BRUBAKER™

Tap Catalog 2016

High Performance Platinum
High Performance Gold
Standard Taps

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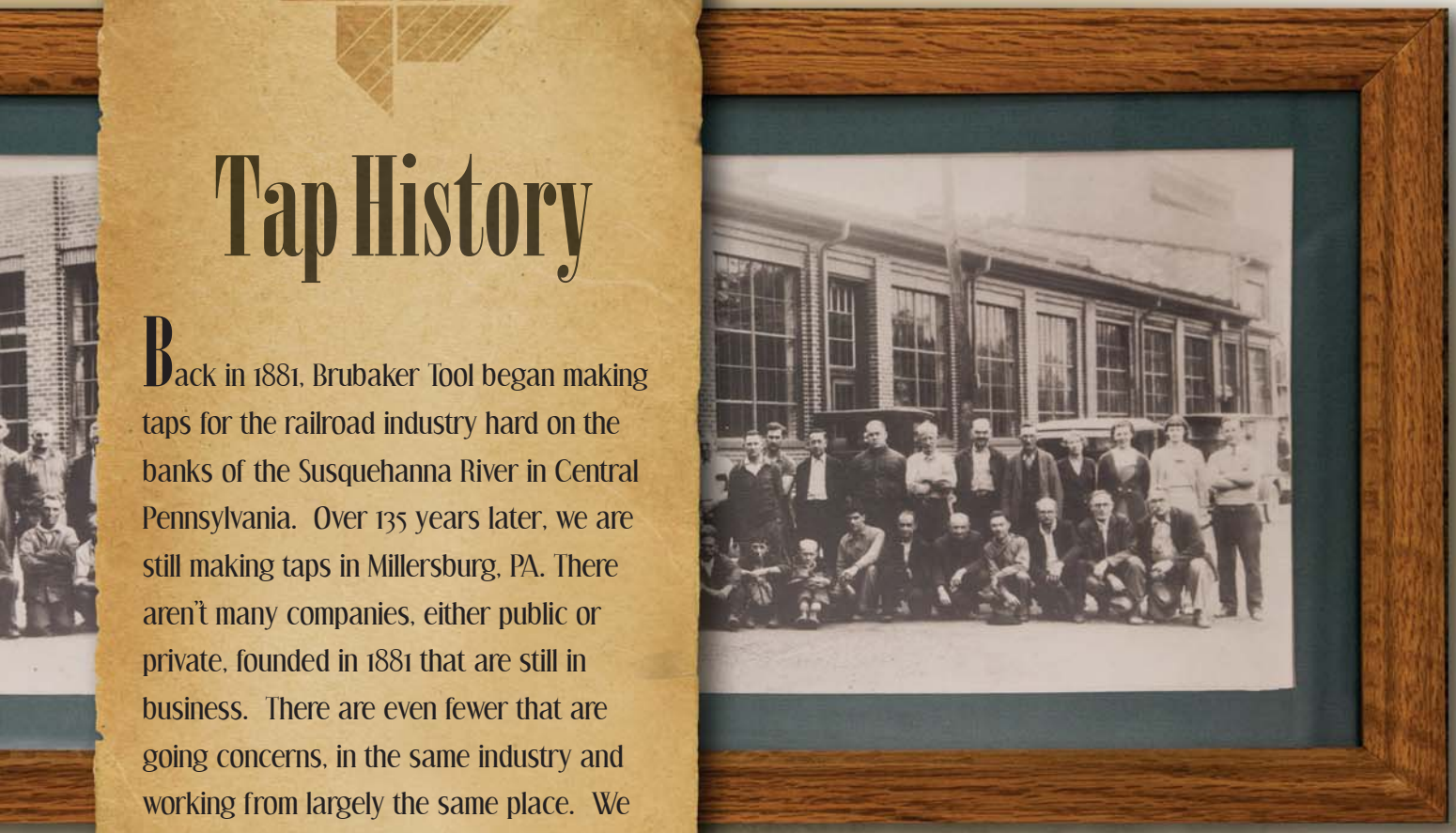
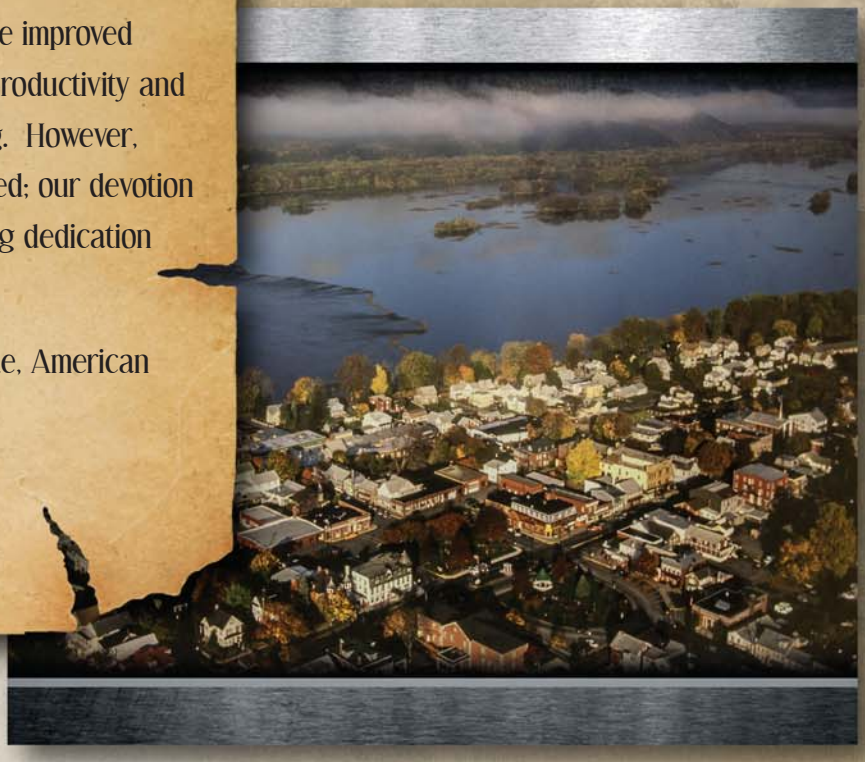
Tap History



Back in 1881, Brubaker Tool began making taps for the railroad industry hard on the banks of the Susquehanna River in Central Pennsylvania. Over 135 years later, we are still making taps in Millersburg, PA. There aren't many companies, either public or private, founded in 1881 that are still in business. There are even fewer that are going concerns, in the same industry and working from largely the same place. We are committed to building upon this storied foundation. Manufacturing technologies have changed, materials have improved and customer demands for productivity and quality are always increasing. However, some things have not changed; our devotion to quality and our unwavering dedication to American manufacturing.

Brubaker . . . American made, American owned since 1881.



Welcome to Our NEW and Updated Tap Catalog.

Welcome to our new, updated and expanded Brubaker Tap Catalog. For the first time we are providing our entire tap line in one consolidated volume. It has been ten years now since the debut of our Gold Series High Performance Tap offering. In the interim we have added to the Gold Series line and also introduced our Platinum Series High Performance Taps. Our Platinum Series is intended for your toughest threading applications in titanium based, nickel based and other high temp alloys.

Traditionally we have published our Standard Tap offering, Gold Series and Platinum Series in separate catalogs. For ease of use and also to provide visibility on the depth and breadth of our full product line, we are consolidating these separate catalogs into one central source.

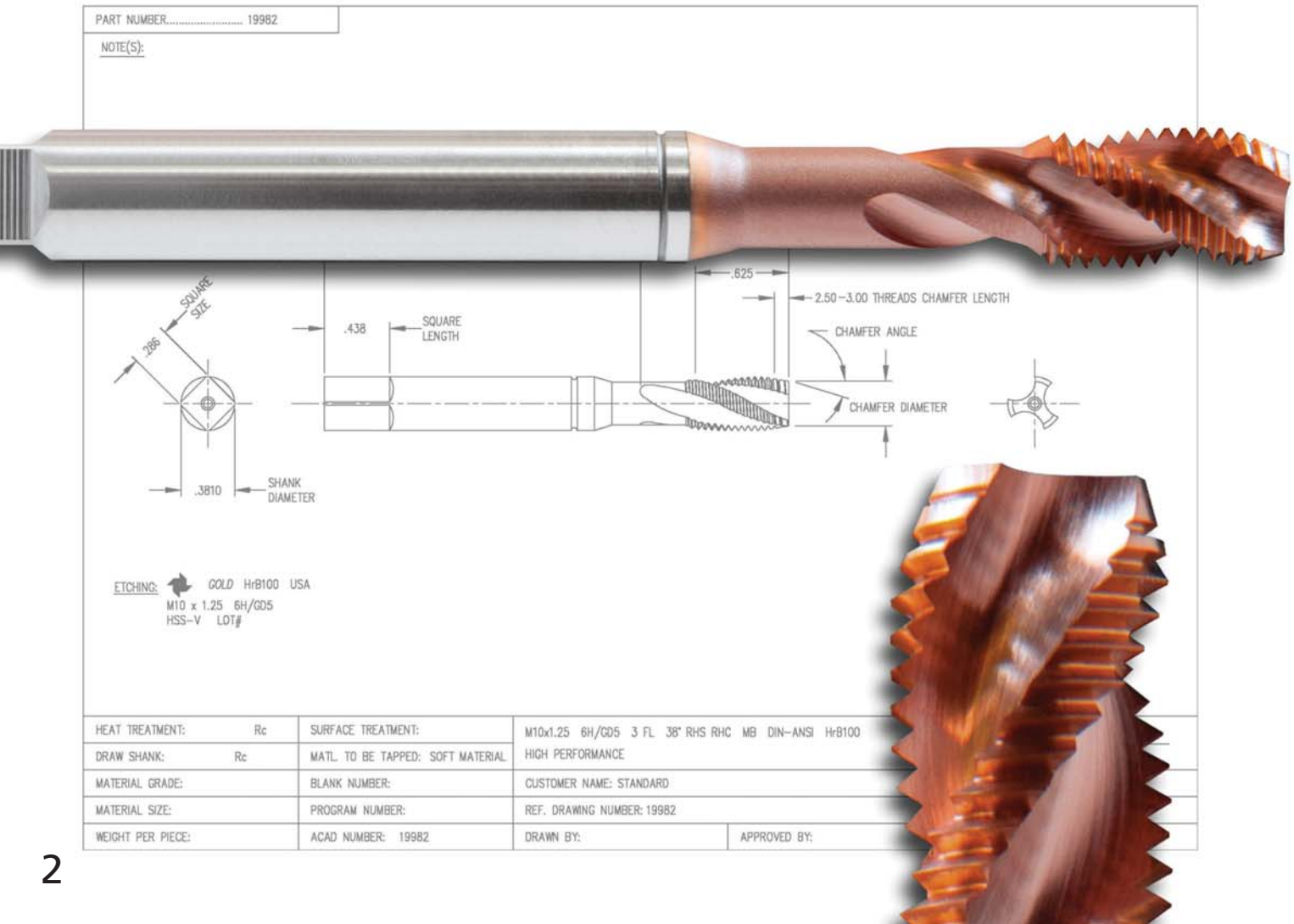
We hope that you can find the right tap for your threading application within these pages. While we believe that this is a very complete catalog, we recognize the need, at times, for more specialized geometries, substrates and coatings. As always we are happy to work with our distribution and end-user customers to develop special taps to meet your performance requirements. Our commitment to application specific solutions is proven out by the fact that over half of our tap business is in production specials.

Whether it is a standard tap, an off-the shelf high performance tap, or a full made special, we stand ready, able and eager to provide the finest threading products in the industry, backed by best-in-class field and factory technical support. We welcome the opportunity to show you why our customers have kept going for over 135 years. As always we appreciate your business.

How the Catalog is Organized

This catalog is organized by tap series. The front part of the catalog is our material specific high performance tap offering. Following the high performance section is our standard HSS tap line. Technical information is in the back of the catalog.

Table of Contents

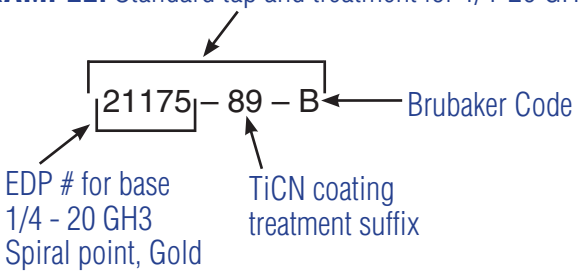


Tap Product Numbering System

To simplify our product numbering system, we are using an EDP number, a suffix to identify the coating or surface treatment followed by a brand code. In all cases, the five digit EDP number will refer to the base part number. The coating is specified by the two (2) digit suffix following the EDP number. Our standard surface treatment recommendation is indicated following the individual EDP number on the catalog page. An optional coating/surface treatment may be specified at the time of order. The brand code following the treatment suffix and should always be "B" indicating Brubaker.

For all Gold Series and Platinum Series taps, we strongly recommend a surface treatment or coating.

EXAMPLE: Standard tap and treatment for 1/4-20 GH3 Spiral Point, Gold Series:



If you want a treatment other than the standard for this series...

21175-89	1) Begin with the standard offering
21175	2) Drop the standard suffix for the series
-88	3) Consult the table for the desired suffix, in this case Titanium Nitride (TiN) 88 instead of the TiCN coating 89
21175-88	4) Add the desired treatment suffix in place of the series standard treatment suffix
21175-88-B	5) Add the "B" for the Brubaker brand

Surface Treatments and Coatings

TREATMENT	ABBREVIATION	SUFFIX	COLOR CODE
Nitride	N	02	
Steam Oxide	SOX	03	
Nitride Steam Oxide	NiSOX	23	
HrB100	TC[59]	59	
Titanium Nitride	TiN	88	
Titanium Carbonitride	TiCN	89	
Chromium Carbide	CrC	90	
Chromium Nitride	CrN	82	

*Bright Taps (00) are only available for series where indicated in the table at the top right hand corner of the series page.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High Performance Tap Index

Gold Series, Spiral Point
HrB100 DIN/ANSI

Our HrB100 Series features unique geometry engineered for outstanding results in softer materials. This new design will eliminate oversize conditions while the spiral point pushes the chip ahead of the cutting threads in through hole applications.

List 300, Inch

Size	NC	NF	2B Limit	No. of Flutes	OAL (mm)	2B Part No.	Hole Size – Inch/(Metric) 65%Thread		75% Thread	
4	40		2B/GH2	2	56	19924-59-B	0.0909	(2.31)	0.0876	(2.23)
6	32		2B/GH3	2	56	19925-59-B	0.1116	(2.83)	0.1076	(2.73)
8	32		2B/GH3	3	63	19926-59-B	0.1376	(3.50)	0.1336	(3.39)
10	24		2B/GH3	3	70	19927-59-B	0.1548	(3.93)	0.1494	(3.79)
10		32	2B/GH3	3	70	19928-59-B	0.1636	(4.16)	0.1596	(4.05)
1/4	20		2B/GH5	3	80	19930-59-B	0.2078	(5.30)	0.2013	(5.10)
1/4		28	2B/GH3	3	80	19931-59-B	0.2198	(5.60)	0.2152	(5.50)
5/16	18		2B/GH5	3	90	19933-59-B	0.2656	(6.70)	0.2584	(6.60)
5/16		24	2B/GH4	3	90	19934-59-B	0.2773	(7.00)	0.2719	(6.90)
3/8	16		2B/GH5	3	100	19935-59-B	0.3222	(8.20)	0.3141	(8.00)
3/8		24	2B/GH4	3	100	19936-59-B	0.3398	(8.60)	0.3344	(8.50)
7/16	14		2B/GH5	3	100	19937-59-B	0.3772	(9.60)	0.3679	(9.30)
7/16		20	2B/GH5	3	100	19938-59-B	0.3953	(10.00)	0.3888	(9.90)
1/2	13		2B/GH5	3	110	19939-59-B	0.4350	(11.10)	0.4251	(10.80)
1/2		20	2B/GH5	3	100	19940-59-B	0.4578	(11.60)	0.4513	(11.50)
5/8	11		2B/GH5	3	110	19941-59-B	0.5482	(13.90)	0.5364	(13.60)
5/8		18	2B/GH5	3	100	19942-59-B	0.5781	(14.70)	0.5709	(14.50)
3/4	10		2B/GH5	3	125	19943-59-B	0.6656	(16.90)	0.6526	(16.60)
3/4		16	2B/GH5	3	110	19944-59-B	0.6972	(17.70)	0.6891	(17.50)
7/8	9		2B/GH6	4	140	19693-59-B	0.7812	(19.80)	0.7667	(19.50)
7/8		14	2B/GH6	4	125	19694-59-B	0.8147	(20.70)	0.8054	(20.50)
1”	8		2B/GH6	4	160	19695-59-B	0.8945	(22.70)	0.8782	(22.30)

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For additional support and for maximum optimization of your tools, call us toll free at: Brubaker 800.522.8665, and ask to speak to our Technical Support Department.

- Designed for Materials Less Than or Equal to HrB100 and HrC23
- Premium Substrate
- Stocked in #59 Coating
- DIN/ANSI Blank
- Plug Chamfer

List 300M, Metric

Size	Pitch	6H Limit	No. of Flutes	OAL (mm)	6H Part No.	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
M3	0.50	6H/GD3	2	56	19945-59-B	0.1015	(2.58)	0.0989	(2.51)
M4	0.70	6H/GD4	3	63	19946-59-B	0.1342	(3.41)	0.1306	(3.32)
M5	0.80	6H/GD4	3	70	19947-59-B	0.1703	(4.32)	0.1662	(4.22)
M6	1.00	6H/GD5	3	80	19948-59-B	0.2030	(5.20)	0.1979	(5.00)
M8	1.25	6H/GD5	3	90	19949-59-B	0.2734	(6.90)	0.2670	(6.80)
M10	1.25	6H/GD5	3	100	19950-59-B	0.3521	(8.90)	0.3458	(8.80)
M10	1.50	6H/GD6	3	100	19951-59-B	0.3438	(8.70)	0.3362	(8.50)
M12	1.25	6H/GD5	3	100	19952-59-B	0.4309	(10.90)	0.4245	(10.80)
M12	1.75	6H/GD6	3	110	19953-59-B	0.4143	(10.50)	0.4053	(10.30)
M14	1.50	6H/GD6	3	100	19954-59-B	0.5013	(12.70)	0.4936	(12.50)
M14	2.00	6H/GD7	3	110	19955-59-B	0.4847	(12.30)	0.4745	(12.10)
M16	1.50	6H/GD6	3	100	19956-59-B	0.5801	(14.70)	0.5724	(14.50)
M16	2.00	6H/GD7	3	110	19957-59-B	0.5634	(14.30)	0.5532	(14.10)

Material Application Guidelines: HrB100 Series

Spiral Point Series

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited	●	●		❍	●	●	●	●								
Cutting Speed	80-120 SFM	80-120 SFM		40-60 SFM	60-100 SFM	40-60 SFM	30-50 SFM	30-50 SFM								
Material Examples	6160, 7075				1008, 1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6AL4V	D2, S7		

BEST ● GOOD ❍

Gold Series, Spiral Point

Our Gold Series features unique geometry engineered for outstanding results in stainless steels and similar materials. The spiral point pushes the chip ahead of cutting threads in through hole applications.

List 310, Inch

Size	NC	NF	No. of Flutes	GH2	GH3	GH4	GH5	GH6	GH7	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
2	56	–	2	19992-89-B						0.0709	(1.80)	0.0686	(1.74)
4	40	–	2	21149-89-B	21150-89-B	21151-89-B	21152-89-B			0.0909	(2.31)	0.0876	(2.23)
6	32	–	2	21153-89-B	21154-89-B	21155-89-B	21156-89-B	21157-89-B	21158-89-B	0.1116	(2.83)	0.1076	(2.73)
8	32	–	3	21159-89-B	21160-89-B	21161-89-B	21162-89-B	21163-89-B	21164-89-B	0.1376	(3.50)	0.1336	(3.39)
10	24	–	3		21165-89-B	21166-89-B	21167-89-B		21168-89-B	0.1548	(3.93)	0.1494	(3.79)
10	–	32	3	21169-89-B	21170-89-B	21171-89-B	21172-89-B	21173-89-B	21174-89-B	0.1636	(4.16)	0.1596	(4.05)
1/4	20	–	3		21175-89-B		21220-89-B		21227-89-B	0.2078	(5.30)	0.2013	(5.10)
1/4	–	28	3		21228-89-B	21229-89-B	21230-89-B	21231-89-B	21232-89-B	0.2198	(5.60)	0.2152	(5.50)
5/16	18	–	3		21233-89-B		21234-89-B		21235-89-B	0.2656	(6.70)	0.2584	(6.60)
5/16	–	24	3		21236-89-B	21237-89-B	21238-89-B	21239-89-B	21240-89-B	0.2773	(7.00)	0.2719	(6.90)
3/8	16	–	3		21241-89-B		21242-89-B		21243-89-B	0.3222	(8.20)	0.3141	(8.00)
3/8	–	24	3		21244-89-B	21245-89-B	21246-89-B	19999-89-B	21247-89-B	0.3398	(8.60)	0.3344	(8.50)
7/16	14	–	3		21250-89-B		21251-89-B		21254-89-B	0.3772	(9.60)	0.3679	(9.30)
7/16	–	20	3		21255-89-B		21256-89-B		21257-89-B	0.3953	(10.00)	0.3888	(9.90)
1/2	13	–	3		21262-89-B		21263-89-B		21264-89-B	0.4350	(11.10)	0.4251	(10.80)
1/2	–	20	3		21270-89-B		21271-89-B		21272-89-B	0.4578	(11.60)	0.4513	(11.50)
9/16	12	–	3		19993-89-B					0.4921	(12.50)	0.4813	(12.20)
9/16	–	18	3		19994-89-B					0.5156	(13.10)	0.5084	(12.29)
5/8	11	–	3		21273-89-B		21274-89-B		21275-89-B	0.5482	(13.90)	0.5364	(13.60)
5/8	–	18	3		21276-89-B		21277-89-B		21278-89-B	0.5781	(14.70)	0.5709	(14.50)
3/4	10	–	3		21279-89-B		21280-89-B		21281-89-B	0.6656	(16.90)	0.6526	(16.60)
3/4	–	16	3		21282-89-B		21283-89-B		21284-89-B	0.6972	(17.70)	0.6891	(17.50)
7/8	9	–	4			21285-89-B				0.7812	(19.80)	0.7667	(19.50)
7/8	–	14	4			21286-89-B				0.8147	(20.70)	0.8054	(20.50)
1"	8	–	4			21287-89-B				0.8945	(20.70)	0.8782	(22.30)

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- Designed for stainless steels and similar alloys
- Premium substrate
- Stock in #89 coating, other coating upon request
- ANSI, Table 302A Blank
- Plug Chamfer

List 310M, Metric

Size	Pitch (mm)	No. of Flutes	GD3	GD4	GD5	GD6	GD7	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
M3	0.50	2	21288-89-B					0.1015	(2.58)	0.0989	(2.51)
M3.5	0.60	2		21289-89-B				0.1178	(2.99)	0.1148	(2.92)
M4	0.70	3		21290-89-B				0.1342	(3.41)	0.1306	(3.32)
M5	0.80	3		21291-89-B				0.1703	(4.32)	0.1662	(4.22)
M6	1.00	3			21292-89-B			0.2030	(5.20)	0.1979	(5.00)
M7	1.00	3			21293-89-B			0.2423	(6.20)	0.2372	(6.00)
M8 M8	1.00 1.25	3 3			21294-89-B 21295-89-B			0.2817 0.2734	(7.20) (6.90)	0.2766 0.2670	(7.00) (6.80)
M10 M10	1.25 1.50	3 3			21296-89-B	 21297-89-B		0.3521 0.3438	(8.90) (8.70)	0.3458 0.3362	(8.80) (8.50)
M12 M12	1.25 1.75	3 3			21298-89-B	 21299-89-B		0.4309 0.4143	(10.90) (10.50)	0.4245 0.4053	(10.80) (10.30)
M14 M14	1.50 2.00	3 3				21300-89-B	 21302-89-B	0.5013 0.4847	(12.70) (12.30)	0.4936 0.4745	(12.50) (12.10)
M16 M16	1.50 2.00	3 3				21303-89-B	 21305-89-B	0.5801 0.5634	(14.70) (14.30)	0.5724 0.5532	(14.50) (14.10)
M18 M18	1.50 2.50	3 3				21306-89-B	 21308-89-B	0.6588 0.6256	(16.70) (15.90)	0.6511 0.6128	(16.50) (15.60)
M20	2.50	3					21309-89-B	0.7043	(17.90)	0.6915	(17.60)

Material Application Guidelines: Spiral Point, Gold

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited						❍	❍	❍	●	❍	●			❍	❍	
Cutting Speed						40-60 SFM	30-50 SFM	30-50 SFM	40-60 SFM	30-50 SFM	30-50 SFM					
Material Examples	6160, 7075				1008, 1010,1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6AL4V	D2, S7		

BEST ● GOOD ❍

Gold Series, Spiral Point
DIN/ANSI

This is our Gold Series Spiral Point tap on a DIN/ANSI blank. This configuration provides longer reach and improved coolant flow to the tap.

List 315, Inch

Size	NC	NF	2B Limit	3B Limit	No. of Flutes	OAL (mm)	2B Part No.	3B Part No.	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
4	40		2B3B/GH2		2	56	19700-89-B		0.0909	(2.31)	0.0876	(2.23)
6	32		2B/GH3	3B/GH2	2	56	19704-89-B	19705-89-B	0.1116	(2.83)	0.1076	(2.73)
8	32		2B/GH3	3B/GH2	3	63	19708-89-B	19709-89-B	0.1376	(3.50)	0.1336	(3.39)
10	24		2B/GH3	3B/GH2	3	70	19712-89-B	19713-89-B	0.1548	(3.93)	0.1494	(3.79)
10		32	2B/GH3	3B/GH2	3	70	19716-89-B	19717-89-B	0.1636	(4.16)	0.1596	(4.05)
1/4	20		2B/GH5	3B/GH3	3	80	19718-89-B	19719-89-B	0.2078	(5.30)	0.2013	(5.10)
1/4		28	2B/GH4	3B/GH3	3	80	19720-89-B	19721-89-B	0.2198	(5.60)	0.2152	(5.50)
5/16	18		2B/GH5	3B/GH3	3	90	19724-89-B	19725-89-B	0.2656	(6.70)	0.2584	(6.60)
5/16		24	2B/GH4	3B/GH3	3	90	19728-89-B	19729-89-B	0.2773	(7.00)	0.2719	(6.90)
3/8	16		2B/GH5	3B/GH3	3	100	19732-89-B	19733-89-B	0.3222	(8.20)	0.3141	(8.00)
3/8		24	2B/GH4	3B/GH3	3	100	19736-89-B	19737-89-B	0.3398	(8.60)	0.3344	(8.50)
7/16	14		2B/GH5	3B/GH3	3	100	19740-89-B	19741-89-B	0.3772	(9.60)	0.3679	(9.30)
7/16		20	2B/GH5	3B/GH3	3	100	19744-89-B	19745-89-B	0.3953	(10.00)	0.3888	(9.90)
1/2	13		2B/GH5	3B/GH3	3	110	19748-89-B	19749-89-B	0.4350	(11.10)	0.4251	(10.80)
1/2		20	2B/GH5	3B/GH3	3	100	19752-89-B	19753-89-B	0.4578	(11.60)	0.4513	(11.50)
5/8	11		2B/GH5	3B/GH3	3	110	19756-89-B	19757-89-B	0.5482	(13.90)	0.5364	(13.60)
5/8		18	2B/GH5	3B/GH3	3	100	19760-89-B	19761-89-B	0.5781	(14.70)	0.5709	(14.50)
3/4	10		2B/GH5	3B/GH3	3	125	19764-89-B	19765-89-B	0.6656	(16.90)	0.6526	(16.60)
3/4		16	2B/GH5	3B/GH3	3	110	19768-89-B	19769-89-B	0.6972	(17.70)	0.6891	(17.50)
7/8	9		2B/GH6	3B/GH4	4	140	19772-89-B	19773-89-B	0.7812	(19.80)	0.7667	(19.50)
7/8		14	2B/GH6	3B/GH4	4	125	19776-89-B	19777-89-B	0.8147	(20.70)	0.8054	(20.50)
1"	8		2B/GH6	3B/GH4	4	160	19778-89-B	19779-89-B	0.8945	(22.70)	0.8782	(22.30)

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List 315M, Metric

Size	Pitch (mm)	6H Limit	No. of Flutes	OAL (mm)	6H Part No.	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
M3	0.50	6H/GD3	2	56	19780-89-B	0.1015	(2.58)	0.0989	(2.51)
M4	0.70	6H/GD4	3	63	19781-89-B	0.1342	(3.41)	0.1306	(3.32)
M5	0.80	6H/GD4	3	70	19782-89-B	0.1703	(4.32)	0.1662	(4.22)
M6	1.00	6H/GD5	3	80	19783-89-B	0.2030	(5.20)	0.1979	(5.00)
M8	1.25	6H/GD5	3	90	19784-89-B	0.2734	(6.90)	0.2670	(6.80)
M10	1.25	6H/GD5	3	100	19785-89-B	0.3521	(8.90)	0.3458	(8.80)
M10	1.50	6H/GD6	3	100	19786-89-B	0.3438	(8.70)	0.3362	(8.50)
M12	1.25	6H/GD5	3	100	19787-89-B	0.4309	(10.90)	0.4245	(10.80)
M12	1.50	6H/GD6	3	100	19788-89-B	0.4226	(10.70)	0.4149	(10.50)
M12	1.75	6H/GD6	3	110	19789-89-B	0.4143	(10.50)	0.4053	(10.30)
M14	1.50	6H/GD6	3	100	19790-89-B	0.5013	(12.70)	0.4936	(12.50)
M14	2.00	6H/GD7	3	110	19791-89-B	0.4847	(12.30)	0.4745	(12.10)
M16	1.50	6H/GD6	3	100	19792-89-B	0.5801	(14.70)	0.5724	(14.50)
M16	2.00	6H/GD7	3	110	19793-89-B	0.5634	(14.30)	0.5532	(14.10)
M18	1.50	6H/GD6	3	110	19794-89-B	0.6588	(16.70)	0.6511	(16.50)
M18	2.50	6H/GD7	3	125	19795-89-B	0.6256	(15.90)	0.6128	(15.60)
M20	1.50	6H/GD6	3	125	19796-89-B	0.7375	(18.70)	0.7299	(18.50)
M20	2.50	6H/GD7	3	140	19797-89-B	0.7043	(17.90)	0.6915	(17.60)

Material Application Guidelines: Spiral Point, Gold

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited						❍	❍	❍	●	❍	●			❍	❍	
Cutting Speed						40-60 SFM	30-50 SFM	30-50 SFM	40-60 SFM	30-50 SFM	30-50 SFM					
Material Examples	6160, 7075				1008, 1010,1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6AL4V	D2, S7		

BEST ● GOOD ❍

Platinum Series, Spiral Point Nickel Alloy Taps

We have taken our high performance spiral point tap, modified the geometry and placed it on a powdered metal substrate tailored specifically for nickel and nickel based alloys.

List 410, Inch

Size	NC	NF	No. of Flutes	GH2	GH3	GH4	GH5	GH7	Hole Size – Inch/(Metric) 55% Thread		65% Thread	
2	56		2	30000-89-B					0.0732	(1.86)	0.0709	(1.80)
4	40		3	30001-89-B	30002-89-B				0.0941	(2.39)	0.0909	(2.31)
6	32		3	30003-89-B	30004-89-B		30005-89-B		0.1157	(2.94)	0.1116	(2.83)
8	32		3	30006-89-B	30007-89-B		30008-89-B		0.1417	(3.60)	0.1376	(3.50)
10	24		3		30009-89-B		30010-89-B		0.1602	(4.07)	0.1548	(3.93)
10		32	3	30011-89-B	30012-89-B		30013-89-B		0.1677	(4.26)	0.1636	(4.16)
1/4	20		3		30014-89-B		30015-89-B	30016-89-B	0.2143	(5.40)	0.2078	(5.30)
1/4		28	3		30017-89-B	30018-89-B	30019-89-B	30020-89-B	0.2245	(5.70)	0.2198	(5.60)
5/16	18		3		30021-89-B		30022-89-B	30023-89-B	0.2728	(6.90)	0.2656	(6.70)
5/16		24	3		30024-89-B	30025-89-B	30026-89-B	30027-89-B	0.2827	(7.20)	0.2773	(7.00)
3/8	16		3		30028-89-B	30029-89-B	30030-89-B	30031-89-B	0.3303	(8.40)	0.3222	(8.20)
3/8		24	3		30032-89-B	30033-89-B	30034-89-B	30035-89-B	0.3452	(8.80)	0.3398	(8.60)
7/16	14		3		30036-89-B		30037-89-B	30038-89-B	0.3865	(9.80)	0.3772	(9.60)
7/16		20	3		30039-89-B		30040-89-B	30041-89-B	0.4018	(10.20)	0.3953	(1.00)
1/2	13		3		30042-89-B		30043-89-B	30044-89-B	0.4450	(11.30)	0.4350	(11.10)
1/2		20	3		30045-89-B		30046-89-B	30047-89-B	0.4643	(11.80)	0.4578	(11.60)
9/16	12		3		30048-89-B				0.5030	(12.80)	0.4921	(12.50)
9/16		18	3		30049-89-B				0.5228	(13.30)	0.5156	(13.10)
5/8	11		3		30050-89-B		30051-89-B	30052-89-B	0.5600	(14.20)	0.5482	(13.90)
5/8		18	3		30053-89-B		30054-89-B	30055-89-B	0.5853	(14.90)	0.5781	(14.70)
3/4	10		3		30056-89-B		30057-89-B	30058-89-B	0.6786	(17.20)	0.6656	(16.90)
3/4		16	3		30059-89-B		30060-89-B	30061-89-B	0.7053	(17.90)	0.6972	(17.70)

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- Designed for nickel alloys
- Premium powdered metal substrate
- Stock in #89 coating, other coating upon request
- ANSI, Table 302A Blank
- Plug Chamfer

List 410M, Metric

Size	Pitch (mm)	No. of Flutes	GD3	GD4	GD5	GD6	Hole Size – Inch/(Metric) 55% Thread		65% Thread	
M2.5	0.45	3	30062-89-B				0.0858	(2.18)	0.0835	(2.12)
M3	0.50	3	30063-89-B				0.1040	(2.64)	0.1015	(2.58)
M3.5	0.60	3		30064-89-B			0.1209	(3.07)	0.1178	(2.99)
M4	0.70	3		30065-89-B			0.1378	(3.50)	0.1342	(3.41)
M5	0.80	3		30066-89-B			0.1743	(4.43)	0.1703	(4.32)
M6	1.00	3			30067-89-B		0.2081	(5.29)	0.2030	(5.16)
M7	1.00	3			30068-89-B		0.2475	(6.29)	0.2423	(6.16)
M8	1.00	3			30069-89-B		0.2868	(7.29)	0.2817	(7.16)
M8	1.25	3			30070-89-B		0.2798	(7.11)	0.2734	(6.94)
M10	1.25	3			30071-89-B		0.3585	(9.11)	0.3521	(8.94)
M10	1.50	3				30072-89-B	0.3515	(8.93)	0.3438	(8.73)
M12	1.25	3			30073-89-B		0.4373	(11.11)	0.4309	(10.94)
M12	1.75	3				30074-89-B	0.4232	(10.75)	0.4143	(10.52)

Material Application Guidelines: Spiral Point, Platinum – Nickel Alloy Series

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited			❍									●				●
Cutting Speed			40-60 SFM									5-15 SFM				10-15 SFM
Material Examples	6160, 7075				1008, 1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6Al4V	D2, S7		

BEST ● GOOD ❍

Platinum Series, Spiral Point Titanium Alloy Taps

We have taken our high performance spiral point tap, modified the geometry and placed it on a powdered metal substrate tailored specifically for titanium and titanium based alloys.

