —                                 | .0140                  | 1/4              | 20               | .2067                             | .0433                  |
|   | 60               | —                                 | .0144                  | 5/16             | 20               | .2692                             | .0433                  |
|   | 58               | —                                 | .0149                  | 5/16             | 18               | .2644                             | .0481                  |
|   | 56               | —                                 | .0155                  | 3/8              | 18               | .3269                             | .0481                  |
|   | 54               | —                                 | .0161                  | 3/8              | 16               | .3209                             | .0541                  |
|   | 52               | —                                 | .0167                  | 7/16             | 16               | .3834                             | .0541                  |
|   | 50               | —                                 | .0173                  | 7/16             | 14               | .3756                             | .0619                  |
|   | 48               | —                                 | .0180                  | 1/2              | 14               | .4381                             | .0619                  |
|   | 46               | —                                 | .0188                  | 1/2              | 13               | .4334                             | .0666                  |
|   | 44               | —                                 | .0197                  | 1/2              | 12               | .4278                             | .0722                  |
|   | 42               | —                                 | .0206                  | 9/16             | 14               | .5006                             | .0619                  |
|   | 40               | —                                 | .0217                  | 9/16             | 12               | .4903                             | .0722                  |
|   | 38               | —                                 | .0228                  | 5/8              | 11               | .5463                             | .0787                  |
|   | 36               | —                                 | .0241                  | 5/8              | 10               | .5384                             | .0866                  |
|   | 34               | —                                 | .0255                  | 11/16            | 10               | .6009                             | .0866                  |
|   | 32               | —                                 | .0271                  | 3/4              | 10               | .6634                             | .0866                  |
|   | 30               | —                                 | .0289                  | 7/8              | 9                | .7788                             | .0962                  |
|   | 28               | —                                 | .0309                  | 1                | 8                | .8918                             | .1082                  |
|   | 26               | —                                 | .0333                  | 1-1/8            | 8                | 1.0168                            | .1082                  |
| —   | —                | —                                 | —                      | 1-1/4            | 7                | 1.1263                            | .1237                  |
| —   | —                | —                                 | —                      | 1-1/2            | 6                | 1.3557                            | .1443                  |

\* These figures give the outside diameter for screws with threads cut theoretically sharp. As it is not practical to make these threads sharp, the outside diameter will measure less than the figures given, the pitch diameter remaining the same.

## American Standard Acme Screw Thread Dimensions

- h** = Basic depth of thread
- h'** = Depth of thread with clearance
- K** = Tap drill
- Basic minor diameter of nut
- Fc** = Width of flat at crest of thread
- Fr** = Width of flat at bottom of space
- n** = Number of threads per inch
- p** = Pitch of thread
- Kr** = Minor diameter of screw
- D** = Major diameter of screw
- T** = Major diameter of tap



