



**MORSE**  
**CUTTING TOOLS**



**MASTER  
CATALOG**

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# New & Expanded

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# MORSE

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## CUTTING TOOLS

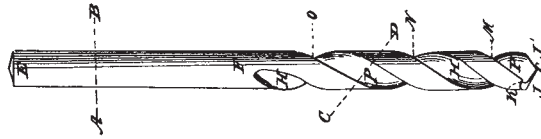


### United States Patent Office.

STEPHEN A. MORSE, OF EAST BRIDGEWATER, MASSACHUSETTS.

IMPROVEMENT IN DRILL BITS.

Specification forming part of Letters Patent No. 38,119, dated April 7, 1863.



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QUALITY SYSTEM  
REGISTERED TO  
ISO 9001:2015

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## High Performance Drills



List No. 5600 3xD and List No. 5603 5xD Non-Coolant Through



List No. 5601 3xD Short Length Coolant Through



List No. 5602 5xD Long Length Coolant Through

### Premium Submicron Carbide

**TiALN - Titanium Aluminum Nitride Coating** increases wear resistance, heat resistance and chip flow and resists chip welding.

### 140° Self-Centering High Performance Point

**Coolant-Through** design delivers coolant directly to the drill point enabling higher speeds and chip loads.

**Recommended for** a wide range of materials including carbon steels, cast steels, alloy steels, stainless steels and cast iron.



## 3xD and 5xD Non-Coolant Through High Performance Drills

### Premium Submicron Carbide

**TiALN - Titanium Aluminum Nitride Coating** increases wear resistance, heat resistance and chip flow and resists chip welding.

### 140° Self-Centering High Performance Point

**Recommended for** a wide range of materials including carbon steels, cast steels, alloy steels, stainless steels and cast iron.

**WITHOUT COOLANT HOLES**

3XD NON-COOLANT THROUGH DRILLS			
Drill and Shank Diameter Tolerances			
	Diameter Range	Drill Dia.	Shank Dia.
INCH	.1181 - .2360	+0.000 / -.00071	-.0001 / -.0005
INCH	.2361 - .3940	+.000 / -.00087	-.0001 / -.0005
INCH	.3941 - .7090	+0.000 / -.00106	-.0001 / -.0005

**Speeds & Feeds: Page 11**

(continued)

# 3xD Non-Coolant Through



**SHEAR DRILL™ HIGH PERFORMANCE DRILLS**

**WITHOUT COOLANT HOLES**  
Drilling up to 3xD

**Tolerances:**  
Page 4

List No. 5600 Non-Coolant Through

FRACTIONAL	SIZE			DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
	WIRE GAGE	LETTER	METRIC					
1/8				.1250	1/8	45/64	1-59/64	98700
9/64				.1406	9/64	25/32	2-3/64	98701
5/32				.1562	5/32	7/8	2-3/16	98702
11/64				.1719	11/64	15/16	2-9/32	98703
3/16				.1875	3/16	1	2-7/16	98704
13/64				.2031	13/64	1	2-7/16	98705
7/32				.2188	7/32	1-1/8	2-5/8	98706
15/64				.2344	15/64	1-1/8	2-5/8	98707
1/4		E		.2500	1/4	1-5/8	3-3/16	98708
		F		.2570	F	1-11/16	3-17/64	98709
17/64				.2656	17/64	1-11/16	3-17/64	98710
		I		.2720	I	1-11/16	3-17/64	98711
9/32				.2812	9/32	1-3/4	3-7/16	98712
19/64				.2969	19/64	1-7/8	3-9/16	98713
5/16				.3125	5/16	1-7/8	3-9/16	98714
21/64				.3281	21/64	2-1/16	3-3/4	98715
		Q		.3320	Q	2-1/16	3-3/4	98716
11/32				.3438	11/32	2-3/16	3-7/8	98717
23/64				.3594	23/64	2-9/32	4	98718
		U		.3680	U	2-9/32	4	98719
3/8				.3750	3/8	2-3/8	4-1/8	98720
25/64				.3906	25/64	2-3/8	4-1/8	98721
13/32				.4062	13/32	2-5/8	4-13/32	98722
27/64				.4219	27/64	2-11/16	4-1/2	98723
7/16				.4375	7/16	2-13/16	4-5/8	98724
29/64				.4531	29/64	2-7/8	4-3/4	98725
15/32				.4688	15/32	2-7/8	4-3/4	98726
31/64				.4844	31/64	3	5-5/16	98727
1/2				.5000	1/2	3-1/16	5-3/8	98728
33/64				.5156	33/64	3-11/32	5-11/16	98729
17/32				.5312	17/32	3-11/32	5-11/16	98730
9/16				.5625	9/16	3-1/2	5-15/16	98731
37/64				.5781	37/64	3-37/64	6	98732
5/8				.6250	5/8	3-25/32	6-19/64	98733



**WITHOUT COOLANT HOLES**  
Drilling up to 5xD

**Tolerances:**  
Page 6



# 5xD Non-Coolant Through

List No. 5603 Non-Coolant Through

FRACTIONAL	SIZE			DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
	WIRE GAGE	LETTER	METRIC					
13/64				.2031	13/64	1-3/4	3-15/16	98851
7/32				.2188	7/32	1-57/64	3-15/16	98852
1/4		E		.2500	1/4	2-3/64	4-19/64	98853
		F		.2570	F	2-13/64	4-19/64	98854
17/64				.2656	17/64	2-13/64	4-19/64	98855
9/32				.2812	9/32	2-23/64	4-41/64	98856
5/16				.3125	5/16	2-33/64	4-41/64	98857
11/32				.3438	11/32	2-27/32	5	98858
3/8				.3750	3/8	3-5/32	5-23/64	98859
25/64				.3906	25/64	3-5/32	5-23/64	98860
13/32				.4062	13/32	3-5/16	5-7/8	98861
27/64				.4219	27/64	3-15/32	5-7/8	98862
7/16				.4375	7/16	3-5/8	6-7/32	98863
1/2				.5000	1/2	4-3/32	6-37/64	98864



# Coolant-Through 3xD Short Length High Performance Drills

Premium Submicron Carbide

TiALN – Titanium Aluminum Nitride Coating increases wear resistance, heat resistance and chip flow and resists chip welding.

140° Self-Centering High Performance Point

Coolant-Through design delivers coolant directly to the drill point enabling higher speeds and chip loads.

Recommended for a wide range of materials including carbon steels, cast steels, alloy steels, stainless steels and cast iron.



5XD NON-COOLANT THROUGH DRILLS & COOLANT THROUGH DRILLS			
Drill and Shank Diameter Tolerances			
Diameter Range		Drill Dia. m7	Shank Dia. h6
INCH	.1182 - .2362	+0.0016 / +.00063	+0.000 / -.00031
METRIC (mm)	> 3.0 - 6.0	+0.004 / +0.016	+0.000 / -.008
INCH	.2363 - .3937	+0.0024 / +.00083	+0.000 / -.00035
METRIC (mm)	> 6.0 - 10.0	+0.006 / +0.021	+0.000 / -.009
INCH	.3938 - .7087	+0.0027 / +.00098	+0.000 / -.00043
METRIC (mm)	> 10.0 - 18.0	+0.007 / +.025	+0.000 / -.011
INCH	.7088 - .7874	+0.0031 / +.00114	+0.000 / -.00051
METRIC (mm)	> 18.0 - 20.0	+0.008 / +0.029	+0.000 / -.013

**Speeds & Feeds: Page 11**

List No. 5601 Short Length Coolant Through

**COOLANT-THROUGH**

FRACTIONAL	SIZE			DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
	WIRE GAGE	LETTER	METRIC					
5/32	21			.1562	6	24	66	98734
		4.0		.1575	6	24	66	98735
		4.2		.1590	6	24	66	98736
		4.5		.1654	6	24	66	98737
		4.5		.1772	6	24	66	98738
3/16	3			.1875	6	24	66	98739
		4.8		.1890	6	28	66	98740
		5.0		.1969	6	28	66	98741
		5.5		.2130	6	28	66	98742
		5.5		.2165	6	28	66	98743
7/32	2			.2188	6	28	66	98744
				.2210	6	28	66	98745
		5.8		.2283	6	28	66	98746
		6.0	A	.2340	6	28	66	98747
		6.0		.2362	6	28	66	98748
1/4		C		.2420	8	34	79	98749
		E		.2500	8	34	79	98750
		6.5		.2559	8	34	79	98751
		F		.2570	8	34	79	98752
		H		.2660	8	34	79	98753
			6.8	.2677	8	34	79	98754
				.2720	8	34	79	98755
		7.0		.2756	8	34	79	98756
			J	.2770	8	34	79	98757
				.2812	8	41	79	98758
9/32			7.5	.2953	8	41	79	98759
				.2969	8	41	79	98760
19/64 5/16				.3125	8	41	79	98761
		8.0		.3150	8	41	79	98762
		8.2		.3228	10	47	89	98763

(continued)



# Coolant-Through 3xD Short Length High Performance Drills

Premium Submicron Carbide

TiALN – Titanium Aluminum Nitride Coating increases wear resistance, heat resistance and chip flow and resists chip welding.