List 420, Inch

Size	NC	NF	No. of Flutes	GH2	GH3	GH5	Hole Size – Inch/(Metric) 55% Thread		65% Thread	
2	56		2	30800-90-B			0.0732	(1.86)	0.0709	(1.80)
4	40		3	30801-90-B	30802-90-B		0.0941	(2.39)	0.0909	(2.31)
6	32		3	30803-90-B	30804-90-B	30805-90-B	0.1157	(2.94)	0.1116	(2.83)
8	32		3		30806-90-B	30807-90-B	0.1417	(3.60)	0.1376	(3.50)
10	24		3		30808-90-B	30809-90-B	0.1602	(4.07)	0.1548	(3.93)
10		32	3		30810-90-B	30811-90-B	0.1677	(4.26)	0.1636	(4.16)
1/4	20		3		30812-90-B	30813-90-B	0.2143	(5.40)	0.2078	(5.30)
1/4		28	3		30814-90-B	30815-90-B	0.2245	(5.70)	0.2198	(5.60)
5/16	18		3		30816-90-B	30817-90-B	0.2728	(6.90)	0.2656	(6.70)
5/16		24	3		30818-90-B	30819-90-B	0.2827	(7.20)	0.2773	(7.00)
3/8	16		3		30820-90-B	30821-90-B	0.3303	(8.40)	0.3222	(8.20)
3/8		24	3		30822-90-B	30823-90-B	0.3452	(8.80)	0.3398	(8.60)
7/16	14		3		30824-90-B	30825-90-B	0.3865	(9.80)	0.3772	(9.60)
7/16		20	3		30826-90-B	30827-90-B	0.4018	(10.20)	0.3953	(10.00)
1/2	13		3		30828-90-B	30829-90-B	0.4450	(11.30)	0.4350	(11.10)
1/2		20	3		30830-90-B	30831-90-B	0.4643	(11.80)	0.4578	(11.60)

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- Designed for titanium alloys and similar material
- Engineered powdered metal substrate
- Stock in #90 coating, other coating upon request
- ANSI, Table 302A Blank
- Plug Chamfer

List 420M, Metric

Size	Pitch (mm)	No. of Flutes	GD3	GD4	GD5	GD6	Hole Size – Inch/(Metric 55% Thread		65% Thread	
M2.5	0.45	3	30832-90-B				0.0858	(2.18)	0.0835	(2.12)
M3	0.50	3	30833-90-B				0.1040	(2.64)	0.1015	(2.58)
M3.5	0.60	3		30834-90-B			0.1209	(3.07)	0.1178	(2.99)
M4	0.70	3		30835-90-B			0.1378	(3.50)	0.1342	(3.41)
M5	0.80	3		30836-90-B			0.1743	(4.43)	0.1703	(4.32)
M6	1.00	3			30837-90-B		0.2081	(5.29)	0.2030	(5.16)
M7	1.00	3			30838-90-B		0.2475	(6.29)	0.2423	(6.16)
M8 M8	1.00 1.25	3 3			30839-90-B 30840-90-B		0.2868 0.2798	(7.29) (7.11)	0.2817 0.2734	(7.16) (6.94)
M10 M10	1.25 1.50	3 3			30841-90-B	 30842-90-B	0.3585 0.3515	(9.11) (8.93)	0.3521 0.3438	(8.94) (8.73)
M12 M12	1.25 1.75	3 3			30843-90-B	 30844-90-B	0.4373 0.4232	(11.11) (10.75)	0.4309 0.4143	(10.94) (10.52)

Material Application Guidelines: Spiral Point, Platinum – Titanium Alloy Series

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited													●			❍
Cutting Speed													10-15 SFM			10-25 SFM
Material Examples	6160, 7075				1008, 1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6Al4V	D2, S7		

BEST ● GOOD ❍

Gold Series, Spiral Flute
HrB100 DIN/ANSI

Our HrB100 Series have unique geometry for outstanding results in softer materials. This new design eliminates oversize conditions, while the spiral flute promotes effective chip evacuation.

List 320, Inch

Size	NC	NF	2B Limit	No. of Flutes	OAL (mm)	2B Part No.	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
4	40		2B/GH2	2	56	19958-59-B	0.0909	(2.31)	0.0876	(2.23)
6	32		2B/GH3	3	56	19959-59-B	0.1116	(2.83)	0.1076	(2.73)
8	32		2B/GH3	3	63	19960-59-B	0.1376	(3.50)	0.1336	(3.39)
10	24		2B/GH3	3	70	19961-59-B	0.1548	(3.93)	0.1494	(3.79)
10		32	2B/GH3	3	70	19962-59-B	0.1636	(4.16)	0.1596	(4.05)
1/4	20		2B/GH5	3	80	19963-59-B	0.2078	(5.30)	0.2013	(5.10)
1/4		28	2B/GH3	3	80	19964-59-B	0.2198	(5.60)	0.2152	(5.50)
5/16	18		2B/GH5	3	90	19965-59-B	0.2656	(6.70)	0.2584	(6.60)
5/16		24	2B/GH4	3	90	19966-59-B	0.2773	(7.00)	0.2719	(6.90)
3/8	16		2B/GH5	3	100	19967-59-B	0.3222	(8.20)	0.3141	(8.00)
3/8		24	2B/GH4	3	100	19968-59-B	0.3398	(8.60)	0.3344	(8.50)
7/16	14		2B/GH5	3	100	19969-59-B	0.3772	(9.60)	0.3679	(9.30)
7/16		20	2B/GH5	3	100	19970-59-B	0.3953	(10.00)	0.3888	(9.90)
1/2	13		2B/GH5	3	110	19971-59-B	0.4350	(11.10)	0.4251	(10.80)
1/2		20	2B/GH5	3	100	19972-59-B	0.4578	(11.60)	0.4513	(11.50)
5/8	11		2B/GH5	4	110	19973-59-B	0.5482	(13.90)	0.5364	(13.60)
5/8		18	2B/GH5	4	100	19974-59-B	0.5781	(14.70)	0.5709	(14.50)
3/4	10		2B/GH5	4	125	19975-59-B	0.6656	(16.90)	0.6526	(16.60)
3/4		16	2B/GH5	4	110	19976-59-B	0.6972	(17.70)	0.6891	(17.50)
7/8	9		2B/GH6	4	140	19696-59-B	0.7812	(19.80)	0.7667	(19.50)
7/8		14	2B/GH6	4	125	19697-59-B	0.8147	(20.70)	0.8054	(20.50)
1"	8		2B/GH6	4	160	19698-59-B	0.8945	(22.70)	0.8782	(22.30)

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- Designed for materials less than or equal to HrB100 and HrC23
- Premium Substrate
- Stocked in #59 Coating
- DIN/ANSI Blank
- Modified Bottom Chamfer

List 320M, Metric

Size	Pitch (mm)	6H Limit	No. of Flutes	OAL (mm)	6H Part No.	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
M3	0.50	6H/GD3	2	56	19977-59-B	0.1015	(2.58)	0.0989	(2.51)
M4	0.70	6H/GD4	3	63	19978-59-B	0.1342	(3.41)	0.1306	(3.32)
M5	0.80	6H/GD4	3	70	19979-59-B	0.1703	(4.32)	0.1662	(4.22)
M6	1.00	6H/GD5	3	80	19980-59-B	0.2030	(5.20)	0.1979	(5.00)
M8	1.25	6H/GD5	3	90	19981-59-B	0.2734	(6.90)	0.2670	(6.80)
M10	1.25	6H/GD5	3	100	19982-59-B	0.3521	(8.90)	0.3458	(8.80)
M10	1.50	6H/GD6	3	100	19983-59-B	0.3438	(8.70)	0.3362	(8.50)
M12	1.25	6H/GD5	3	100	19984-59-B	0.4309	(10.90)	0.4245	(10.80)
M12	1.75	6H/GD6	3	110	19985-59-B	0.4143	(10.50)	0.4053	(10.30)
M14	1.50	6H/GD6	4	100	19986-59-B	0.5013	(12.70)	0.4936	(12.50)
M14	2.00	6H/GD7	4	110	19987-59-B	0.4847	(12.30)	0.4745	(12.10)
M16	1.50	6H/GD6	4	100	19988-59-B	0.5801	(14.70)	0.5724	(14.50)
M16	2.00	6H/GD7	4	110	19989-59-B	0.5634	(14.30)	0.5532	(14.10)

Material Application Guidelines: HrB100 Series Spiral Flute

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited	●	●		❍	●	●	●	●								
Cutting Speed	80-100 SFM	80-100 SFM		30-45 SFM	40-80 SFM	30-45 SFM	30-50 SFM	20-40 SFM								
Material Examples	6160, 7075				1008, 1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6AL4V	D2, S7		

BEST ● GOOD ❍

Gold Series, Spiral Flute

Our Gold Series features unique geometry engineered for outstanding results in stainless steels and similar materials. The spiral flute promotes effective chip evacuation.

List 325, Inch

Size	NC	NF	No. of Flutes	GH2	GH3	GH4	GH5	GH6	GH7	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
2	56		2	19995-89-B						0.0709	(1.80)	0.0686	(1.74)
4	40	–	2	21311-89-B	21312-89-B	21314-89-B	21315-89-B			0.0909	(2.31)	0.0876	(2.23)
6	32	–	3	21317-89-B	21318-89-B	21320-89-B	21321-89-B	21323-89-B	21324-89-B	0.1116	(2.83)	0.1076	(2.73)
8	32	–	3	21326-89-B	21327-89-B	21329-89-B	21330-89-B	21332-89-B	21333-89-B	0.1376	(3.50)	0.1336	(3.39)
10 10	24 –	– 32	3 3	21340-89-B	21335-89-B 21341-89-B	21336-89-B 21342-89-B	21338-89-B 21343-89-B	21344-89-B	21339-89-B 21345-89-B	0.1548 0.1636	(3.93) (4.16)	0.1494 0.1596	(3.79) (4.05)
1/4 1/4	20 –	– 28	3 3		21346-89-B 21349-89-B	21350-89-B	21347-89-B 21351-89-B	21352-89-B	21348-89-B 21353-89-B	0.2078 0.2198	(5.30) (5.60)	0.2013 0.2152	(5.10) (5.50)
5/16 5/16	18 –	– 24	3 3		21354-89-B 21357-89-B	21358-89-B	21355-89-B 21359-89-B	21360-89-B	21356-89-B 21361-89-B	0.2656 0.2773	(6.70) (7.00)	0.2584 0.2719	(6.60) (6.90)
3/8 3/8	16 –	– 24	3 3		21362-89-B 21365-89-B	21366-89-B	21363-89-B 21367-89-B	21368-89-B	21364-89-B 21369-89-B	0.3222 0.3398	(8.20) (8.60)	0.3141 0.3344	(8.00) (8.50)
7/16 7/16	14 –	– 20	3 3		21370-89-B 21373-89-B		21371-89-B 21374-89-B		21372-89-B 21375-89-B	0.3772 0.3953	(9.60) (10.00)	0.3679 0.3888	(9.30) (9.90)
1/2 1/2	13 –	– 20	3 3		21376-89-B 21379-89-B		21377-89-B 21380-89-B		21378-89-B 21381-89-B	0.4350 0.4578	(11.10) (11.60)	0.4251 0.4513	(10.80) (11.50)
9/16 9/16	12 –	– 18	4 4		19996-89-B 19997-89-B					0.4921 0.5156	(12.50) (13.10)	0.4813 0.5084	(12.20) (12.90)
5/8 5/8	11 –	– 18	4 4		21382-89-B 21385-89-B		21383-89-B 21386-89-B		21384-89-B 21387-89-B	0.5482 0.5781	(13.90) (14.70)	0.5364 0.5709	(13.60) (14.50)
3/4 3/4	10 –	– 16	4 4		21388-89-B 21391-89-B		21389-89-B 21392-89-B		21390-89-B 21393-89-B	06656 0.6972	(16.90) (17.70)	0.6526 0.6891	(16.60) (17.50)
7/8 7/8	9 –	– 14	4 4			21394-89-B 21395-89-B				0.7812 0.8147	(19.80) (20.70)	0.7667 0.8054	(19.50) (20.50)
1"	8	–	4			21396-89-B				0.8945	(22.70)	0.8782	(22.30)

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- Designed for stainless steels and similar alloys
- Premium substrate
- Stock in #89 coating, other coating upon request
- ANSI, Table 302A Blank
- Modified Bottom Chamfer

List 325M, Metric

Size	Pitch (mm)	No. of Flutes	GD3	GD4	GD5	GD6	GD7	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
M3	0.50	3	21397-89-B					0.1015	(2.58)	0.0989	(2.51)
M3.5	0.60	3		21398-89-B				0.1178	(2.99)	0.1148	(2.92)
M4	0.70	3		21399-89-B				0.1342	(3.41)	0.1306	(3.32)
M5	0.80	3		21406-89-B				0.1703	(4.32)	0.1662	(4.22)
M6	1.00	3			21407-89-B			0.2030	(5.20)	0.1979	(5.00)
M7	1.00	3			21408-89-B			0.2423	(6.20)	0.2372	(6.00)
M8	1.00	3			21410-89-B			0.2817	(7.20)	0.2766	(7.00)
M8	1.25	3			21411-89-B			0.2734	(6.90)	0.2670	(6.80)
M10 M10	1.25 1.50	3 3			21448-89-B	21449-89-B		0.3521 0.3438	(8.90) (8.70)	0.3458 0.3362	(8.80) (8.50)
M12 M12	1.25 1.75	3 3			21450-89-B	21451-89-B		0.4309 0.4143	(10.90) (10.50)	0.4245 0.4053	(10.80) (10.30)
M14 M14	1.50 2.00	4 4				21452-89-B	21453-89-B	0.5013 0.4847	(12.70) (12.30)	0.4936 0.4745	(12.50) (12.10)
M16 M16	1.50 2.00	4 4				21454-89-B	21455-89-B	0.5801 0.5634	(14.70) (14.30)	0.5724 0.5532	(14.50) (14.10)
M18 M18	1.50 2.50	4 4				21456-89-B	21457-89-B	0.6588 0.6256	(16.70) (15.90)	0.6511 0.6128	(16.50) (15.60)
M20	2.50	4					21458-89-B	0.7043	(17.90)	0.6915	(17.60)

Material Application Guidelines: Spiral Flute, Gold

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited						❍		❍	●	❍	●			❍	❍	
Cutting Speed						30-45 SFM		20-40 SFM	30-45 SFM	20-40 SFM	20-40 SFM			20-40 SFM	20-40 SFM	
Material Examples	6160, 7075				1008, 1010,1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6Al4V	D2, S7		

BEST ● GOOD ❍

Gold Series, Spiral Flute
DIN/ANSI

This is our Gold Series Spiral Flute tap on a DIN/ANSI blank. This configuration provides longer reach and improved coolant flow to the tap.

List 330, Inch

Size	NC	NF	2B Limit	3B Limit	No. of Flutes	OAL (mm)	2B Part No.	3B Part No.	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
4	40		2B3B/GH2		2	56	19798-89-B		0.0909	(2.31)	0.0876	(2.23)
6	32		2B/GH3	3B/GH2	3	56	19800-89-B	19801-89-B	0.1116	(2.83)	0.1076	(2.73)
8	32		2B/GH3	3B/GH2	3	63	19802-89-B	19803-89-B	0.1376	(3.50)	0.1336	(3.39)
10	24		2B/GH3	3B/GH2	3	70	19804-89-B	19805-89-B	0.1548	(3.39)	0.1494	(3.79)
10		32	2B/GH3	3B/GH2	3	70	19806-89-B	19807-89-B	0.1636	(4.16)	0.1596	(4.05)
1/4	20		2B/GH5	3B/GH3	3	80	19808-89-B	19809-89-B	0.2078	(5.30)	0.2013	(5.10)
1/4		28	2B/GH4	3B/GH3	3	80	19810-89-B	19811-89-B	0.2198	(5.60)	0.2152	(5.50)
5/16	18		2B/GH5	3B/GH3	3	90	19812-89-B	19813-89-B	0.2656	(6.70)	0.2584	(6.60)
5/16		24	2B/GH4	3B/GH3	3	90	19814-89-B	19815-89-B	0.2773	(7.00)	0.2719	(6.90)
3/8	16		2B/GH5	3B/GH3	3	100	19816-89-B	19817-89-B	0.3222	(8.20)	0.3141	(8.00)
3/8		24	2B/GH4	3B/GH3	3	100	19818-89-B	19819-89-B	0.3398	(8.60)	0.3344	(8.50)
7/16	14		2B/GH5	3B/GH3	3	100	19820-89-B	19821-89-B	0.3772	(9.60)	0.3679	(9.30)
7/16		20	2B/GH5	3B/GH3	3	100	19822-89-B	19823-89-B	0.3953	(10.00)	0.3888	(9.90)
1/2	13		2B/GH5	3B/GH3	3	110	19824-89-B	19825-89-B	0.4350	(11.10)	0.4251	(10.80)
1/2		20	2B/GH5	3B/GH3	3	100	19826-89-B	19827-89-B	0.4578	(11.60)	0.4513	(11.50)
5/8	11		2B/GH5	3B/GH3	4	110	19828-89-B	19829-89-B	0.5482	(13.90)	0.5364	(13.60)
5/8		18	2B/GH5	3B/GH3	4	100	19830-89-B	19831-89-B	0.5781	(14.70)	0.5709	(14.50)
3/4	10		2B/GH5	3B/GH3	4	125	19832-89-B	19833-89-B	0.6656	(16.90)	0.6526	(16.60)
3/4		16	2B/GH5	3B/GH3	4	110	19834-89-B	19835-89-B	0.6972	(17.70)	0.6891	(17.50)
7/8	9		2B/GH6	3B/GH4	4	140	19836-89-B	19837-89-B	0.7812	(19.80)	0.7667	(19.50)
7/8		14	2B/GH6	3B/GH4	4	125	19838-89-B	19839-89-B	0.8147	(20.70)	0.8054	(20.50)
1"	8		2B/GH6	3B/GH4	4	160	19840-89-B	19841-89-B	0.8945	(22.70)	0.8782	(22.30)

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- Designed for stainless steels and similar alloys
- Premium substrate
- Stock in #89 coating, other coating upon request
- DIN/ANSI Blank
- Modified Bottom Chamfer

List 330M, Metric

Size	Pitch (mm)	6H Limit	No. of Flutes	OAL (mm)	6H Part No.	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
M3	0.50	6H/GD3	3	56	19842-89-B	0.1015	(2.58)	0.0989	(2.51)
M4	0.70	6H/GD4	3	63	19843-89-B	0.1342	(3.41)	0.1306	(3.32)
M5	0.80	6H/GD4	3	70	19844-89-B	0.1703	(4.32)	0.1662	(4.22)
M6	1.00	6H/GD5	3	80	19845-89-B	0.2030	(5.20)	0.1979	(5.00)
M8	1.25	6H/GD5	3	90	19846-89-B	0.2734	(6.90)	0.2670	(6.80)
M10	1.25	6H/GD5	3	100	19847-89-B	0.3521	(8.90)	0.3458	(8.80)
M10	1.50	6H/GD6	3	100	19848-89-B	0.3438	(8.70)	0.3362	(8.50)
M12	1.25	6H/GD5	3	100	19849-89-B	0.4309	(10.90)	0.4245	(10.80)
M12	1.50	6H/GD6	3	100	19850-89-B	0.4226	(10.70)	0.4149	(10.50)
M12	1.75	6H/GD6	3	110	19851-89-B	0.4143	(10.50)	0.4053	(10.30)
M14	1.50	6H/GD6	4	100	19852-89-B	0.5013	(12.70)	0.4936	(12.50)
M14	2.00	6H/GD7	4	110	19853-89-B	0.4847	(12.30)	0.4745	(12.10)
M16	1.50	6H/GD6	4	100	19854-89-B	0.5801	(14.70)	0.5724	(14.50)
M16	2.00	6H/GD7	4	110	19855-89-B	0.5634	(14.30)	0.5532	(14.10)
M18	1.50	6H/GD6	4	110	19856-89-B	0.6588	(16.70)	0.6511	(16.50)
M18	2.50	6H/GD7	4	125	19857-89-B	0.6256	(15.90)	0.6128	(15.60)
M20	1.50	6H/GD6	4	125	19858-89-B	0.7375	(18.70)	0.7299	(18.50)
M20	2.50	6H/GD7	4	140	19859-89-B	0.7043	(17.90)	0.6915	(17.60)

Material Application Guidelines: Spiral Flute, Gold

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited						❍		❍	●	❍	●			❍	❍	
Cutting Speed						30-45 SFM		20-40 SFM	30-45 SFM	20-40 SFM	20-40 SFM			20-40 SFM	20-40 SFM	
Material Examples	6160, 7075				1008, 1010,1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6AL4V	D2, S7		

BEST ● GOOD ❍

Platinum Series, Spiral Flute Nickel Alloy Taps

We have taken our high performance spiral flute tap, modified the geometry and placed it on a powdered metal substrate tailored specifically for nickel and nickel based alloys.

List 430, Inch

Size	NC	NF	No. of Flutes	GH2	GH3	GH4	GH5	GH7	Hole Size – Inch/(Metric) 55% Thread		65% Thread	
2	56		2	30700-89-B					0.0732	(1.86)	0.0709	(1.80)
4	40		3	30701-89-B	30702-89-B				0.0941	(2.39)	0.0909	(2.31)
6	32		3	30703-89-B	30704-89-B		30705-89-B		0.1157	(2.94)	0.1116	(2.83)
8	32		3	30706-89-B	30707-89-B		30708-89-B		0.1417	(3.60)	0.1376	(3.50)
10	24		3		30709-89-B		30710-89-B		0.1602	(4.07)	0.1548	(3.93)
10		32	3	30711-89-B	30712-89-B		30713-89-B		0.1677	(4.26)	0.1636	(4.16)
1/4	20		3		30714-89-B		30715-89-B	30716-89-B	0.2143	(5.40)	0.2078	(5.30)
1/4		28	3		30717-89-B	30718-89-B	30719-89-B	30720-89-B	0.2245	(5.70)	0.2198	(5.60)
5/16	18		3		30721-89-B		30722-89-B	30723-89-B	0.2728	(6.90)	0.2656	(6.70)
5/16		24	3		30724-89-B	30725-89-B	30726-89-B	30727-89-B	0.2827	(7.20)	0.2773	(7.00)
3/8	16		3		30728-89-B	30729-89-B	30730-89-B	30731-89-B	0.3303	(8.40)	0.3222	(8.20)
3/8		24	3		30732-89-B	30733-89-B	30734-89-B	30735-89-B	0.3452	(8.80)	0.3398	(8.60)
7/16	14		3		30736-89-B		30737-89-B	30738-89-B	0.3865	(9.80)	0.3772	(9.60)
7/16		20	3		30739-89-B		30740-89-B	30741-89-B	0.4018	(10.20)	0.3953	(10.00)
1/2	13		3		30742-89-B		30743-89-B	30744-89-B	0.4450	(11.30)	0.4350	(11.10)
1/2		20	3		30745-89-B		30746-89-B	30747-89-B	0.4643	(11.80)	0.4578	(11.60)
9/16	12		3		30748-89-B				0.5030	(12.80)	0.4921	(12.50)
9/16		18	3		30749-89-B				0.5228	(13.30)	0.5156	(13.10)
5/8	11		4		30750-89-B		30751-89-B	30752-89-B	0.5600	(14.20)	0.5482	(13.90)
5/8		18	4		30753-89-B		30754-89-B	30755-89-B	0.5853	(14.90)	0.5781	(14.70)
3/4	10		4		30756-89-B		30757-89-B	30758-89-B	0.6786	(17.20)	0.6656	(16.90)
3/4		16	4		30759-89-B		30760-89-B	30761-89-B	0.7053	(17.90)	0.6972	(17.70)

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- Designed for nickel alloys
- Premium powdered metal substrate
- Stock in #89 coating, other coating upon request
- ANSI, Table 302A Blank
- Modified Bottom Chamfer

List 430M, Metric

Size	Pitch (mm)	No. of Flutes	GD3	GD4	GD5	GD6	Hole Size – Inch/(Metric) 55% Thread		65% Thread	
M2.5	0.45	3	30762-89-B				0.0858	(2.18)	0.0835	(2.12)
M3	0.50	3	30763-89-B				0.1040	(2.64)	0.1015	(2.58)
M3.5	0.60	3		30764-89-B			0.1209	(3.07)	0.1178	(2.99)
M4	0.70	3		30765-89-B			0.1378	(3.50)	0.1342	(3.41)
M5	0.80	3		30766-89-B			0.1743	(4.43)	0.1703	(4.32)
M6	1.00	3			30767-89-B		0.2081	(5.29)	0.2030	(5.16)
M7	1.00	3			30768-89-B		0.2475	(6.29)	0.2423	(6.16)
M8	1.00	3			30769-89-B		0.2868	(7.29)	0.2817	(7.16)
M8	1.25	3			30770-89-B		0.2798	(7.11)	0.2734	(6.94)
M10 M10	1.25 1.50	3 3			30771-89-B	 30772-89-B	0.3585 0.3515	(9.11) (8.93)	0.3521 0.3438	(8.94) (8.73)
M12 M12	1.25 1.75	3 3			30773-89-B	 30774-89-B	0.4373 0.4232	(11.11) (10.75)	0.4309 0.4143	(10.94) (10.52)

Material Application Guidelines: Spiral Flute, Platinum – Nickel Alloy Series

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited			❍									●				●
Cutting Speed			40-60 SFM									5-15 SFM				10-25 SFM
Material Examples	6160, 7075				1008, 1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6Al4V	D2, S7		

BEST ● GOOD ❍

Platinum Series, Spiral Flute Titanium Alloy Taps

We have taken our high performance spiral flute tap, modified the geometry and placed it on a powdered metal substrate tailored specifically for titanium and titanium based alloys.

List 440, Inch

Size	NC	NF	No. of Flutes	GH2	GH3	GH5	Hole Size – Inch/(Metric) 55% Thread		65% Thread	
2	56		2	30900-90-B			0.0732	(1.86)	0.0709	(1.80)
4	40		3	30901-90-B	30902-90-B		0.0941	(2.39)	0.0909	(2.31)
6	32		3	30903-90-B	30904-90-B	30905-90-B	0.1157	(2.94)	0.1116	(2.83)
8	32		3		30906-90-B	30907-90-B	0.1417	(3.60)	0.1376	(3.50)
10	24		3		30908-90-B	30909-90-B	0.1602	(4.07)	0.1548	(3.93)
10		32	3		30910-90-B	30911-90-B	0.1677	(4.26)	0.1636	(4.16)
1/4	20		3		30912-90-B	30913-90-B	0.2143	(5.40)	0.2078	(5.30)
1/4		28	3		30914-90-B	30915-90-B	0.2245	(5.70)	0.2198	(5.60)
5/16	18		3		30916-90-B	30917-90-B	0.2728	(6.90)	0.2656	(6.70)
5/16		24	3		30918-90-B	30919-90-B	0.2827	(7.20)	0.2773	(7.00)
3/8	16		3		30920-90-B	30921-90-B	0.3303	(8.40)	0.3222	(8.20)
3/8		24	3		30922-90-B	30923-90-B	0.3452	(8.80)	0.3398	(8.60)
7/16	14		3		30924-90-B	30925-90-B	0.3865	(9.80)	0.3772	(9.60)
7/16		20	3		30926-90-B	30927-90-B	0.4018	(10.20)	0.3953	(10.00)
1/2	13		3		30928-90-B	30929-90-B	0.4450	(11.30)	0.4350	(11.10)
1/2		20	3		30930-90-B	30931-90-B	0.4643	(11.80)	0.4578	(11.60)

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- Designed for titanium alloys and similar material
- Engineered powdered metal substrate
- Stock in #90 coating, other coating upon request
- ANSI, Table 302A Blank
- Modified Bottom Chamfer

List 440M, Metric

Size	Pitch (mm)	No. of Flutes	GD3	GD4	GD5	GD6	Hole Size – Inch/(Metric) 55%Thread		65%Thread	
M2.5	0.45	3	30932-90-B				0.0858	(2.18)	0.0835	(2.12)
M3	0.50	3	30933-90-B				0.1040	(2.64)	0.1015	(2.58)
M3.5	0.60	3		30934-90-B			0.1209	(3.07)	0.1178	(2.99)
M4	0.70	3		30935-90-B			0.1378	(3.50)	0.1342	(3.41)
M5	0.80	3		30936-90-B			0.1743	(4.43)	0.1703	(4.32)
M6	1.00	3			30937-90-B		0.2081	(5.29)	0.2030	(5.16)
M7	1.00	3			30938-90-B		0.2475	(6.29)	0.2423	(6.16)
M8 M8	1.00 1.25	3 3			30939-90-B 30940-90-B		0.2868 0.2798	(7.29) (7.11)	0.2817 0.2734	(7.16) (6.94)
M10 M10	1.25 1.50	3 3			30941-90-B	 30942-90-B	0.3585 0.3515	(9.11) (8.93)	0.3521 0.3438	(8.94) (8.73)
M12 M12	1.25 1.75	3 3			30943-90-B	 30944-90-B	0.4373 0.4232	(11.11) (10.75)	0.4309 0.4143	(10.94) (10.52)

Material Application Guidelines: Spiral Flute, Platinum – Titanium Alloy Series

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited													●			❍
Cutting Speed													10-15 SFM			10-25 SFM
Material Examples	6160, 7075				1008, 1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6Al4V	D2, S7		

BEST ● GOOD ❍

Gold Series, Straight Flute
Die Cast

Our Gold Series straight flute tap features specialized geometry engineered for superior results in aluminum and gray cast iron.

List 335, Inch

Size	NC	NF	No. of Flutes	Chamfer	GH2	GH3	GH5	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
4	40	–	3	Plug	21855-82-B			0.0909	(2.31)	0.0876	(2.23)
4	40	–	3	Bottom	21856-82-B			0.0909	(2.31)	0.0876	(2.23)
6	32	–	3	Plug		21857-82-B		0.1116	(2.83)	0.1076	(2.73)
6	32	–	3	Bottom		21858-82-B		0.1116	(2.83)	0.1076	(2.73)
8	32	–	3	Plug		21859-82-B		0.1376	(3.50)	0.1336	(3.39)
8	32	–	3	Bottom		21860-82-B		0.1376	(3.50)	0.1336	(3.39)
10	24	–	3	Plug		21861-82-B		0.1548	(3.93)	0.1494	(3.79)
10	24	–	3	Bottom		21862-82-B		0.1548	(3.93)	0.1494	(3.79)
10	–	32	3	Plug		21863-82-B		0.1636	(4.16)	0.1596	(4.05)
10	–	32	3	Bottom		21864-82-B		0.1636	(4.16)	0.1596	(4.05)
1/4	20	–	3	Plug		21865-82-B	21866-82-B	0.2078	(5.30)	0.2013	(5.10)
1/4	20	–	3	Bottom		21867-82-B	21868-82-B	0.2078	(5.30)	0.2013	(5.10)
1/4	–	28	3	Plug		21869-82-B		0.2198	(5.60)	0.2152	(5.50)
1/4	–	28	3	Bottom		21870-82-B		0.2198	(5.60)	0.2152	(5.50)
5/16	18	–	4	Plug		21871-82-B	21872-82-B	0.2656	(6.70)	0.2584	(6.60)
5/16	18	–	4	Bottom		21873-82-B	21874-82-B	0.2656	(6.70)	0.2584	(6.60)
5/16	–	24	4	Plug		21875-82-B		0.2773	(7.00)	0.2719	(6.90)
5/16	–	24	4	Bottom		21876-82-B		0.2773	(7.00)	0.2719	(6.90)
3/8	16	–	4	Plug		21877-82-B	21878-82-B	0.3222	(8.20)	0.3141	(8.00)
3/8	16	–	4	Bottom		21879-82-B	21880-82-B	0.3222	(8.20)	0.3141	(8.00)
3/8	–	24	4	Plug		21881-82-B		0.3398	(8.60)	0.3344	(8.50)
3/8	–	24	4	Bottom		21882-82-B		0.3398	(8.60)	0.3344	(8.50)
7/16	14	–	4	Plug		21883-82-B		0.3772	(9.60)	0.3679	(9.30)
7/16	14	–	4	Bottom		21884-82-B		0.3772	(9.60)	0.3679	(9.30)
7/16	–	20	4	Plug		21885-82-B		0.3953	(10.00)	0.3888	(9.90)
7/16	–	20	4	Bottom		21886-82-B		0.3953	(10.00)	0.3888	(9.90)
1/2	13	–	4	Plug		21887-82-B		0.4350	(11.10)	0.4251	(10.80)
1/2	13	–	4	Bottom		21888-82-B		0.4350	(11.10)	0.4251	(10.80)
1/2	–	20	4	Plug		21889-82-B		0.4578	(11.60)	0.4513	(11.50)
1/2	–	20	4	Bottom		21890-82-B		0.4578	(11.60)	0.4513	(11.50)

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- Designed for aluminum and gray cast iron
- Premium substrate
- Stock in #82 coating, other coatings upon request
- ANSI, Table 302A Blank
- Plug or Bottom Chamfer

List 335M, Metric

Size	Pitch (mm)	No. of Flutes	Chamfer	GD3	GD4	GD5	GD6	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
M3	0.50	3	Plug	21891-82-B				0.1015	(2.58)	0.0989	(2.51)
M3	0.50	3	Bottom	21892-82-B				0.1015	(2.58)	0.0989	(2.51)
M4	0.70	3	Plug		21893-82-B			0.1342	(3.41)	0.1306	(3.32)
M4	0.70	3	Bottom		21894-82-B			0.1342	(3.41)	0.1306	(3.32)
M5	0.80	3	Plug			21895-82-B		0.1703	(4.32)	0.1662	(4.22)
M5	0.80	3	Bottom			21896-82-B		0.1703	(4.32)	0.1662	(4.22)
M6	1.00	3	Plug			21897-82-B		0.2030	(5.20)	0.1979	(5.00)
M6	1.00	3	Bottom			21898-82-B		0.2030	(5.20)	0.1979	(5.00)
M8	1.25	4	Plug			21899-82-B		0.2734	(6.90)	0.2670	(6.80)
M8	1.25	4	Bottom			21974-82-B		0.2734	(6.90)	0.2670	(6.80)
M10	1.25	4	Plug			21975-82-B		0.3521	(8.90)	0.3458	(8.80)
M10	1.25	4	Bottom			21976-82-B		0.3521	(8.90)	0.3458	(8.80)
M10	1.50	4	Plug				21977-82-B	0.3438	(8.70)	0.3362	(8.50)
M10	1.50	4	Bottom				21978-82-B	0.3438	(8.70)	0.3362	(8.50)
M12	1.75	4	Plug				21979-82-B	0.4143	(10.50)	0.4053	(10.30)
M12	1.75	4	Bottom				21980-82-B	0.4143	(10.50)	0.4053	(10.30)

Material Application Guidelines: Straight Flute Die Cast, Gold

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited	●	●	●	❍												
Cutting Speed	80-100 SFM	80-100 SFM	60-80 SFM	40-60 SFM												
Material Examples	6160, 7075				1008, 1010,1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6Al4V	D2, S7		

BEST ● GOOD ❍

Gold Series, Straight Flute
Die Cast DIN/ANSI

Our Gold Series straight flute tap features specialized geometry engineered for superior results in aluminum and gray cast iron. This tap is on a DIN/ANSI blank to provide longer reach and improved coolant flow.