### FOR 10 OR LESS THREADS PER INCH

$$h' = \frac{p}{2} \text{ plus } .010$$

$$Fr = \frac{.3707}{n} \text{ minus } .0052$$

$$T = D \text{ plus } .020$$

### FOR MORE THAN 10 THREADS PER INCH

$$h' = \frac{p}{2} \text{ plus } .005$$

$$Fr = \frac{.3707}{n} \text{ minus } .0026$$

$$T = D \text{ plus } .010$$

$$p = \frac{1}{n}$$

$$Fc = \frac{.3707}{n}$$

$$K = D \text{ minus } p$$

$$Kr = D \text{ minus } 2h'$$

| Threads per inch (n) | Depth of Thread with Clearance (h') | Flat at Top of Thread (Fc) | Flat at Bottom of Space (Fr) | Space at Top of Thread | Thickness at Root of Thread |
|----------------------|-------------------------------------|----------------------------|------------------------------|------------------------|-----------------------------|
| 1                    | .5100                               | .3707                      | .3655                        | .6293                  | .6345                       |
| 1-1/3                | .3850                               | .2780                      | .2728                        | .4720                  | .4772                       |
| 2                    | .2600                               | .1854                      | .1802                        | .3146                  | .3198                       |
| 3                    | .1767                               | .1236                      | .1184                        | .2097                  | .2149                       |
| 4                    | .1350                               | .0927                      | .0875                        | .1573                  | .1625                       |
| 5                    | .1100                               | .0741                      | .0689                        | .1259                  | .1311                       |
| 6                    | .0933                               | .0618                      | .0566                        | .1049                  | .1101                       |
| 7                    | .0814                               | .0530                      | .0478                        | .0899                  | .0951                       |
| 8                    | .0725                               | .0463                      | .0411                        | .0787                  | .0839                       |
| 9                    | .0655                               | .0412                      | .0360                        | .0699                  | .0751                       |
| 10                   | .0600                               | .0371                      | .0319                        | .0629                  | .0681                       |
| 12                   | .0467                               | .0309                      | .0283                        | .0524                  | .0550                       |
| 14                   | .0407                               | .0265                      | .0239                        | .0449                  | .0475                       |
| 16                   | .0363                               | .0232                      | .0206                        | .0393                  | .0419                       |

### Temperature Conversion

Using this table to convert Fahrenheit degrees (F°) directly to Celsius degrees (C°) and vice versa. It covers the range of temperatures used in most hardening, tempering and annealing operations.

Lower, higher and intermediate conversions can be made by substituting a known Fahrenheit (F°) or Celsius (C°) temperature figure in either of the following formulas.

$$F^{\circ} = \frac{C^{\circ} \times 9}{5} + 32$$

$$C^{\circ} = \frac{F^{\circ} - 32}{9} \times 5$$

| F°   | C°   |
|------|------|
| -160 | -107 |
| -140 | -96  |
| -120 | -84  |
| -100 | -73  |
| -80  | -62  |
| -60  | -51  |
| -40  | -40  |

| F°  | C°  |
|-----|-----|
| -20 | -29 |
| 0   | -18 |
| 20  | -7  |
| 32  | 0   |
| 40  | 4   |
| 60  | 16  |
| 80  | 27  |

| F°  | C°  |
|-----|-----|
| 100 | 38  |
| 120 | 49  |
| 140 | 60  |
| 160 | 71  |
| 180 | 82  |
| 200 | 93  |
| 212 | 100 |

| F°  | C°  |
|-----|-----|
| 220 | 104 |
| 300 | 149 |
| 400 | 204 |
| 500 | 260 |
| 600 | 316 |
| 700 | 371 |
| 800 | 427 |

| F°   | C°   |
|------|------|
| 1000 | 538  |
| 1200 | 649  |
| 1400 | 760  |
| 1600 | 871  |
| 1800 | 982  |
| 2000 | 1093 |
| 2200 | 1204 |

### High Temperatures Judged by Color and Colors for Tempering

| Degrees Centigrade | Degrees Fahrenheit | High Temperatures Judged by Color |
|--------------------|--------------------|-----------------------------------|
| 400                | 752                | Red heat, visible in the dark     |
| 525                | 975                | Red heat, visible in daylight     |
| 700                | 1292               | Dark red                          |
| 900                | 1652               | Cherry-red                        |
| 1100               | 2012               | Orange-red                        |
| 1300               | 2372               | Yellow-white                      |
| 1500               | 2732               | Brilliant white                   |

| Degrees Centigrade | Degrees Fahrenheit | Colors for Tempering |
|--------------------|--------------------|----------------------|
| 221.1              | 430                | Very pale yellow     |
| 237.8              | 460                | Straw-yellow         |
| 254.4              | 490                | Yellow-brown         |
| 260.0              | 500                | Brown-yellow         |
| 271.1              | 520                | Brown-purple         |
| 282.2              | 540                | Full purple          |
| 293.3              | 560                | Full blue            |