140° Self-Centering High Performance Point

Coolant-Through design delivers coolant directly to the drill point enabling higher speeds and chip loads.

Recommended for a wide range of materials including carbon steels, cast steels, alloy steels, stainless steels and cast iron.



(continued)

List No. 5601 Short Length Coolant Through

COOLANT-THROUGH

FRACTIONAL	SIZE		METRIC	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
	WIRE GAGE	LETTER						
21/64		Q		.3281	10	47	89	98764
				.3320	10	47	89	98765
			8.5	.3346	10	47	89	98766
			9.0	.3543	10	47	89	98767
				.3594	10	47	89	98768
23/64		U		.3680	10	47	89	98769
			9.5	.3740	10	47	89	98770
3/8				.3750	10	47	89	98771
25/64				.3906	10	47	89	98772
			10.0	.3937	10	47	89	98773
13/32				.4062	12	55	102	98774
			10.5	.4134	12	55	102	98775
27/64				.4219	12	55	102	98776
			11.0	.4331	12	55	102	98777
7/16				.4375	12	55	102	98778
			11.5	.4528	12	55	102	98779
15/32				.4688	12	55	102	98780
			12.0	.4724	12	55	102	98781
			12.5	.4921	14	60	107	98782
1/2				.5000	14	60	107	98783
			13.0	.5118	14	60	107	98784
			13.5	.5315	14	60	107	98785
			14.0	.5512	14	60	107	98786
			14.5	.5709	16	65	115	98787
9/16				.5625	16	65	115	98788
			15.0	.5906	16	65	115	98789
			16.0	.6250	16	65	115	98790
5/8				.6299	16	65	115	98791
			16.0	.6299	16	65	115	98791
3/4				.7500	20	79	131	98792

To achieve Optimal Results all Components of the Drilling System must be considered

Technical Information: See Page 10

Recommended Speeds & Feeds: See Page 11

Speeds & Feeds: Page 11



# Coolant-Through 5xD Long Length High Performance Drills

Premium Submicron Carbide

TiALN – Titanium Aluminum Nitride Coating increases wear resistance, heat resistance and chip flow and resists chip welding.

140° Self-Centering High Performance Point

Coolant-Through design delivers coolant directly to the drill point enabling higher speeds and chip loads.

Recommended for a wide range of materials including carbon steels, cast steels, alloy steels, stainless steels and cast iron.



List No. 5602 Long Length Coolant Through

**COOLANT-THROUGH**

5XD NON-COOLANT THROUGH DRILLS & COOLANT THROUGH DRILLS			
Drill and Shank Diameter Tolerances			
Diameter Range		Drill Dia. m7	Shank Dia. h6
INCH	.1182 - .2362	+0.0016 / +.00063	+0.000 / -.00031
METRIC (mm)	> 3.0 - 6.0	+0.004 / +0.016	+0.000 / -.008
INCH	.2363 - .3937	+0.0024 / +.00083	+0.000 / -.00035
METRIC (mm)	> 6.0 - 10.0	+0.006 / +0.021	+0.000 / -.009
INCH	.3938 - .7087	+0.0027 / +.00098	+0.000 / -.00043
METRIC (mm)	> 10.0 - 18.0	+0.007 / +.025	+0.000 / -.011
INCH	.7088 - .7874	+0.0031 / +.00114	+0.000 / -.00051
METRIC (mm)	> 18.0 - 20.0	+0.008 / +0.029	+0.000 / -.013

FRACTIONAL	SIZE			DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.	
	WIRE GAGE	LETTER	METRIC						
5/32	21		4.0	.1562	6	36	74	98793	
				.1575	6	36	74	98794	
				.1590	6	36	74	98795	
				4.2	.1654	6	36	74	98796
				4.5	.1772	6	36	74	98797
3/16	3			.1875	6	36	74	98798	
				.1890	6	44	82	98799	
				5.0	.1969	6	44	82	98800
					.2130	6	44	82	98801
				5.5	.2165	6	44	82	98802
7/32	2			.2188	6	44	82	98803	
				.2210	6	44	82	98804	
				5.8	.2283	6	44	82	98805
		A		.2340	6	44	82	98806	
				6.0	.2362	6	44	82	98807
		C		.2420	8	53	91	98808	
		E		.2500	8	53	91	98809	
1/4			6.5	.2559	8	53	91	98810	
		F		.2570	8	53	91	98811	
		H		.2660	8	53	91	98812	
			6.8	.2677	8	53	91	98813	
		I		.2720	8	53	91	98814	
		J		.2756	8	53	91	98815	
9/32				.2770	8	53	91	98816	
				.2812	8	53	91	98817	
			7.5	.2953	8	53	91	98818	
				.2969	8	53	91	98819	
				8.0	.3125	8	53	91	98820
19/64 5/16				.3150	8	53	91	98821	
			8.2	.3228	10	61	103	98822	

(continued)

# Coolant-Through 5xD Long Length High Performance Drills

Premium Submicron Carbide

TiALN - Titanium Aluminum Nitride Coating increases wear resistance, heat resistance and chip flow and resists chip welding.

140° Self-Centering High Performance Point

Coolant-Through design delivers coolant directly to the drill point enabling higher speeds and chip loads.

Recommended for a wide range of materials including carbon steels, cast steels, alloy steels, stainless steels and cast iron.



(continued)

List No. 5602 Long Length Coolant Through

COOLANT-THROUGH

FRACTIONAL	SIZE		METRIC	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
	WIRE GAGE	LETTER						
21/64		Q		.3281	10	61	103	98823
				.3320	10	61	103	98824
			8.5	.3346	10	61	103	98825
			9.0	.3543	10	61	103	98826
23/64		U		.3594	10	61	103	98827
			9.5	.3680	10	61	103	98828
3/8				.3740	10	61	103	98829
			10.0	.3750	10	61	103	98830
13/32				.3937	10	61	103	98831
			10.5	.4062	12	71	118	98832
27/64				.4134	12	71	118	98833
			11.0	.4219	12	71	118	98834
7/16				.4331	12	71	118	98835
			11.5	.4375	12	71	118	98836
15/32				.4528	12	71	118	98837
			12.0	.4688	12	71	118	98838
1/2				.4724	12	71	118	98839
			12.5	.4921	14	77	124	98840
9/16				.5000	14	77	124	98841
			13.0	.5118	14	77	124	98842
5/8				.5315	14	77	124	98843
			14.0	.5512	14	77	124	98844
3/4				.5625	16	83	133	98845
			14.5	.5709	16	83	133	98846
5/8				.5906	16	83	133	98847
			15.0	.6250	16	83	133	98848
3/4				.6299	16	83	133	98849
			16.0	.7500	20	101	153	98850

To achieve Optimal Results all Components of the Drilling System must be considered

Technical Information: See Page 10

Recommended Speeds & Feeds: See Page 11

Speeds & Feeds: Page 11



## Technical Information

All components of the drilling system contribute to the achievement of the quality of the hole produced and the productivity that can be realized. In order to maximize success the following should be considered.

1. Toolholding – High quality tool holders should be used. Total indicated tool run out measured at the point should be less than .001”.
2. Machine – A rigid machine with a high quality spindle is required.
3. Workholding – The workpiece must be held rigidly so that it cannot deflect or vibrate during drilling
4. Drilling and Chamfering – A chamfer should be added to a hole only after drilling, never before.
5. The drill should be perpendicular to the surface being drilled. An inclined or rough surface should be pre-machined with an end mill to make it perpendicular before drilling.
6. Drilling On Turning Machines – When drilling on a turning machine the drill must be on center. The tolerance range for centrality should not exceed  $\pm .001$ . When drilling more than 3XD the drill may require a reduction in speed.
7. Coolant – **SHEARDRILL™** drills are high penetration drills. To perform to their potential they must be properly cooled. A high pressure and high volume with a quality high lubricity coolant will aid chip removal, enhance tool life and, increase hole quality.
  - Without adequate coolant, drills can heat up quickly and expand, sometimes leading to the drill seizing in the hole.
  - Heat at the drill point can cause coolant to vaporize resulting in thermal damage to the point. Coolant pressure should be high enough to break this barrier keeping the point within acceptable operating parameters.
  - See Minimum Favorable Coolant Pressure chart below for coolant-through drills