List 340, Inch

Size	NC	NF	2B Limit	3B Limit	No. of Flutes	OAL (mm)	2B Part No.	3B Part No.	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
4	40		2B3B/GH2		3	56	19860-82-B		0.0909	(2.31)	0.0876	(2.23)
6	32		2B/GH3	3B/GH2	3	56	19862-82-B	19863-82-B	0.1116	(2.83)	0.1076	(2.73)
8	32		2B/GH3	3B/GH2	3	63	19864-82-B	19865-82-B	0.1376	(3.50)	0.1336	(3.39)
10	24		2B/GH3	3B/GH2	3	70	19866-82-B	19867-82-B	0.1548	(3.93)	0.1494	(3.79)
10		32	2B/GH3	3B/GH2	3	70	19868-82-B	19869-82-B	0.1636	(4.16)	0.1596	(4.05)
1/4	20		2B/GH5	3BGH3	3	80	19870-82-B	19871-82-B	0.2078	(5.30)	0.2013	(5.10)
1/4		28	2B/GH4	3B/GH3	3	80	19872-82-B	19873-82-B	0.2198	(5.60)	0.2152	(5.50)
5/16	18		2B/GH5	3B/GH3	4	90	19874-82-B	19875-82-B	0.2656	(6.70)	0.2584	(6.60)
5/16		24	2B/GH4	3B/GH3	4	90	19876-82-B	19877-82-B	0.2773	(7.00)	0.2719	(6.90)
3/8	16		2B/GH5	3B/GH3	4	100	19878-82-B	19879-82-B	0.3222	(8.20)	0.3141	(8.00)
3/8		24	2BGH4	3B/GH3	4	100	19880-82-B	19881-82-B	0.3398	(8.60)	0.3344	(8.50)
7/16	14		2B/GH5	3B/GH3	4	100	19882-82-B	19883-82-B	0.3772	(9.60)	0.3679	(9.30)
7/16		20	2B/GH5	3B/GH3	4	100	19884-82-B	19885-82-B	0.3953	(10.00)	0.3888	(9.90)
1/2	13		2B/GH5	3B/GH3	4	110	19886-82-B	19887-82-B	0.4350	(11.10)	0.4251	(10.80)
1/2		20	2B/GH5	3B/GH3	4	100	19888-82-B	19889-82-B	0.4578	(11.60)	0.4513	(11.50)

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- Designed for aluminum and gray cast iron
- Premium substrate
- Stock in #82 coating, other coatings upon request
- DIN/ANSI Blank
- Bottom Chamfer

List 340M, Metric

Size	Pitch (mm)	6H Limit	No. of Flutes	OAL (mm)	6H Part No.	Hole Size – Inch/(Metric) 65% Thread		75% Thread	
M3	0.50	6H/GD3	3	56	19890-82-B	0.1015	(2.58)	0.0989	(2.51)
M4	0.70	6H/GD4	3	63	19891-82-B	0.1342	(3.41)	0.1306	(3.32)
M5	0.80	6H/GD4	3	70	19892-82-B	0.1703	(4.32)	0.1662	(4.22)
M6	1.00	6H/GD5	3	80	19893-82-B	0.2030	(5.20)	0.1979	(5.00)
M8	1.25	6H/GD5	4	90	19894-82-B	0.2734	(6.90)	0.2670	(6.80)
M10	1.25	6H/GD5	4	100	19895-82-B	0.3521	(8.90)	0.3458	(8.80)
M10	1.50	6H/GD6	4	100	19896-82-B	0.3438	(8.70)	0.3362	(8.50)
M12	1.25	6H/GD5	4	100	19897-82-B	0.4309	(10.90)	0.4245	(10.80)
M12	1.50	6H/GD6	4	100	19898-82-B	0.4226	(10.70)	0.4149	(10.50)
M12	1.75	6H/GD6	4	110	19899-82-B	0.4143	(10.50)	0.4053	(10.30)
M14	1.50	6H/GD6	4	100	19921-82-B	0.5013	(12.70)	0.4936	(12.50)
M14	2.00	6H/GD7	4	110	19922-82-B	0.4847	(12.30)	0.4745	(12.10)

Material Application Guidelines: Straight Flute Die Cast, Gold

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited	●	●	●	❍												
Cutting Speed	80-100 SFM	80-100 SFM	60-80 SFM	40-60 SFM												
Material Examples	6160, 7075				1008, 1010,1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6AL4V	D2, S7		

BEST ● GOOD ❍

Gold Series, Forming Tap

Our Gold Series forming tap has been designed for outstanding performance in a wide range of materials from aluminum to medium carbon steel and stainless steel. This is the go to tool for most thread forming applications.

List 350, Inch

Size	NC	NF	Taper Length	No. Grv.	GH2	GH3	GH4	GH5	GH6	GH7	GH8	GH9	GH10	Hole Size – Inch 65% Thrd	75% Thrd
0	80	–	Bottom	0	21459-89-B	21460-89-B								0.0547	0.0539
0	80	–	Plug	0	21461-89-B	21462-89-B		21463-89-B		21464-89-B				0.0547	0.0539
2	56	–	Bottom	0	21465-89-B	21466-89-B								0.0785	0.0773
2	56	–	Plug	0	21467-89-B	21468-89-B		21469-89-B		21470-89-B				0.0785	0.0773
4	40	–	Bottom	0		21471-89-B		21472-89-B		21473-89-B				0.1014	0.0998
4	40	–	Plug	0		21474-89-B		21475-89-B		21476-89-B				0.1014	0.0998
5	40	–	Bottom	0		21477-89-B		21478-89-B		21479-89-B				0.1144	0.1128
5	40	–	Plug	0		21480-89-B		21481-89-B		21482-89-B				0.1144	0.1128
6	32	–	Bottom	2		21483-89-B		21484-89-B		21485-89-B		21486-89-B		0.1248	0.1228
6	32	–	Plug	2		21487-89-B		21488-89-B		21489-89-B		21490-89-B		0.1248	0.1228
8	32	–	Bottom	2		21491-89-B		21492-89-B		21493-89-B		21494-89-B		0.1508	0.1488
8	32	–	Plug	2		21495-89-B		21496-89-B		21497-89-B		21498-89-B		0.1508	0.1488
10	24	–	Bottom	2		21499-89-B	21536-89-B	21537-89-B	21538-89-B	21539-89-B		21540-89-B		0.1724	0.1697
10	24	–	Plug	2		21541-89-B	21542-89-B	21543-89-B	21544-89-B	21545-89-B		21546-89-B		0.1724	0.1697
10	–	32	Bottom	2		21547-89-B	21548-89-B	21549-89-B	21550-89-B	21551-89-B		21552-89-B		0.1768	0.1748
10	–	32	Plug	2		21553-89-B	21554-89-B	21555-89-B	21556-89-B	21557-89-B		21558-89-B		0.1768	0.1748
1/4	20	–	Bottom	4		21559-89-B	21560-89-B	21561-89-B	21562-89-B	21563-89-B		21564-89-B		0.2289	0.2256
1/4	20	–	Plug	4		21565-89-B	21566-89-B	21567-89-B	21568-89-B	21569-89-B		21570-89-B		0.2289	0.2256
1/4	–	28	Bottom	4		21571-89-B	21572-89-B	21573-89-B	21574-89-B	21575-89-B		21576-89-B		0.2349	0.2326
1/4	–	28	Plug	4		21577-89-B	21578-89-B	21579-89-B	21580-89-B	21581-89-B		21582-89-B		0.2349	0.2326
5/16	18	–	Bottom	4		21583-89-B		21584-89-B		21585-89-B		21586-89-B		0.2890	0.2854
5/16	18	–	Plug	4		21587-89-B		21588-89-B		21589-89-B		21590-89-B		0.2890	0.2854
5/16	–	24	Bottom	4		21591-89-B		21592-89-B		21593-89-B		21594-89-B		0.2949	0.2922
5/16	–	24	Plug	4		21595-89-B		21596-89-B		21597-89-B		21598-89-B		0.2949	0.2922
3/8	16	–	Bottom	4		21599-89-B		21600-89-B		21602-89-B		21604-89-B		0.3486	0.3446
3/8	16	–	Plug	4		21606-89-B		21608-89-B		21610-89-B		21612-89-B		0.3486	0.3446
3/8	–	24	Bottom	4		21614-89-B		21616-89-B		21618-89-B		21620-89-B		0.3574	0.3547
3/8	–	24	Plug	4		21622-89-B		21734-89-B		21735-89-B		21736-89-B		0.3574	0.3547
7/16	14	–	Bottom	6				21737-89-B		21738-89-B	21739-89-B	21740-89-B		0.4073	0.4027
7/16	14	–	Plug	6				21741-89-B		21742-89-B	21743-89-B	21744-89-B		0.4073	0.4027
7/16	–	20	Bottom	6				21745-89-B		21746-89-B	21747-89-B	21748-89-B		0.4164	0.4131
7/16	–	20	Plug	6				21749-89-B		21750-89-B	21751-89-B	21752-89-B		0.4164	0.4131

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- Designed for a wide range of materials
- Premium substrate
- Stock in #89 coating, other coatings upon request
- ANSI, Table 302A Blank
- Plug or Bottom Taper (Chamfer)

List 350, Inch (continued)

Size	NC	NF	Taper Length	No. Grv.	GH2	GH3	GH4	GH5	GH6	GH7	GH8	GH9	GH10	Hole Size – Inch 65% Thread	65% Thread
1/2	13	–	Bottom	6				21753-89-B		21754-89-B	21755-89-B	21756-89-B		0.4675	0.4625
1/2	13	–	Plug	6				21757-89-B		21758-89-B	21759-89-B	21760-89-B		0.4675	0.4625
1/2	–	20	Bottom	6				21761-89-B		21762-89-B	21763-89-B	21764-89-B		0.4789	0.4756
1/2	–	20	Plug	6				21765-89-B		21766-89-B	21767-89-B	21768-89-B		0.4789	0.4756
9/16	12		Bottom	6						21982-89-B				0.5273	0.5219
9/16	12		Plug	6						21981-89-B				0.5273	0.5219
9/16		18	Bottom	6						21984-89-B				0.5390	0.5354
9/16		18	Plug	6						21983-89-B				0.5390	0.5354
5/8	11	–	Bottom	6				21769-89-B		21770-89-B		21771-89-B	21772-89-B	0.5866	0.5807
5/8	11	–	Plug	6				21773-89-B		21774-89-B		21775-89-B	21776-89-B	0.5866	0.5807
5/8	–	18	Bottom	6				21777-89-B		21778-89-B		21779-89-B	21780-89-B	0.6015	0.5979
5/8	–	18	Plug	6				21781-89-B		21782-89-B		21783-89-B	21784-89-B	0.6015	0.5979
3/4	10	–	Bottom	6				21785-89-B		21786-89-B		21787-89-B	21788-89-B	0.7078	0.7013
3/4	10	–	Plug	6				21789-89-B		21790-89-B		21791-89-B	21792-89-B	0.7078	0.7013
3/4	–	16	Bottom	6				21793-89-B		21794-89-B		21795-89-B	21796-89-B	0.7236	0.7196
3/4	–	16	Plug	6				21797-89-B		21798-89-B		21799-89-B	21822-89-B	0.7236	0.7196

Material Application Guidelines: Forming Taps, Gold

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited	●	●			●	●		❍	●	❍	❍			❍		
Cutting Speed	120-150 SFM	120-150 SFM			60-90 SFM	60-90 SFM		60-90 SFM	45-75 SFM	45-75 SFM	45-75 SFM			45-75 SFM		
Material Examples	6160, 7075				1008, 1010,1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6Al4V	D2, S7		

BEST ● GOOD ❍

Gold Series, Forming Tap

- Designed for a wide range of materials
- Premium substrate
- Stock in #89 coating, other coatings upon request
- ANSI, Table 302A Blank
- Plug or Bottom Taper (Chamfer)

List 350M, Metric

Size	Pitch (mm)	Chamfer	No. Grv.	GD3	GD4	GD5	GD6	GD7	GD8	GD9	GD10	Hole Size – Inch 65% Thrd	75% Thrd
M3	0.50	Bottom	0	21823-89-B		21824-89-B						0.1098	0.1085
M3	0.50	Plug	0	21825-89-B		21826-89-B						0.1098	0.1085
M3.5	0.60	Bottom	2		21827-89-B		21828-89-B					0.1278	0.1263
M3.5	0.60	Plug	2		21829-89-B		21830-89-B					0.1278	0.1263
M4	0.70	Bottom	2		21831-89-B		21832-89-B					0.1458	0.1441
M4	0.70	Plug	2		21833-89-B		21834-89-B					0.1458	0.1441
M5	0.80	Bottom	2		21835-89-B			21836-89-B				0.1836	0.1815
M5	0.80	Plug	2		21837-89-B			21838-89-B				0.1836	0.1815
M6	1.00	Bottom	4			21839-89-B			21840-89-B			0.2196	0.2170
M6	1.00	Plug	4			21841-89-B			21842-89-B			0.2196	0.2170
M8	1.25	Bottom	4				21843-89-B			21844-89-B		0.2942	0.2910
M8	1.25	Plug	4				21845-89-B			21846-89-B		0.2942	0.2910
M10	1.50	Bottom	4				21847-89-B			21848-89-B		0.3688	0.3649
M10	1.50	Plug	4				21849-89-B			21850-89-B		0.3688	0.3649
M12	1.75	Bottom	6					21851-89-B			21852-89-B	0.4434	0.4389
M12	1.75	Plug	6					21853-89-B			21854-89-B	0.4434	0.4389

Material Application Guidelines: Forming Taps, Gold

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited	●	●			●	●		❍	●	❍	❍			❍		
Cutting Speed	120-150 SFM	120-150 SFM			60-90 SFM	60-90 SFM		60-90 SFM	45-75 SFM	45-75 SFM	45-75 SFM			45-75 SFM		
Material Examples	6160, 7075				1008, 1010,1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6AI4V	D2, S7		

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Gold Series, Spiral Flute Pipe Tap — High Performance Taps

High performance pipe taps for a wide range of materials.

- Designed for ductile material, medium carbon steels and stainless steels
- Premium substrate
- Stock in #89 coating, other coatings upon request
- ANSI, Table 311 Blank
- 3 Thread Chamfer

List 360, Inch

Size	Pitch	No. of Flutes	Part No. NPT	Part No. NPTF
1/16	27	4	19900-89-B	19909-89-B
1/8	27	4	19901-89-B	19910-89-B
1/8SS	27	4	19902-89-B	19911-89-B
1/4	18	4	19903-89-B	19912-89-B
3/8	18	4	19904-89-B	19913-89-B
1/2	14	4	19905-89-B	19914-89-B
3/4	14	5	19906-89-B	19915-89-B
1"	11-1/2	5	19907-89-B	19916-89-B

Material Application Guidelines: Spiral Flute Pipe Taps, Gold

Work Material	Aluminum		Cast Iron		Steel			Alloy Steel	Stainless Steel			High Nickel	Titanium Alloy	Die Steel	Hardened Steel	
Series	Wrought	Casting	Gray	Ductile Malleable	Low Carbon	Medium Carbon	High Carbon		300 Series	400 Series	PH Series				<35 HrC	35-45 HrC
Best Suited						❍	❍	❍	●	❍	●			❍	❍	
Cutting Speed						15-35 SFM	10-30 SFM	10-30 SFM	15-35 SFM	10-30 SFM	10-30 SFM			10-30 SFM	10-30 SFM	
Material Examples	6160, 7075				1008, 1010,1018	1035, 1045	1050, 1055	4140, 4340	303, 304, 316		17-4PH, 15-5PH	Inconel, Monel	6Al4V	D2, S7		

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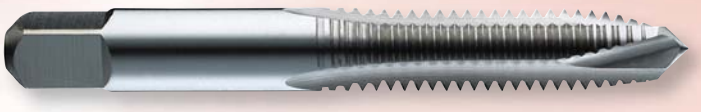
Standard High Speed Steel Tap Index

Spiral Point



General purpose taps designed primarily for tapping through holes. Best used under power.

List 110, Spiral Point Plug, Machine Screw and Fractional

Size	NC	NC	No. of Flutes	GH1	GH2	GH3	GH4	GH5	GH7
0		80	2	11000-00-B	11001-00-B	11700-00-B			
1 1	64	 72	2 2		11003-00-B 11005-00-B				
2 2	56	 64	2 2		11007-00-B 11009-00-B	11701-00-B		11702-00-B	
3 3	48	 56	2 2		11011-00-B 11013-00-B	11703-00B		11704-00-B	
4 4	40 48		2 2		11015-00-B 11017-00-B	11706-00-B		11707-00-B	11708-00-B
5 5	40	 44	2 2		11020-00-B 11021-00-B			11709-00-B	
6 6	32	 40	2 2	11022-00-B	11023-00-B 11027-00-B	11024-00-B	11710-00-B	11711-00-B 11712-00-B	11025-00-B
8 8 8	32 32	 36	2 3 2	 11032-00-B	11029-00-B 11033-00-B	11030-00-B 11716-00-B	11713-00-B	11714-00-B	11031-00-B
10 10 10 10	24 24	 32 32	2 3 2 3	11034-00-B 11038-00-B	11035-00-B 11039-00-B	11036-00-B 11719-00-B 11040-00-B 11722-00-B	11717-00-B 11720-00-B	11718-00-B 11721-00-B	11037-00-B 11041-00-B
12 12	24	 28	2 2	11042-00-B		11043-00-B 11044-00-B			
1/4 1/4 1/4 1/4	20 20	 28 28	2 3 2 3	11045-00-B 11051-00-B	11046-00-B 11052-00-B 11053-00-B	11047-00-B 11048-00-B 11054-00-B	 11055-00-B 11056-00-B	11049-00-B 11050-00-B	
5/16 5/16 5/16 5/16	18 18	 24 24	2 3 2 3		11058-00-B 11064-00-B 11065-00-B	11059-00-B 11060-00-B 11066-00-B	 11067-00-B 11068-00-B	11061-00-B 11062-00-B	
3/8 3/8	16	 24	3 3	11069-00-B	11070-00-B	11071-00-B 11075-00-B	 11076-00-B	11072-00-B	
7/16 7/16	14	 20	3 3			11078-00-B 11081-00-B		11079-00-B 11082-00-B	
1/2 1/2	13	 20	3 3		11084-00-B	11085-00-B 11089-00-B		11086-00-B 11090-00-B	
9/16 9/16	12	 18	3 3			11091-00-B 11092-00-B			
5/8 5/8	11	 18	3 3			11093-00-B 11095-00-B		11094-00-B 11723-00-B	
3/4 3/4	10	 16	3 3			11096-00-B 11098-00-B		11097-00-B 11724-00-B	

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- Highly recommended for ductile materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Plug Chamfer

List 232M, Spiral Point Plug, Metric

Size	Pitch	No. of Flutes	GD3	GD4	GD5	GD6	GD7
M1.6	0.35	2	23202-00-B				
M2	0.40	2	23208-00-B				
M2.5	0.45	2	23214-00-B				
M3	0.50	2	23217-00-B				
M3.5	0.60	2		23220-00-B			
M4	0.70	2		23223-00-B			
M4.5	0.75	2		23226-00-B			
M5	0.80	2		23229-00-B			
M6	1.00	2			23232-00-B		
M7	1.00	2			23238-00-B		
M8 M8 M8	1.00 1.25 1.25	3 2 3			11725-00-B 23244-00-B 11726-00-B		
M10 M10 M10	1.00 1.25 1.50	3 3 3			11727-00-B 11728-00-B	 23250-00-B	
M12 M12 M12	1.25 1.50 1.75	3 3 3			11729-00-B	 11730-00-B 23256-00-B	
M14 M14 M14	1.25 1.50 2.00	3 3 3			11731-00-B	 11732-00-B	 23262-00-B
M16 M16	1.50 2.00	3 3				11733-00-B	 23268-00-B
M18 M18	1.50 2.50	3 3				11734-00-B	 23274-00-B
M20 M20 M20	1.50 2.50 2.50	3 3 4				11735-00-B	 11736-00-B 23277-00-B

Spiral Point

General purpose taps designed primarily for tapping short, blind holes. Best used under power.

- Highly recommended for ductile materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Bottom Chamfer

List 112, Spiral Point Bottom, Machine Screw and Fractional

Size	NC	NF	No. of Flutes	GH1	GH2	GH3	GH7
0		80	2	11200-00-B	11201-00-B		
1 1	64	 72	2 2		11203-00-B 11205-00-B		
2	56		2	11206-00-B	11207-00-B		
3 3	48	 56	2 2		11211-00-B 11213-00-B		
4 4	40 48		2 2	11214-00-B	11215-00-B 11217-00-B		
5 5	40	 44	2 2		11220-00-B 11221-00-B		
6 6	32	 40	2 2		11223-00-B 11227-00-B	11224-00-B	11225-00-B
8 8	32	 36	2 2		11229-00-B 11233-00-B	11230-00-B	11231-00-B
10 10	24	 32	2 2	 11238-00-B	11235-00-B 11239-00-B	11236-00-B 11240-00-B	
12	24		2			11243-00-B	
1/4 1/4	20	 28	2 2			11247-00-B 11254-00-B	
5/16 5/16	18	 24	2 2			11259-00-B 11266-00-B	

General purpose taps designed primarily for tapping through holes 0.005" oversize. Best used under power.

- Highly recommended for ductile materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Plug Chamfer

List 117, Spiral Point Plug, 0.005 O/S (GH11, GD11) Machine Screw, Fractional and Metric

Size	Pitch	No. of Flutes	GH11
6	32	2	11737-00-B
8	32	2	11738-00-B
10	24	2	11739-00-B
10	32	2	11740-00-B
1/4	20	2	11749-00-B
1/4	28	2	11741-00-B
5/16	18	2	11761-00-B
5/16	24	2	11742-00-B
3/8	16	3	11772-00-B
3/8	24	3	11743-00-B
7/16	14	3	11779-00-B
7/16	20	3	11744-00-B
1/2	13	3	11786-00-B
1/2	20	3	11745-00-B
5/8	11	3	11794-00-B
5/8	18	3	11746-00-B

Size	Pitch	No. of Flutes	GD11
M4	0.70	2	11747-00-B
M5	0.80	2	11748-00-B
M6	1.00	2	11750-00-B
M8	1.25	3	11751-00-B
M10	1.50	3	11752-00-B
M12	1.75	3	11753-00-B

Spiral Point

General purpose taps designed primarily for tapping through holes in applications requiring extended reach. Best used under power.

- Highly recommended for ductile materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 303A Blank
- Plug Chamfer

List 113SP, Spiral Point Plug, Extension, Machine Screw, Fractional and Metric

Taper	NC	NF	No. of Flutes	OAL	GH2	GH3
4	40		2	4	11300-00-B	
6	32		2	4		11301-00-B
6	32		2	6		11302-00-B
8	32		2	4		11303-00-B
8	32		2	6		11304-00-B
10	24		2	4		11305-00-B
10	24		2	6		11306-00-B
10		32	2	4		11307-00-B
10		32	2	6		11308-00-B
1/4	20		2	4		11309-00-B
1/4	20		2	6		11310-00-B
1/4		28	2	4		11311-00-B
1/4		28	2	6		11312-00-B
5/16	18		2	4		11313-00-B
5/16	18		2	6		11314-00-B
5/16		24	2	4		11315-00-B
5/16		24	2	6		11316-00-B
3/8	16		3	4		11317-00-B
3/8	16		3	6		11318-00-B
3/8		24	3	4		11319-00-B
3/8		24	3	6		11320-00-B
7/16	14		3	6		11321-00-B
7/16		20	3	6		11322-00-B
1/2	13		3	6		11323-00-B
1/2		20	3	6		11324-00-B
5/8	11		3	6		11325-00-B
5/8		18	3	6		11326-00-B
3/4	10		3	6		11327-00-B
3/4		16	3	6		11328-00-B

Size	Pitch	No. of Flutes	OAL	GD4	GD5	GD6
M4	0.70	2	4	11329-00-B		
M4	0.70	2	6	11330-00-B		
M5	0.80	2	4	11331-00-B		
M5	0.80	2	6	11332-00-B		
M6	1.00	2	4		11333-00-B	
M6	1.00	2	6		11334-00-B	
M8	1.25	2	4		11335-00-B	
M8	1.25	2	6		11336-00-B	
M10	1.50	3	4			11337-00-B
M10	1.50	3	6			11338-00-B
M12	1.75	3	6			11339-00-B

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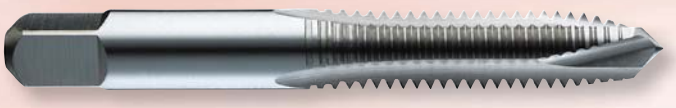

General purpose taps designed primarily for tapping through holes that will accommodate a screw thread insert (STI). Best used under power.

- Highly recommended for ductile materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 322 Blank
- Plug Chamfer

List 123, Spiral Point Plug, Screw Thread Insert (STI), Machine Screw, Fractional and Metric

Size (STI)	NC	NF	No. of Flutes	GH1	GH2	GH3	GH4
2	56		2		12350-00-B		
3	48		2		12351-00-B		
4 4	40	 48	2 2	12315-00-B	12353-00-B 12355-00-B		
5	40		2		12356-00-B		
6 6 8	32 32	 40	2 2 2		12324-00-B 12359-00-B 12330-00-B	12358-00-B 12361-00-B	
8		36	2		12362-00-B		
10 10	24	 32	2 2		12336-00-B 12340-00-B	12363-00B 12364-00-B	
1/4 1/4	20	 28	2 2		12347-00-B 12354-00-B	12365-00-B 12366-00-B	
5/16 5/16	18	 24	3 3		12367-00-B 12368-00-B	12360-00-B 12370-00-B	12369-00-B
3/8 3/8	16	 24	3 3		 12375-00-B	12371-00-B 12373-00-B	12372-00-B
7/16 7/16	14	 20	3 3			12378-00-B 12381-00-B	12374-00-B 12376-00-B
1/2 1/2	13	 20	4 4			12385-00-B 12389-00-B	12377-00-B 12379-00-B

Size	Pitch	No. of Flutes	GD2	GD3	GD4
M2	0.40	2	12380-00-B		
M2.5	0.45	2	12382-00-B		
M3	0.50	2	12383-00-B		
M4	0.70	2		12384-00-B	
M5	0.80	2		12386-00-B	
M6	1.00	3		12387-00-B	
M8	1.25	3		12388-00-B	
M10	1.50	3			12390-00-B
M12	1.75	3			12391-00-B

Spiral Flute

General purpose taps designed primarily for tapping blind and relatively deep holes. Can be used by hand or under power.

- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Plug or Bottom Chamfer

List 120, Spiral Flute, 50 Degree Plug or Bottom, Machine Screw and Fractional

Size	NC	NF	No. of Flutes	GH1 Plug	GH1 Bottom	GH2 Plug	GH2 Bottom	GH3 Plug	GH3 Bottom	GH5 Plug	GH5 Bottom
3	48		2			12002-00-B	12003-00-B				
4	40		2		12004-00-B	12006-00-B	12007-00-B				
5	40		2			12010-00-B	12011-00-B				
6	32		2	12013-00-B		12191-00-B	12192-00-B	12014-00-B	12015-00-B		
8	32		3			12193-00-B	12194-00-B	12022-00-B	12023-00-B		
10	24		3					12026-00-B	12027-00-B		
10		32	3			12195-00-B	12196-00-B	12030-00-B	12031-00-B		
12	24		3					12034-00-B	12035-00-B		
1/4	20		3					12038-00-B	12039-00-B	12040-00-B	12041-00-B
1/4		28	3					12042-00-B	12043-00-B		
5/16	18		3					12046-00-B	12047-00-B	12052-00-B	12053-00-B
5/16		24	3					12050-00-B	12051-00-B		
3/8	16		3					12054-00-B	12055-00-B	12064-00-B	12065-00-B
3/8		24	3					12058-00-B	12059-00-B		
7/16	14		3					12062-00-B	12063-00-B		12077-00-B
7/16		20	3					12066-00-B	12067-00-B		
1/2	13		3					12070-00-B	12071-00-B	12085-00-B	12086-00-B
1/2		20	3					12074-00-B	12075-00-B		
5/8	11		4					12097-00-B	12098-00-B	12099-00-B	12141-00-B
5/8		18	4					12152-00-B	12153-00-B		
3/4	10		4					12154-00-B	12155-00-B		12157-00-B
3/4		16	4					12160-00-B	12161-00-B		

List 234M, Spiral Flute, 50 Degree Plug or Bottom, Metric

Size	Pitch	No. of Flutes	GD3 Plug	GD3 Bottom	GD4 Plug	GD4 Bottom	GD5 Plug	GD5 Bottom	GD6 Plug	GD6 Bottom	GD7 Plug	GD7 Bottom
M3	0.50	2	23417-00-B	23418-00-B								
M4	0.70	3			23423-00-B	23424-00-B						
M5	0.80	3			23429-00-B	23430-00-B						
M6	1.00	3					23432-00-B	23433-00-B				
M8	1.25	3					23444-00-B	23445-00-B				
M10	1.50	3							23450-00-B	23451-00-B		
M12	1.75	3							23456-00-B	23457-00-B		
M16	2.00	4									23460-00-B	23461-00-B

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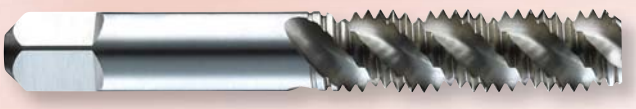

General purpose taps designed primarily for tapping blind and relatively deep holes and will accommodate a screw thread insert (STI). Can be used by hand or under power.

- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 322 Blank
- Bottom Chamfer, Inch sizes
- Modified Bottom Chamfer, Metric sizes

List 119, Spiral Flute, 50 Degree Screw Thread Insert (STI), Bottom, Machine Screw and Fractional, Modified Bottom, Metric

Size	NC	No. of Flutes	GH2 Bottom	GH3 Bottom	GH4 Bottom
2	56	2	11922-00-B		
3	48	2	11923-00-B		
4 4	40 48	2 3	11900-00-B 11924-00-B		
6 6	32 40	3 3	11902-00-B 11925-00-B	11903-00-B	
8 8	32 36	3 3	11904-00-B 11926-00-B	11905-00-B	
10 10	24 32	3 3	11906-00-B 11908-00-B	11907-00-B 11909-00-B	
1/4 1/4	20 28	3 3	11910-00-B 11912-00-B	11911-00-B 11913-00-B	
5/16 5/16	18 24	3 3	 11928-00-B	11914-00-B 11915-00-B	11927-00-B
3/8 3/8	16 24	3 3	 11930-00-B	11916-00-B 11917-00-B	11929-00-B
7/16 7/16	14 20	3 3		11918-00-B 11919-00-B	11931-00-B 11932-00-B
1/2 1/2	13 20	3 3		11920-00-B 11921-00-B	11933-00-B 11934-00-B

Size	NC	No. of Flutes	GD2 Mod-Bott	GD3 Mod-Bott	GD4 Mod-Bott
M2	0.40	2	11935-00-B		
M2.5	0.45	2	11936-00-B		
M3	0.50	3	11937-00-B		
M4	0.70	3		11938-00-B	
M5	0.80	3		11939-00-B	
M6	1.00	3		11940-00-B	
M8	1.25	3		11941-00-B	
M10	1.50	3			11942-00-B
M12	1.75	3			11943-00-B

Straight Flute

General purpose taps designed for tapping through or blind holes. Can be used by hand or under power.

List 106 Straight Flute, Taper, Plug or Bottom, Machine Screw and Fractional

Size	NC	NF	No. of Flutes	GH1 Taper	GH1 Plug	GH1 Bottom	GH2 Taper	GH2 Plug	GH2 Bottom
0		80	2	10000-00-B	10001-00-B	10002-00-B		10005-00-B	10006-00-B
1	64		2	10008-00-B	10009-00-B	10010-00-B		10013-00-B	
1		72	2	10016-00-B	10017-00-B	10018-00-B		10021-00-B	10022-00-B
2	56		2					10033-00-B	10034-00-B
2	56		3	10028-00-B	10029-00-B	10030-00-B	10036-00-B	10037-00-B	10038-00-B
2		64	3				10044-00-B		10046-00-B
3	48		2					10053-00-B	10054-00-B
3	48		3		10049-00-B		10056-00-B	10057-00-B	10058-00-B
3		56	3				10060-00-B	10061-00-B	10062-00-B
4	40		2					10073-00-B	10074-00-B
4	40		3	10068-00-B	10069-00-B	10070-00-B	10076-00-B	10077-00-B	10078-00-B
4	48		3		10081-00-B		10084-00-B	10085-00-B	10086-00-B
4	(36)		3				10088-00-B	10089-00-B	10090-00-B
5	40		2					10097-00-B	10098-00-B
5	40		3		10093-00-B	10094-00-B	10100-00-B	10101-00-B	10102-00-B
5		44	3				10108-00-B	10109-00-B	10110-00-B
6	32		2					10121-00-B	10122-00-B
6	32		3	10116-00-B	10117-00-B	10118-00-B	10124-00-B	10125-00-B	10126-00-B
6		40	2					10145-00-B	
6		40	3				10148-00-B	10149-00-B	10150-00-B
8	32		2					10165-00-B	10166-00-B
8	32		3					10169-00-B	
8	32		4	10160-00-B	10161-00-B	10162-00-B	10172-00-B	10173-00-B	10174-00-B
8		36	4		10197-00-B		10200-00-B	10201-00-B	10202-00-B
10	24		2					10213-00-B	10214-00-B
10	24		3					10217-00-B	
10	24		4	10208-00-B	10209-00-B	10210-00-B	10220-00-B	10221-00-B	10222-00-B
10		32	2					10257-00-B	10258-00-B
10		32	3					10261-00-B	10262-00-B
10		32	4	10252-00-B	10253-00-B	10254-00-B	10264-00-B	10265-00-B	10266-00-B
12	24		4						
12		28	4		10293-00-B				

Combines all List 102 and List 106 Taps

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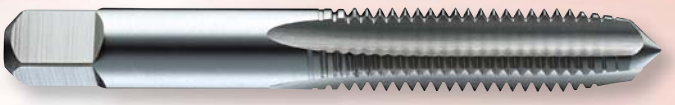
- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Taper, Plug or Bottom Chamfer

List 106 (continued)

Size	NC	NF	No. of Flutes	GH3 Taper	GH3 Plug	GH3 Bottom	GH7 Bottom
0		80	2				
1	64		2				
1		72	2				
2	56		2				
2	56		3				
2		64	3				
3	48		2				
3	48		3				
3		56	3				
4	40		2				
4	40		3				
4	48		3				
4	(36)		3				
5	40		2				
5	40		3				
5		44	3				
6	32		2		10129-00-B	10130-00-B	
6	32		3	10132-00-B	10133-00-B	10134-00-B	
6		40	2				
6		40	3				
8	32		2		10177-00-B	10178-00-B	
8	32		3		10181-00-B	10182-00-B	10190-00-B
8	32		4	10184-00-B	10185-00-B	10186-00-B	10194-00-B
8		36	4				
10	24		2		10225-00-B	10226-00-B	
10	24		3		10229-00-B	10230-00-B	10238-00-B
10	24		4	10232-00-B	10233-00-B	10234-00-B	10242-00-B
10		32	2		10269-00-B	10270-00-B	
10		32	3		10273-00-B	10274-00-B	
10		32	4	10276-00-B	10277-00-B	10278-00-B	10286-00-B
12	24		4	10288-00-B	10289-00-B	10290-00-B	
12		28	4	10296-00-B	10297-00-B	10298-00-B	

Straight Flute



General purpose taps designed for tapping through or blind holes. Can be used by hand or under power.