### Rules Relative to the Circle

#### To Find Circumference

- Multiply diameter by 3.1416
- Or divide diameter by 0.3183

#### To Find Diameter

- Multiply circumference by 0.3183
- Or divide circumference by 3.1416

#### To Find Radius

- Multiply circumference by 0.15915
- Or divide circumference by 6.28318

#### To Find Side of an Inscribed Square

- Multiply diameter by 0.7071
- Or multiply circumference by 0.2251
- Or divide circumference by 4.4428

#### To Find Side of an Equal Square

- Multiply diameter by 0.8862
- Or divide diameter by 1.1284
- Or multiply circumference by 0.2821
- Or divide circumference by 3.545

#### Square

- A side multiplied by 1.4142 equals diameter of its circumscribing circle
- A side multiplied by 4.443 equals circumference of its circumscribing circle
- A side multiplied by 1.128 equals diameter of an equal side
- A side multiplied by 3.547 equals circumference of an equal circle

#### To Find the Area of a Circle

- Multiply circumference by one-quarter of the diameter
- Or multiply the square of diameter by 0.7854
- Or multiply the square of circumference by .07958
- Or multiply the square of 1/2 diameter by 3.1416

#### To Find the Surface of a Sphere or Globe

- Multiply the diameter by the circumference
- Or multiply the square of a diameter by 3.1416
- Or multiply four times the square of radius by 3.1416



**Triangle Chart**

For the Rapid Solution of Right-Angle and Oblique-Angle Triangles

|  |  |  |  |
|--|--|--|--|
| <br>$C = \sqrt{A^2 - B^2}$                             | <br>$\sin D = \frac{B}{A}$                                 | <br>$E = 90^\circ - D$                   | <br>$B = \sqrt{A^2 - C^2}$                                 |
| <br>$\sin E = \frac{C}{A}$                             | <br>$D = 90^\circ - E$                                     | <br>$A = \sqrt{B^2 + C^2}$               | <br>$\tan D = \frac{B}{C}$                                 |
| <br>$B = A \times \sin D$                              | <br>$C = A \times \cos D$                                  | <br>$B = A \times \cos E$                | <br>$C = A \times \sin E$                                  |
| <br>$A = \frac{B}{\sin D}$                             | <br>$C = B \times \cot D$                                  | <br>$A = \frac{B}{\cos E}$               | <br>$C = B \times \tan E$                                  |
| <br>$A = \frac{C}{\cos D}$                             | <br>$B = C \times \tan D$                                  | <br>$A = \frac{C}{\sin E}$               | <br>$B = C \times \cot E$                                  |
| <br>$B = \frac{A \times \sin F}{\sin D}$               | <br>$E = 180^\circ - (D + F)$                              | <br>$C = \frac{A \times \sin E}{\sin D}$ | <br>$\tan D = \frac{A \times \sin E}{B - A \times \cos E}$ |
| <br>$F = 180^\circ - (D + E)$                          | <br>$\sin E = \frac{C \times \sin D}{A}$                   | <br>$\sin F = \frac{B \times \sin D}{A}$ | <br>$A = \frac{C \times \sin D}{\sin E}$                   |
| <br>$\text{Area} = \frac{A \times B \times \sin E}{2}$ | <br>$\cos D = \frac{B^2 + C^2 - A^2}{2 \times B \times C}$ | <br>$A = \frac{B \times \sin D}{\sin F}$ | <br>$\cot E = \frac{A \times \csc F}{C} - \cot F$          |

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| <b>KAV1096</b>      | Mechanics' Quickshot® Arbored Hole Saw Kit . . . . .   | .604      | <b>1719</b>         | Video, Combination Set . . . . .                    | .648      |
| <b>KAV1097</b>      | Maintenance Quickshot® Arbored Hole Saw Kit . . . . .  | .605      | <b>1722</b>         | Video, Combination Square . . . . .                 | .648      |
| <b>KCT1098</b>      | Maintenance Carbide Tipped Hole Saw Kit . . . . .      | .605      | <b>1725</b>         | Video, Bevel Protractor . . . . .                   | .648      |
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