## Speeds and Feeds

Material Group	Examples	Composition / Structure		Hardness BRN	Cutting Speed (SFM)	D = 0.125"	D = 0.250"	D = 0.375"	D = 0.500"	D = 0.625"	D = 0.750"
Unalloyed steel, cast steel, machining steel	1008, 1108, 1018, 10L18, 12L15, ASTM A426: Gr. CP1	C = 0.10 - 0.25	Annealed, Long Chipping	125	390	0.004"	0.005"	0.006"	0.008"	0.009"	0.012"
		C = 0.10 - 0.25	Annealed, Short Chipping	125	410	0.004"	0.005"	0.006"	0.009"	0.011"	0.013"
	1030, 1055, 1070, 1524, 1050, 1060, ASTM 352 Gr. LCA, ASTM 356 Gr. 1, 1536	C = 0.25 - 0.55	Annealed, Long Chipping	190	360	0.004"	0.005"	0.006"	0.009"	0.011"	0.013"
		C = 0.25 - 0.55	Annealed, Short Chipping	190	390	0.004"	0.006"	0.007"	0.009"	0.011"	0.014"
		C = 0.25 - 0.55	Tempered	250	300	0.004"	0.006"	0.007"	0.009"	0.011"	0.015"
		C = 0.25 - 0.80	Annealed	270	260	0.004"	0.006"	0.007"	0.009"	0.011"	0.015"
		C = 0.25 - 0.80	Tempered	300	260	0.004"	0.006"	0.007"	0.009"	0.011"	0.015"
Low-alloy steel, cast steel, machining steel	1330, 2515, 3140, 4130, 4140, 4320, 4340, 5140, 8620, 9315, 9840	Annealed		180	260	0.004"	0.006"	0.007"	0.009"	0.012"	0.015"
		Tempered		275	260	0.004"	0.006"	0.007"	0.009"	0.011"	0.014"
		Tempered		300	260	0.004"	0.005"	0.006"	0.008"	0.010"	0.013"
		Tempered		350	230	0.004"	0.006"	0.007"	0.009"	0.011"	0.013"
High-alloy steel, cast steel, high alloy tool steel	D2, M2, T15	Annealed		200	200	0.003"	0.004"	0.005"	0.006"	0.008"	0.010"
		Hardened and Tempered		325	160	0.002"	0.004"	0.004"	0.006"	0.008"	0.010"
Gray cast iron	ASTM A48 Cl. 25, ASE J431c: Gr. G3000, ASTM A48 Cl. 30	Pearlitic / Ferritic		180	540	0.006"	0.007"	0.009"	0.012"	0.014"	0.018"
		Pearlitic (Martensitic)		260	360	0.005"	0.006"	0.008"	0.010"	0.013"	0.016"
Ductile cast iron	ASTM A536 Gr. 60-40-18, SAE J434c: Gr. D5506	Ferritic		160	360	0.005"	0.006"	0.008"	0.010"	0.012"	0.015"
		Pearlitic		250	360	0.004"	0.005"	0.006"	0.007"	0.009"	0.012"
Malleable cast iron	ASTM A47 Gr. 32510, SAE J158 Gr. M4504, M5003	Ferritic		130	430	0.005"	0.006"	0.007"	0.009"	0.012"	0.015"
		Pearlitic		230	430	0.004"	0.005"	0.006"	0.008"	0.010"	0.012"
Austenitic Stainless Steels	202, 303, 304, 316, 316L	Easy to Moderate Machining		200	180	0.003"	0.004"	0.005"	0.006"	0.008"	0.010"
Ferritic, Martensitic, and PH stainless steels	405, 410, 440C, 502, AM350, 17-4PH	Annealed		200	180	0.003"	0.004"	0.005"	0.006"	0.008"	0.010"
		Hardened and Tempered		325	160	0.002"	0.004"	0.004"	0.006"	0.008"	0.010"

### SPEED AND FEED RATES FOR NON-COOLANT-THROUGH DRILLS SHOULD EACH BE REDUCED BY 20%

Better drilling productivity is obtained by knowing the properties of the workpiece material. The hardness, chip forming characteristics, and machining characteristics help to select optimal machining parameters. Contact Morse Cutting Tools for more information.

SPEEDS and FEEDS are suggested starting points and may be increased or decreased depending upon material and machining conditions. Start conservatively and increase until machining cycle is optimized.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.



# HIGH PERFORMANCE CARBIDE DRILLS for ALUMINUM

- Premium Submicron Carbide
- Zirconium Carbo-Nitride Coated
- 135° 4-Facet Self-Centering Point
- Triple Margin
- Coolant-Through 3xD - 5xD - 12xD
- Non-Coolant-Though 3xD - 5xD



For High Performance Drilling of Aluminum  
and other Non-Ferrous Materials.



# High Performance Carbide Drills for Aluminum

## Technical Information

All components of the drilling system contribute to the achievement of the quality of the hole produced and the productivity that can be realized. In order to maximize success the following should be considered.

1. Toolholding – High quality tool holders should be used. Total indicated tool run out measured at the point should be less than .001”.
2. Machine – A rigid machine with a high quality spindle is required.
3. Workholding – The workpiece must be held rigidly so that it cannot deflect or vibrate during drilling
4. Drilling and Chamfering – A chamfer should be added to a hole only after drilling, never before.
5. The drill should be perpendicular to the surface being drilled. An inclined or rough surface should be pre-machined with an end mill to make it perpendicular before drilling.
6. Drilling On Turning Machines – When drilling on a turning machine the drill must be on center. The tolerance range for centrality should not exceed  $\pm .001$ . When drilling more than 3XD the drill may require a reduction in speed.
7. Coolant – **SHEARDRILL™** drills are high penetration drills. To perform to their potential they must be properly cooled. A high pressure and high volume with a quality high lubricity coolant will aid chip removal, enhance tool life, and increase hole quality.
  - Without adequate coolant, drills can heat up quickly and expand, sometimes leading to the drill seizing in the hole.
  - Heat at the drill point can cause coolant to vaporize resulting in thermal damage to the point. Coolant pressure should be high enough to break this barrier keeping the point within acceptable operating parameters.

Drill and Shank Diameter Tolerances			
Diameter Range		Drill Dia. h7	Shank Dia. h6
INCH	≤ .1181	+ .000 / - .00039	+ .000 / - .00024
METRIC (mm)	≤ 3.0	+ .000 / - .010	+ .000 / - .006
INCH	.1182 - .2362	+ .000 / - .00047	+ .000 / - .00031
METRIC (mm)	3.01 - 6.0	+ .000 / - .012	+ .000 / - .008
INCH	.2363 - .3937	+ .000 / - .00059	+ .000 / - .00035
METRIC (mm)	6.01 - 10.0	+ .000 / - .015	+ .000 / - .009
INCH	.3938 - .7087	+ .000 / - .00071	+ .000 / - .00043
METRIC (mm)	10.01 - 18.0	+ .000 / - .018	+ .000 / - .011



# High Performance Carbide Drills for Aluminum

Coolant-Through & Non-Coolant-Through

COOLANT THROUGH SEE PAGE 18

Premium Submicron Carbide

ZrCN - Zirconium Carbo-Nitride Coating increases wear resistance, heat resistance and chip flow and resists chip welding.

135° 4-Facet Self-Centering High Performance Point

15° Helix Angle with Polished Flutes

Edge Preparation for enhanced edge strength, tool life, coating adhesion and surface finish. Higher speeds and feeds.

Triple Margin Design for improved drilling stability, surface finish, hole quality and size precision.



List No. 5604 3xD Non-Coolant-Through

List No. 5605 3xD Coolant-Through



List No. 5604 5xD Non-Coolant-Through

List No. 5605 5xD Coolant-Through



List No. 5605 12xD Coolant-Through

**Coolant-Through Design** delivers coolant directly to the drill point enabling higher speeds and chip loads. Eliminates the need for "pecking" in deeper hole drilling.

**Recommended for Aluminum and a wide range of other Non-Ferrous Materials. Increased Productivity and Long Tool Life.**

## High Performance Carbide Drills for Aluminum

List No. 5604 3xD Non-Coolant-Through

3xD - WITHOUT COOLANT HOLES

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
1/16	.0625	1/8	5/8	2	06015
#52	.0635	1/8	11/16	2	06016
#51	.0670	1/8	11/16	2	06017
#50	.0700	1/8	11/16	2	06018
#49	.0730	1/8	11/16	2	06019
#48	.0760	1/8	11/16	2	06020
5/64	.0781	1/8	11/16	2	06021
#47	.0785	1/8	3/4	2-1/2	06022
2.00 MM	.0787	1/8	3/4	2-1/2	06023
#46	.0810	1/8	3/4	2-1/2	06024
#45	.0820	1/8	3/4	2-1/2	06025
#44	.0860	1/8	3/4	2-1/2	06026
#43	.0890	1/8	3/4	2-1/2	06027
#42	.0935	1/8	3/4	2-1/2	06028
3/32	.0938	1/8	3/4	2-1/2	06029
#41	.0960	1/8	13/16	2-1/2	06030
#40	.0980	1/8	13/16	2-1/2	06031
2.50 MM	.0984	1/8	13/16	2-1/2	06032
#39	.0995	1/8	13/16	2-1/2	06033
#38	.1015	1/8	13/16	2-1/2	06034