List 106 Straight Flute, Taper,Plug or Bottom, Machine Screw and Fractional

Size	NC	NF	No. of Flutes	GH1 Taper	GH1 Plug	GH1 Bottom	GH2 Taper	GH2 Plug	GH2 Bottom	GH3 Taper	GH3 Plug	GH3 Bottom
1/4	20		2								10316-00-B	10317-00-B
1/4	20		3		10301-00-B			10309-00-B			10320-00-B	10321-00-B
1/4	20		4	10304-00-B	10305-00-B	10306-00-B	10311-00-B	10312-00-B	10313-00-B	10323-00-B	10324-00-B	10325-00-B
1/4		28	2									10345-00-B
1/4		28	3								10348-00-B	
1/4		28	4		10336-00-B	10337-00-B		10340-00-B	10341-00-B	10351-00-B	10352-00-B	10353-00-B
5/16	18		2								10368-00-B	10369-00-B
5/16	18		3								10372-00-B	10373-00-B
5/16	18		4		10360-00-B	10361-00-B	10363-00-B	10364-00-B	10365-00-B	10375-00-B	10376-00-B	10377-00-B
5/16		24	4		10388-00-B	10389-00-B		10392-00-B	10393-00-B	10399-00-B	10400-00-B	10401-00-B
3/8	16		3		10408-00-B						10419-00-B	10420-00-B
3/8	16		4		10411-00-B	10412-00-B	10414-00-B	10415-00-B	10416-00-B	10422-00-B	10423-00-B	10424-00-B
3/8		24	3							10443-00-B	10444-00-B	
3/8		24	4		10435-00-B	10436-00-B		10439-00-B	10440-00-B	10446-00-B	10447-00-B	10448-00-B
7/16	14		3								10463-00-B	
7/16	14		4		10455-00-B			10459-00-B	10460-00B	10465-00-B	10466-00-B	10467-00-B
7/16		20	3								10482-00-B	
7/16		20	4					10478-00-0B	10479-00-B	10484-00-B	10485-00-B	10486-00-B
1/2	13		3								10501-00-B	10502-00-B
1/2	13		4		10493-00-B	10494-00-B		10497-00-B	10498-00-B	10504-00-B	10505-00-B	10506-00-B
1/2		20	3								10521-00-B	
1/2		20	4		10513-00-B	10514-00-B				10523-00-B	10524-00-B	10525-00-B
9/16	12		4							10535-00-B	10536-00-B	10537-00-B
9/16		18	4					10544-00-B		10546-00-B	10547-00-B	10548-00-B
5/8	11		4		10555-00-B			10558-00-B		10561-00-B	10562-00-B	10563-00-B
5/8		18	4		10570-00-B			10574-00-B		10577-00-B	10578-00-B	10579-00-B
11/16	11	(NS)	4							10585-00-B	10586-00-B	10587-00-B
11/16	16	(NS)	4							10589-00-B	10590-00-B	10591-00-B
3/4	10		4		10594-00-B			10597-00-B		10600-00-B	10601-00-B	10602-00-B
3/4		16	4		10609-00-B			10612-00-B		10615-00-B	10616-00-B	10617-00-B
7/8	9		4					10624-00-B				
7/8		14	4					10634-00-B				
1	8		4					10644-00-B				
1		12	4									
1	14	(NS)	4					10658-00-B				
1-1/8	7		4									
1-1/8		12	4									
1-1/4	7		4									
1-1/4		12	6									
1-3/8	6		4									
1-3/8		12	6									
1-1/2	6		4									
1-1/2		12	6									

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- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Taper, Plug or Bottom Chamfer

List 106 (continued)

Size	NC	NF	No. of Flutes	GH4 Taper	GH4 Plug	GH4 Bottom	GH5 Plug	GH5 Bottom	GH6 Taper	GH6 Plug	GH6 Bottom
1/4	20		2				10328-00-B				
1/4	20		3				10332-00-B	10333-00-B			
1/4	20		4								
1/4		28	2								
1/4		28	3								
1/4		28	4		10356-00-B	10357-00-B					
5/16	18		2								
5/16	18		3				10380-00-B				
5/16	18		4				10384-00-B	10385-00-B			
5/16		24	4		10404-00-B	10405-00-B					
3/8	16		3				10427-00-B	10428-00-B			
3/8	16		4				10431-00-B	10432-00-B			
3/8		24	3								
3/8		24	4		10451-00-B	10452-00-B					
7/16	14		3								
7/16	14		4				10470-00-B	10471-00-B			
7/16		20	3								
7/16		20	4				10489-00-B	10490-00-B			
1/2	13		3								
1/2	13		4				10509-00-B	10510-00-B			
1/2		20	3								
1/2		20	4				10528-00-B	10529-00-B			
9/16	12		4				10540-00-B	10541-00-B			
9/16		18	4				10551-00-B	10552-00-B			
5/8	11		4				10566-00-B	10567-00-B			
5/8		18	4				10582-00-B	10583-00-B			
11/16	11	(NS)	4								
11/16	16	(NS)	4								
3/4	10		4				10605-00-B	10606-00-B			
3/4		16	4				10620-00-B	10621-00-B			
7/8	9		4	10626-00-B	10627-00-B	10628-00-B				10631-00-B	
7/8		14	4	10636-00-B	10637-00-B	10638-00-B				10641-00-B	
1		8	4	10646-00-B	10647-00-B	10648-00-B				10651-00-B	
1		12	4	10653-00-B	10654-00-B	10655-00-B					
1	14	(NS)	4	10660-00-B	10661-00-B	10662-00-B					
1-1/8	7		4	10668-00-B	10669-00-B	10670-00-B					
1-1/8		12	4	10672-00-B	10673-00-B	10674-00-B					
1-1/4	7		4	10676-00-B	10677-00-B	10678-00-B					
1-1/4		12	6	10680-00-B	10681-00-B	10682-00-B					
1-3/8	6		4	10684-00-B	10685-00-B	10686-00-B					
1-3/8		12	6	10688-00-B	10689-00-B	10690-00-B					
1-1/2	6		4	10692-00-B	10693-00-B	10694-00-B					
1-1/2		12	6	10696-00-B	10697-00-B	10698-00-B					

Straight Flute

General purpose taps designed for tapping through or blind holes. Can be used by hand or under power.

List 230M Straight Flute, Taper, Plug or Bottom, Metric

Size	Pitch	No.of Flutes	GD3 Taper	GD3 Plug	GD3 Bottom	GD4 Taper	GD4 Plug	GD4 Bottom	GD5 Taper	GD5 Plug	GD5 Bottom	GD6 Taper	GD6 Plug	GD6 Bottom
M1.6	0.35	2		23002-00-B										
M2	0.40	3	23007-00-B	23008-00-B	23009-00-B									
M2.5	0.45	3		23014-00-B										
M3	0.50	3	23016-00-B	23017-00-B	23018-00-B									
M3.5	0.60	3					23020-00-B							
M4	0.70	4				23022-00-B	23023-00-B	23024-00-B						
M4.5	0.75	4					23026-00-B							
M5	0.80	4				23028-00-B	23029-00-B	23030-00-B						
M6	1.00	4							23031-00-B	23032-00-B	23033-00-B			
M7	1.00	4							23037-00-B	23038-00-B	23039-00-B			
M8	1.00	4								22900-00-B	22901-00-B			
M8	1.25	4							23043-00-B	23044-00-B	23045-00-B			
M10	1.00	4								22902-00-B	22903-00-B			
M10	1.25	4							23046-00-B	23047-00-B	23048-00-B			
M10	1.50	4										23049-00-B	23050-00-B	23051-00-B
M12	1.25	4							23052-00-B	23053-00-B	23054-00-B			
M12	1.50	4											22904-00-B	22905-00-B
M12	1.75	4										23055-00-B	23056-00-B	23057-00-B
M14	1.25	4								22906-00-B				
M14	1.50	4										23058-00-B	23059-00-B	23060-00-B
M14	2.00	4												
M16	1.50	4										23064-00-B	23065-00-B	23066-00-B
M16	2.00	4												
M18	1.50	4										23070-00-B	23071-00-B	23072-00-B
M18	2.50	4												
M20	1.50	4											22907-00-B	22908-00-B
M20	2.50	4												
M24	3.00	4												
M27	3.00	4												
M30	3.50	4												
M33	3.50	4												
M36	4.00	4												

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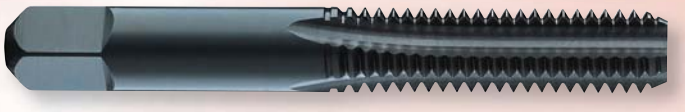
- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Taper, Plug or Bottom Chamfer

List 230M Straight Flute, Metric (continued)

Size	Pitch	No.of Flutes	GD7 Taper	GD7 Plug	GD7 Bottom	GD8 Taper	GD8 Plug	GD8 Bottom	GD9 Taper	GD9 Plug	GD9 Bottom
M1.6	0.35	2									
M2	0.40	3									
M2.5	0.45	3									
M3	0.50	3									
M3.5	0.60	3									
M4	0.70	4									
M4.5	0.75	4									
M5	0.80	4									
M6	1.00	4									
M7	1.00	4									
M8	1.00	4									
M8	1.25	4									
M10	1.00	4									
M10	1.25	4									
M10	1.50	4									
M12	1.25	4									
M12	1.50	4									
M12	1.75	4									
M14	1.25	4									
M14	1.50	4									
M14	2.00	4	23061-00-B	23062-00-B	23063-00-B						
M16	1.50	4									
M16	2.00	4	23067-00-B	23068-00-B	23069-00-B						
M18	1.50	4									
M18	2.50	4	23073-00-B	23074-00-B	23075-00-B						
M20	1.50	4									
M20	2.50	4	23076-00-B	23077-00-B	23078-00-B						
M24	3.00	4				23082-00-B	23083-00-B	23084-00-B			
M27	3.00	4				23085-00-B	23086-00-B	23087-00-B			
M30	3.50	4							23088-00-B	23089-00-B	23090-00-B
M33	3.50	4							23091-00-B	23092-00-B	23093-00-B
M36	4.00	4							23094-00-B	23095-00-B	23096-00-B

Straight Flute



General purpose taps designed for tapping through or blind holes. Can be used by hand or under power.

- Recommended for gray cast iron, brass and materials producing small broken chips
- Stocked with #23 treatment, other surface coating upon request
- ANSI Table 302 Blank
- Standard high speed steel substrate
- Plug or Bottom Chamfer

List 107 Straight Flute, Cast Iron, Plug or Bottom, Fractional and Metric

Size	NC	NF	No. of Flutes	GH3 Plug	GH3 Bottom	GH5 Plug	GH5 Bottom
1/4	20		4	10700-23-B	10701-23-B	10702-23-B	10703-23-B
1/4		28	4	10704-23-B	10705-23-B		
5/16	18		4	10706-23-B	10707-23-B	10708-23-B	10709-23-B
5/16		24	4	10710-23-B	10711-23-B		
3/8	16		4	10712-23-B	10713-23-B	10714-23-B	10715-23-B
3/8		24	4	10722-23-B	10723-23-B		
7/16	14		4	10730-23-B	10731-23-B	10738-23-B	10739-23-B
7/16		20	4	10746-23-B	10747-23-B	10792-23-B	10793-23-B
1/2	13		4	10754-23-B	10755-23-B	10758-23-B	10759-23-B
1/2		20	4	10762-23-B	10763-23-B	10794-23-B	10795-23-B
9/16	12		4	10770-23-B	10771-23-B		
9/16		18	4	10778-23-B	10779-23-B	10796-23-B	10797-23-B
5/8	11		4	10780-23-B	10781-23-B	10782-23-B	10783-23-B
5/8		18	4	10784-23-B	10785-23-B	10798-23-B	10799-23-B
3/4	10		4	10786-23-B	10787-23-B	10788-23-B	10789-23-B
3/4		16	4	10790-23-B	10791-23-B	10803-23-B	10807-23-B

Size	Pitch	No. of Flutes	GD5 Plug	GD5 Bottom	GD6 Plug	GD6 Bottom
M6	1.00	4	23158-23-B	23159-23-B		
M8	1.25	4	23160-23-B	23161-23-B		
M10	1.50	4			23162-23-B	23163-32-B
M12	1.75	4			23164-23-B	23165-23-B

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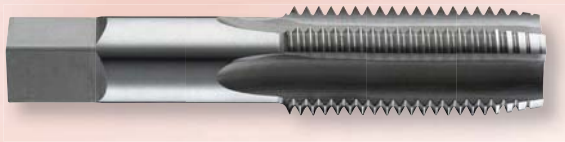


General purpose taps designed for tapping through or blind holes. Can be used by hand or under power.

- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Plug or Bottom Chamfer

List 108 Straight Flute, 8 Pitch, Plug or Bottom, Fractional

Size	Pitch	No. of Flutes	GH5		GH6	
			Plug	Bottom	Plug	Bottom
1-1/8	8	4	10801-00-B	10802-00-B		
1-1/4	8	4	10805-00-B	10806-00-B		
1-3/8	8	4	10809-00-B	10810-00-B		
1-1/2	8	6	10813-00-B	10814-00-B		
1-5/8	8	6			10817-00-B	10818-00-B
1-3/4	8	6			10821-00-B	10822-00-B
1-7/8	8	6			10825-00-B	10826-00-B
2"	8	6			10829-00-B	10830-00-B
2-1/4	8	6			10833-00-B	10834-00-B
2-1/2	8	6			10837-00-B	10838-00-B

Straight Flute

General purpose taps designed for tapping through and blind holes 0.005" oversize. Can be used by hand or under power.

- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Plug or Bottom Chamfer

List 109, Straight Flute, 0.005" O/S (GH11), Plug or Bottom, Machine Screw and Fractional

Size	Pitch	No. of Flutes	GH11 Plug	GH11 Bottom
6	32	3	10900-00-B	
8	32	4	10901-00-B	
10	24	4	10902-00-B	
10	32	4	10903-00-B	
1/4	20	4	10940-00-B	10904-00-B
1/4	28	4	10905-00-B	
5/16	18	4	10946-00-B	10906-00-B
5/16	24	4	10907-00-B	
3/8	16	4	10950-00-B	10908-00-B
3/8	24	4	10909-00-B	
7/16	14	4	10954-00-B	
7/16	20	4	10910-00-B	
1/2	13	4	10958-00-B	10911-00-B
1/2	20	4	10912-00-B	
5/8	11	4	10966-00-B	10913-00-B
5/8	18	4	10914-00-B	
3/4	10	4	10915-00-B	

General purpose taps designed for tapping plastic in through or blind holes. Can be used by hand or under power.

- Recommended for thermoplastic and thermosetting plastic materials
- Stocked with #02 surface treatment, other surface coating/treatments upon request
- Standard high speed steel substrate
- ANSI Table 302 Blank
- Plug or Bottom Chamfer

List 111, Straight Flute, Plastic Series, Plug or Bottom, Machine Screw and Fractional

Size	Pitch	No. of Flutes	GH2		GH3		GH5		GH7	
			Plug	Bottom	Plug	Bottom	Plug	Bottom	Plug	Bottom
2	56	3	11114-02-B	11115-02-B			11116-02-B	11117-02-B		
4	40	3	11118-02-B	11119-02-B			11120-02-B	11121-02-B		
6	32	3			11122-02-B	11123-02-B			11124-02-B	11125-02-B
8	32	3			11126-02-B	11127-02-B			11128-02-B	11129-02-B
10	24	3			11130-02-B	11131-02-B			11133-02-B	11134-02-B
10	32	3			11135-02-B	11136-02-B			11137-02-B	11138-02-B
1/4	20	3			11139-02-B	11140-02-B			11141-02-B	11142-02-B
1/4	28	3			11143-02-B	11144-02-B			11145-02-B	11146-02-B

Straight Flute

General purpose taps designed for tapping through and blind holes. Can be used by hand or under power.

- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Plug or Bottom Chamfer

List 115, Straight Flute, Left Hand, Plug or Bottom, Machine Screw, Fractional

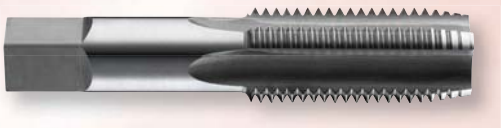
Size	Pitch	No. of Flutes	GH3 Plug	GH3 Bottom
6	32	3	11521-00-B	11522-00-B
6	40	3	11158-03-B	11159-00-B
8	32	4	11523-00-B	11524-00-B
8	36	4	11560-00-B	11561-00-B
10	24	4	11525-00-B	11526-00-B
10	32	4	11527-00-B	11528-00-B
1/4	20	4	11529-00-B	11530-00-B
1/4	28	4	11531-00-B	11532-00-B
5/16	18	4	11533-00-B	11534-00-B
5/16	24	4	11535-00-B	11536-00-B
3/8	16	4	11537-00-B	11538-00-B
3/8	24	4	11539-00-B	11540-00-B
7/16	14	4	11541-00-B	11542-00-B
7/16	20	4	11543-00-B	11544-00-B
1/2	13	4	11545-00-B	11546-00-B
1/2	20	4	11547-00-B	11548-00-B
9/16	12	4	11562-00-B	11563-00-B
9/16	18	4	11564-00-B	11565-00-B
5/8	11	4	11549-00-B	11550-00-B
5/8	18	4	11551-00-B	11552-00-B
3/4	10	4	11553-00-B	11554-00-B
3/4	16	4	11555-00-B	11556-00-B
7/8	9	4	11566-00-B	11567-00-B
7/8	14	4	11568-00-B	11569-00-B
1"	8	4	11570-00-B	11571-00-B
1"	12	4	11572-00-B	11573-00-B

General purpose taps designed for tapping through and blind holes in applications requiring extended reach. Can be used by hand or under power.

- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 303A Blank
- Plug or Bottom Chamfer

List 113, Straight Flute, Extension, Plug or Bottom, Machine Screw, Fractional

Size	NC	NF	No. of Flutes	OAL	GH3 Plug	GH3 Bottom
6	32		3	6	11350-00-B	11351-00-B
8	32		4	6	11352-00-B	11353-00-B
10	24		4	6	11354-00-B	11355-00-B
10		32	4	6	11356-00-B	11357-00-B
1/4	20		4	6	11358-00-B	11359-00-B
1/4	20		4	8	11380-00-B	
1/4		28	4	6	11360-00-B	11361-00-B
5/16	18		4	6	11362-00-B	11363-00-B
5/16	18		4	8	11381-00-B	
5/16		24	4	6	11364-00-B	11365-00-B
3/8	16		4	6	11366-00-B	11367-00-B
3/8	16		4	8	11382-00-B	
3/8		24	4	6	11368-00-B	11369-00-B
7/16	14		4	6	11383-00-B	
1/2	13		4	6	11384-00-B	
1/2	13		4	8	11385-00-B	
1/2	13		4	10	11386-00-B	
5/8	11		4	6	11387-00-B	
5/8	11		4	8	11388-00-B	
3/4	10		4	10	11389-00-B	



General purpose taps designed for tapping through and blind holes that will accommodate a screw thread insert (STI). Can be used by hand or under power.

- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 322 Blank
- Plug or Bottom Chamfer, Inch sizes
- Modified Bottom Chamfer, Metric sizes

List 122, Straight Flute, Screw Thread Insert (STI), Plug or Bottom Chamfer (Metric Modified Bottom Chamfer Only) Machine Screw, Fractional and Metric

Size STI	NC	NF	No. of Flutes	GH1 Plug	GH1 Bottom	GH2 Plug	GH2 Bottom	GH3 Plug	GH3 Bottom	GH4 Plug	GH4 Bottom
2	56		3			12200-00-B	12201-00-B				
3	48		3			12202-00-B	12203-00-B				
4	40		3	12204-00-B	12205-00-B	12206-00-B	12207-00-B				
4		48	3			12208-00-B	12209-00-B				
5	40		3			12212-00-B	12213-00-B				
6	32		3			12214-00-B	12215-00-B	12216-00-B	12217-00-B		
6		40	3		12219-00-B	12224-00-B	12225-00-B				
8	32		3			12220-00-B	12221-00-B	12222-00-B	12223-00-B		
8		36	3			12262-00-B	12263-00-B				
10	24		3			12226-00-B	12227-00-B	12228-00-B	12229-00-B		
10		32	3			12230-00-B	12231-00-B	12232-00-B	12233-00-B		
1/4	20		3			12238-00-B	12239-00-B	12240-00-B	12241-00-B		
1/4		28	3			12242-00-B	12243-00-B	12244-00-B	12245-00-B		
5/16	18		4					12246-00-B	12247-00-B	12264-00-B	12265-00-B
5/16		24	4			12248-00-B	12249-00-B	12266-00-B	12267-00-B		
3/8	16		4					12250-00-B	12251-00-B	12268-00-B	12269-00-B
3/8		24	4			12252-00-B	12253-00-B	12270-00-B	12271-00-B		
7/16	14		4					12254-00-B	12255-00-B	12273-00-B	12274-00-B
7/16		20	4					12256-00-B	12257-00-B	12275-00-B	12276-00-B
1/2	13		4					12258-00-B	12259-00-B	12277-00-B	12278-00-B
1/2		20	4					12260-00-B	12261-00-B	12279-00-B	12280-00-B

Size	Pitch	No. of Flutes	GD2 Mod-Bott	GD3 Mod-Bott	GD4 Mod-Bott
M2	0.40	2	12281-00-B		
M2.5	0.45	2	12282-00-B		
M3	0.50	3	12283-00-B		
M4	0.70	3		12284-00-B	
M5	0.80	3		12285-00-B	
M6	1.00	3		12286-00-B	
M8	1.25	3		12287-00-B	
M10	1.50	3			12288-00-B
M12	1.75	3			12289-00-B

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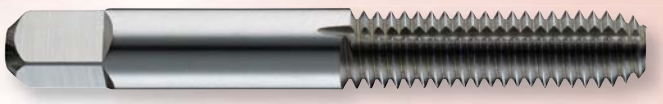
HERITAGE CUTTER

Thread Forming Taps



General purpose taps designed for thread forming in through or blind holes. Best used under power.

List 124, Thread Forming – True Lead, Plug or Bottom Taper (Chamfer), Machine Screw, Fractional and Metric

Size	NC	NF	No. Lube Grooves	GH2 Plug	GH2 Bottom	GH3 Plug	GH3 Bottom	GH4 Plug	GH4 Bottom	GH5 Plug	GH5 Bottom
0		80	0	12400-00-B	12401-00-B		15501-00-B				
1	64		0		12403-00-B						
1		72	0		12405-00-B						
2	56		0		12407-00-B	12408-00-B	12409-00-B				
2		64	0		12411-00-B		12413-00-B				
3	48		0		15547-00-B		12415-00-B				
3		56	0				12417-00-B				
4	40		0			12418-00-B	12419-00-B			12420-00-B	12421-00-B
4		48	0			12422-00-B	12423-00-B				15579-00-B
5	40		0			12424-00-B	12425-00-B			12426-00-B	12427-00-B
6	32		1			12432-00-B	12433-00-B			12434-00-B	12435-00-B
6		40	1			12436-00-B	12437-00-B			12438-00-B	12439-00-B
8	32		1			12440-00-B	12441-00-B			12442-00-B	12443-00-B
8		36	1				12445-00-B				
10	24		1					12448-00-B	12449-00-B		
10		32	1					12452-00-B	12453-00-B		
12	24		1					12456-00-B	12457-00-B		
1/4	20		1			15716-00-B	15717-00-B	12462-00-B	12463-00-B		
1/4		28	1					12466-00-B	12467-00-B		
5/16	18		1							12468-00-B	12469-00-B
5/16		24	1							12472-00-B	12473-00-B
3/8	16		1							12476-00-B	12477-00-B
3/8		24	1							12480-00-B	12481-00-B
7/16	14		1								
7/16		20	1								
1/2	13		1							12492-00-B	12493-00-B
1/2		20	1							12496-00-B	12497-00-B
5/8	11		1								
5/8		18	1								
3/4	10		1								
3/4		16	1								

List 124M, Thread Forming – True Lead, Metric

Size	Pitch	No.of Flutes	GD5 Plug	GD5 Bottom	GD6 Plug	GD6 Bottom	GD7 Plug	GD7 Bottom	GD8 Plug	GD8 Bottom
M3	0.50	0	16464-00-B	16465-00-B						
M4	0.70	1			16466-00-B	16467-00-B				
M5	0.80	1					16468-00-B	16469-00-B		
M6	1.00	1							16470-00-B	16471-00-B
M8	1.25	1								
M10	1.50	1								
M12	1.75	1								

- Highly recommended for ductile materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 302 Blank
- Plug or Bottom taper (Chamfer)

List 124, (continued)

Size	NC	NF	No. Lube Grooves	GH6 Plug	GH6 Bottom	GH7 Plug	GH7 Bottom	GH8 Plug	GH8 Bottom	GH10 Plug	GH10 Bottom
0		80	0								
1 1	64	 72	0 0								
2 2	56	 64	0 0								
3 3	48	 56	0 0								
4 4	40	 48	0 0								
5	40		0								
6 6	32	 40	1 1								
8 8	32	 36	1 1								
10 10	24	 32	1 1	12450-00-B 12454-00-B	12451-00-B 12455-00-B						
12	24		1	12458-00-B	12459-00-B						
1/4 1/4	20	 28	1 1	12464-00-B 15734-00-B	12465-00-B 15735-00-B						
5/16 5/16	18	 24	1 1			12470-00-B 12474-00-B	12471-00-B 12475-00-B				
3/8 3/8	16	 24	1 1			 12482-00-B	12479-00-B 12483-00-B				
7/16 7/16	14	 20	1 1					12486-00-B 15834-00-B	 15835-00-B		
1/2 1/2	13	 20	1 1					12494-00-B	12495-00-B		
5/8 5/8	11	 18	1 1			15924-00-B 15948-00-B	15925-00-B 15949-00-B			15930-00-B	15931-00-B
3/4 3/4	10	 16	1 1			15972-00-B 15996-00-B	15973-00-B 15997-00-B			15978-00-B	15979-00-B

List 124M, (continued)

Size	Pitch	No.of Flutes	GD9 Plug	GD9 Bottom	GD10 Plug	GD10 Bottom	GD11 Plug	GD11 Bottom
M3	0.50	0						
M4	0.70	1						
M5	0.80	1						
M6	1.00	1						
M8	1.25	1	16472-00-B	16473-00-B				
M10	1.50	1			16474-00-B	16475-00-B		
M12	1.75	1						16477-00-B

List 130, Straight Flute, NPT for Cast Iron
List 132, Straight Flute, NPTF for Cast Iron

General purpose taper pipe taps. Can be used by hand or under power.

- Recommended for gray cast iron, brass and materials producing small broken chips
- Standard high speed steel substrate
- Stocked with #23 treatment, other surface coating upon request
- ANSI Table 311 Blank
- 3 Thread Chamfer

Size	Pitch	No. of Flutes	NPT	NPTF
1/8	27	4	13100-23-B	13300-23-B
*1/8	27	4	13101-23-B	13301-23-B
1/4	18	4	13102-23-B	13302-23-B
3/8	18	4	13103-23-B	13303-23-B
1/2	14	4	13104-23-B	13304-23-B
3/4	14	5	13105-23-B	13305-23-B
1"	11-1/2	5	13106-23-B	13306-23-B
1-1/4	11-1/2	5	13107-23-B	13307-23-B
1-1/2	11-1/2	7	13108-23-B	
2"	11-1/2	7	13109-23-B	

*= Small Shank

List 134, Straight Flute, NPT, (ANPT)
List 138, Straight Flute, NPTF

General purpose taper pipe taps. Can be used by hand or under power.

- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 311 Blank
- 3 Thread Chamfer

Size	Pitch	No. of Flutes	NPT, ANPT	NPTF
1/16	27	4	13400-00-B	
1/8	27	4	13402-00-B	13802-00-B
*1/8	27	4	13404-00-B	13804-00-B
1/4	18	4	13406-00-B	13806-00-B
3/8	18	4	13408-00-B	13808-00-B
1/2	14	4	13410-00-B	13810-00-B
3/4	14	5	13412-00-B	13812-00-B
1"	11-1/2	5	13414-00-B	13814-00-B
1-1/4	11-1/2	5	13416-00-B	13816-00-B
1-1/2	11-1/2	7	13418-00-B	13818-00-B
2"	11-1/2	7	13420-00-B	13820-00-B

*= Small Shank

List 136, Straight Flute– Interrupted, NPT
List 140, Straight Flute– Interrupted, NPTF

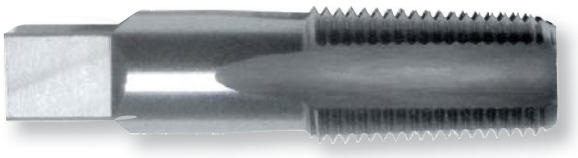
General purpose semi-interrupted taper pipe taps.
Can be used by hand or under power.

- Recommended for materials producing long stringy chips
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 311 Blank
- 3 Thread Chamfer

Size	Pitch	No. of Flutes	NPT	NPTF
1/8	27	4	13602-00-B	14002-00-B
*1/8	27	4	13604-00-B	14004-00-B
1/4	18	4	13606-00-B	14006-00-B
3/8	18	4	13608-00-B	14008-00-B
1/2	14	4	13610-00-B	14010-00-B
3/4	14	5	13612-00-B	14012-00-B
1"	11-1/2	5	13614-00-B	14014-00-B
1-1/4	11-1/2	5	13616-00-B	14016-00-B
1-1/2	11-1/2	7	13618-00-B	
2"	11-1/2	7	13620-00-B	

*= Small Shank

List 144, Straight Flute, PTF (Short Projection)



General purpose taper pipe taps. Can be used by hand
or under power.

- Designed for Shallow Blind Holes (SAE Short Specification)
- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 311 Blank
- 2 Thread Chamfer

Size	Pitch	No. of Flutes	PTF
1/8	27	4	14402-00-B
*1/8	27	4	14401-00-B
1/4	18	4	14406-00-B
3/8	18	4	14408-00-B
1/2	14	4	14410-00-B
3/4	14	5	14412-00-B

*= Small Shank

List 150, Straight Flute, Plug, NPS
List 152, Straight Flute, Plug, NPSF

General purpose straight pipe taps. Can be used by hand
or under power.

- Recommended for a wide range of materials
- Standard high speed steel substrate
- Stocked in bright finish, surface coating/treatments upon request
- ANSI Table 311 Blank
- Plug Chamfer

Size	Pitch	No. of Flutes	NPS	NPSF
1/8	27	4	15002-00-B	15202-00-B
1/4	18	4	15006-00-B	15206-00-B
3/8	18	4	15008-00-B	15208-00-B
1/2	14	4	15010-00-B	15210-00-B
3/4	14	5	15012-00-B	15212-00-B
1"	11-1/2	5	15014-00-B	15214-00-B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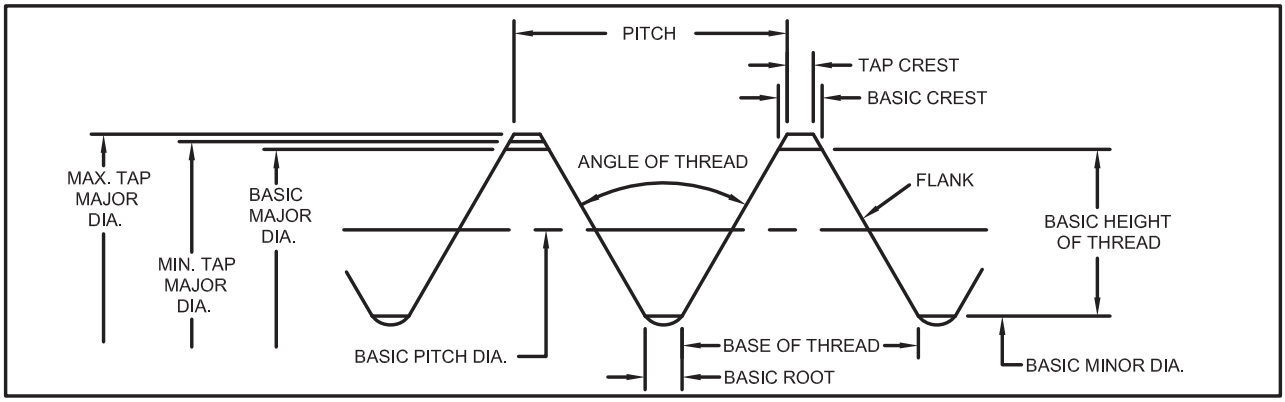
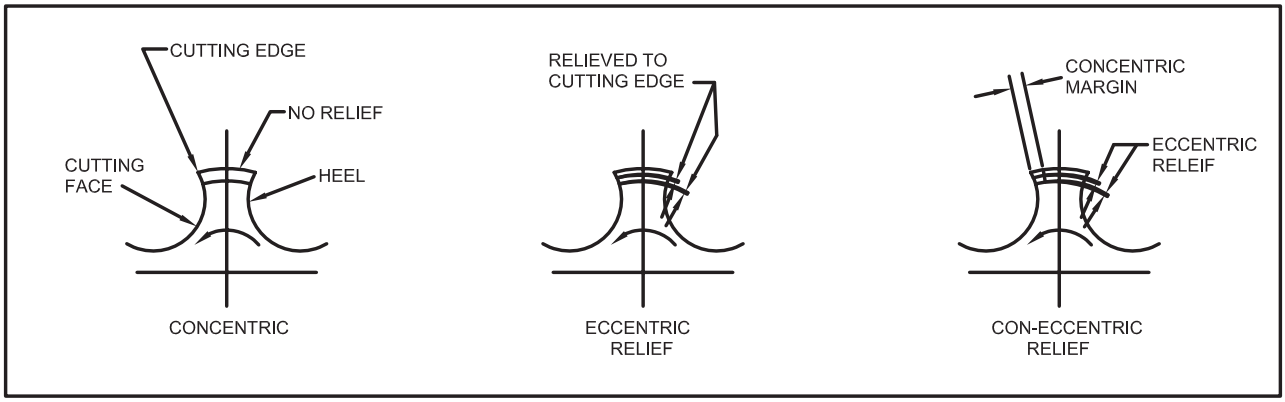
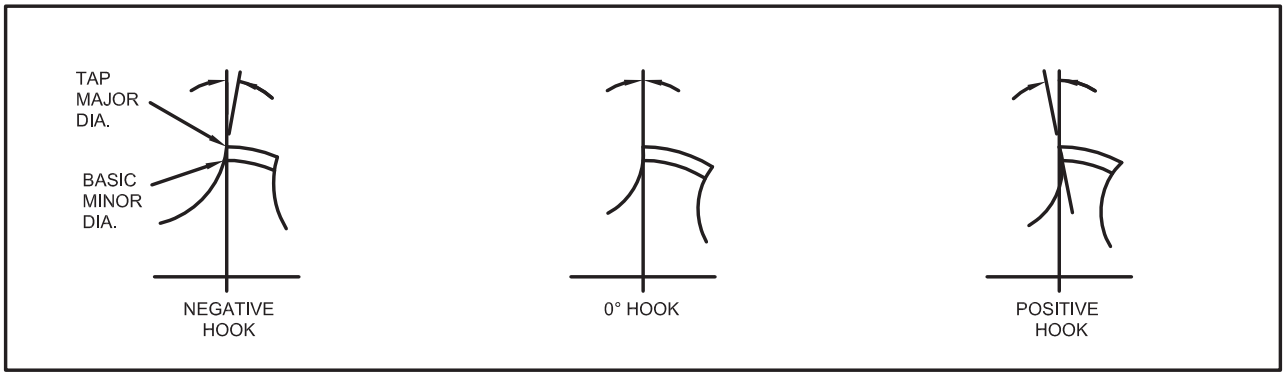
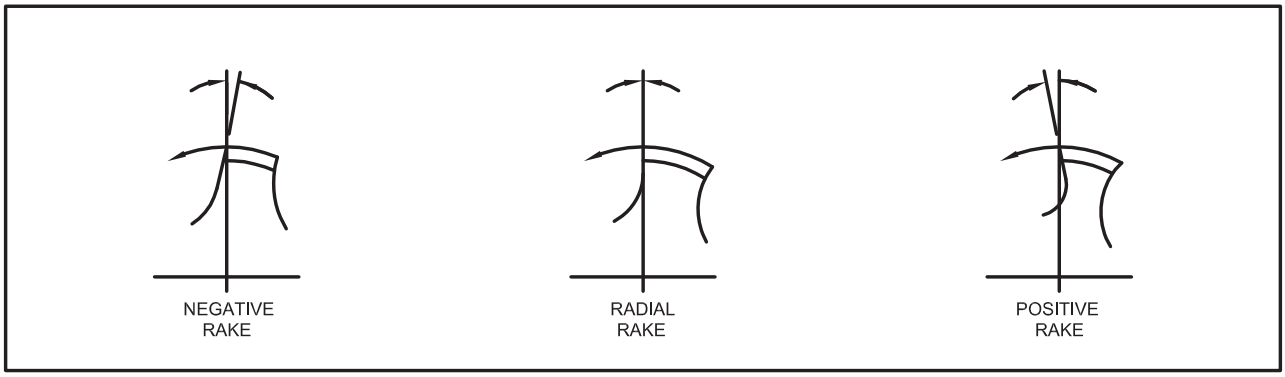
Technical Table of Contents

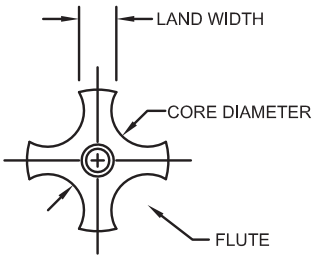
Terms Applying to Taps

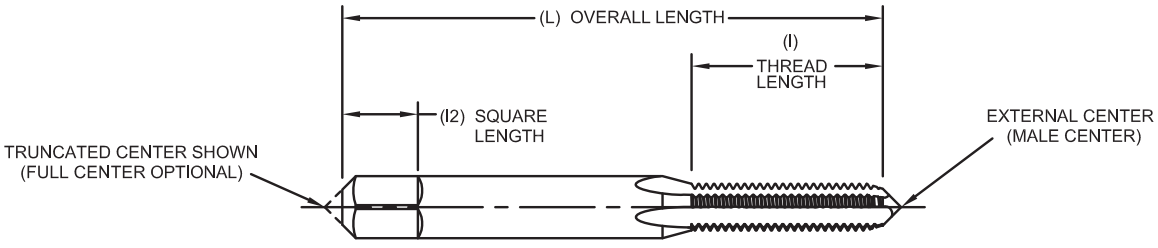




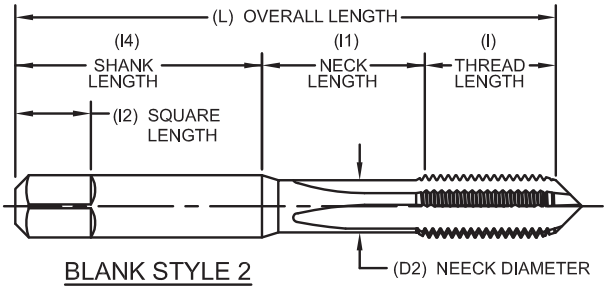




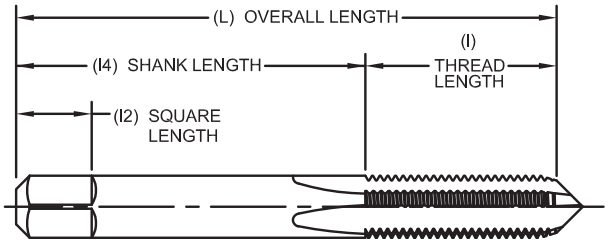




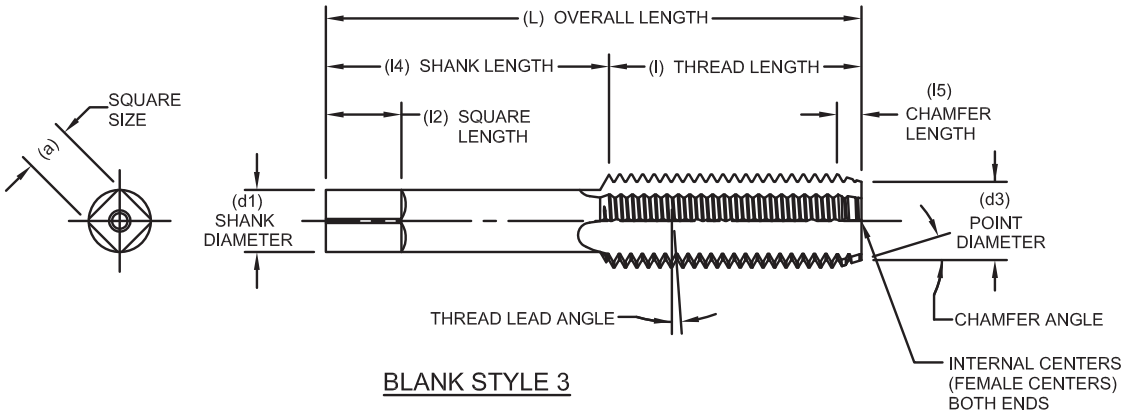
BLANK STYLE 1



BLANK STYLE 2
(WITH OPTIONAL NECK)



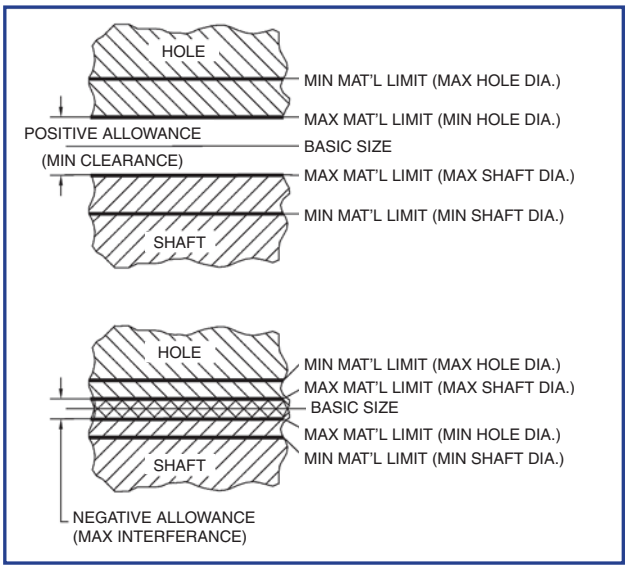
BLANK STYLE 2
(WITH OPTIONAL NECK)



BLANK STYLE 3

Nomenclature

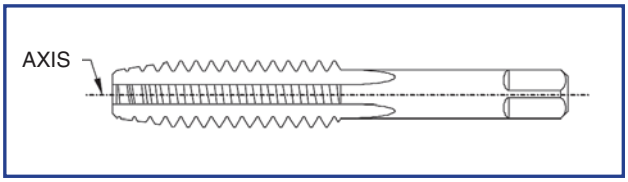
ALLOWANCE – A prescribed difference between the maximum material limits of mating parts. It is the maximum clearance (positive allowance) or maximum interference (negative allowance) between such parts.



ANGLE OF TAPER – The included angle of taper on a taper tap or screw thread.

ANGLE OF THREAD – The included angle of a thread (or angle of thread) is the angle between the flanks of the thread measured in an axial plane.

AXIS – The imaginary straight line which forms the longitudinal centerline of the tool or threaded part.



BACK TAPER – A gradual decrease in the diameter of the thread form on a tap from the chamfered end of the land toward the back which creates a slight radial relief in the threads.

BASE OF THREAD – That which coincides with the cylindrical or conical surface from which the thread projects.

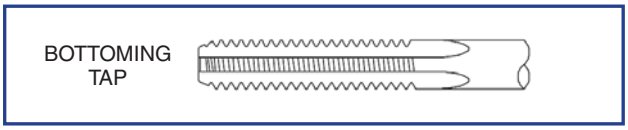
BASIC – See SIZE

BEARING – The actual contact area of the thread form on the land of a tap with the thread form on the product, exclusive of the chamfer cutting edge.

BELL-MOUTH THREAD – An internal thread which is larger in diameter at the start of the thread than at some distance beyond.

BODY – The threaded full diameter portion of a solid tap, inclusive of the chamfer.

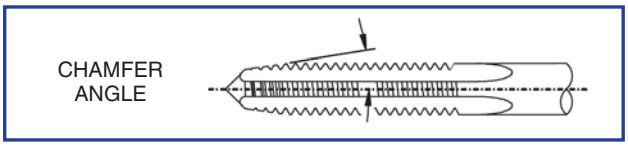
BOTTOMING TAP – A tap having a chamfer length of approximately 1 – 2 threads.



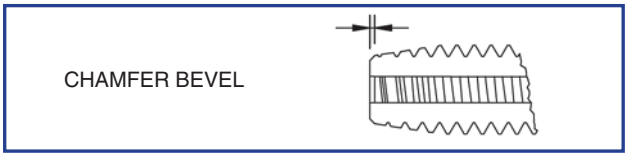
CENTER RELIEF – See RELIEF

CHAMFER – The tapering of the threads at the front end of each land of a tap by cutting away and relieving the crest of the first few teeth to distribute the cutting action over several teeth.

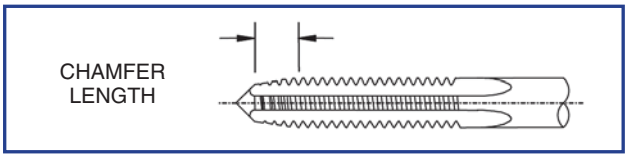
CHAMFER ANGLE – The angle formed between the chamfer and the axis of the tap, measured in an axial plane at the cutting edge.



CHAMFER BEVEL – An angular surface of revolution (which may or may not be relieved) preceding the point diameter of the tap. May also be referred to as a starting chamfer.



CHAMFER LENGTH – The length of the chamfer measured parallel to the axis at the cutting edge.



-Taper taps are chamfered 7 to 10 threads;
-Plug taps are chamfered 3 to 5 threads;
-Semi-Bottoming (Modified Bottoming) are chamfered 2 to 3 threads;
-Bottoming taps are chamfered 1 to 2 threads.

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CHAMFER RELIEF – The gradual decrease in land height from cutting edge to heel on the chamfered portion of the land on a tap to provide radial clearance for the cutting edge.

CHAMFER RELIEF ANGLE – The compliment of the angle formed between a line tangent to the relieved surfaces at the cutting edge and a radial line to the same point on the cutting edge.

CHIP BREAKERS – Steps or notches formed in the thread crest or cutting face for the purpose of breaking up chips.

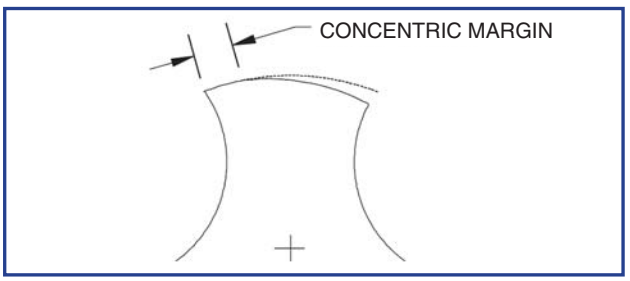
CLASSES OF THREADS – Classes of threads are distinguished from each other by the amounts of tolerance or tolerances and all allowance specified. It is not applicable to the tools used for threading.

CLEARANCE – Any space provided to prevent undesirable contact of the tool and the workpiece.

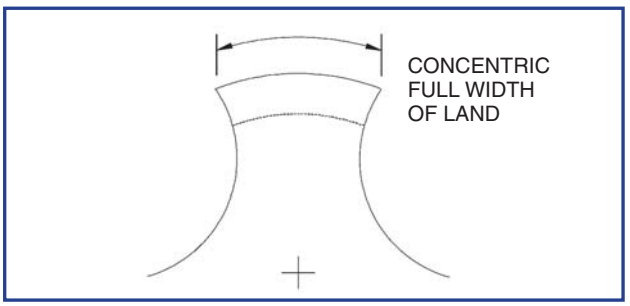
CONCENTRIC – Having a common center.

CONCENTRICITY – See preferred terms TIV and RELATIVE ECCENTRCITY to describe lack of concentricity between two or more tool elements.

CONCENTRIC MARGIN – A portion of the threaded land adjacent to the cutting edge, which has concentric threads.



CONCENTRIC THREADS – Threads that are substantially circular for the full land width with a center concentric with the tool axis; that is, having no relief in the thread form except for that slight amount produced by back taper.



CON-ECCENTRIC THREAD – See RELIEF

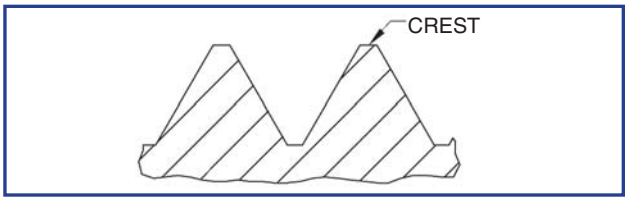
CONTROLLED ROOT TAP – A tap having specified minor diameter limits with or without a specified root shape.

CORE – The central portion of a tap below the flutes which joins the lands.

CORE DIAMETER – The diameter of a circle which is tangent to the bottom of the flutes at a given point on the axis.

CORE TAPER – The taper in the core of a tap.

CREST – That surface of the thread which joins the flanks of the thread and is farthest from the cylinder or cone from which the thread projects.



CREST CLEARANCE – The radial distance between the root of the internal thread and the crest of the external thread of the coaxially assembled design forms of mating parts.

CUTTING EDGE – The leading edge of the land in the direction of rotation for cutting and which does the actual cutting.

CUTTING FACE – The leading side of the land in the direction of rotation for cutting on which the chip impinges.

DRYSEAL – A thread system used for both external and internal application designed for use where the assembled product must withstand high fluid or gas pressure without the use of a sealing compound or where a sealer is functionally objectionable.

ECCENTRIC – Not having a common center.

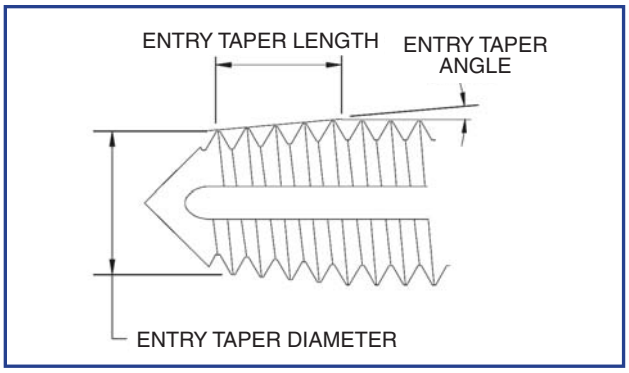
ECCENTRIC RELIF – See RELIEF.

ECCENTRICITY – (With respect to the tool axis.) One half of the Total Indicator Variation (TIV). See also RELATIVE ECCENTRICITY.

ECCENTRIC THREAD – See RELIEF.

END CUTTING TAP – A tap with an additional cutting edge below the chamfer.

ENTRY TAPER FORMING TAPS – The portion of a thread forming tap where the pitch diameter is tapered toward the front to allow entry into the hole to be tapped. These tapered threads produce contact points that perform the forming or extrusion process.

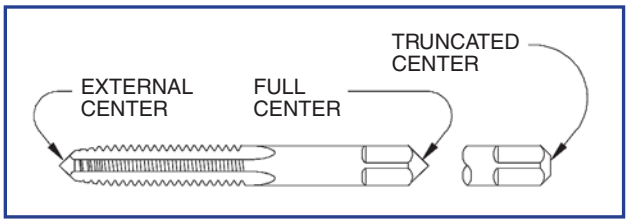


ENTRY TAPER LENGTH – The length, measured on the full diameter of the thread forming lobe, from the entry diameter position to the theoretical intersection of the tap major diameter and the entry taper angle.
Bottoming Length – 1 to 2-1/2 pitches
Plug Length – 3 to 5 pitches

ENTRY TAPER ANGLE – The angle at which the pitch diameter is tapered from the major diameter to the entry diameter portion.

ENTRY TAPER DIAMETER – The diameter measured at the thread crest nearest the front of the tap. This diameter must be an appropriate amount smaller than the diameter of the hole produced for tapping.

EXTERNAL CENTER – The pointed end on a tap. Its included angle varies with manufacturing practice. It must not be confused with the tap chamfer or a chamfer bevel. Also referred to as a male center.



FACE – See CUTTING FACE

FILLET – On a thread profile the radius joining the thread flank with the thread root.

FULL INDICATOR MOVEMENT (FIM) – The difference between the maximum and the minimum sweep of the indicator during the checking cycle. Similar to TIV

FIRST FULL THREAD – The first full thread on the cutting edge behind the chamfer. It is at this point that rake, hook and thread elements are measured.

FISHTAIL POINT – The type of point on an end cutting tap having an internal angular relief below the chamfer.

FLANK – The flank of a thread is either surface connecting the crest with the root. The flank surface intersection with the axial plane is theoretically a straight line.

FLANK, CLEARANCE – The clearance flank is that which does not take the externally applied axial load in an assembly.

FLANK, TRAILING – The trailing flank of a thread is the one that is opposite to the leading flank.

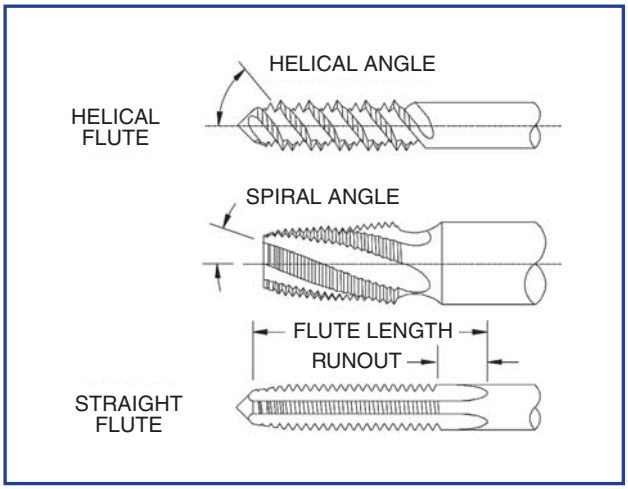
FLANK, LEADING – (1) The flank of a thread facing toward the chamfered end of a threading tool. (2) The leading flank of a thread is the one which, when the thread is about to be assembled with a mating thread, faces the mating part.

FLANK, PRESSURE – The pressure flank is that which takes the externally supplied axial load in an assembly. The term is used particularly in relation to buttress and other similar threads.

FLANK ANGLE – See HALF ANGLE

FLATTED LAND – See RELIEF

FLUTES – The longitudinal channels formed in a tap to create cutting edges on the thread profile and to provide chip spaces and cutting fluid passages. Flutes may be straight or angular (helical).
Angular Flute – A flute lying in a plane intersecting the tool axis at an angle.
Spiral Flute – A flute with uniform axial lead in a spiral path around the axis of a cylindrical or conical tap.
Straight Flute – A flute which forms a cutting edge lying in an axial plane.



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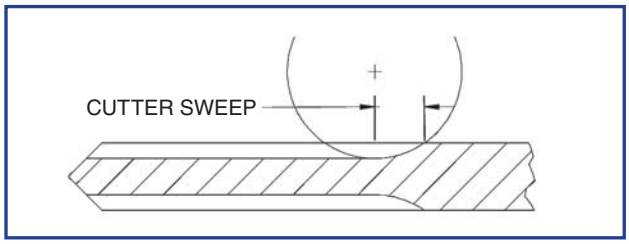
FLUTE ANGLE – The angle which the projection of an angular flute into an axial plane parallel to the flute makes with the tap axis.

FLUTE LEAD – The axial advance of a spiral cutting edge in one turn around the tool axis.

FLUTE LEAD ANGLE – The angle which a spiral cutting edge at a given point intersects with an axial plane through the same point.

FLUTE LENGTH – As applied to taps, the full axial length of a flute including the cutter sweep.

FLUTE RUNOUT – The section removed by the milling cutter or grinding wheel in exiting the flute.



FLUTE TAPER – See preferred term CORE TAPER.

FRONT TAPER – A gradual increase in the diameter of the thread form on a tap from the leading edge of the tool toward the back.

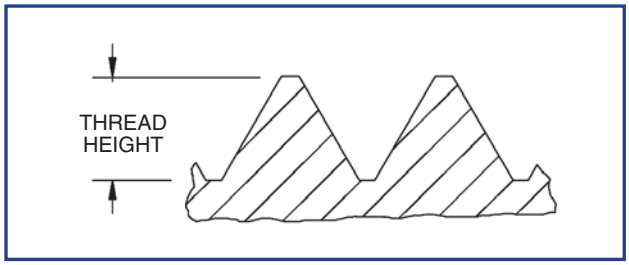
FULL INDICATOR READING – See preferred term TOTAL INDICATOR VARIATION (TIV).

GUN POINT – See preferred term SPIRAL POINT.

HALF ANGLE – The flank angle is the angle between the individual flank and a perpendicular line to the axis of the thread, measure in a axial plane. A flank angle of a symmetrical thread is commonly termed the half-angle of thread.

HEEL – The edge of the land opposite the cutting edge.

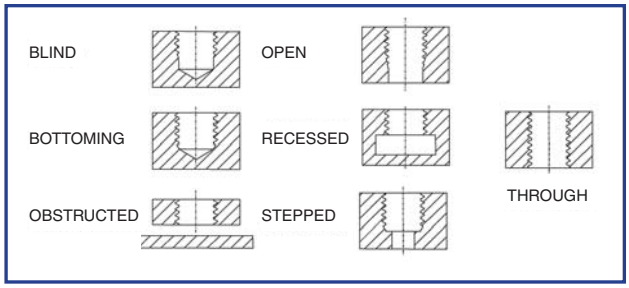
HEIGHT OF THREAD – The height of thread is the distance measured radially between the major and minor cylinders or cones, respectively.



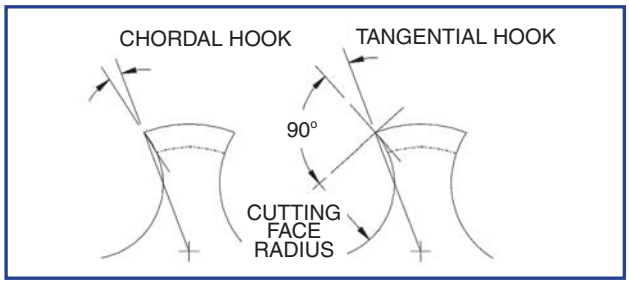
HEIGHT OF THREAD ENGAGEMENT – The height of thread engagement between two coaxially assembled mating threads is the radial distance by which their thread forms overlap each other.

HELIX VARIATION – Helix variation of a thread is an undulate aberration from true helical advancement. The "helical path" includes the helix with its superimposed variation and is measured either as the maximum deviation from the true helix or as the "cumulative pitch". The cumulative pitch is the distance measured parallel to the axis of the thread between corresponding points on any two thread forms whether or not they are in the same axial plane.

HOLE – (1) Blind – A hole which does not pass through the workpiece and is not threaded to its full depth.
(2) Bottoming – A blind hole which is threaded close to the bottom. **(3) Obstructed –** A through hole which has some obstruction beyond the hole limiting the travel of the tap.
(4) Open – A hole which passes through the workpiece but is not threaded its full depth. **(5) Recessed –** A blind hole with a recess larger than the tap major diameter and beyond the depth of full thread, limiting the travel of the tap.
(6) Stepped – A blind or open hole with a change in diameter which limits the thread depth. **(7) Through –** A hole which passes through the workpiece and is threaded its full depth.



HOOK ANGLE – The inclination of a concave cutting face, usually specified either as Chordal Hook or Tangential Hook,

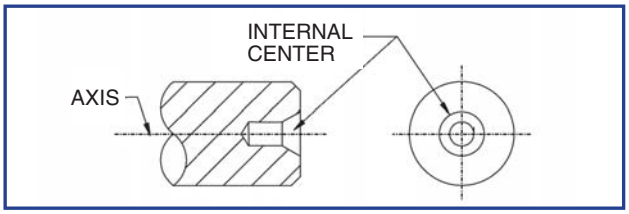


Chordal Hook Angle – The angle between the chord passing through the root and crest of a thread form at the cutting face, and a radial line through the crest at the cutting edge.
Tangential Hook Angle – The angle between the line tangent to a hook cutting face at the cutting edge and a radial line to the same point.

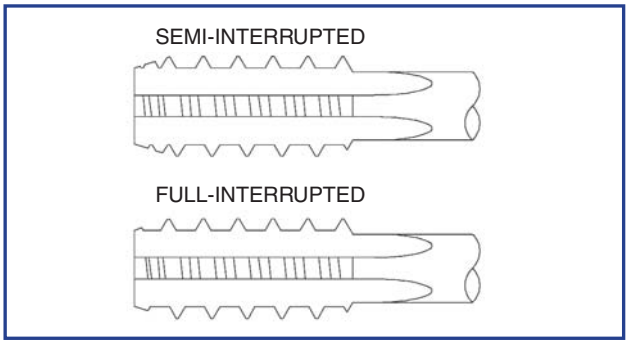
HOOK FACE – A concave cutting face.

INCLUDED ANGLE – See ANGLE OF THREAD.

INTERNAL CENTER – A 60 degree countersink with clearance at the bottom in one or both ends of a tool, which establishes the tap axis. May also be referred to as a female center.



INTERRUPTED THREAD TAP – A tap having an odd number of lands with alternate threads in the thread helix removed. In some cases alternate threads are removed only for a portion of the thread length.



LAND – One of the threaded sections between the flutes of a tap.

LAND WIDTH – The chordal width of the land between the cutting edges and the heel measured normal to the cutting edge.

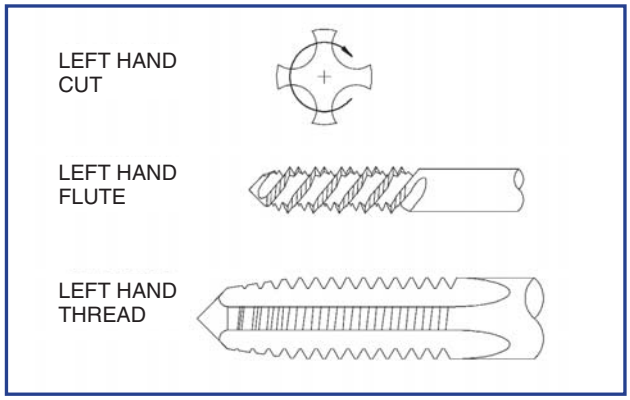
LEAD DEVIATION – The deviation from the basic (nominal) lead. Progressive Lead Deviation - (1) On a straight thread the deviation from a true helix where the thread helix advances uniformly but with increasing amount. (2) On a taper thread the deviation from a true spiral where the thread spiral advances uniformly but with increasing amount.

THREAD DRUNKEN – See HELIX VARIATIONS.

LEAD OF FLUTE – See FLUTE LEAD.

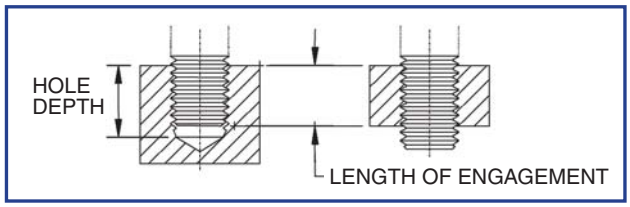
LEAD OF THREAD – The distance a screw thread advances axially in one complete turn. On a single lead screw or tap the lead and pitch are identical. On a double lead screw or tap the lead is twice the pitch, etc.

LEFT HAND CUT – Rotation in a clockwise direction for cutting when viewed from the chamfered end of a tap.
Left Hand Flutes – Flutes which, viewed axially, twist in a counterclockwise direction.
Left Hand Threads – A thread is a left hand thread if, when viewed axially, it winds in a counterclockwise and receding direction. All left hand threads are designated LH.



LENGTH – The dimension of a tool element measured parallel to the tool axis.

LENGTH OF ENGAGEMENT – The length of engagement of two mating threads is the axial distance over which two mating threads are designated to contact.



LIMITS – The limits of size are the applicable maximum and minimum sizes.

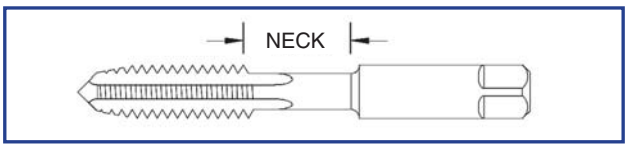
MAJOR DIAMETER – On a straight thread the major diameter is that of the major cylinder. On a taper thread the major diameter at a given position on the thread axis is that of the major cone at that position.

MALE CENTER – See preferred term EXTERNAL CENTER.

MARGIN – See CONCENTRIC MARGIN

MINOR DIAMETER – On a straight thread the minor diameter is that of the minor cylinder. On a taper thread the minor diameter at a given position on the thread axis is that of the minor cone at that position.

NECK – A section of reduced diameter between two adjacent portions of a tool.



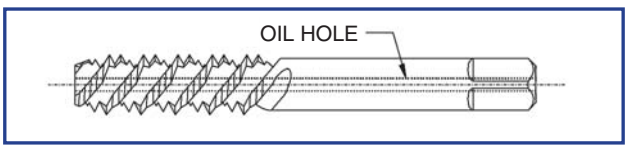
NOMINAL SIZE – See SIZE.

NON-REVERSING TAP – A tap which passes completely through the part being tapped without reversal of rotation of the tap or the part.

OFFSET – The distance a straight cutting face is off center or the distance the measuring chord is off center on a hook cutting face.

OIL GROOVES – Longitudinal straight or helical grooves in the shank, guide or pilot for lubrication or to carry cutting fluid to the cutting edges.

OIL HOLES – Holes by which a cutting fluid is fed to the cutting edges of a tool. They may either pass completely through the tool or exit in the flutes.



OVERALL LENGTH – The extreme length of a complete tool from end to end, but not including adjusting screw or external centers when required.

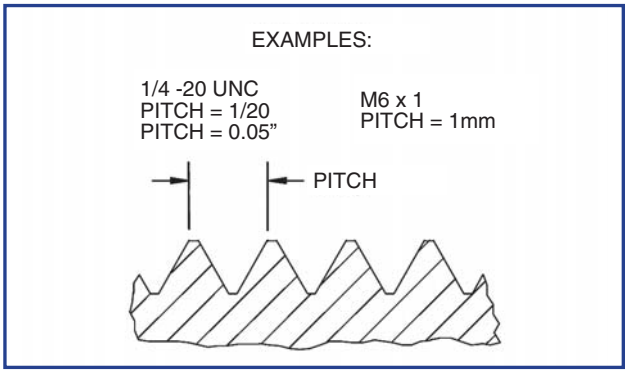
PERCENT OF THREAD – One-half the difference between the basic major diameter and the actual minor diameter of an internal thread, divided by the basic thread height, expressed as a percentage.

PILOT, PLAIN – A cylinder portion preceding the chamfered end of the tap body to maintain alignment.

PILOT, THREADED – A threaded portion preceding the chamfered end of a tap which facilitates starting the tap in correct relationship to a previously formed internal thread.

PITCH DIAMETER – On a straight thread, the pitch diameter is the diameter of the imaginary co-axial cylinder, the surface of which would pass through the thread profiles at such points as to make the width of the groove equal to one-half of the basic pitch. On a perfect thread this occurs at the point where the widths of the thread and groove are equal. On a taper thread, the pitch diameter at a given position on the thread axis is the diameter of the pitch cone at that position.

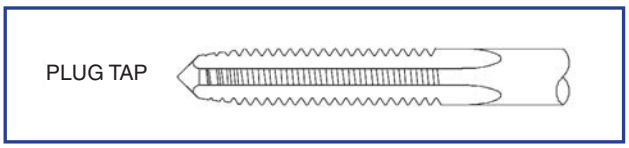
PITCH – The pitch of a thread having uniform spacing is the distance, measured parallel to its axis, between corresponding points on adjacent thread forms in the same axial plane and on the same side of the axis. The basic pitch is equal to the lead divided by the number of thread starts.



PITCH ERROR – The deviation from the true basic pitch measured between adjacent teeth on a land.