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
#37	.1040	1/8	13/16	2-1/2	06035
#36	.1065	1/8	13/16	2-1/2	06036
7/64	.1094	1/8	13/16	2-1/2	06037
#35	.1100	1/8	7/8	2-1/2	06038
#34	.1110	1/8	7/8	2-1/2	06039
#33	.1130	1/8	7/8	2-1/2	06040
#32	.1160	1/8	7/8	2-1/2	06041
3.00 MM	.1181	1/8	7/8	2-1/2	06042
#31	.1200	1/8	7/8	2-1/2	06043
1/8	.1250	1/8	7/8	2-1/2	06044
#30	.1285	3/16	15/16	2-1/2	06045
#29	.1360	3/16	15/16	2-1/2	06046
3.50 MM	.1378	3/16	15/16	2-1/2	06047
#28	.1405	3/16	15/16	2-1/2	06048
9/64	.1406	3/16	1	2-1/2	06049
#27	.1440	3/16	1	2-1/2	06050
#26	.1470	3/16	1	2-1/2	06051
#25	.1495	3/16	1	2-1/2	06052
#24	.1520	3/16	1	2-1/2	06053
#23	.1540	3/16	1	2-1/2	06054

(continued)





# High Performance Carbide Drills for Aluminum

List No. 5604 3xD Non-Coolant-Through (continued)

3xD - WITHOUT  
COOLANT HOLES

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
5/32	.1562	3/16	1	2-1/2	<b>06055</b>
#22	.1570	3/16	1-1/16	2-1/2	<b>06056</b>
4.00 MM	.1575	3/16	1-1/16	2-1/2	<b>06057</b>
#21	.1590	3/16	1-1/16	2-1/2	<b>06058</b>
#20	.1610	3/16	1-1/16	2-1/2	<b>06059</b>
4.20 MM	.1654	3/16	1-1/16	2-1/2	<b>06060</b>
#19	.1660	3/16	1-1/16	2-1/2	<b>06061</b>
#18	.1695	3/16	1-1/16	2-1/2	<b>06062</b>
11/64	.1719	3/16	1-1/16	2-1/2	<b>06063</b>
#17	.1730	3/16	1-1/8	3	<b>06064</b>
#16	.1770	3/16	1-1/8	3	<b>06065</b>
4.50 MM	.1772	3/16	1-1/8	3	<b>06066</b>
#15	.1800	3/16	1-1/8	3	<b>06067</b>
#14	.1820	3/16	1-1/8	3	<b>06068</b>
#13	.1850	3/16	1-1/8	3	<b>06069</b>
3/16	.1875	3/16	1-1/8	3	<b>06070</b>
#12	.1890	1/4	1-3/16	3	<b>06071</b>
#11	.1910	1/4	1-3/16	3	<b>06072</b>
#10	.1935	1/4	1-3/16	3	<b>06073</b>
#9	.1960	1/4	1-3/16	3	<b>06074</b>
5.00 MM	.1969	1/4	1-3/16	3	<b>06075</b>
#8	.1990	1/4	1-3/16	3	<b>06076</b>
5.10 MM	.2008	1/4	1-3/16	3	<b>06077</b>
#7	.2010	1/4	1-3/16	3	<b>06078</b>
13/64	.2031	1/4	1-3/16	3	<b>06079</b>
#6	.2040	1/4	1-1/4	3	<b>06080</b>
#5	.2055	1/4	1-1/4	3	<b>06081</b>
#4	.2090	1/4	1-1/4	3	<b>06082</b>
#3	.2130	1/4	1-1/4	3	<b>06083</b>
5.50 MM	.2165	1/4	1-1/4	3	<b>06084</b>
7/32	.2188	1/4	1-1/4	3	<b>06085</b>
#2	.2210	1/4	1-1/4	3	<b>06086</b>
#1	.2280	1/4	1-1/4	3	<b>06087</b>
A	.2340	1/4	1-1/4	3	<b>06088</b>
15/64	.2344	1/4	1-1/4	3	<b>06089</b>
6.00 MM	.2362	1/4	1-3/8	3	<b>06090</b>
B	.2380	1/4	1-3/8	3	<b>06091</b>
C	.2420	1/4	1-3/8	3	<b>06092</b>
D	.2460	1/4	1-3/8	3	<b>06093</b>
1/4 (E)	.2500	1/4	1-3/8	3	<b>06094</b>
6.50 MM	.2559	5/16	1-7/16	3	<b>06095</b>
F	.2570	5/16	1-7/16	3	<b>06096</b>
G	.2610	5/16	1-7/16	3	<b>06097</b>
17/64	.2656	5/16	1-7/16	3	<b>06098</b>
H	.2660	5/16	1-1/2	3	<b>06099</b>

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
I	.2720	5/16	1-1/2	3	<b>06100</b>
7.00 MM	.2756	5/16	1-1/2	3	<b>06101</b>
J	.2770	5/16	1-1/2	3	<b>06102</b>
K	.2810	5/16	1-1/2	3	<b>06103</b>
9/32	.2812	5/16	1-1/2	3	<b>06104</b>
L	.2900	5/16	1-9/16	4	<b>06105</b>
M	.2950	5/16	1-9/16	4	<b>06106</b>
7.50 MM	.2953	5/16	1-9/16	4	<b>06107</b>
19/64	.2969	5/16	1-9/16	4	<b>06108</b>
N	.3020	5/16	1-5/8	4	<b>06109</b>
5/16	.3125	5/16	1-5/8	4	<b>06110</b>
8.00 MM	.3150	3/8	1-11/16	4	<b>06111</b>
O	.3160	3/8	1-11/16	4	<b>06112</b>
P	.3230	3/8	1-11/16	4	<b>06113</b>
21/64	.3281	3/8	1-11/16	4	<b>06114</b>
Q	.3320	3/8	1-11/16	4	<b>06115</b>
8.50 MM	.3346	3/8	1-11/16	4	<b>06116</b>
R	.3390	3/8	1-11/16	4	<b>06117</b>
11/32	.3438	3/8	1-11/16	4	<b>06118</b>
S	.3480	3/8	1-3/4	4	<b>06119</b>
9.00 MM	.3543	3/8	1-3/4	4	<b>06120</b>
T	.3580	3/8	1-3/4	4	<b>06121</b>
23/64	.3594	3/8	1-3/4	4	<b>06122</b>
U	.3680	3/8	1-13/16	4	<b>06123</b>
9.50 MM	.3740	3/8	1-13/16	4	<b>06124</b>
3/8	.3750	3/8	1-13/16	4	<b>06125</b>
V	.3770	7/16	1-7/8	4	<b>06126</b>
W	.3860	7/16	1-7/8	4	<b>06127</b>
25/64	.3906	7/16	1-7/8	4	<b>06128</b>
10.00 MM	.3937	7/16	1-15/16	4	<b>06129</b>
X	.3970	7/16	1-15/16	4	<b>06130</b>
Y	.4040	7/16	1-15/16	4	<b>06131</b>
13/32	.4062	7/16	1-15/16	4	<b>06132</b>
Z	.4130	7/16	2	4	<b>06133</b>
10.50 MM	.4134	7/16	2	4	<b>06134</b>
27/64	.4219	7/16	2	4	<b>06135</b>
10.80 MM	.4252	7/16	2	4	<b>06136</b>
11.00 MM	.4331	7/16	2-1/16	4	<b>06137</b>
7/16	.4375	7/16	2-1/16	4	<b>06138</b>
11.50 MM	.4528	1/2	2-1/8	4	<b>06139</b>
29/64	.4531	1/2	2-1/8	4	<b>06140</b>
15/32	.4688	1/2	2-1/8	4	<b>06141</b>
12.00 MM	.4724	1/2	2-3/16	5	<b>06142</b>
31/64	.4844	1/2	2-3/16	5	<b>06143</b>
12.50 MM	.4921	1/2	2-1/4	5	<b>06144</b>

(continued)



SPEEDS  
& FEEDS  
Page 23

# High Performance Carbide Drills for Aluminum

List No. 5604 3xD Non-Coolant-Through (continued)

**3xD - WITHOUT  
COOLANT HOLES**

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.	SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
1/2	.5000	1/2	2-1/4	5	<b>06145</b>	14.50 MM	.5709	5/8	3	5	<b>06153</b>
13.00 MM	.5118	9/16	2-3/8	5	<b>06146</b>	37/64	.5781	5/8	3	5	<b>06154</b>
33/64	.5156	9/16	2-3/8	5	<b>06147</b>	15.00 MM	.5906	5/8	3	5	<b>06155</b>
17/32	.5312	9/16	2-1/2	5	<b>06148</b>	19/32	.5938	5/8	3	5	<b>06156</b>
13.50 MM	.5315	9/16	2-1/2	5	<b>06149</b>	39/64	.6094	5/8	3	5	<b>06157</b>
35/64	.5469	9/16	2-1/2	5	<b>06150</b>	15.50 MM	.6102	5/8	3	5	<b>06158</b>
14.00 MM	.5512	9/16	2-1/2	5	<b>06151</b>	5/8	.6250	5/8	3	5	<b>06159</b>
9/16	.5625	9/16	3	5	<b>06152</b>	16.00 MM	.6299	3/4	3	5	<b>06160</b>