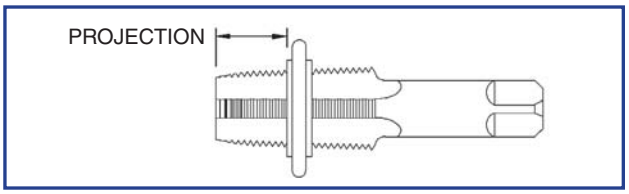
PITCH LINE – A generator of the imaginary cylinder or cone specified in the definition of Pitch Diameter.

PLUG TAP – A tap with 3 to 5 chamfered threads.



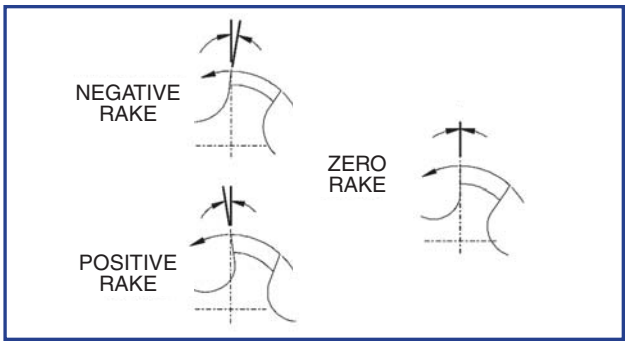
POINT DIAMETER – The diameter at the cutting edge of the leading end of the chamfered section.

PROJECTION – The distance the small end of a taper thread projects through a taper thread ring gauge.



PULL TAP – A tap which has its shank ahead of the chamfered threads so that the shank passes through the hole to be tapped before cutting begins.

RAKE – The angular relationship of the straight cutting face of a tooth with respect to a radial line through the crest of the tooth at the cutting edge. Positive rake means that the crest of the cutting face is angularly ahead of the balance of the cutting face of the tooth. Negative rake means that the crest of the cutting face is angularly behind the balance of the cutting face of the tooth.



RELIEF – The removal of metal behind the cutting edge to provide clearance between the part being threaded and the threaded land.

Center Relief – Clearance produced on a portion of the tap land by reducing the diameter of the entire thread form between cutting edge and heel.

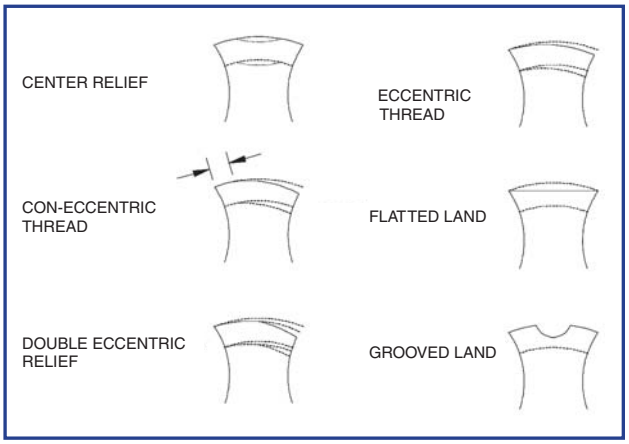
Con-Eccentric Relief – Radial relief in the thread form starting behind the concentric margin.

Double Eccentric Thread Relief – The combination of a slight radial relief in the thread form starting at the cutting edge and continuing for a portion of the land width, and a greater radial relief for the balance of the land.

Eccentric Thread Relief – Radial relief in the thread form starting at the cutting edge and continuing to the heel.

Flatted Land Relief – Clearance produced on a portion of the tap land by truncating the thread between cutting edge and heel.

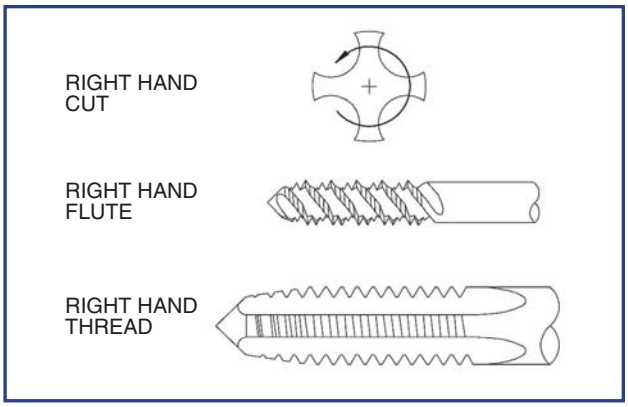
Grooved Land Relief – Clearance produced on a tap land by forming a longitudinal grove in the center of the land.



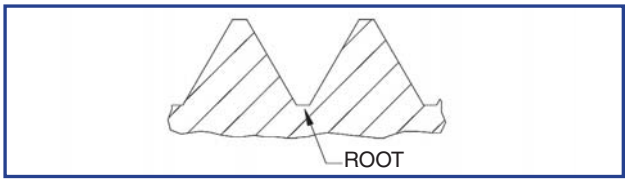
RIGHT HAND CUT – Rotation in a counterclockwise direction for cutting when viewed from the chamfered end of a tap.

Right Hand Flutes – Flutes which viewed axially, twist in a clockwise direction.

Right Hand Threads – A thread is a right hand thread if, when viewed axially, it winds in a clockwise and receding direction.



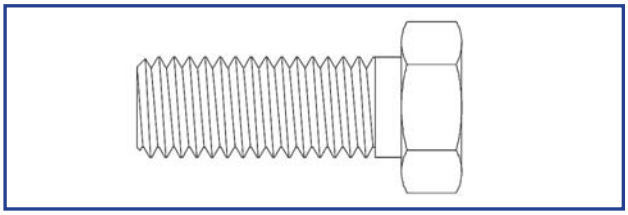
ROOT – The root is that surface of the thread which joins the flanks of adjacent thread forms and is identical with or immediately adjacent to the cylinder or cone from which the thread projects.



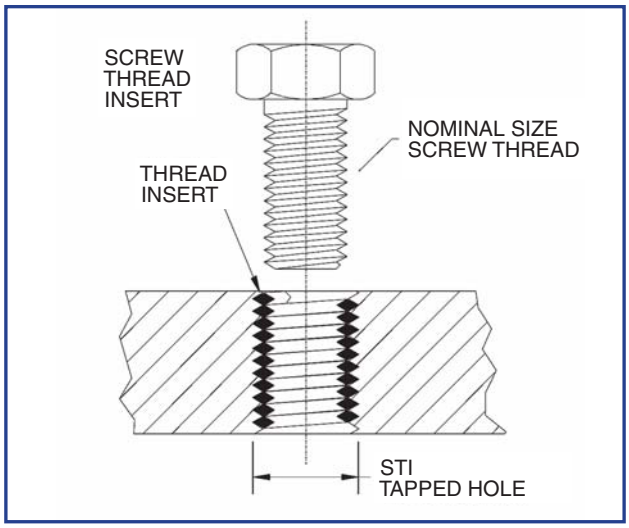
RUNOUT – The radial variation from a true circle which lies in a diametral plane and is concentric with the tool axis. See also TOTAL INDICATOR VARIATION (TIV).

SALVAGE HOLE – An internal center in the front end of a tool with sufficient clearance to permit facing back the end of the tool.

SCREW THREAD – The screw thread is a ridge, usually of uniform section and produced by forming a groove in the form of a helix on the external or internal surface of a cylinder, or in the form of a conical spiral on the external or internal surface of a cone or frustum of a cone. A screw thread formed on a cylinder is known as a straight or parallel thread, to distinguish it from a taper screw thread which is formed on a cone or frustum of a cone.

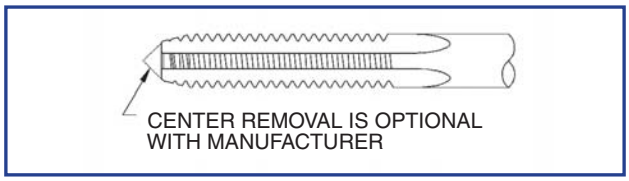


Screw Thread Insert (STI) – (commonly referred to as "helical thread insert"). Screw thread bushing coiled from diamond shaped cross-section wire. They are screwed into oversize tapped holes to form nominal size internal threads.



SCREW THREAD INSERT (STI) TAP – These taps are oversize to the extent that the internal thread which they produce will accommodate a helical coil screw thread insert which at final assembly will accept a screw thread of the nominal size and pitch.

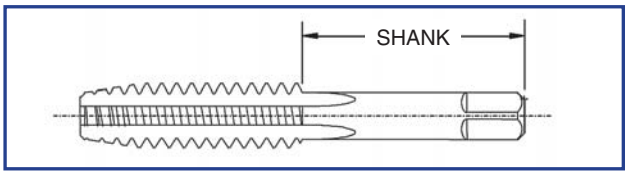
SEMI-BOTTOMING TAP – A tap having a chamfer length of approximately 2 – 3 threads.



SET – A set of hand taps consists of one each of standard taper, plug and bottoming straight fluted hand taps of the same pitch and major diameter.

SET, SERIAL – Two or more related taps which, used in a specified sequence, progressively cut a thread of full width and height. Taps in a set frequently have a thread form modified from, or entirely different from the basic thread form. They are identified by annular grooves on the shank near the square.

SHANK – The portion of the tool by which it is held and driven.
Square Shank – A cylindrical shank with driving square only.
Plain Round Shank – A cylindrical shank without driving square or other driving means.
Flatted Round Shank – A cylindrical shank with set screw flat only.



SHAVING – The excessive removal of material from the product thread profile by the tool thread flanks caused by an axial advance per revolution less than or more than the actual lead on the tool. In tapping this results in an increase in product pitch diameter without an increase in product major diameter.

SIZE, BASIC – Is that size from which the limits of size are derived by the application of allowances and tolerances.

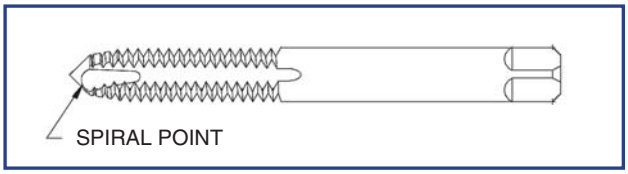
SIZE, FUNCTIONAL – The functional diameter of an external or internal thread is the pitch diameter of the enveloping thread of perfect pitch, lead and flank angles, having full depth of engagement but clear at crests and roots, and of a specified length of engagement. It may be derived by subtracting from the pitch diameter in the case of an internal thread, the cumulative effects from deviations from specified profile, including variations in lead and flank angle over a specified length of engagement. The effects of taper, out-of-roundness and surface defect may be positive or negative on internal threads.

SIZE, NOMINAL – The designation used for the purpose of general identification.

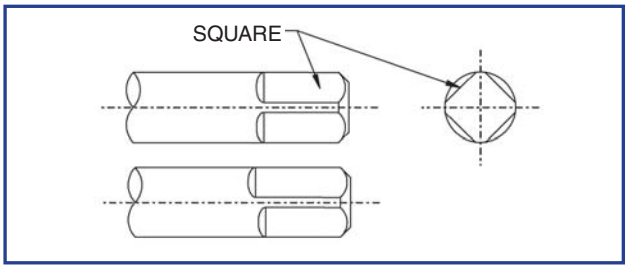
SPIRAL FLUTE – See FLUTES

SPIRAL POINT – The angular fluting in the cutting face of the land at the chamfered end. It is formed at an angle with respect to the tap axis of opposite hand to that of rotation. Its length is usually greater than the chamfer length and its angle with respect to the tap axis is usually made great enough to direct the chips ahead of the tap. The tap may or may not have longitudinal flutes.

SPIRAL POINT ANGLE – The angle made by the projection of the spiral point flute into an axial plane parallel to the tap axis.



SQUARE – Four driving flats parallel to the axis of the tap shank forming a square or square with round corners.



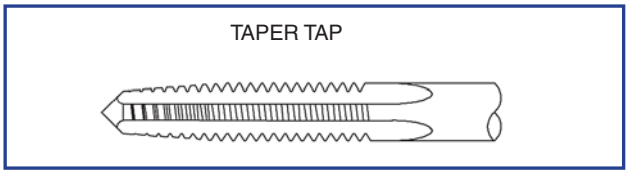
STRAIGHT FLUTE – See FLUTES

TAPER PER INCH – (1) On a taper threaded part, or on a taper shank, the difference in diameter in one inch measured parallel to the axis. (2) On a taper tap the difference in diameter in one inch measured parallel to the axis of the cutting face.

TAPER SHANK – A shank made to fit a specified taper socket.

TAPER START – A tapering of the threads, with respect to axis, which progressively reduces the diameter of the thread form for a short distance toward the entering end of the tap.

TAPER TAP – A tap having a chamfer length of 7 to 10 threads.



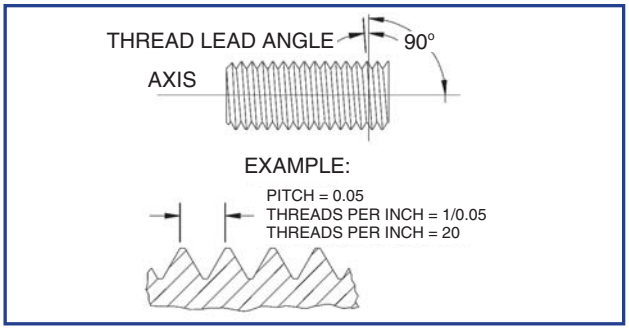
THREADS PER INCH (TPI) – The reciprocal of the pitch in inches.

THREAD, SINGLE – A tap having a lead equal to the pitch.

THREAD, MULTIPLE – A thread of which the lead is an integral multiple of the pitch. On a double thread, the lead is equal to twice the pitch. On a triple thread the lead is equal to three times the pitch, etc.

THREAD HELIX ANGLE – See preferred term THREAD LEAD ANGLE.

THREAD LEAD ANGLE – On a straight thread, the lead angle is the angle made by the helix of the thread at the pitch line with a plane perpendicular to the axis. On a taper thread, the lead angle at a given axial position is the angle made by the conical spiral of the thread, with the plane perpendicular to the axis, at the pitch line.



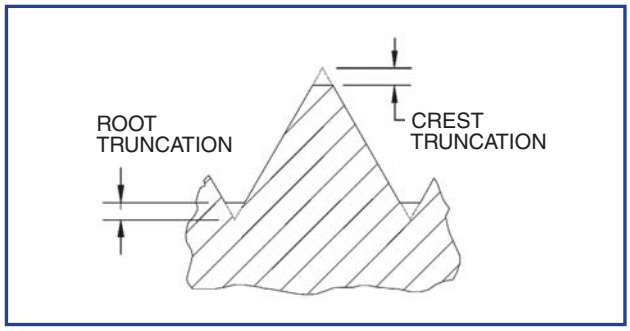
TIV – Total indicator variation.

TOLERANCE – The total permissible variation of a size. The tolerance is the difference between the limits of size.

TOTAL INDICATOR READING – See preferred term TOTAL INDICATOR VARIATION (TIV).

TOTAL INDICATOR VARIATION (TIV) – The difference between maximum and minimum indicator readings obtained during a checking cycle.

TRUNCATION, CREST – The crest truncation of a thread is the radial distance between the sharp crest and the cylinder or cone that would bound the crest.



TRUNCATION, ROOT – The root truncation of a thread is the radial distance between the sharp root and the cylinder or cone that would bound the root.

TURNS PER INCH – The number of turns per inch is the reciprocal of the lead in inches.

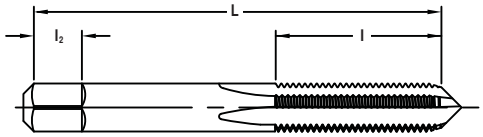
Standard Marking Symbols

Standard Tap Marking	Product Thread Designation	Thread Series	Governing Standards
STI	STI	Helical Coil wire screw thread insert	ASME B18.29.1
ACME-C	ACME-C	Acme thread – centralizing	ASME B1.5
ACME-G	ACME-G	Acme thread – general purpose	ASME B1.5
STUB ACME	STUB ACME	Stub acme thread	ASME B1.8
NH	NH	American National Hose	ASME B1.20.7
ANPT	ANPT	Aeronautical National form taper pipe	MIL-P-7105
NGO	NGO	National Gas outlet thread	ANSI/CSA/CGA STD V-1
NGS	NGS	National Gas straight thread	ANSI/CSA/CGA STD V-1
NGT	NGT	National Gas taper thread	ANSI/CSA/CGA STD V-1
PTF-SAE	PTF-SAE-SHORT	Dryseal SAE short taper pipe thread	ASME B1.20.3
AMO	AMO	American National Standard Microscope Objective Thread	ASME B1.11
UNM	UNM	Unified Miniature thread series	ASME B1.10
BUTT	BUTT	American Buttress thread	AMSE B1.9
SGT	SGT	Special Gas Taper thread	ANSI/CSA/CGA STD V-1
SPL-PTF	PTF	Special Dryseal taper pipe thread	ASME B1.20.3
BSW	BSW	British Standard Whitworth coarse thread	BSI BS84
BSF	BSF	British Standard Whitworth fine thread	BSI BS84
Rc	Rc	British Standard Taper Pipe for pressure tight joints	BSI BS21
Rp	Rp	British Standard Straight Pipe for pressure tight joints	BSI BS21
G	G	British Standard Straight Pipe for non-pressure tight joints such as mechanical assemblies	BSI B52779
G – trunc	G – trunc	British Standard Straight Pipe for non-pressure tight joints such as mechanical assemblies with truncated crests	BSI B52779
M	M	Metric Screw Threads – M Profile with basic ISO 65 profile	ASME B1.13M B1.10M
M	MJ	Metric Screw Threads – M Profile with a rounded root radius equal to 0.15011P to 0.18042P (ext. thread only)	ASME B1.21M
NC	NC5IF	Class 5 Interference fit internal thread – Entire ferrous material range	ASME B1.12
NC	NC5INF	Class 5 Interference fit internal thread – Entire nonferrous material range	ASME B1.12
NPS	NPSC	American Standard Straight Pipe threads in pipe couplings	ASME B1.20.1
NPSF	NPSF	Dryseal American Standard fuel internal straight pipe threads	ASME B1.20.3
NPSH	NPSH	American Standard Straight Hose coupling threads for joining to American Standard taper pipe threads	ASME B1.20.7

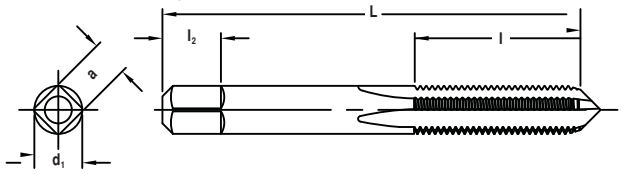
Standard Tap Marking	Product Thread Designation	Thread Series	Governing Standards
NPSI	NPSI	Dryseal American Standard intermediate internal straight pipe threads	ASME B1.20.3
NPSL	NPSL	American Standard Straight Pipe threads for loose fitting mechanical joints with locknuts	ASME B1.20.1
NPS	NPSM	American Standard Straight Pipe threads for free fitting mechanical joints for fixtures	ASME B1.20.1
NPT	NPT	American Standard Taper Pipe threads for general use	ASME B1.20.1
NPTF	NPTF	Dryseal American Standard Taper Pipe thread	ASME B1.20.3
NPTR	NPTR	American Standard Taper Pipe threads for railing joints	ASME B1.20.1
N	UN	Unified Inch Screw Thread, constant pitch series	ASME B1.1
NC	UNC	Unified Inch Screw Thread, coarse pitch series	ASME B1.1
NF	UNF	Unified Inch Screw Thread, fine pitch series	ASME B1.1
NEF	UNEF	Unified Inch Screw Thread, extra fine pitch series	ASME B1.1
N	UNJ	Unified Inch Screw Thread, constant pitch series, with rounded root radius 0.15011P to 0.18042P (ext. thd. only)	ASME B1.15
NC	UNJC	Unified Inch Screw Thread, coarse pitch series, with rounded root radius 0.15011P to 0.18042P (ext. thd. only)	ASME B1.15
NF	UNJF	Unified Inch Screw Thread, fine pitch series, with rounded root radius 0.15011P to 0.18042P (ext. thd. only)	ASME B1.15
NEF	UNJEF	Unified Inch Screw Thread, extra fine pitch series, with rounded root radius 0.15011P to 0.18042P (ext. thd. only)	ASME B1.15
NS	UNJS	Unified Inch Screw Thread, special pitch series, with rounded root radius 0.15011P to 0.18042P (ext. thd. only)	ASME B1.15
N	UNR	Unified Inch Screw Thread, constant pitch series, with rounded root radius not less than 0.108P (ext. thd. only)	ASME B1.1
NC	UNCR	Unified Inch Screw Thread, coarse pitch series, with rounded root radius not less than 0.108P (ext. thd. only)	ASME B1.1
NF	UNFR	Unified Inch Screw Thread, fine pitch series, with rounded root radius not less than 0.108P (ext. thd. only)	ASME B1.1
NEF	UNEFR	Unified Inch Screw Thread, extra fine pitch series, with rounded root radius not less than 0.108P (ext. thd. only)	ASME B1.1
NS	UNS	Unified Inch Screw Thread, special diameter, pitch or length of engagement	ASME B1.1

Table 302 Blank Dimensions

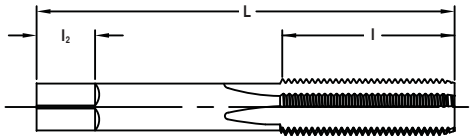
Style 1



Style 2



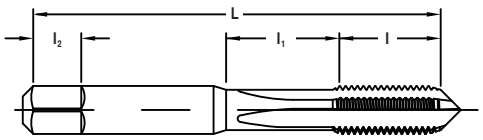
Style 3



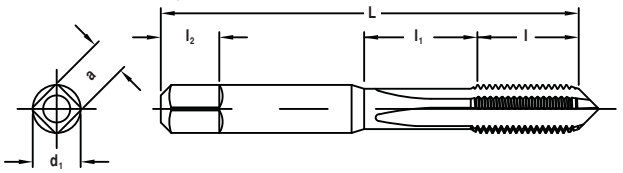
Machine Screw Size No. (Inches)	Nominal Fractional Diameter	Nominal Metric Diameter Millimeters, (Inches)	Blank Design No.	Dimensions – Inches				
				Overall Length L	Thread Length l	Square Length l_2	Shank Diameter d_1	Size of Square a
0 (.0600)		M1.6(.0630)	1	1.63	0.31	0.19	0.1410	0.110
1 (.0730)		M1.8 (.0709)	1	1.69	0.38	0.19	0.1410	0.110
2 (.0860)		M2 (.0787), M2.2 (.0866)	1	1.75	0.44	0.19	0.1410	0.110
3 (.0990)		M2.5 (.0984)	1	1.81	0.50	0.19	0.1410	0.110
4 (.1120)			1	1.88	0.56	0.19	0.1410	0.110
5 (.1250)		M3 (.1181)	1	1.94	0.63	0.19	0.1410	0.110
6 (.1380)		M3.5 (.1378)	1	2.00	0.69	0.19	0.1410	0.110
8 (.1640)		M4 (.1575)	1	2.13	0.75	0.25	0.1680	0.131
10 (.1900)		M4.5 (.1772), M5 (.1969)	1	2.38	0.88	0.25	0.1940	0.152
12 (.2160)			1	2.38	0.94	0.28	0.2200	0.165
	1/4 (.2500)	M6 (.2362)	2	2.50	1.00	0.31	0.2550	0.191
	5/16 (.3125)	M7 (.2756), M8 (.3150)	2	2.72	1.13	0.38	0.3180	0.238
	3/8 (.3750)	M10 (.3937)	2	2.94	1.25	0.44	0.3810	0.286
	7/16 (.4375)		3	3.16	1.44	0.41	0.3230	0.242
	1/2 (.5000)	M12 (.4724)	3	3.38	1.66	0.44	0.3670	0.275
	9/16 (.5625)	M14 (.5512)	3	3.59	1.66	0.50	0.4290	0.322
	5/8 (.6250)	M16 (.6299)	3	3.81	1.81	0.56	0.4800	0.360
	11/16 (.6875)	M18 (.7087)	3	4.03	1.81	0.63	0.5420	0.406
	3/4 (.7500)		3	4.25	2.00	0.69	0.5900	0.442
	13/16 (.8125)	M20 (.7874)	3	4.47	2.00	0.69	0.6520	0.489
	7/8 (.8750)	M22 (.8661)	3	4.69	2.22	0.75	0.6970	0.523
	15/16 (.9375)	M24 (.9449)	3	4.91	2.22	0.75	0.7600	0.570
	1 (1.0000)	M25 (.9843)	3	5.13	2.50	0.81	0.8000	0.600
	1-1/16 (1.0625)	M27 (1.0630)	3	5.13	2.50	0.88	0.8960	0.672
	1-1/8 (1.1250)		3	5.44	2.56	0.88	0.8960	0.672
	1-3/16 (1.1875)	M30 (1.1811)	3	5.44	2.56	1.00	1.0210	0.766
	1-1/4 (1.2500)		3	5.75	2.56	1.00	1.0210	0.766
	1-5/16 (1.3125)	M33 (1.2992)	3	5.75	2.56	1.06	1.1080	0.831
	1-3/8 (1.3750)		3	6.06	3.00	1.06	1.1080	0.831
	1-7/16 (1.4375)	M36 (1.4173)	3	6.06	3.00	1.13	1.2330	0.925
	1-1/2 (1.5000)		3	6.38	3.00	1.13	1.2330	0.925
	1-5/8 (1.6250)	M39 (1.5354)	3	6.69	3.19	1.13	1.3050	0.979
	1-3/4 (1.7500)	M42 (1.6535)	3	7.00	3.19	1.25	1.4300	1.072
	1-7/8 (1.8750)		3	7.31	3.56	1.25	1.5190	1.139
	2 (2.0000)	M48 (1.8898)	3	7.63	3.56	1.38	1.6440	1.233

Table 302A Blank Dimensions

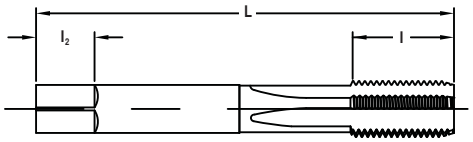
Style 1



Style 2



Style 3



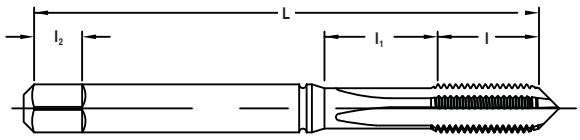
Machine Screw Size No. (Inches)	Nominal Fractional Diameter	Nominal Metric Diameter Millimeters, (Inches)	Blank Design No.	Dimensions – Inches					
				Overall Length L	Thread Length l	Neck Length l_1	Square Length l_2	Shank Diameter d_1	Size of Square a
0 (.0600)		M1.6(.0630)	1	1.63	0.31	*	0.19	0.1410	0.110
2 (.0860)		M2 (.0787), M2.2 (.0866)	1	1.75	0.18	0.26**	0.19	0.1410	0.110
3 (.0990)		M2.5 (.0984)	1	1.81	0.21	0.29	0.19	0.1410	0.110
4 (.1120)			1	1.88	0.25	0.31	0.19	0.1410	0.110
5 (.1250)		M3 (.1181)	1	1.94	0.25	0.38	0.19	0.1410	0.110
6 (.1380)		M3.5 (.1378)	1	2.00	0.31	0.38	0.19	0.1410	0.110
8 (.1640)		M4 (.1575)	1	2.13	0.31	0.44	0.25	0.1680	0.131
10 (.1900)		M4.5 (.1772), M5 (.1969)	1	2.38	0.42	0.46	0.25	0.1940	0.152
	1/4 (.2500)	M6 (.2362)	2	2.50	0.50	0.50	0.31	0.2550	0.191
	5/16 (.3125)	M7 (.2756), M8 (.3150)	2	2.72	0.56	0.57	0.38	0.3180	0.238
	3/8 (.3750)	M10 (.3937)	2	2.94	0.63	0.63	0.44	0.3810	0.286
	7/16 (.4375)		3	3.16	0.86	***	0.41	0.3230	0.242
	1/2 (.5000)	M12 (.4724)	3	3.38	0.92	***	0.44	0.3670	0.275
	9/16 (.5625)	M14 (.5512)	3	3.59	1.00	***	0.50	0.4290	0.322
	5/8 (.6250)	M16 (.6299)	3	3.81	1.09	***	0.56	0.4800	0.360
	11/16 (.6875)	M18 (.7087)	3	4.03	1.20	***	0.63	0.5420	0.406
	3/4 (.7500)		3	4.25	1.20	***	0.69	0.5900	0.442
	13/16 (.8125)	M20 (.7874)	3	4.47	1.20	***	0.69	0.6520	0.489
	7/8 (.8750)	M22 (.8661)	3	4.69	1.33	***	0.75	0.6970	0.523
	1 (1.0000)	M25 (.9843)	3	5.13	1.50	***	0.81	0.8000	0.600

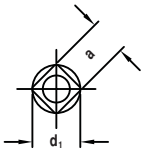
* Blank Without Neck
** Forming Style Without Neck
*** Reduced Shank, Neck Not Required

Element	Range Over	Range To (Incl.)	Direction	Tolerance
Overall Length - L	0.0520 1.0100	1.0100 2.0000	Plus or Minus Plus or Minus	0.031 0.063
Length of Thread - l	0.0520 0.2230 0.5100 1.5100	0.2230 0.5100 1.5100 2.0000	Plus or Minus Plus or Minus Plus or Minus Plus or Minus	0.063 0.094 0.094 0.125
Length of Square - l2	0.0520 1.0100	1.0100 2.0000	Plus or Minus Plus or Minus	0.031 0.063
Diameter of Shank - d1	0.0520 0.6350 1.5100	0.6350 1.5100 2.0000	Minus Minus Minus	0.0015 0.0020 0.0030
Size of Square - a	0.0520 0.5100 1.0100	0.5100 1.0100 2.0000	Minus Minus Minus	0.004 0.006 0.008

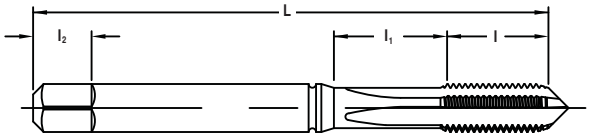
DIN/ANSI Blank Dimensions

Style 1

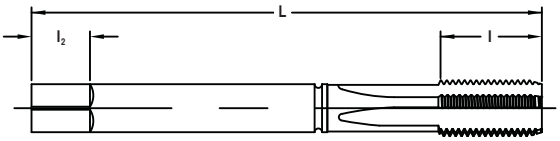




Style 2



Style 3



Machine Screw Size No. (Inches)	Nominal Fractional Diameter	Nominal Metric Diameter Millimeters, (Inches)	Pitch	Center Type	Tap Dimensions – Inches Overall Length L (mm)	L (inch)	Thread Length l	Neck Length l1	Square Length l2	Shank Diameter d1	Size of Square a
2 (.0860)		M2 (.0787), M2.2 (.0866)		External	45	1.77	0.18	0.29	0.19	0.1410	0.110
3 (.0990)		M2.5 (.0984)		External	50	1.97	0.21	0.34	0.19	0.1410	0.110
4 (.1120)				External	56	2.20	0.25	0.46	0.19	0.1410	0.110
5 (.1250)		M3 (.1181)		External	56	2.20	0.25	0.46	0.19	0.1410	0.110
6 (.1380)		M3.5 (.1378)		External	56	2.20	0.31	0.48	0.19	0.1410	0.110
8 (.1640)		M4 (.1575)		External	63	2.48	0.31	0.52	0.25	0.1680	0.131
10 (.1900)		M4.5 (.1772), M5 (.1969)		External	70	2.76	0.42	0.57	0.25	0.1940	0.152
	1/4 (.2500)	M6 (.2362)		External	80	3.15	0.50	0.68	0.31	0.2550	0.191
	5/16 (.3125)	M7 (.2756), M8 (.3150)		Internal	90	3.54	0.56	0.82	0.38	0.3180	0.238
	3/8 (.3750)	M10 (.3937)		Internal	100	3.94	0.63	0.91	0.44	0.3810	0.286
	7/16 (.4375)			Internal	100	3.94	0.86	*	0.41	0.3230	0.242
	1/2 (.5000)	M12 (.4724)	Coarse	Internal	110	4.33	0.92	*	0.44	0.3670	0.275
	1/2 (.5000)	M12 (.4724)	Fine	Internal	100	3.94	0.92	*	0.44	0.3670	0.275
	9/16 (.5625)	M14 (.5512)	Coarse	Internal	110	4.33	1.00	*	0.50	0.4290	0.322
	9/16 (.5625)	M14 (.5512)	Fine	Internal	100	3.94	1.00	*	0.50	0.4290	0.322
	5/8 (.6250)	M16 (.6299)	Coarse	Internal	110	4.33	1.09	*	0.56	0.4800	0.360
	5/8 (.6250)	M16 (.6299)	Fine	Internal	100	3.94	1.09	*	0.56	0.4800	0.360
	11/16 (.6875)	M18 (.7087)	Coarse	Internal	125	4.92	1.20	*	0.63	0.5420	0.406
	11/16 (.6875)	M18 (.7087)	Fine	Internal	110	4.33	1.20	*	0.63	0.5420	0.406
	3/4 (.7500)		Coarse	Internal	125	4.92	1.20	*	0.69	0.5900	0.442
	3/4 (.7500)		Fine	Internal	110	4.33	1.20	*	0.69	0.5900	0.442
	13/16 (.8125)	M20 (.7874)	Coarse	Internal	140	5.51	1.20	*	0.69	0.6520	0.489
	13/16 (.8125)	M20 (.7874)	Fine	Internal	125	4.92	1.20	*	0.69	0.6520	0.489
	7/8 (.8750)	M22 (.8661)	Coarse	Internal	140	5.51	1.33	*	0.75	0.6970	0.523
	7/8 (.8750)	M22 (.8661)	Fine	Internal	125	4.92	1.33	*	0.75	0.6970	0.523
	1 (1.0000)	M25 (.9843)	Coarse	Internal	160	6.30	1.50	*	0.81	0.8000	0.600
	1 (1.0000)	M25 (.9843)	Fine	Internal	140	5.51	1.50	*	0.81	0.8000	0.600

* Reduced Shank, Neck Not Required

Note: (Up to 3/8"/M10 Incl.) Thread + Neck Length slightly longer to match OSG and Emuge offering
Undercut Shank beyond Thread Lenth (same as ANSI Gold Series)
Grind external centers

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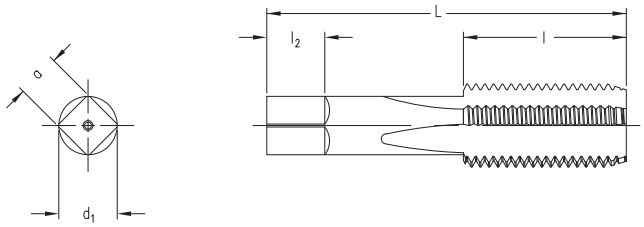
Table 303 Blank Dimensions

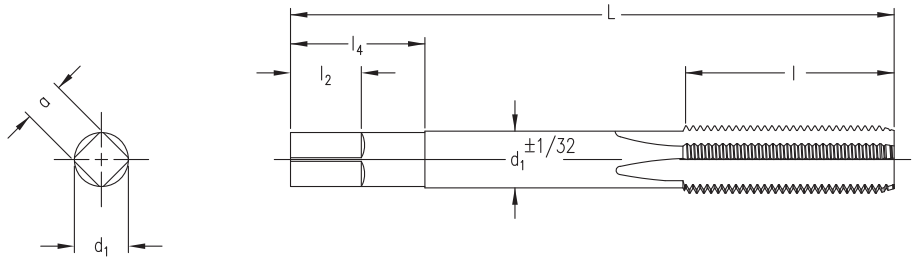


Unless otherwise specified, special taps 1.010" to 1.510" diameter inclusive, having 14 or more threads per inch or 1.75 millimeter pitch and finer, and sizes over 1.510" diameter with 10 or more threads per inch, or 2.5 millimeter pitch and finer, will be made to the general dimensions shown below.