# High Performance Carbide Drills for Aluminum

List No. 5604 5xD Non-Coolant-Through

**5xD - WITHOUT  
COOLANT HOLES**

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.	SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
1/16	.0625	1/8	3/4	2-1/2	<b>06161</b>	#30	.1285	3/16	1-1/4	3	<b>06191</b>
#52	.0635	1/8	3/4	2-1/2	<b>06162</b>	#29	.1360	3/16	1-3/8	3	<b>06192</b>
#51	.0670	1/8	3/4	2-1/2	<b>06163</b>	3.50 MM	.1378	3/16	1-3/8	3	<b>06193</b>
#50	.0700	1/8	7/8	2-1/2	<b>06164</b>	#28	.1405	3/16	1-3/8	3	<b>06194</b>
#49	.0730	1/8	7/8	2-1/2	<b>06165</b>	9/64	.1406	3/16	1-3/8	3	<b>06195</b>
#48	.0760	1/8	7/8	2-1/2	<b>06166</b>	#27	.1440	3/16	1-3/8	3	<b>06196</b>
5/64	.0781	1/8	7/8	2-1/2	<b>06167</b>	#26	.1470	3/16	1-3/8	3	<b>06197</b>
#47	.0785	1/8	7/8	2-1/2	<b>06168</b>	#25	.1495	3/16	1-3/8	3	<b>06198</b>
2.00 MM	.0787	1/8	7/8	2-1/2	<b>06169</b>	#24	.1520	3/16	1-3/8	3	<b>06199</b>
#46	.0810	1/8	7/8	2-1/2	<b>06170</b>	#23	.1540	3/16	1-3/8	3	<b>06200</b>
#45	.0820	1/8	7/8	2-1/2	<b>06171</b>	5/32	.1562	3/16	1-3/8	3	<b>06201</b>
#44	.0860	1/8	1	2-1/2	<b>06172</b>	#22	.1570	3/16	1-3/8	3	<b>06202</b>
#43	.0890	1/8	1	2-1/2	<b>06173</b>	4.00 MM	.1575	3/16	1-3/8	3	<b>06203</b>
#42	.0935	1/8	1	2-1/2	<b>06174</b>	#21	.1590	3/16	1-3/8	3	<b>06204</b>
3/32	.0938	1/8	1	2-1/2	<b>06175</b>	#20	.1610	3/16	1-3/8	3	<b>06205</b>
#41	.0960	1/8	1	3	<b>06176</b>	4.20 MM	.1654	3/16	1-5/8	4	<b>06206</b>
#40	.0980	1/8	1	3	<b>06177</b>	#19	.1660	3/16	1-5/8	4	<b>06207</b>
2.50 MM	.0984	1/8	1-1/4	3	<b>06178</b>	#18	.1695	3/16	1-5/8	4	<b>06208</b>
#39	.0995	1/8	1-1/4	3	<b>06179</b>	11/64	.1719	3/16	1-5/8	4	<b>06209</b>
#38	.1015	1/8	1-1/4	3	<b>06180</b>	#17	.1730	3/16	1-5/8	4	<b>06210</b>
#37	.1040	1/8	1-1/4	3	<b>06181</b>	#16	.1770	3/16	1-5/8	4	<b>06211</b>
#36	.1065	1/8	1-1/4	3	<b>06182</b>	4.50 MM	.1772	3/16	1-5/8	4	<b>06212</b>
7/64	.1094	1/8	1-1/4	3	<b>06183</b>	#15	.1800	3/16	1-5/8	4	<b>06213</b>
#35	.1100	1/8	1-1/4	3	<b>06184</b>	#14	.1820	3/16	1-5/8	4	<b>06214</b>
#34	.1110	1/8	1-1/4	3	<b>06185</b>	#13	.1850	3/16	1-5/8	4	<b>06215</b>
#33	.1130	1/8	1-1/4	3	<b>06186</b>	3/16	.1875	3/16	1-5/8	4	<b>06216</b>
#32	.1160	1/8	1-1/4	3	<b>06187</b>	#12	.1890	1/4	1-5/8	4	<b>06217</b>
3.00 MM	.1181	1/8	1-1/4	3	<b>06188</b>	#11	.1910	1/4	1-5/8	4	<b>06218</b>
#31	.1200	1/8	1-1/4	3	<b>06189</b>	#10	.1935	1/4	1-3/4	4	<b>06219</b>
1/8	.1250	1/8	1-1/4	3	<b>06190</b>	#9	.1960	1/4	1-3/4	4	<b>06220</b>

(continued)



# High Performance Carbide Drills for Aluminum

List No. 5604 5xD Non-Coolant-Through (continued)

5xD - WITHOUT  
COOLANT HOLES

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
5.00 MM	.1969	1/4	1-3/4	4	06221
#8	.1990	1/4	1-3/4	4	06222
5.10 MM	.2008	1/4	1-3/4	4	06223
#7	.2010	1/4	1-3/4	4	06224
13/64	.2031	1/4	1-3/4	4	06225
#6	.2040	1/4	1-3/4	4	06226
#5	.2055	1/4	1-3/4	4	06227
#4	.2090	1/4	1-3/4	4	06228
#3	.2130	1/4	1-3/4	4	06229
5.50 MM	.2165	1/4	1-3/4	4	06230
7/32	.2188	1/4	1-3/4	4	06231
#2	.2210	1/4	2	4	06232
#1	.2280	1/4	2	4	06233
A	.2340	1/4	2	4	06234
15/64	.2344	1/4	2	4	06235
6.00 MM	.2362	1/4	2	4	06236
B	.2380	1/4	2	4	06237
C	.2420	1/4	2	4	06238
D	.2460	1/4	2	4	06239
1/4 (E)	.2500	1/4	2	4	06240
6.50 MM	.2559	5/16	2-1/8	4	06241
F	.2570	5/16	2-1/8	4	06242
G	.2610	5/16	2-1/8	4	06243
17/64	.2656	5/16	2-1/8	4	06244
H	.2660	5/16	2-1/8	4	06245
I	.2720	5/16	2-1/8	4	06246
7.00 MM	.2756	5/16	2-1/8	4	06247
J	.2770	5/16	2-1/8	4	06248
K	.2810	5/16	2-1/8	4	06249
9/32	.2812	5/16	2-3/8	4	06250
L	.2900	5/16	2-3/8	4	06251
M	.2950	5/16	2-3/8	4	06252
7.50 MM	.2953	5/16	2-3/8	4	06253
19/64	.2969	5/16	2-3/8	4	06254
N	.3020	5/16	2-3/8	4	06255
5/16	.3125	5/16	2-3/8	4	06256
8.00 MM	.3150	3/8	2-3/8	4	06257
O	.3160	3/8	2-1/2	5	06258
P	.3230	3/8	2-1/2	5	06259
21/64	.3281	3/8	2-1/2	5	06260
Q	.3320	3/8	2-1/2	5	06261
8.50 MM	.3346	3/8	2-1/2	5	06262
R	.3390	3/8	2-1/2	5	06263

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
11/32	.3438	3/8	2-1/2	5	06264
S	.3480	3/8	2-3/4	5	06265
9.00 MM	.3543	3/8	2-3/4	5	06266
T	.3580	3/8	2-3/4	5	06267
23/64	.3594	3/8	2-3/4	5	06268
U	.3680	3/8	2-3/4	5	06269
9.50 MM	.3740	3/8	2-3/4	5	06270
3/8	.3750	3/8	2-7/8	5	06271
V	.3770	7/16	2-7/8	5	06272
W	.3860	7/16	2-7/8	5	06273
25/64	.3906	7/16	2-7/8	5	06274
10.00 MM	.3937	7/16	2-7/8	5	06275
X	.3970	7/16	2-7/8	5	06276
Y	.4040	7/16	2-7/8	5	06277
13/32	.4062	7/16	2-7/8	5	06278
Z	.4130	7/16	2-7/8	5	06279
10.50 MM	.4134	7/16	2-7/8	5	06280
27/64	.4219	7/16	2-7/8	5	06281
10.80 MM	.4252	7/16	2-7/8	5	06282
11.00 MM	.4331	7/16	2-7/8	5	06283
7/16	.4375	7/16	3	5	06284
11.50 MM	.4528	1/2	3	5	06285
29/64	.4531	1/2	3	5	06286
15/32	.4688	1/2	3	5	06287
12.00 MM	.4724	1/2	3	5	06288
31/64	.4844	1/2	3	5	06289
12.50 MM	.4921	1/2	3	5	06290
1/2	.5000	1/2	3-1/4	5	06291
13.00 MM	.5118	9/16	3-1/4	5	06292
33/64	.5156	9/16	3-1/4	5	06293
17/32	.5312	9/16	3-1/4	5	06294
13.50 MM	.5315	9/16	3-1/4	5	06295
35/64	.5469	9/16	3-1/4	5	06296
14.00 MM	.5512	9/16	3-1/4	5	06297
9/16	.5625	9/16	3-1/4	5	06298
14.50 MM	.5709	5/8	3-1/2	6	06299
37/64	.5781	5/8	3-1/2	6	06300
15.00 MM	.5906	5/8	3-1/2	6	06301
19/32	.5938	5/8	3-1/2	6	06302
39/64	.6094	5/8	3-1/2	6	06303
15.50 MM	.6102	5/8	3-1/2	6	06304
5/8	.6250	5/8	3-1/2	6	06305
16.00 MM	.6299	3/4	3-1/2	6	06306

HIGH PERFORMANCE DRILLS FOR ALUMINUM



SPEEDS  
& FEEDS  
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COOLANT-THROUGH

# High Performance Carbide Drills for Aluminum

## High Performance Carbide Drills for Aluminum

List No. 5605 3xD Coolant-Through

3xD - WITH COOLANT HOLES

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
3.00 MM	.1181	6 MM	20 MM	62 MM	<b>06307</b>
3.10 MM	.1220	6 MM	20 MM	62 MM	<b>06308</b>
1/8	.1250	6 MM	20 MM	62 MM	<b>06309</b>
3.20 MM	.1260	6 MM	20 MM	62 MM	<b>06310</b>
3.30 MM	.1299	6 MM	20 MM	62 MM	<b>06311</b>
3.40 MM	.1339	6 MM	20 MM	62 MM	<b>06312</b>
3.50 MM	.1378	6 MM	20 MM	62 MM	<b>06313</b>
9/64	.1406	6 MM	20 MM	62 MM	<b>06314</b>
3.60 MM	.1417	6 MM	20 MM	62 MM	<b>06315</b>
3.70 MM	.1457	6 MM	20 MM	62 MM	<b>06316</b>
3.80 MM	.1496	6 MM	24 MM	66 MM	<b>06317</b>
3.90 MM	.1535	6 MM	24 MM	66 MM	<b>06318</b>
5/32	.1562	6 MM	24 MM	66 MM	<b>06319</b>
4.00 MM	.1575	6 MM	24 MM	66 MM	<b>06320</b>
4.10 MM	.1614	6 MM	24 MM	66 MM	<b>06321</b>
4.20 MM	.1654	6 MM	24 MM	66 MM	<b>06322</b>
4.30 MM	.1693	6 MM	24 MM	66 MM	<b>06323</b>
11/64	.1719	6 MM	24 MM	66 MM	<b>06324</b>
4.40 MM	.1732	6 MM	24 MM	66 MM	<b>06325</b>
4.50 MM	.1772	6 MM	24 MM	66 MM	<b>06326</b>
4.60 MM	.1811	6 MM	24 MM	66 MM	<b>06327</b>
4.65 MM	.1831	6 MM	24 MM	66 MM	<b>06328</b>
#13	.1850	6 MM	24 MM	66 MM	<b>06329</b>
3/16	.1875	6 MM	28 MM	66 MM	<b>06330</b>
#12	.1890	6 MM	28 MM	66 MM	<b>06331</b>
4.90 MM	.1929	6 MM	28 MM	66 MM	<b>06332</b>
5.00 MM	.1969	6 MM	28 MM	66 MM	<b>06333</b>
5.10 MM	.2008	6 MM	28 MM	66 MM	<b>06334</b>
13/64	.2031	6 MM	28 MM	66 MM	<b>06335</b>
#6	.2040	6 MM	28 MM	66 MM	<b>06336</b>
5.20 MM	.2047	6 MM	28 MM	66 MM	<b>06337</b>
5.30 MM	.2087	6 MM	28 MM	66 MM	<b>06338</b>
5.40 MM	.2126	6 MM	28 MM	66 MM	<b>06339</b>
5.50 MM	.2165	6 MM	28 MM	66 MM	<b>06340</b>
5.55 MM	.2185	6 MM	28 MM	66 MM	<b>06341</b>

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
7/32	.2188	6 MM	28 MM	66 MM	<b>06342</b>
5.60 MM	.2205	6 MM	28 MM	66 MM	<b>06343</b>
5.70 MM	.2244	6 MM	28 MM	66 MM	<b>06344</b>
5.80 MM	.2283	6 MM	28 MM	66 MM	<b>06345</b>
5.90 MM	.2323	6 MM	28 MM	66 MM	<b>06346</b>
15/64	.2344	6 MM	28 MM	66 MM	<b>06347</b>
6.00 MM	.2362	6 MM	28 MM	66 MM	<b>06348</b>
6.10 MM	.2402	8 MM	34 MM	79 MM	<b>06349</b>
6.20 MM	.2441	8 MM	34 MM	79 MM	<b>06350</b>
6.30 MM	.2480	8 MM	34 MM	79 MM	<b>06351</b>
1/4 (E)	.2500	8 MM	34 MM	79 MM	<b>06352</b>
6.40 MM	.2520	8 MM	34 MM	79 MM	<b>06353</b>
6.50 MM	.2559	8 MM	34 MM	79 MM	<b>06354</b>
6.60 MM	.2598	8 MM	34 MM	79 MM	<b>06355</b>
6.70 MM	.2638	8 MM	34 MM	79 MM	<b>06356</b>
17/64	.2656	8 MM	34 MM	79 MM	<b>06357</b>
6.80 MM	.2677	8 MM	34 MM	79 MM	<b>06358</b>
6.90 MM	.2717	8 MM	41 MM	79 MM	<b>06359</b>
7.00 MM	.2756	8 MM	41 MM	79 MM	<b>06360</b>
7.10 MM	.2795	8 MM	41 MM	79 MM	<b>06361</b>
9/32	.2812	8 MM	41 MM	79 MM	<b>06362</b>
7.20 MM	.2835	8 MM	41 MM	79 MM	<b>06363</b>
7.30 MM	.2874	8 MM	41 MM	79 MM	<b>06364</b>
7.40 MM	.2913	8 MM	41 MM	79 MM	<b>06365</b>
7.50 MM	.2953	8 MM	41 MM	79 MM	<b>06366</b>
19/64	.2969	8 MM	41 MM	79 MM	<b>06367</b>
7.70 MM	.3031	8 MM	41 MM	79 MM	<b>06368</b>
7.80 MM	.3071	8 MM	41 MM	79 MM	<b>06369</b>
7.90 MM	.3110	8 MM	41 MM	79 MM	<b>06370</b>
5/16	.3125	8 MM	41 MM	79 MM	<b>06371</b>
8.00 MM	.3150	8 MM	41 MM	79 MM	<b>06372</b>
8.10 MM	.3189	10 MM	47 MM	89 MM	<b>06373</b>
8.20 MM	.3228	10 MM	47 MM	89 MM	<b>06374</b>
8.30 MM	.3268	10 MM	47 MM	89 MM	<b>06375</b>
21/64	.3281	10 MM	47 MM	89 MM	<b>06376</b>

(continued)



# High Performance Carbide Drills for Aluminum

List No. 5605 3xD Coolant-Through (continued)

3xD - WITH  
COOLANT HOLES

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
8.40 MM	.3307	10 MM	47 MM	89 MM	<b>06377</b>
8.50 MM	.3346	10 MM	47 MM	89 MM	<b>06378</b>
8.60 MM	.3386	10 MM	47 MM	89 MM	<b>06379</b>
8.70 MM	.3425	10 MM	47 MM	89 MM	<b>06380</b>
11/32	.3438	10 MM	47 MM	89 MM	<b>06381</b>
8.80 MM	.3465	10 MM	47 MM	89 MM	<b>06382</b>
9.00 MM	.3543	10 MM	47 MM	89 MM	<b>06383</b>
23/64	.3594	10 MM	47 MM	89 MM	<b>06384</b>
9.20 MM	.3622	10 MM	47 MM	89 MM	<b>06385</b>
9.30 MM	.3661	10 MM	47 MM	89 MM	<b>06386</b>
9.50 MM	.3740	10 MM	47 MM	89 MM	<b>06387</b>
3/8	.3750	10 MM	47 MM	89 MM	<b>06388</b>
9.60 MM	.3780	10 MM	47 MM	89 MM	<b>06389</b>
9.80 MM	.3858	10 MM	47 MM	89 MM	<b>06390</b>
9.90 MM	.3898	10 MM	47 MM	89 MM	<b>06391</b>
25/64	.3906	10 MM	47 MM	89 MM	<b>06392</b>
10.00 MM	.3937	10 MM	47 MM	89 MM	<b>06393</b>
10.10 MM	.3976	12 MM	55 MM	102 MM	<b>06394</b>
10.20 MM	.4016	12 MM	55 MM	102 MM	<b>06395</b>
10.30 MM	.4055	12 MM	55 MM	102 MM	<b>06396</b>
13/32	.4062	12 MM	55 MM	102 MM	<b>06397</b>
10.40 MM	.4094	12 MM	55 MM	102 MM	<b>06398</b>
10.50 MM	.4134	12 MM	55 MM	102 MM	<b>06399</b>
27/64	.4219	12 MM	55 MM	102 MM	<b>06400</b>
10.80 MM	.4252	12 MM	55 MM	102 MM	<b>06401</b>
11.00 MM	.4331	12 MM	55 MM	102 MM	<b>06402</b>
11.10 MM	.4370	12 MM	55 MM	102 MM	<b>06403</b>
7/16	.4375	12 MM	55 MM	102 MM	<b>06404</b>
11.20 MM	.4409	12 MM	55 MM	102 MM	<b>06405</b>
11.50 MM	.4528	12 MM	55 MM	102 MM	<b>06406</b>