Nominal Diamter Range – Inches		Nominal Fractional Diameter Inches	Nominal Metric Diameter Millimeters	Tap Dimensions – Inches				
Over	To (Incl.)			Overall Length L	Thread Length l	Square Length l_2	Shank Diameter d_1	Size of Square a
1.010	1.073	1-1/16	M27	4.00	1.50	0.88	0.8960	0.672
1.073	1.135	1-1/8		4.00	1.50	0.88	0.8960	0.672
1.135	1.198	1-3/16	M30	4.00	1.50	1.00	1.0210	0.766
1.198	1.260	1-1/4		4.00	1.50	1.00	1.0210	0.766
1.260	1.323	1-5/16	M33	4.00	1.50	1.00	1.1080	0.831
1.323	1.385	1-3/8		4.00	1.50	1.00	1.1080	0.831
1.385	1.448	1-7/16	M36	4.00	1.50	1.00	1.2330	0.925
1.448	1.510	1-1/2		4.00	1.50	1.00	1.2330	0.925
1.510	1.635	1-5/8	M39	5.00	2.00	1.13	1.3050	0.979
1.635	1.760	1-3/4	M42	5.00	2.00	1.25	1.4300	1.072
1.760	1.885	1-7/8		5.00	2.00	1.25	1.5190	1.139
1.885	2.010	2	M48	5.00	2.00	1.38	1.6440	1.233
2.010	2.135	2-1/8		5.25	2.00	1.38	1.7690	1.327
2.135	2.260	2-1/4	M56	5.25	2.00	1.44	1.8940	1.420
2.260	2.385	2-3/8		5.25	2.00	1.44	2.0190	1.514
2.385	2.510	2-1/2		5.25	2.00	1.50	2.1000	1.575
2.510	2.635	2-5/8	M64	5.50	2.00	1.50	2.1000	1.575
2.635	2.760	2-3/4		5.50	2.00	1.50	2.1000	1.575
2.760	2.885	2-7/8	M72	5.50	2.00	1.50	2.1000	1.575
2.885	3.010	3		5.50	2.00	1.50	2.1000	1.575
3.010	3.135	3-1/8		5.75	2.00	1.50	2.1000	1.575
3.135	3.260	3-1/4	M80	5.75	2.00	1.50	2.1000	1.575
3.260	3.385	3-3/8		5.75	2.00	1.50	2.1000	1.575
3.385	3.510	3-1/2		5.75	2.00	1.50	2.1000	1.575
3.510	3.635	3-5/8	M90	6.00	2.00	1.75	2.1000	1.575
3.635	3.760	3-3/4		6.00	2.00	1.75	2.1000	1.575
3.760	3.885	3-7/8		6.00	2.00	1.75	2.1000	1.575
3.885	4.010	4	M100	6.00	2.00	1.75	2.1000	1.575

For tolerances see Table 302.
For standard thread limits and tolerances for Unified Inch Screw Threads see Tables 327A.
For standard thread limits and tolerances for Metric Threads see Tables 337 and 341.
For eccentricity tolerances of tap elements see Table 317.

Table 303A Blank Dimensions



Unless otherwise specified, special extension taps will be furnished with dimensions and tolerances as shown for Machine Screw and Fractional taps in Tables 302 and 303, and for Pipe taps in Table 311.

Exceptions: (1) Types of centers are optional with manufacturer.
(2) Tolerances on shank diameter d_1 for l_4 length as shown in the following table.
(3) Shank eccentricity tolerance in Table 317 applies only to the l_4 length shown in the following table.
(4) Length of Close Tolerance Shank, (l_4) is minimum.

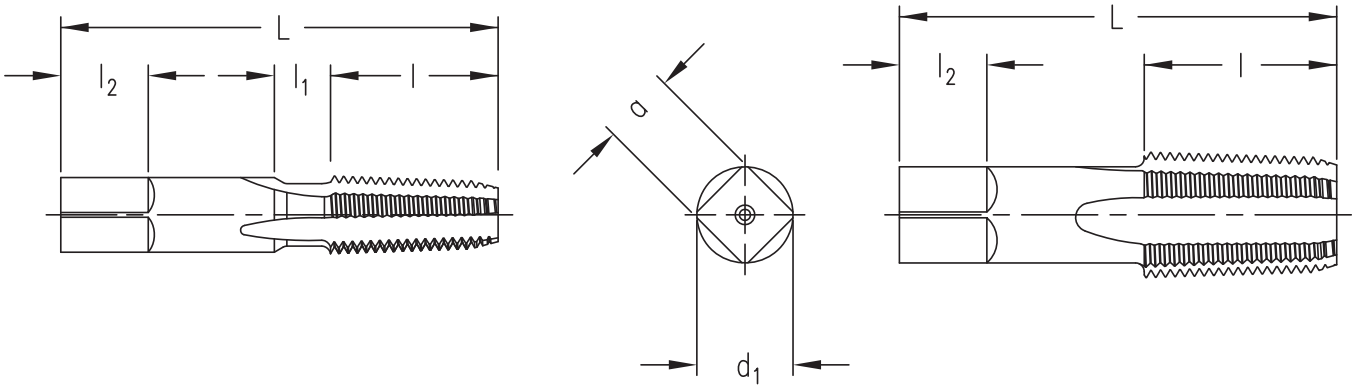
Nominal Tap Size			
Fractional	Machine Screw	Pipe	Shank Length l_4
	0-3		0.88
	4		1.00
	5-6		1.13
	8		1.25
	10-12	1/16-1/8-1/4	1.38
1/4	14		1.50
5/16			1.56
3/8			1.63
7/16		3/8-1/2	1.69
1/2			1.69
9/16		3/4	1.88
5/8		1	2.00
11/16			2.13
3/4		1-1/4	2.25
13/16		1-1/2	2.38
7/8			2.50
15/16			2.63
1			2.63
1-1/8		2	2.75
1-1/4		2-1/2	2.88
1-3/8			3.00

Nominal Tap Size		
Fractional	Pipe	Shank Length l_4
1-1/2		3.00
1-5/8	3	3.13
1-3/4		3.13
1-7/8		3.25
2		3.25
2-1/8		3.38
2-1/4		3.38
2-3/8		3.50
2-1/2		3.50
2-5/8	3-1/2	3.63
2-3/4		3.63
2-7/8		3.75
3		3.75
3-1/8		3.88
3-1/4		3.88
3-3/8	4	4.00
3-1/2		4.00
3-5/8		4.13
3-3/4		4.13
3-7/8		4.25
4		4.25

Tolerances for Shank Diameter, d_1 for l_4 length

Size Range				
Fractional	Machine Screw	Pipe	Direction	Tolerance
1/4 to 5/8 incl.	0 to 14 incl.	1/16 to 1/8 incl.	Minus	.003
11/16 to 1" 1/2 incl.		1/4 to 1" incl.	Minus	.004
1-5/8 to 4" incl.		1-1/4 to 4" incl.	Minus	.006

Table 311 Blank Dimensions



Size (Inches)	Threads Per Inch	Dimensions – Inches Overall Length L	Thread Length l	Square Length l2	Shank Diameter d1	Size of Square a	Length of Optional Neck l1
1/16	27	2.13	0.69	0.38	0.3125	0.234	0.38
1/8	27	2.13	0.75	0.38	0.4375	0.328	0.38
1/8*	27	2.13	0.75	0.38	0.3125	0.234	
1/4	18	2.44	1.06	0.44	0.5625	0.421	0.38
3/8	18	2.56	1.06	0.50	0.7000	0.531	0.38
1/2	14	3.13	1.38	0.63	0.6875	0.515	
3/4	14	3.25	1.38	0.69	0.9063	0.679	
1	11-1/2	3.75	1.75	0.81	1.1250	0.843	
1-1/4	11-1/2	4.00	1.75	0.94	1.3125	0.984	
1-1/2	11-1/2	4.25	1.75	1.00	1.5000	1.125	
2	11-1/2	4.25	1.75	1.13	1.8750	1.406	

*Small Shank

Element	Range	Direction	Tolerance
Overall Length - L	1/16 to 3/4 inc. 1" to 2"	Plus or Minus Plus or Minus	0.031 0.063
Length of Thread - l	1/16 to 3/4 inc. 1" to 1-1/4 inc. 1-1/2 to 2"	Plus or Minus Plus or Minus Plus or Minus	0.063 0.094 0.125
Length of Square - l2	1/16 to 3/4 inc. 1" to 2"	Plus or Minus Plus or Minus	0.031 0.063
Diameter of Shank - d1	1/16 to 1/8" inc 1/4 to 1" inc. 1-1/4 to 2"	Minus Minus Minus	0.0015 0.0020 0.0030
Size of Square - a	1/16 to 1/8" inc 1/4 to 3/4 inc. 1" to 2"	Minus Minus Minus	0.004 0.006 0.008

GH (GD) Pitch Diameter Limit Explanation

Basic Pitch Diameter = Basic OD – (.64952 / TPI) inch
Basic OD – (.64952 * Pitch) metric

Maximum PD Limit

GH (GD) pitch diameter increases above basic pitch diameter in 0.0005" (0.013mm) increments.

GL (GL) pitch diameter decreases below basic pitch diameter in 0.0005" increments. GL1 maximum PD limit is equal to basic pitch diameter.

Minimum PD Limit

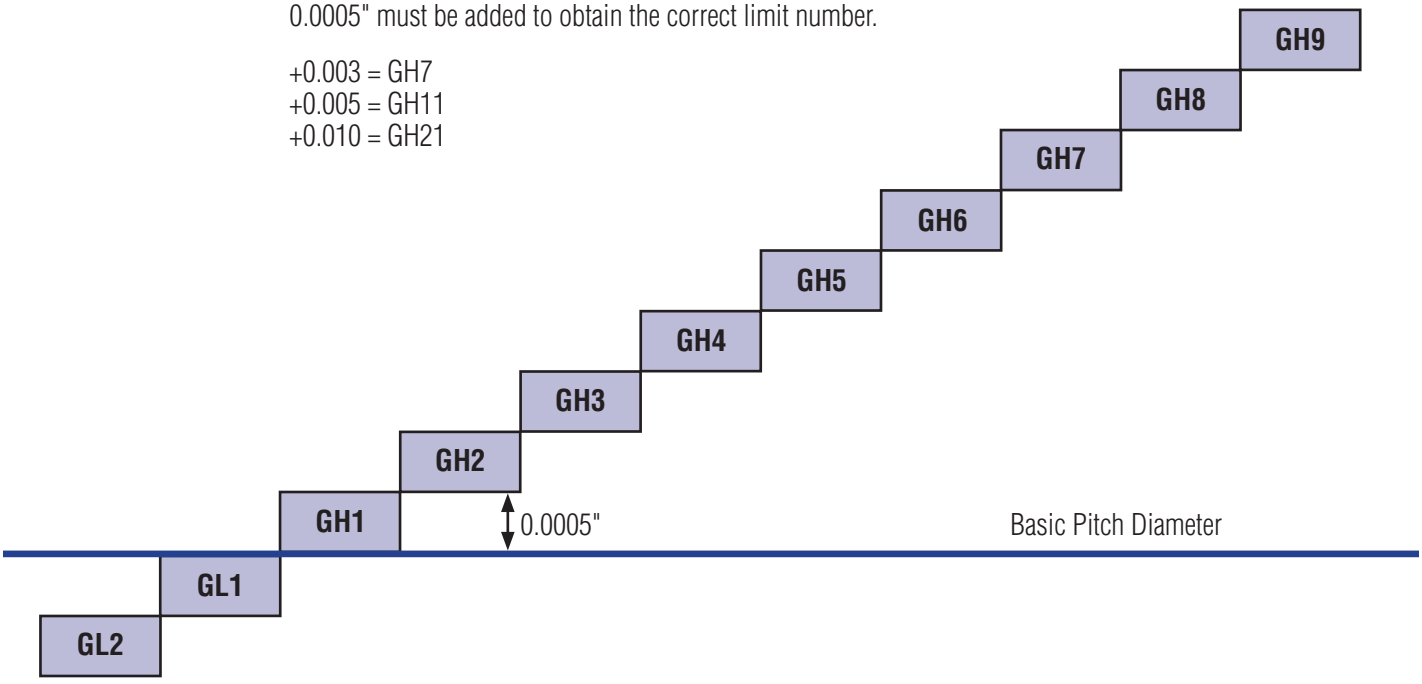
For GH(L) limits the minimum pitch diameter limit falls in the minus direction as follows:

Size Range	Tolerance
To 1" Incl.	- 0.0005"

For GD (metric PD) limits the minimum pitch diameter limit is in the minus direction and is variable based on size and pitch. GD limits have a larger pitch diameter tolerance as compared to GH(L) limits and tend to overlap

If the pitch diameter is expressed as an oversize value, for example +0.005, the amount oversize is the minimum PD limit. 0.0005" must be added to obtain the correct limit number.

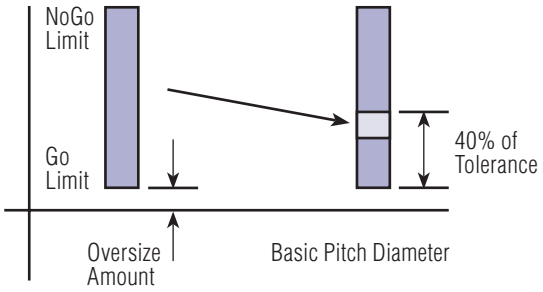
+0.003 = GH7
+0.005 = GH11
+0.010 = GH21



GH (GD) Calculations for Special Gauging Limits

Occasionally customers tap a threaded hole that requires special oversize pitch diameter limits. Typically, this occurs when the thread is to be plated or heat treated after tapping. Special pitch diameter limits require a tap with a GH(D) limit that is larger than listed on the standard class of fit recommendation charts. The proper pitch diameter limit is determined through performing a few calculations.

Special gauging limits may be determined by observing the value on the handle of the Go / NoGo gauge or on the part drawing. Typically the minimum and maximum values are etched on the gauge handle. The method for determining a special pitch diameter is as follows:

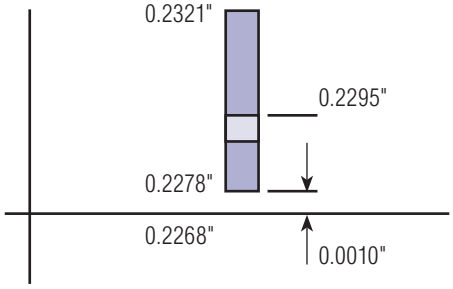


Example: 1/4-28 NF Go: .2278. NoGo: .2321

a) Determine 40% point of pitch diameter tolerance.
0.2321– 0.2278 = 0.0043
0.0043* .40 = 0.0017
0.2278+ 0.0017 = 0.2295

b) Subtract basic pitch diameter from 40% value
0.2295 – 0.2268 = 0.0027

c) Calculate GH(D) Limit
0.0027 / 0.0005 = 5.4 = GH5



If the intended plating thickness is known, the amount a tap should be oversize is calculated as follows:

Plating Thickness = 0.0004"
Plating Thickness (0.0004") * 4 = Amount Oversize (0.0016")
0.0016" / 0.0005" = 3.2 = 3 (rounded) GH Limits to be Added
If a 2B class of fit normally calls for an H5 limit, the oversize tap should be H5 + H3 = H8.

Size	Threads Per Inch		Recommended Tap Limits		Internal Thread Pitch DiameterLimits		
	NC	NF	Class 2B	Class 3B	Min. All Classes (Basic)	Max. Class 2B	Max Class 3B
0		80	H2	H1	0.0519	0.0542	0.0536
1 1	64	 72	H2 H2	H1 H1	0.0629 0.0640	0.0655 0.0665	0.0648 0.0659
2 2	56	 64	H2 H2	H1 H1	0.0744 0.0759	0.0772 0.0786	0.0765 0.0779
3 3	48	 56	H2 H2	H1 H1	0.0855 0.0874	0.0855 0.0902	0.0877 0.0895
4 4	40	 48	H2 H2	H2 H1	0.0958 0.0985	0.0991 0.1016	0.0982 0.1008
5 5	40	 44	H2 H2	H2 H1	0.1088 0.1102	0.1121 0.1134	0.1113 0.1126
6 6	32	 40	H3 H2	H2 H2	0.1177 0.1218	0.1214 0.1252	0.1204 0.1243
8 8	32	 36	H3 H2	H2 H2	0.1437 0.1460	0.1475 0.1496	0.1465 0.1487
10 10	24	 32	H3 H3	H3 H2	0.1629 0.1697	0.1672 0.1736	0.1661 0.1726
12 12	24	 28	H3 H3	H3 H3	0.1889 0.1928	0.1933 0.1970	0.1922 0.1959
1/4 1/4	20	 28	H5 H4	H3 H3	0.2175 0.2268	0.2224 0.2311	0.2211 0.2300
5/16 5/16	18	 24	H5 H4	H3 H3	0.2764 0.2854	0.2817 0.2902	0.2803 0.2890
3/8 3/8	16	 24	H5 H4	H3 H3	0.3344 0.3479	0.3401 0.3528	0.3387 0.3516
7/16 7/16	14	 20	H5 H5	H3 H3	0.3911 0.4050	0.3972 0.4104	0.3957 0.4091
1/2 1/2	13	 20	H5 H5	H3 H3	0.4500 0.4675	0.4565 0.4731	0.4548 0.4717
9/16 9/16	12	 18	H5 H5	H3 H3	0.5084 0.5264	0.5152 0.5323	0.5135 0.5308
5/8 5/8	11	 18	H5 H5	H3 H3	0.5660 0.5889	0.5732 0.5949	0.5714 0.5934
3/4 3/4	10	 16	H5 H5	H4 H3	0.6850 0.7094	0.6927 0.7159	0.6907 0.7143
7/8 7/8	9	 14	H6 H6	H4 H4	0.8028 0.8286	0.8110 0.8356	0.8089 0.8339
1" 1"	8	 12	H6 H6	H4 H4	0.9188 0.9459	0.9276 0.9535	0.9254 0.9516
1"	14 NS		H6	H4	0.9536	0.9609	0.9590
1-1/8 1-1/8	7	 12	H8 H6	H4 H4	1.0332 1.0709	1.0416 1.0787	1.0393 1.0768
1-1/4 1-1/4	7	 12	H8 H6	H4 H4	1.1572 1.1959	1.1668 1.2039	1.1644 1.2019
1-3/8 1-3/8	6	 12	H8 H6	H4 H4	1.2667 1.3209	1.2771 1.3291	1.2745 1.3270
1-1/2 1-1/2	6	 12	H8 H6	H4 H4	1.3917 1.4459	1.4022 1.4542	1.3996 1.4522

Thread Size		Recommended Tap Limits		Min. All Classes (Basic) (mm)	Internal Thread – Product Limits		Min. All Classes (Basic) (inch)	Internal Thread – Product Limits	
Nominal Dia. (mm)	Pitch (mm)	6H	4H		Max. Class 6H (mm)	Max Class 4H (mm)		Max Class 6H (inch)	Max Class 4H (inch)
1.6	0.35	D3	D1	1.373	1.458	1.426	0.0541	0.0574	0.0561
2	0.4	D3	D1	1.740	1.830	1.796	0.0685	0.0720	0.0707
2.5	0.45	D3	D1	2.208	2.303	2.268	0.0869	0.0907	0.0893
3	0.5	D3	D1	2.675	2.775	2.738	0.1053	0.1093	0.1078
3.5	0.6	D4	D1	3.110	3.222	3.181	0.1224	0.1269	0.1252
4	0.7	D4	D2	3.545	3.663	3.620	0.1396	0.1442	0.1425
4.5	0.75	D4	D2	4.013	4.131	4.088	0.1580	0.1626	0.1609
5	0.8	D4	D2	4.480	4.605	4.560	0.1764	0.1813	0.1795
6	1	D5	D3	5.350	5.500	5.445	0.2106	0.2165	0.2144
7	1	D5	D3	6.350	6.500	6.445	0.2500	0.2559	0.2537
8 8	1 1.25	D5 D5	D3 D3	7.350 7.188	7.500 7.348	7.445 7.288	0.2894 0.2830	0.2953 0.2893	0.2931 0.2869
10 10	1.25 1.5	D5 D6	D3 D3	9.188 9.026	9.348 9.206	9.288 9.138	0.3617 0.3554	0.3680 0.3624	0.3657 0.3598
12 12	1.25 1.75	D5 D6	D3 D3	11.188 10.863	11.368 11.063	11.300 10.988	0.4405 0.4277	0.4476 0.4356	0.4449 0.4326
14 14	1.5 2	D6 D7	D3 D3	13.026 12.701	13.216 12.913	13.144 12.833	0.5128 0.5000	0.5203 0.5084	0.5175 0.5052
16 16	1.5 2	D6 D7	D3 D4	15.026 14.701	15.216 14.913	15.144 14.833	0.5916 0.5788	0.5991 0.5871	0.5962 0.5840
18 18	1.5 2.5	D6 D7	D3 D4	17.026 16.376	17.216 16.600	17.144 16.516	0.6703 0.6447	0.6778 0.6535	0.6750 0.6502
20 20	1.5 2.5	D6 D7	D3 D4	19.026 18.376	19.216 18.600	19.144 18.516	0.7491 0.7235	0.7565 0.7323	0.7537 0.7290
24	3	D8	D4	22.051	22.316	22.221	0.8681	0.8786	0.8748
27	3	D8	D5	25.051	25.316	25.221	0.9863	0.9967	0.9930
30	3.5	D9	D5	27.727	28.007	27.907	1.0916	1.1026	1.0987
33	3.5	D9	D5	30.727	31.007	30.907	1.2097	1.2207	1.2168
36	4	D9	D5	33.402	33.702	33.592	1.3150	1.3269	1.3225

The above recommended taps normally produce the Class of Fit in average materials when used with reasonable care. However, if the tap specified does not give a satisfactory gauge fit in the work, an alternate limit tap may be necessary.

Size	Threads Per Inch NC	Threads Per Inch NF	Recommended Tap Limits Class 2B	Recommended Tap Limits Class 3B	Internal Thread Pitch DiameterLimits Min. All Classes (Basic)	Internal Thread Pitch DiameterLimits Max. Class 2B	Internal Thread Pitch DiameterLimits Max Class 3B
0		80	H3	H2	0.0519	0.0542	0.0536
1 1	64	 72	H3 H3	H2 H2	0.0629 0.0640	0.0655 0.0665	0.0648 0.0659
2 2	56	 64	H4 H4	H3 H3	0.0744 0.0759	0.0772 0.0786	0.0765 0.0779
3 3	48	 56	H4 H4	H3 H3	0.0855 0.0874	0.0855 0.0902	0.0877 0.0895
4 4	40	 48	H4 H4	H3 H3	0.0958 0.0985	0.0991 0.1016	0.0982 0.1008
5 5	40	 44	H4 H4	H3 H3	0.1088 0.1102	0.1121 0.1134	0.1113 0.1126
6 6	32	 40	H5 H4	H4 H3	0.1177 0.1218	0.1214 0.1252	0.1204 0.1243
8 8	32	 36	H5 H5	H4 H4	0.1437 0.1460	0.1475 0.1496	0.1465 0.1487
10 10	24	 32	H6 H5	H4 H4	0.1629 0.1697	0.1672 0.1736	0.1661 0.1726
12 12	24	 28	H6 H5	H4 H4	0.1889 0.1928	0.1933 0.1970	0.1922 0.1959
1/4 1/4	20	 28	H6 H6	H5 H4	0.2175 0.2268	0.2224 0.2311	0.2211 0.2300
5/16 5/16	18	 24	H7 H6	H5 H5	0.2764 0.2854	0.2817 0.2902	0.2803 0.2890
3/8 3/8	16	 24	H7 H6	H6 H5	0.3344 0.3479	0.3401 0.3528	0.3387 0.3516
7/16 7/16	14	 20	H8 H7	H6 H5	0.3911 0.4050	0.3972 0.4104	0.3957 0.4091
1/2 1/2	13	 20	H8 H7	H6 H5	0.4500 0.4675	0.4565 0.4731	0.4548 0.4717
9/16 9/16	12	 18	H9 H8	H7 H6	0.5084 0.5264	0.5152 0.5323	0.5135 0.5308
5/8 5/8	11	 18	H9 H8	H7 H6	0.5660 0.5889	0.5732 0.5949	0.5714 0.5934
3/4 3/4	10	 16	H10 H8	H7 H6	0.6850 0.7094	0.6927 0.7159	0.6907 0.7143

Thread Size		Recommended Tap Limits		Min. All Classes (Basic)	Internal Thread – Product Limits		Min. All Classes (Basic)	Internal Thread – Product Limits	
Nominal Dia. (mm)	Pitch (mm)	6H	4H	(mm)	Max. Class 6H (mm)	Max Class 4H (mm)	(inch)	Max Class 6H (inch)	Max Class 4H (inch)
1.6	0.35	D4	D3	1.373	1.458	1.426	0.0541	0.0574	0.0561
2	0.4	D4	D3	1.740	1.830	1.796	0.0685	0.0720	0.0707
2.5	0.45	D4	D3	2.208	2.303	2.268	0.0869	0.0907	0.0893
3	0.5	D5	D3	2.675	2.775	2.738	0.1053	0.1093	0.1078
3.5	0.6	D5	D3	3.110	3.222	3.181	0.1224	0.1269	0.1252
4	0.7	D6	D4	3.545	3.663	3.620	0.1396	0.1442	0.1425
4.5	0.75	D6	D4	4.013	4.131	4.088	0.1580	0.1626	0.1609
5	0.8	D6	D4	4.480	4.605	4.560	0.1764	0.1813	0.1795
6	1	D7	D4	5.350	5.500	5.445	0.2106	0.2165	0.2144
7	1	D7	D4	6.350	6.500	6.445	0.2500	0.2559	0.2537
8 8	1 1.25	D7 D8	D4 D5	7.350 7.188	7.500 7.348	7.445 7.288	0.2894 0.2830	0.2953 0.2893	0.2931 0.2869
10 10	1.25 1.5	D8 D9	D5 D5	9.188 9.026	9.348 9.206	9.288 9.138	0.3617 0.3554	0.3680 0.3624	0.3657 0.3598
12 12	1.25 1.75	D9 D9	D5 D6	11.188 10.863	11.368 11.063	11.300 10.988	0.4405 0.4277	0.4476 0.4356	0.4449 0.4326
14 14	1.5 2	D9 D10	D6 D6	13.026 12.701	13.216 12.913	13.144 12.833	0.5128 0.5000	0.5203 0.5084	0.5175 0.5052
16 16	1.5 2	D9 D10	D6 D6	15.026 14.701	15.216 14.913	15.144 14.833	0.5916 0.5788	0.5991 0.5871	0.5962 0.5840
18 18	1.5 2.5	D9 D11	D6 D7	17.026 16.376	17.216 16.600	17.144 16.516	0.6703 0.6447	0.6778 0.6535	0.6750 0.6502
20 20	1.5 2.5	D9 D11	D6 D7	19.026 18.376	19.216 18.600	19.144 18.516	0.7491 0.7235	0.7565 0.7323	0.7537 0.7290

Note: Forming taps require higher pitch diameter limits as compared to cutting taps.

The above recommended taps normally produce the Class of Fit in average materials when used with reasonable care. However, if the tap specified does not give a satisfactory gauge fit in the work, an alternate limit tap may be necessary.

Controlled Root Radius with Increased Minor Diameter

The UNJ thread standard (ASME B1.15) defines a system of threads for highly stressed applications requiring high fatigue strength. The MJ thread standard (B1.21M) defines a similar system for metric threads. These standards were originally developed for aerospace fasteners and threaded component applications.

The design characteristics for the UNJ and MJ thread systems are as follows:

External Threads – threads must be produced with a prescribed, larger than normal, root radius. Standard UN and M tooling may not be used.

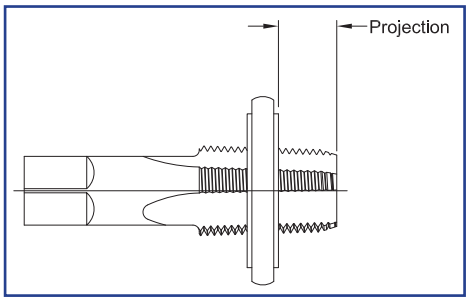
Internal Threads – threads are not required to have a root radius; therefore, ground thread taps designed to produce Unified Screw Threads or M profile Screw Threads for the proper class of fit may be used which is typically 3B. The larger product minor diameter of the internal threads requires the use of a larger tap drill than typically used.

The letter "J" need not be marked on the shank of the tap. Occasionally, customers will request a special marking.

A tap drill should be selected that will produces approximately 65 percent of thread. For drill size values see page XX regarding Drilled Hole Sizes.

Tapping Depth for Taper Pipe Threads – Projection Explanation

Standard taper pipe tap taps are designed to produce the correct thread length for standard male pipe fittings. In most applications, this includes 4 to 5 turns for a "hand tight" fit, which is the L1 thread length. Also included is the L3 thread length which are three additional "wrench turn" threads to provide sealing of the assembly.



The tap pitch diameter is determined by using an L1 ring gauge. The L1 gauge is threaded onto the tap until a hand tight fit is achieved. The portion of the tap that extends from the front of the gauge to the front of the tap is the projection. The projection determines the pitch diameter size of the pipe tap. Standard and SAE Short projections are listed in the table below.

Nominal Size	Thread per Inch	Standard Projection	SAE Short Projection
1/16	27	0.312	0.241
1/8	27	0.312	0.241
1/4	18	0.459	0.361
3/8	18	0.454	0.361
1/2	14	0.579	0.465
3/4	14	0.565	0.465
1	11-1/2	0.678	
1-1/4	11-1/2	0.686	
1-1/2	11-1/2	0.699	
2	11-1/2	0.667	
2-1/2	8	0.925	
3	8	0.925	

Occasionally the workpiece geometry will not allow the use of a standard projection. This condition occurs when the hole to be threaded is relatively shallow. This situation will require a tap with a "special projection".

The special projection may be determined as follows:

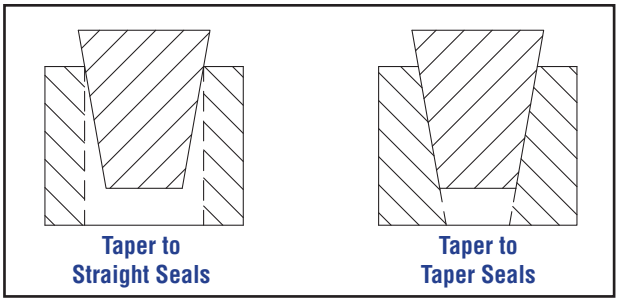
Special Projection = Part Hole Depth (Unobstructed) – L1 Gauge Thickness

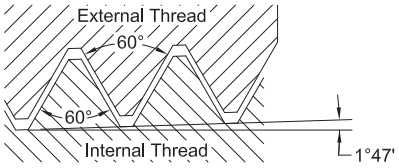
The chamfer would be included and the length adjusted according to the application.

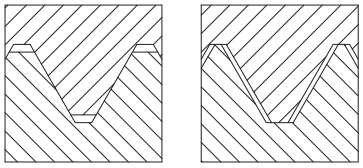
A Brubaker engineer would be happy to assist with these calculations.

Pipe Thread Gauging Requirements

Pipe threads used in threaded assemblies are intended to seal. This article will focus on internal threads. The seal is intended to be accomplished using one of two methods, the assembly of tapered internal and external threads or the assembly of a straight internal thread and tapered external thread.

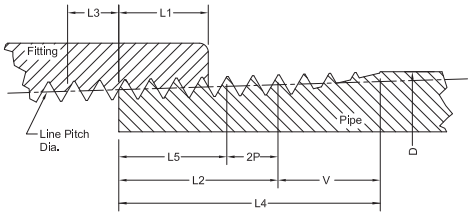


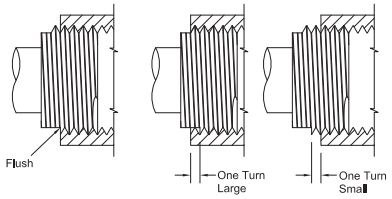




NPT and NPTF threads have a taper of 3/4" per foot or 0.0625" per inch (1° 47' Incl.). The major difference between NPT and NPTF involves the method of producing a leak proof assembly. NPT threads require the use of teflon tape or pipe compound (dope) to produce a leak proof assembly.

NPTF is considered a Dry Seal, and no sealant is required. The crest/root are designed to distort after one additional revolution when hand tightening. For this reason, the crest and root truncation of an NPTF fitting is held to a much tighter tolerance. An NPTF tap CAN be used in an NPT application, but an NPT tap CANNOT be used in an NPTF application. Both NPT and NPTF use the same L1 gauge. This gauge is normally the first gauge used, and has a notch at a distance of L1 (See illustration below). The thread is considered acceptable if it is within +/- one turn from the first (largest) thread. The L1 gauge is generally the only gauge used in an NPT application





NPTF threads are separated into 2 different categories, Class 1 and Class 2. Class 1 applications do not require inspection of the crest and root diameters. Class 2 applications require a pressure-tight seal where sealants are not used. Therefore, the root and crest truncation must be inspected. The ANPT design is not a NPTF design but is safety critical and inspected as an NPTF thread.

The purpose of the L3 Plug gauge is to measure the taper of the part. This gauge does not check size, it checks the taper only. The L3 gauge measures the L3 section of the internal thread. It also has a notch on it in the same theoretical position as the L1 gauge. To be compliant, the notch on the L3 gauge MUST fall within +/-½ turn relative to where the notch on the L1 gauge falls. For example, if the L1 gauge notch, when hand tightened, is ½ turn outside of the thread, the L3 gauge must fall between flush to 1 turn maximum outside the thread.

Root truncation is measured with a six step gauge. The 6 step truncation gauge is used to measure the critical crest tolerance in an internal NPTF thread. The three gauges, L1, L3, and 6 step truncation gauge are used in conjunction with each other.

NPT – National Pipe Taper
Gauges required
L1 Plug Gauge

NPTF – National Pipe Tapered Dryseal
Gauges required
L1 Plug Gauge
L3 Plug Gauge
6 Step Plug Gauge

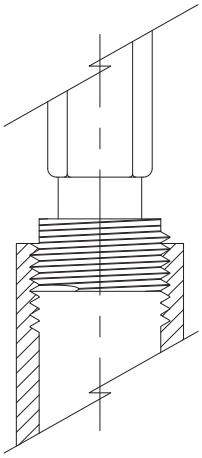
ANPT – Aeronautical National Pipe Taper
Gauges required
L1 Plug Gauge
L3 Plug Gauge
6 Step Plug Gauge

L1 Gauge

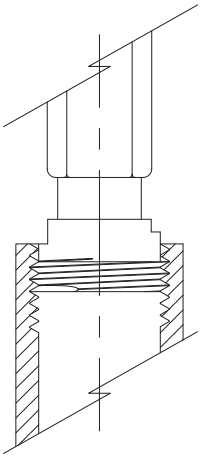
L3 Gauge

6 Step Truncation Gauge

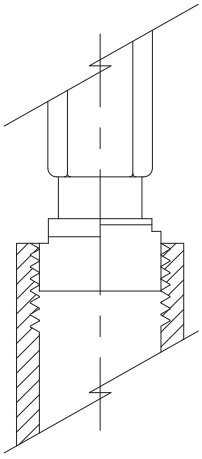
American Pipe Threads		Pipe Thread	External Thread	Internal Thread	Comments
NPT	Natl. Pipe Taper	General Purpose	Taper	Taper	
NPTF	F-Fuel	Dry Sealing	Taper	Taper	
NPSC	C-Coupling	General Purpose	Taper (NPT)	Cylindrical	
NPSM	M-Mechanical	Fastening Thread	Cylindrical	Cylindrical	UN Thread Profile
NPSF	F-Fuel	Dry Sealing	Taper (NPTF)	Cylindrical	
NPSI	I-Intermediate	Dry Sealing	Taper (NPT-SAE/NPTF)	Cylindrical	Thread dia. slightly increased
NPSL	L-Locknut		Cylindrical	Cylindrical	
ANPT	A-Aeronautical		Taper (NPT)	Taper (NPT)	Same as NPT up to 2", different above 2"



Screw the L1 plug into the fitting (hand tighten). This classifies the thread as to "Maximum", "Basic", or "Minimum".



Screw the L3 plug into the fitting (hand tighten). The gauge must match the classification of the L1 plug within +/- 1/2 turns.



Insert 6-step Crest Check plug into the fitting. When the L1 plug is at the maximum notch, the 6-step gauge must go between "MX" and "MXT" notch. When the L1 plug is at the Basic Notch, the 6-Step gauge must go between "B" and "BT" notch. When the L1 plug is at mininum notch, the 6-Step gauge must go between the "MN" and "MNT"notch.

Drilled Hole Size, Cutting Tap, Inch

Thread Size Size	TPI	Drill Size	Decimal Equiva.	Percent of Thread
0	80	1.2mm	0.0472	79%
		1.25mm	0.0492	66%
1	64	1.45mm	0.0571	78%
		1.5mm	0.0591	69%
1	72	1.5mm	0.0591	77%
2	56	1.75mm	0.0689	74%
		1.8mm	0.0709	65%
2	64	1.8mm	0.0709	75%
		49	0.0730	64%
3	48	5/64	0.0781	77%
		2.05mm	0.0807	68%
3	56	45	0.0820	73%
4	40	43	0.0890	71%
		2.35mm	0.0925	60%
4	48	2.35mm	0.0925	72%
		3/32	0.0938	67%
5	40	38	0.1015	72%
		37	0.1040	65%
5	44	2.6mm	0.1024	77%
		36	0.1065	63%
6	32	2.75mm	0.1078	74%
		35	0.1100	69%
6	40	33	0.1130	77%
		32	0.1160	68%
8	32	3.4mm	0.1339	74%
		29	0.1360	69%
8	36	29	0.1360	78%
		28	0.1405	65%
10	24	25	0.1495	75%
		23	0.1540	67%
10	32	21	0.1590	76%
		20	0.1610	71%
12	24	16	0.1770	72%
		15	0.1800	67%
12	28	15	0.1800	78%
		13	0.1850	67%
1/4	20	7	0.2010	75%
		5	0.2055	69%
1/4	28	3	0.2130	80%
		7/32	0.2188	67%
5/16	18	F	0.2570	77%
		17/64	0.2656	65%
5/16	24	I	0.2720	75%
		J	0.2770	66%
3/8	16	5/16	0.3125	77%
		P	0.3230	64%
3/8	24	Q	0.3320	79%
		R	0.3390	67%
7/16	14	9.3mm	0.3661	77%
		3/8	0.3750	67%
7/16	20	25/64	0.3906	72%
		10mm	0.3937	67%
1/2	13	27/64	0.4219	78%
		11mm	0.4331	67%
1/2	20	29/64	0.4531	72%
9/16	12	31/64	0.4844	72%
		12.5mm	0.4921	65%
9/16	18	13.0mm	0.5118	70%
		33/64	0.5156	65%

Thread Size Size	TPI	Drill Size	Decimal Equiva.	Percent of Thread
5/8	11	17/32	0.5313	79%
		35/64	0.5469	66%
5/8	18	14.5mm	0.5709	75%
		37/64	0.5781	65%
11/16	11	39/64	0.6094	66%
11/16	16	16.0mm	0.6299	71%
3/4	10	21/32	0.6563	72%
		17mm	0.6693	62%
3/4	16	11/16	0.6875	77%
7/8	9	49/64	0.7656	76%
		25/32	0.7813	65%
7/8	14	13/16	0.8125	67%
1	8	7/8	0.8750	77%
		57/64	0.8906	67%
1	12	59/64	0.9219	72%
1	14	15/16	0.9375	67%
1-1/8	7	Spc. Drill	0.9858	75%
		Spc. Drill	1.0044	65%
1-1/8	8	Spc. Drill	1.0032	75%
		Spc. Drill	1.0195	65%
1-1/8	12	Spc. Drill	1.0438	75%
		Spc. Drill	1.0546	65%
1-1/4	7	Spc. Drill	1.1108	75%
		Spc. Drill	1.1294	65%
1-1/4	8	Spc. Drill	1.1282	75%
		Spc. Drill	1.1445	65%
1-1/4	12	Spc. Drill	1.1688	75%
		Spc. Drill	1.1796	65%
1-3/8	6	Spc. Drill	1.2126	75%
		Spc. Drill	1.2343	65%
1-3/8	8	Spc. Drill	1.2532	75%
		Spc. Drill	1.2695	65%
1-3/8	12	Spc. Drill	1.2938	75%
		Spc. Drill	1.3046	65%
1-1/2	6	Spc. Drill	1.3376	75%
		Spc. Drill	1.3593	65%
1-1/2	8	Spc. Drill	1.3782	75%
		Spc. Drill	1.3945	65%
1-1/2	12	Spc. Drill	1.4188	75%
		Spc. Drill	1.4296	65%
1-5/8	8	Spc. Drill	1.5032	75%
		Spc. Drill	1.5195	65%
1-3/4	8	Spc. Drill	1.6282	75%
		Spc. Drill	1.6445	65%
1-7/8	8	Spc. Drill	1.7532	75%
		Spc. Drill	1.7695	65%
2	8	Spc. Drill	1.8782	75%
		Spc. Drill	1.8945	65%
2-1/4	8	Spc. Drill	2.1282	75%
		Spc. Drill	2.1445	65%
2-1/2	8	Spc. Drill	2.3782	75%
		Spc. Drill	2.3945	65%

For additional support and for maximum optimization of your tools, call us toll free at: Brubaker 800.522.8665, and ask to speak to our Technical Support Department.

Drilled Hole Size, Cutting Tap, Metric

Thread Size Nominal Dia. (mm)	Pitch (mm)	Drill Size	Decimal Equiva.	Percent of Thread
1.6	0.35	1.25mm	0.0492	77%
2	0.4	#52	0.0635	74%
		1.65mm	0.0650	67%
2.5	0.45	#46	0.0810	76%
		#45	0.0820	71%
3	0.5	2.5mm	0.0984	77%
		#39	0.0995	73%
		#38	0.1015	65%
3.5	0.6	2.9mm	0.1142	77%
		#32	0.1160	71%
		3.0mm	0.1181	64%
4	0.7	3.3mm	0.1299	77%
		3.4mm	0.1339	66%
4.5	0.75	3.75mm	0.1476	77%
		#25	0.1495	72%
		#24	0.1520	66%
5	0.8	4.2mm	0.1654	77%
		#19	0.1660	75%
		#18	0.1695	67%
6	1	5.0mm	0.1969	77%
		#8	0.1990	73%
		#7	0.2010	69%
		13/64	0.2031	65%
7	1	6.0mm	0.2362	77%
		B	0.2380	74%
		C	0.2420	66%
8	1	7.0mm	0.2756	77%
		J	0.2770	74%
		K	0.2810	66%
8	1.25	17/64	0.2656	77%
		H	0.2660	77%
		I	0.2730	66%

Thread Size Nominal Dia. (mm)	Pitch (mm)	Drill Size	Decimal Equiva.	Percent of Thread
10	1.25	8.75mm	0.3445	77%
		S	0.3480	71%
		9.0mm	0.3543	62%
10	1.5	8.5mm	0.3346	77%
		R	0.3390	71%
		11/32	0.3438	65%
12	1.25	27/64	0.4219	79%
		11.0mm	0.4331	62%
12	1.75	Y	0.4040	76%
		13/32	0.4063	74%
		Z	0.4130	66%
14	1.5	12.5mm	0.4921	77%
		1/2	0.5000	67%
14	2	12.0mm	0.4724	77%
		31/64	0.4844	65%
16	1.5	14.5mm	0.5709	77%
		37/64	0.5781	68%
16	2	14.0mm	0.5512	77%
		9/16	0.5625	66%
18	1.5	16.5mm	0.6496	77%
		21/32	0.6563	68%
18	2.5	15.5mm	0.6102	77%
		5/8	0.6250	65%
20	1.5	18.5mm	0.7283	77%
		47/64	0.7344	69%
20	2.5	17.5mm	0.6890	77%
		45/64	0.7031	66%

Drilled Hole Size, Forming Tap, Inch

Thread Size Size	TPI	Drill Size	Decimal Equiva.	Percent of Thread
0	80	1.35mm	0.0531	84%
		54	0.0551	60%
1	64	1.65mm	0.0650	79%
		1.70mm	0.0669	60%
1	72	1.70mm	0.0669	67%
2	56	1.95mm	0.0768	80%
		5/64	0.0781	68%
2	64	5/64	0.0781	78%
		2.00mm	0.0787	72%
3	48	43	0.0890	74%
3	56	43	0.0890	86%
4	40	39	0.0995	77%
		38	0.1015	65%
4	48	38	0.1015	78%
		2.60mm	0.1024	71%
5	40	33	0.1130	74%
		2.90mm	0.1142	67%
5	44	33	0.1130	81%
		2.90mm	0.1142	73%
6	32	3.1mm	0.1220	79%
		1/8	0.1250	64%
6	40	1/8	0.1250	80%
		3.20mm	0.1260	74%
8	32	3.75mm	0.1476	81%
		25	0.1495	71%
8	36	25	0.1495	80%
		24	0.1520	67%
10	24	18	0.1695	76%
		11/64	0.1719	67%
10	32	17	0.1730	84%
		16	0.1770	64%
12	24	9	0.1960	74%
		8	0.1990	63%
12	28	5.05mm	0.1988	74%

Thread Size Size	TPI	Drill Size	Decimal Equiva.	Percent of Thread
1/4	20	5.70mm	0.2244	79%
		1	0.2280	68%
1/4	28	5.90mm	0.2323	76%
		A	0.2340	69%
5/16	18	7.25mm	0.2854	75%
		L	0.2900	62%
5/16	24	7.4mm	0.2913	78%
		M	0.2950	65%
3/8	16	8.75mm	0.3445	75%
		S	0.3480	67%
3/8	24	9.00mm	0.3543	76%
		T	0.3580	63%
7/16	14	10.20mm	0.4016	77%
		Y	0.4040	72%
7/16	20	Z	0.4130	75%
1/2	13	11.80mm	0.4646	71%
		15/32	0.4688	62%
1/2	20	12.00mm	0.4724	85%
9/16	12	17/32	0.5313	58%
9/16	18	17/32	0.5313	87%
5/8	11	37/64	0.5781	79%
5/8	18	19/32	0.5938	87%
11/16	11	16.50mm	0.6496	64%
11/16	16	21/32	0.6563	77%
3/4	10	45/64	0.7031	72%
		18.00mm	0.7087	64%
3/4	16	23/32	0.7188	77%

Drilled Hole Size, Forming Tap, Metric

Thread Size Nominal Dia. (mm)	Pitch (mm)	Drill Size	Decimal Equiva.	Percent of Thread
1.6	0.35	1.40mm	0.0551	88%
		1.45mm	0.0571	66%
2	0.4	#50	0.0700	85%
		1.8mm	0.0709	77%
		#49	0.0730	56%
2.5	0.45	#43	0.0890	82%
3	0.5	2.75mm	0.1083	77%
		7/64	0.1094	68%
		#35	0.1100	63%
3.5	0.6	3.2mm	0.1260	77%
		#30	0.1285	61%
4	0.7	#27	0.1440	75%
		3.7mm	0.1457	66%
		#26	0.1470	59%
4.5	0.75	#20	0.1610	84%
		4.2mm	0.1654	62%
		#19	0.1660	58%
5	0.8	4.6mm	0.1811	77%
		#14	0.1820	73%
		#13	0.1850	58%
6	1	5.5mm	0.2165	77%
		7/32	0.2188	68%
		#2	0.2210	60%
7	1	6.5mm	0.2559	77%
		F	0.2570	73%
		G	0.2610	57%
8	1	7.5mm	0.2953	77%
		19/64	0.2969	71%
8	1.25	L	0.2900	78%
		7.4mm	0.2913	74%
		M	0.2950	62%

Thread Size Nominal Dia. (mm)	Pitch (mm)	Drill Size	Decimal Equiva.	Percent of Thread
10	1.25	U	0.3680	80%
		9.4mm	0.3701	74%
		3/8	0.3750	59%
10	1.5	9.25mm	0.3642	77%
		9.3mm	0.3661	72%
		U	0.3680	67%
12	1.25	11.4mm	0.4488	74%
		29/64	0.4531	60%
12	1.75	7/16	0.4375	78%
		11.2mm	0.4409	70%
14	1.5	17/64	0.5313	52%
14	2	13.0mm	0.5118	77%
		33/64	0.5156	70%
16	1.5	39/64	0.6094	54%
16	2	15.0mm	0.5906	77%
		19/32	0.5938	71%
18	1.5	11/16	0.6875	55%
18	2.5	21/32	0.6563	82%
		17.0mm	0.6693	62%
20	1.5	49/64	0.7656	57%
20	2.5	47/64	0.7344	83%
		19.0mm	0.7480	62%

Inch and Metric–Cutting Tap

Size	Diameter	TPI	Drill Size	Decimal Equiva.	Percent of Thread
2	0.0860	56	#49	0.0730	56%
4	0.1120	40	3/32	0.0938	56%
6	0.1380	32	#32	0.1160	54%
8	0.1640	32	9/64	0.1406	58%
10	0.1900	24	#20	0.1610	54%
10	0.1900	32	#19	0.1660	59%
1/4	0.2500	20	#3	0.2130	57%
1/4	0.2500	28	#2	0.2210	63%
5/16	0.3125	18	I	0.2720	56%
5/16	0.3125	24	9/32	0.2813	58%
3/8	0.3750	16	21/64	0.3281	58%
3/8	0.3750	24	11/32	0.3438	58%
7/16	0.4375	14	W	0.3860	56%
7/16	0.4375	20	10.2mm	0.4016	55%
1/2	0.5000	13	11.2mm	0.4409	59%
1/2	0.5000	20	11.8mm	0.4646	55%
9/16	0.5625	12	1/2	0.5000	58%
9/16	0.5625	18	33/64	0.5156	65%
5/8	0.6250	11	9/16	0.5625	53%
5/8	0.6250	18	37/64	0.5781	65%
3/4	0.7500	10	43/64	0.6719	60%
3/4	0.7500	16	18.0mm	0.7087	51%

Nominal Dia. (mm)	Diameter (Inch)	Pitch (mm)	Drill Size	Decimal Equiva.	Percent of Thread
2.5	0.0984	0.45	#44	0.0860	54%
3	0.1181	0.5	#37	0.1040	55%
3.5	0.1378	0.6	#31	0.1200	58%
4	0.1575	0.7	#29	0.1360	60%
5	0.1969	0.8	#17	0.1730	58%
6	0.2362	1	#4	0.2090	53%
7	0.2756	1	1/4	0.2500	50%
8	0.3150	1	7.25mm	0.2854	58%
8	0.3150	1.25	9/32	0.2813	53%
10	0.3937	1.25	23/64	0.3594	54%
10	0.3937	1.5	9.0mm	0.3543	51%
12	0.4724	1.25	7/16	0.4375	55%
12	0.4724	1.75	27/64	0.4219	56%

Code No.	Description	Approx. Hardness	Characteristics	Application
02	Nitride	1200 Hv	Consists of a thin, hardened case .0005-.0020 deep on the surface the tool to resist abrasion.	Can be used in most abrasive materials both ferrous and non-ferrous. Not recommended when chipping may be a problem.
03	Steam Oxide	No Change	Consists of a layer of ferrous oxide on the surface of the tool which has good lubricant retaining properties. Improves toughness by relieving grinding stresses.	Can be used in low carbon, stainless and free machining steels. Not recommended for use in soft non-ferrous materials where it may cause galling.
04	Chrome Plate	1200 Hv	Consists of a very thin layer of hard chromium on the surface of the tool which reduces friction and prevents galling.	Can be used in most ferrous, non-ferrous and non-metallic materials. While unlikely, it may cause galling in high chromium stainless steels.
23	Nitride and Steam Oxide	1200 Hv	A combination of two treatments which produces the favorable characteristic of both resistance to abrasion and galling.	Can be used in iron and cast iron, stainless and high tensile steels. Not recommended for use in soft non-ferrous materials where it may cause galling.
82	Chromium Nitride	1750 Hv	Consists of a very hard coating on the surface of the tool which has outstanding wear resistance, reduces friction and prevents galling.	Can be used on titanium, titanium alloys, aluminum alloys and copper alloys. Very effective at higher speed and in many tapping applications.
88	Titanium Nitride	2400 Hv	Consists of a very hard coating on the surface of the tool which has outstanding wear resistance, reduces friction and prevents galling.	Can be used in most ferrous, non-ferrous and non-metallic materials. While unlikely, it may cause galling in titanium and titanium alloys.
89	Titanium Carbonitrde	3000 Hv	Consists of an extremely hard coating on the surface of the tool which has outstanding wear resistance, reduces friction and prevents galling.	Can be used in most ferrous, non-ferrous and abrasive materials. While unlikely, it may cause galling in titanium and titanium alloys.
90	Chromium Carbide	1850 Hv	Consists of a very hard coating on the surface of the tool which has outstanding wear resistance, reduces friction and prevents galling.	Can be used on titanium, titanium alloys, exotic materials and die cast aluminum. Very effective at higher speed and in many tapping applications. Under certain conditions it may cause galling in wrought aluminum.

Tapping Speed (SFM) and Treatment/Coating Recommendations

Tapping Speed and Treatment/Coating recommendations are for our standard high speed steel product. High performance recommendations are listed on the individual product pages.

Work Material	Series	Recommended Tapping Speed (SFM) *	Recommended Treatment/Coating (Listed Best to Good)
Aluminum	Wrought Cast	75 75	82, 02 82, 02
Cast Iron	Gray Ductile Malleable	35 35	89, 88, 23, 02 89, 88, 23, 03, 02
Steel	Low Carbon Medium Carbon High Carbon	55 35 25	89, 88, 03 89, 88, 03 89, 88, 03
Alloy Steel		35	89, 88, 03
Stainless Steel	300 Series	35**	89, 88, 03
	400 Series	25**	89, 88, 03
	PH Series	15**	89, 88, 03
High Nickel Alloys		8**	89
Titanium Alloy		12**	90
Die Steel		25	89, 88, 03
Hardened Steel	<35 HrC 35 – 45 HrC	25** 10**	89, 88, 03 89, 88, 03

* Recommended Tapping Speed should be considered a starting point. Adjustments may be necessary depending on the cutting conditions.

** A High Performance style tap is strongly recommended for these materials.

RPM = SFM/(Basic Diameter *3.1416/12)
Example: 1/4-20 NC Tap @ 35 SFM
35 SFM/(0.250*3.1416/12) = 535 RPM

Ordering is as simple as contacting your local authorized distributor. Alternatively, you can call us directly to get a list of authorized distributors in your area. For technical support, please use the numbers listed below and ask to speak with an applications engineer. Thank you for your business and your support of American manufacturing.

BRUBAKER™

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Limited Warranty

Brubaker warrants to original equipment manufacturers, distributors and industrial and commercial users of its products that each new product that it manufactures or supplies is free from defects in material and workmanship. Its sole obligation under this warranty is limited to furnishing, without additional charge, a replacement for, or, at its option, repairing or issuing credit for any such product which shall, within one year from the date of sale by **Brubaker** be returned freight prepaid to **Brubaker** and which, upon inspection, is determined by **Brubaker** to be defective in materials or workmanship. The provisions of this warranty shall not apply to any product which has been subjected to misuse, improper operating conditions, or which has been repaired or altered, if such would adversely affect performance of the product. Complete written information with respect to all such matters must be furnished to **Brubaker** as a prerequisite to its consideration of any claim or complaint under this warranty.

The repair, replacement or issuance of credit for parts provided for in this warranty constitutes the Buyer's exclusive remedy. The warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose. **Brubaker** has no liability or responsibility on any claim of any kind, whether in contract, tort or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery or use of any product sold hereunder, in excess of the cost of replacement or repair as provided herein. In no event shall **Brubaker** be liable for any special, incidental or consequential damages. **Brubaker** makes no other warranty, express or implied, except as set forth above; and neither assumes nor authorizes any other person or entity to assume for it any other obligation or liability in connection with any of its products.

WARNING

Any cutting tool may break or shatter under improper use. Government regulations require use of safety glasses and other appropriate safety equipment at all times in the vicinity of use. Wet or dry grinding of cutting tools produces potentially hazardous dusts or mists; to avoid adverse health effects, use adequate ventilation and read the material Safety Data Sheet for further applicable tool material or grade before grinding.

Tap Troubleshooting Guide

General Problem	Possible Cause	Solution
Oversize Pitch Diameter	Incorrect Tap	1. Use correct GH(GD) limit, see recommendations. 2. Ensure chips are being removed from tap flutes. 3. Increase chamfer length, if possible.
	Excessive "Z" Axial Spindle Movement	1. Check spindle and holder for excessive movement. 2. Reduce/increase spindle feed by approximately 2 - 6%. 3. Adjust Tap Geometry to avoid over/under feed.
	Poor Alignment	1. If cored hole, check for alignment. 2. Check for correct workholding. 3. Utilize a floating type holder.
	Cutting Speed	1. Reduce Tapping Speed.
	Poor Lubrication	1. Ensure proper concentration and delivery of coolant. 2. Use coolant through, if possible.
	Tap Limit	1. If finish quality is acceptable, reduce GH limit.
	Welding/(BUE) Built Up Edge	1. Apply correct surface treatment/coating. 2. Utilize appropriate tapping speed. 3. Ensure proper concentration and delivery of coolant. 4. Increase hole size.
	Excessive or Incorrect PD Relief	1. Utilize an alternate tap series. 2. Use tap with special geometry.
Undersize Pitch Diameter	Incorrect Tap	1. Use correct GH(GD) limit, see recommendations. 2. Ensure chips are being removed from tap flutes. 3. Visually inspect threaded hole for roughness.
	Tap Limit	1. If finish quality is acceptable, increase GH limit. 2. Thin walled parts often require an increased GH Limit.
	Welding/(BUE) Built Up Edge	1. Apply correct surface treatment/coating. 2. Utilize appropriate tapping speed. 3. Ensure proper concentration and delivery of coolant. 4. Increase hole size.
Oversize/Undersize Minor Diameter	Correct Hole Size	1. Check actual drilled hole size, prior to tapping. 2. Use 65% of thread, if possible. 3. Hole size critical for forming style taps. 4. Utilize controlled minor diameter tap, prevent undersize.
	Poor Lubrication	1. Ensure proper concentration and delivery of coolant.
	Welding/(BUE) Built Up Edge	1. Apply correct surface treatment/coating. 2. Utilize appropriate tapping speed. 3. Rough or torn threads may interfere with gauge.

BRUBAKER™

For additional support and for maximum optimization of your tools, call us toll free at: Brubaker 800.522.8665, and ask to speak to our Technical Support Department.

General Problem	Possible Cause	Solution
Torn/Rough Threads	Incorrect Tap	1. Ensure chips are being removed from tap flutes.
	Chip Packing	1. Reduce number of flutes, if threads are rough.
	Chatter Finish	1. Check Tap Geometry, flute size, thread relief, ect.
	Chamfer Length	1. Increase chamfer length, if possible.
	Welding/(BUE) Built Up Edge	1. Apply correct surface treatment/coating. 2. Utilize appropriate tapping speed. 3. Rough or torn threads may interfere with gauge.
Poor Tool Life	Incorrect Tap Chip Packing	1. Ensure chips are being removed from tap flutes. 2. Increase number of flutes, if excessive wear. 3. Use bottom type forming tap to prevent work hardening.
	Work Surface Hardening	1. Maintain a sharp drill point. 2. Use carbide drill for longer tool life.
	Tapping Speed	1. Check recommendation charts. 2. Use suitable treatment or coating to extend life.
Tap Chipping	Incorrect Tap	1. Ensure chips are being removed from tap flutes.
	Tapping Speed	1. Check recommendation charts. 2. Use suitable treatment or coating to extend life.
	Geometry	1. Increase chamfer length, if possible. 2. Reduce hook cutting angle. 3. Reduce chamfer relief. 4. Reduce spiral flute helix angle.
Tap Breakage	Incorrect Tap	1. Ensure chips are being removed from tap flutes. 2. Check for correct geometry. 3. Use suitable treatment or coating to extend life.
	Pre-Tap Drill Size	1. Increase drill size, use 65% of thread, if possible.
	Bottom Clearance	1. Confirm tap is not bottoming out in drilled hole.
	Thread Depth	1. 1.5XD thread length optimum, 2XD should be maximum. 2. For bottoming holes, use modified bottom chamfer.

Drill Chart

Drill Size	Metric (mm)	Decimal
80	0.34	0.0135
—	0.35	0.0138
79	0.37	0.0145
1/64	0.40	0.0156
—	0.40	0.0157
78	0.41	0.0160
—	0.45	0.0177
77	0.46	0.0180
—	0.50	0.0197
76	0.51	0.0200
75	0.53	0.0210
—	0.55	0.0217
74	0.57	0.0225
—	0.60	0.0236
73	0.61	0.0240
72	0.64	0.0250
—	0.65	0.0256
71	0.66	0.0260
—	0.70	0.0276
70	0.71	0.0280
69	0.74	0.0292
—	0.75	0.0295
68	0.79	0.0310
1/32	0.80	0.0313
—	0.80	0.0315
67	0.81	0.0320
66	0.84	0.0330
—	0.85	0.0335
65	0.89	0.0350
—	0.90	0.0354
64	0.91	0.0360
63	0.94	0.0370
—	0.95	0.0374
62	0.97	0.0380
61	0.99	0.0390
—	1.00	0.0394
60	1.02	0.0400
59	1.04	0.0410
58	1.07	0.0420
57	1.09	0.0430
—	1.10	0.0433
56	1.18	0.0465
3/64	1.19	0.0469
—	1.20	0.0472
—	1.25	0.0492
—	1.30	0.0512
55	1.32	0.0520
—	1.35	0.0531

Drill Size	Metric (mm)	Decimal
54	1.40	0.0550
—	1.40	0.0551
—	1.45	0.0571
—	1.50	0.0591
53	1.51	0.0595
1/16	1.59	0.0625
—	1.60	0.0630
52	1.61	0.0635
—	1.65	0.0650
51	1.70	0.0670
---	1.75	0.0689
50	1.78	0.0700
---	1.80	0.0709
49	1.85	0.0730
—	1.90	0.0748
48	1.93	0.0760
—	1.95	0.0768
5/64	1.98	0.0781
47	1.99	0.0785
---	2.00	0.0787
—	2.05	0.0807
46	2.06	0.0810
45	2.08	0.0820
—	2.10	0.0827
44	2.18	0.0860
—	2.20	0.0866
43	2.26	0.0890
—	2.30	0.0906
—	2.35	0.0925
42	2.37	0.0935
3/32	2.38	0.0938
—	2.40	0.0945
41	2.44	0.0960
40	2.49	0.0980
—	2.50	0.0984
39	2.53	0.0995
38	2.58	0.1015
—	2.60	0.1024
37	2.64	0.1040
—	2.70	0.1063
36	2.71	0.1065
—	2.75	0.1083
7/64	2.78	0.1094
35	2.79	0.1100
—	2.80	0.1102
34	2.82	0.1110
33	2.87	0.1130
—	2.90	0.1142

Drill Size	Metric (mm)	Decimal
32	2.95	0.1160
—	3.00	0.1181
31	3.05	0.1200
—	3.10	0.1220
1/8	3.18	0.1250
—	3.20	0.1260
30	3.26	0.1285
—	3.30	0.1299
—	3.40	0.1339
29	3.45	0.1360
—	3.50	0.1378
28	3.57	0.1405
9/64	3.57	0.1406
27	3.66	0.1440
—	3.70	0.1457
26	3.73	0.1470
—	3.75	0.1476
25	3.80	0.1495
24	3.86	0.1520
23	3.91	0.1540
5/32	3.97	0.1563
22	3.99	0.1570
—	4.00	0.1575
21	4.04	0.1590
20	4.09	0.1610
—	4.20	0.1654
19	4.22	0.1660
18	4.31	0.1695
11/64	4.37	0.1719
17	4.39	0.1730
16	4.50	0.1770
15	4.57	0.1800
—	4.60	0.1811
14	4.62	0.1820
13	4.70	0.1850
3/16	4.76	0.1875
12	4.80	0.1890
11	4.85	0.1910
10	4.91	0.1935
9	4.98	0.1960
15	5.00	0.1968
8	5.05	0.1990
7	5.11	0.2010
13/64	5.16	0.2031
6	5.18	0.2040
5	5.22	0.2055
4	5.31	0.2090
3	5.41	0.2130

Drill Size	Metric (mm)	Decimal
—	5.50	0.2165
7/32	5.56	0.2188
2	5.61	0.2210
—	5.70	0.2244
1	5.79	0.2280
—	5.90	0.2323
A	5.94	0.2340
15/64	5.95	0.2344
—	6.00	0.2362
B	6.05	0.2380
C	6.15	0.2420
D	6.25	0.2460
1/4	6.35	0.2500
E	6.35	0.2500
—	6.50	0.2559
F	6.53	0.2570
G	6.63	0.2610
17/64	6.75	0.2656
H	6.76	0.2660
I	6.91	0.2720
—	7.00	0.2756
J	7.04	0.2770
K	7.14	0.2810
9/32	7.15	0.2813
—	7.25	0.2854
L	7.37	0.2900
—	7.40	0.2913
M	7.49	0.2950
—	7.50	0.2953
19/64	7.54	0.2969
N	7.67	0.3020
5/16	7.94	0.3125
—	8.00	0.3150
O	8.03	0.3160
P	8.20	0.3230
21/64	8.33	0.3281
Q	8.43	0.3320
—	8.50	0.3346
R	8.61	0.3390
11/32	8.73	0.3438
—	8.75	0.3445
S	8.84	0.3480
—	9.00	0.3543
T	9.09	0.3580
23/64	9.13	0.3594
—	9.25	0.3642
—	9.30	0.3661
U	9.35	0.3680

Drill Size	Metric (mm)	Decimal
—	9.40	0.3701
—	9.50	0.3740
3/8	9.53	0.3750
V	9.58	0.3770
W	9.80	0.3860
25/64	9.92	0.3906
—	10.00	0.3937
X	10.08	0.3970
—	10.20	0.4016
Y	10.26	0.4040
13/32	10.32	0.4063
Z	10.49	0.4130
—	10.50	0.4134
27/64	10.72	0.4219
—	11.00	0.4331
7/16	11.11	0.4375
—	11.20	0.4409
—	11.40	0.4488
—	11.50	0.4528
29/64	11.51	0.4531
—	11.80	0.4646
15/32	11.91	0.4688
—	12.00	0.4724
31/64	12.30	0.4844
—	12.50	0.4921
1/2	12.70	0.5000
—	13.00	0.5118
33/64	13.10	0.5156
17/32	13.50	0.5313
35/64	13.89	0.5469
—	14.00	0.5512
9/16	14.29	0.5625
—	14.50	0.5709
37/64	14.68	0.5781
—	15.00	0.5905
19/32	15.08	0.5938
39/64	15.48	0.6094
—	15.50	0.6102
5/8	15.88	0.6250
—	16.00	0.6299
41/64	16.27	0.6406
—	16.50	0.6496
21/32	16.67	0.6563
—	17.00	0.6693
43/64	17.07	0.6719
11/16	17.46	0.6875
—	17.50	0.6890
45/64	17.86	0.7031

Drill Size	Metric (mm)	Decimal
—	18.00	0.7087
23/32	18.26	0.7188
—	18.50	0.7283
47/64	18.65	0.7344
—	19.00	0.7480
3/4	19.05	0.7500
49/64	19.45	0.7656
—	19.50	0.7677
25/32	19.85	0.7813
—	20.00	0.7874
51/64	20.24	0.7969
—	20.50	0.8071
13/16	20.64	0.8125
—	21.00	0.8268
53/64	21.03	0.8281
27/32	21.43	0.8438
—	21.50	0.8465
55/64	21.83	0.8594
—	22.00	0.8661
42559	22.23	0.8750
—	22.50	0.8858
57/64	22.62	0.8906
—	23.00	0.9055
29/32	23.02	0.9063
59/64	23.42	0.9219
—	23.50	0.9252
15/16	23.81	0.9375
—	24.00	0.9449
61/64	24.21	0.9531
—	24.50	0.9646
31/32	24.61	0.9688
—	25.00	0.9842
63/64	25.00	0.9844
1	25.40	1.0000

EDP Number Index, 10000–10594

If the EDP number is known for the desired tool, it can be found in the numeric EDP listing. Find the desired EDP number and turn to the corresponding page.

EDP Number Index, 10597–11230

EDP Number Index, 11231–12155

If the EDP number is known for the desired tool, it can be found in the numeric EDP listing. Find the desired EDP number and turn to the corresponding page.

EDP Number Index, 12157–15501

EDP Number Index, 15547–19999

If the EDP number is known for the desired tool, it can be found in the numeric EDP listing. Find the desired EDP number and turn to the corresponding page.

EDP Number Index, 21149–21591

EDP Number Index, 21592–23432

If the EDP number is known for the desired tool, it can be found in the numeric EDP listing. Find the desired EDP number and turn to the corresponding page.

EDP Number Index, 23433–30944

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