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
29/64	.4531	12 MM	55 MM	102 MM	<b>06407</b>
11.70 MM	.4606	12 MM	55 MM	102 MM	<b>06408</b>
11.80 MM	.4646	12 MM	55 MM	102 MM	<b>06409</b>
15/32	.4688	12 MM	55 MM	102 MM	<b>06410</b>
12.00 MM	.4724	12 MM	55 MM	102 MM	<b>06411</b>
12.10 MM	.4764	14 MM	60 MM	107 MM	<b>06412</b>
12.20 MM	.4803	14 MM	60 MM	107 MM	<b>06413</b>
12.30 MM	.4843	14 MM	60 MM	107 MM	<b>06414</b>
31/64	.4844	14 MM	60 MM	107 MM	<b>06415</b>
12.50 MM	.4921	14 MM	60 MM	107 MM	<b>06416</b>
12.60 MM	.4961	14 MM	60 MM	107 MM	<b>06417</b>
1/2	.5000	14 MM	60 MM	107 MM	<b>06418</b>
13.00 MM	.5118	14 MM	60 MM	107 MM	<b>06419</b>
13.30 MM	.5236	14 MM	60 MM	107 MM	<b>06420</b>
17/32	.5312	14 MM	60 MM	107 MM	<b>06421</b>
13.50 MM	.5315	14 MM	60 MM	107 MM	<b>06422</b>
14.00 MM	.5512	14 MM	60 MM	107 MM	<b>06423</b>
9/16	.5625	16 MM	65 MM	115 MM	<b>06424</b>
14.50 MM	.5709	16 MM	65 MM	115 MM	<b>06425</b>
15.00 MM	.5906	16 MM	65 MM	115 MM	<b>06426</b>
15.50 MM	.6102	16 MM	65 MM	115 MM	<b>06427</b>
5/8	.6250	16 MM	65 MM	115 MM	<b>06428</b>
16.00 MM	.6299	16 MM	65 MM	115 MM	<b>06429</b>
16.50 MM	.6496	18 MM	73 MM	123 MM	<b>06430</b>
17.00 MM	.6693	18 MM	73 MM	123 MM	<b>06431</b>
17.50 MM	.6890	18 MM	73 MM	123 MM	<b>06432</b>
18.00 MM	.7087	18 MM	73 MM	123 MM	<b>06433</b>
18.50 MM	.7283	20 MM	79 MM	131 MM	<b>06434</b>
3/4	.7500	20 MM	79 MM	131 MM	<b>06435</b>
19.50 MM	.7677	20 MM	79 MM	131 MM	<b>06436</b>
20.00 MM	.7874	20 MM	79 MM	131 MM	<b>06437</b>

# High Performance Carbide Drills for Aluminum

List No. 5605 5xD Coolant-Through

5xD - WITH  
COOLANT HOLES

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
3.00 MM	.1181	6 MM	28 MM	66 MM	<b>06438</b>
3.10 MM	.1220	6 MM	28 MM	66 MM	<b>06439</b>
1/8	.1250	6 MM	28 MM	66 MM	<b>06440</b>
3.20 MM	.1260	6 MM	28 MM	66 MM	<b>06441</b>
3.30 MM	.1299	6 MM	28 MM	66 MM	<b>06442</b>

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
3.40 MM	.1339	6 MM	28 MM	66 MM	<b>06443</b>
3.50 MM	.1378	6 MM	28 MM	66 MM	<b>06444</b>
9/64	.1406	6 MM	28 MM	66 MM	<b>06445</b>
3.60 MM	.1417	6 MM	28 MM	66 MM	<b>06446</b>
3.70 MM	.1457	6 MM	28 MM	66 MM	<b>06447</b>

(continued)



SPEEDS  
& FEEDS  
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# High Performance Carbide Drills for Aluminum

List No. 5605 5xD Coolant-Through (continued)

**5xD - WITH  
COOLANT HOLES**

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.	SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
3.80 MM	.1496	6 MM	36 MM	74 MM	<b>06448</b>	9/32	.2812	8 MM	53 MM	91 MM	<b>06493</b>
3.90 MM	.1535	6 MM	36 MM	74 MM	<b>06449</b>	7.20 MM	.2835	8 MM	53 MM	91 MM	<b>06494</b>
5/32	.1562	6 MM	36 MM	74 MM	<b>06450</b>	7.30 MM	.2874	8 MM	53 MM	91 MM	<b>06495</b>
4.00 MM	.1575	6 MM	36 MM	74 MM	<b>06451</b>	7.40 MM	.2913	8 MM	53 MM	91 MM	<b>06496</b>
4.10 MM	.1614	6 MM	36 MM	74 MM	<b>06452</b>	7.50 MM	.2953	8 MM	53 MM	91 MM	<b>06497</b>
4.20 MM	.1654	6 MM	36 MM	74 MM	<b>06453</b>	19/64	.2969	8 MM	53 MM	91 MM	<b>06498</b>
4.30 MM	.1693	6 MM	36 MM	74 MM	<b>06454</b>	7.70 MM	.3031	8 MM	53 MM	91 MM	<b>06499</b>
11/64	.1719	6 MM	36 MM	74 MM	<b>06455</b>	7.80 MM	.3071	8 MM	53 MM	91 MM	<b>06500</b>
4.40 MM	.1732	6 MM	36 MM	74 MM	<b>06456</b>	7.90 MM	.3110	8 MM	53 MM	91 MM	<b>06501</b>
4.50 MM	.1772	6 MM	36 MM	74 MM	<b>06457</b>	5/16	.3125	8 MM	53 MM	91 MM	<b>06502</b>
4.60 MM	.1811	6 MM	36 MM	74 MM	<b>06458</b>	8.00 MM	.3150	8 MM	53 MM	91 MM	<b>06503</b>
4.65 MM	.1831	6 MM	36 MM	74 MM	<b>06459</b>	8.10 MM	.3189	10 MM	61 MM	103 MM	<b>06504</b>
#13	.1850	6 MM	36 MM	74 MM	<b>06460</b>	8.20 MM	.3228	10 MM	61 MM	103 MM	<b>06505</b>
3/16	.1875	6 MM	44 MM	82 MM	<b>06461</b>	8.30 MM	.3268	10 MM	61 MM	103 MM	<b>06506</b>
#12	.1890	6 MM	44 MM	82 MM	<b>06462</b>	21/64	.3281	10 MM	61 MM	103 MM	<b>06507</b>
4.90 MM	.1929	6 MM	44 MM	82 MM	<b>06463</b>	8.40 MM	.3307	10 MM	61 MM	103 MM	<b>06508</b>
5.00 MM	.1969	6 MM	44 MM	82 MM	<b>06464</b>	8.50 MM	.3346	10 MM	61 MM	103 MM	<b>06509</b>
5.10 MM	.2008	6 MM	44 MM	82 MM	<b>06465</b>	8.60 MM	.3386	10 MM	61 MM	103 MM	<b>06510</b>
13/64	.2031	6 MM	44 MM	82 MM	<b>06466</b>	8.70 MM	.3425	10 MM	61 MM	103 MM	<b>06511</b>
#6	.2040	6 MM	44 MM	82 MM	<b>06467</b>	11/32	.3438	10 MM	61 MM	103 MM	<b>06512</b>
5.20 MM	.2047	6 MM	44 MM	82 MM	<b>06468</b>	8.80 MM	.3465	10 MM	61 MM	103 MM	<b>06513</b>
5.30 MM	.2087	6 MM	44 MM	82 MM	<b>06469</b>	9.00 MM	.3543	10 MM	61 MM	103 MM	<b>06514</b>
5.40 MM	.2126	6 MM	44 MM	82 MM	<b>06470</b>	23/64	.3594	10 MM	61 MM	103 MM	<b>06515</b>
5.50 MM	.2165	6 MM	44 MM	82 MM	<b>06471</b>	9.20 MM	.3622	10 MM	61 MM	103 MM	<b>06516</b>
5.55 MM	.2185	6 MM	44 MM	82 MM	<b>06472</b>	9.30 MM	.3661	10 MM	61 MM	103 MM	<b>06517</b>
7/32	.2188	6 MM	44 MM	82 MM	<b>06473</b>	9.50 MM	.3740	10 MM	61 MM	103 MM	<b>06518</b>
5.60 MM	.2205	6 MM	44 MM	82 MM	<b>06474</b>	3/8	.3750	10 MM	61 MM	103 MM	<b>06519</b>
5.70 MM	.2244	6 MM	44 MM	82 MM	<b>06475</b>	9.60 MM	.3780	10 MM	61 MM	103 MM	<b>06520</b>
5.80 MM	.2283	6 MM	44 MM	82 MM	<b>06476</b>	9.80 MM	.3858	10 MM	61 MM	103 MM	<b>06521</b>
5.90 MM	.2323	6 MM	44 MM	82 MM	<b>06477</b>	9.90 MM	.3898	10 MM	61 MM	103 MM	<b>06522</b>
15/64	.2344	6 MM	44 MM	82 MM	<b>06478</b>	25/64	.3906	10 MM	61 MM	103 MM	<b>06523</b>
6.00 MM	.2362	6 MM	44 MM	82 MM	<b>06479</b>	10.00 MM	.3937	10 MM	61 MM	103 MM	<b>06524</b>
6.10 MM	.2402	8 MM	53 MM	91 MM	<b>06480</b>	10.10 MM	.3976	12 MM	71 MM	118 MM	<b>06525</b>
6.20 MM	.2441	8 MM	53 MM	91 MM	<b>06481</b>	10.20 MM	.4016	12 MM	71 MM	118 MM	<b>06526</b>
6.30 MM	.2480	8 MM	53 MM	91 MM	<b>06482</b>	10.30 MM	.4055	12 MM	71 MM	118 MM	<b>06527</b>
1/4 (E)	.2500	8 MM	53 MM	91 MM	<b>06483</b>	13/32	.4062	12 MM	71 MM	118 MM	<b>06528</b>
6.40 MM	.2520	8 MM	53 MM	91 MM	<b>06484</b>	10.40 MM	.4094	12 MM	71 MM	118 MM	<b>06529</b>
6.50 MM	.2559	8 MM	53 MM	91 MM	<b>06485</b>	10.50 MM	.4134	12 MM	71 MM	118 MM	<b>06530</b>
6.60 MM	.2598	8 MM	53 MM	91 MM	<b>06486</b>	27/64	.4219	12 MM	71 MM	118 MM	<b>06531</b>
6.70 MM	.2638	8 MM	53 MM	91 MM	<b>06487</b>	10.80 MM	.4252	12 MM	71 MM	118 MM	<b>06532</b>
17/64	.2656	8 MM	53 MM	91 MM	<b>06488</b>	11.00 MM	.4331	12 MM	71 MM	118 MM	<b>06533</b>
6.80 MM	.2677	8 MM	53 MM	91 MM	<b>06489</b>	11.10 MM	.4370	12 MM	71 MM	118 MM	<b>06534</b>
6.90 MM	.2717	8 MM	53 MM	91 MM	<b>06490</b>	7/16	.4375	12 MM	71 MM	118 MM	<b>06535</b>
7.00 MM	.2756	8 MM	53 MM	91 MM	<b>06491</b>	11.20 MM	.4409	12 MM	71 MM	118 MM	<b>06536</b>
7.10 MM	.2795	8 MM	53 MM	91 MM	<b>06492</b>	11.50 MM	.4528	12 MM	71 MM	118 MM	<b>06537</b>

(continued)



# High Performance Carbide Drills for Aluminum

List No. 5605 5xD Coolant-Through (continued)

5xD - WITH  
COOLANT HOLES

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
29/64	.4531	12 MM	71 MM	118 MM	<b>06538</b>
11.70 MM	.4606	12 MM	71 MM	118 MM	<b>06539</b>
11.80 MM	.4646	12 MM	71 MM	118 MM	<b>06540</b>
15/32	.4688	12 MM	71 MM	118 MM	<b>06541</b>
12.00 MM	.4724	12 MM	71 MM	118 MM	<b>06542</b>
12.10 MM	.4764	14 MM	77 MM	124 MM	<b>06543</b>
12.20 MM	.4803	14 MM	77 MM	124 MM	<b>06544</b>
12.30 MM	.4843	14 MM	77 MM	124 MM	<b>06545</b>
31/64	.4844	14 MM	77 MM	124 MM	<b>06546</b>
12.50 MM	.4921	14 MM	77 MM	124 MM	<b>06547</b>
12.60 MM	.4961	14 MM	77 MM	124 MM	<b>06548</b>
1/2	.5000	14 MM	77 MM	124 MM	<b>06549</b>
13.00 MM	.5118	14 MM	77 MM	124 MM	<b>06550</b>
13.30 MM	.5236	14 MM	77 MM	124 MM	<b>06551</b>
17/32	.5312	14 MM	77 MM	124 MM	<b>06552</b>

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
13.50 MM	.5315	14 MM	77 MM	124 MM	<b>06553</b>
14.00 MM	.5512	14 MM	77 MM	124 MM	<b>06554</b>
9/16	.5625	16 MM	83 MM	133 MM	<b>06555</b>
14.50 MM	.5709	16 MM	83 MM	133 MM	<b>06556</b>
15.00 MM	.5906	16 MM	83 MM	133 MM	<b>06557</b>
15.50 MM	.6102	16 MM	83 MM	133 MM	<b>06558</b>
5/8	.6250	16 MM	83 MM	133 MM	<b>06559</b>
16.00 MM	.6299	16 MM	83 MM	133 MM	<b>06560</b>
16.50 MM	.6496	18 MM	93 MM	143 MM	<b>06561</b>
17.00 MM	.6693	18 MM	93 MM	143 MM	<b>06562</b>
17.50 MM	.6890	18 MM	93 MM	143 MM	<b>06563</b>
18.00 MM	.7087	18 MM	93 MM	143 MM	<b>06564</b>
18.50 MM	.7283	20 MM	101 MM	153 MM	<b>06565</b>
3/4	.7500	20 MM	101 MM	153 MM	<b>06566</b>
19.50 MM	.7677	20 MM	101 MM	153 MM	<b>06567</b>
20.00 MM	.7874	20 MM	101 MM	153 MM	<b>06568</b>

# High Performance Carbide Drills for Aluminum

List No. 5605 12xD Coolant-Through

12xD - WITH  
COOLANT HOLES

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
3.00 MM	.1181	6 MM	54 MM	92 MM	<b>06569</b>
3.10 MM	.1220	6 MM	54 MM	92 MM	<b>06570</b>
1/8	.1250	6 MM	54 MM	92 MM	<b>06571</b>
3.20 MM	.1260	6 MM	54 MM	92 MM	<b>06572</b>
3.30 MM	.1299	6 MM	54 MM	92 MM	<b>06573</b>
3.40 MM	.1339	6 MM	54 MM	92 MM	<b>06574</b>
3.50 MM	.1378	6 MM	54 MM	92 MM	<b>06575</b>
9/64	.1406	6 MM	54 MM	92 MM	<b>06576</b>
3.60 MM	.1417	6 MM	54 MM	92 MM	<b>06577</b>
3.70 MM	.1457	6 MM	54 MM	92 MM	<b>06578</b>
3.80 MM	.1496	6 MM	64 MM	102 MM	<b>06579</b>
3.90 MM	.1535	6 MM	64 MM	102 MM	<b>06580</b>
5/32	.1562	6 MM	64 MM	102 MM	<b>06581</b>
4.00 MM	.1575	6 MM	64 MM	102 MM	<b>06582</b>
4.10 MM	.1614	6 MM	64 MM	102 MM	<b>06583</b>
4.20 MM	.1654	6 MM	64 MM	102 MM	<b>06584</b>
4.30 MM	.1693	6 MM	64 MM	102 MM	<b>06585</b>
11/64	.1719	6 MM	64 MM	102 MM	<b>06586</b>
4.40 MM	.1732	6 MM	64 MM	102 MM	<b>06587</b>
4.50 MM	.1772	6 MM	64 MM	102 MM	<b>06588</b>

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
4.60 MM	.1811	6 MM	64 MM	102 MM	<b>06589</b>
4.65 MM	.1831	6 MM	64 MM	102 MM	<b>06590</b>
#13	.1850	6 MM	64 MM	102 MM	<b>06591</b>
3/16	.1875	6 MM	78 MM	116 MM	<b>06592</b>
#12	.1890	6 MM	78 MM	116 MM	<b>06593</b>
4.90 MM	.1929	6 MM	78 MM	116 MM	<b>06594</b>
5.00 MM	.1969	6 MM	78 MM	116 MM	<b>06595</b>
5.10 MM	.2008	6 MM	78 MM	116 MM	<b>06596</b>
13/64	.2031	6 MM	78 MM	116 MM	<b>06597</b>
#6	.2040	6 MM	78 MM	116 MM	<b>06598</b>
5.20 MM	.2047	6 MM	78 MM	116 MM	<b>06599</b>
5.30 MM	.2087	6 MM	78 MM	116 MM	<b>06600</b>
5.40 MM	.2126	6 MM	78 MM	116 MM	<b>06601</b>
5.50 MM	.2165	6 MM	78 MM	116 MM	<b>06602</b>
5.55 MM	.2185	6 MM	78 MM	116 MM	<b>06603</b>
7/32	.2188	6 MM	78 MM	116 MM	<b>06604</b>
5.60 MM	.2205	6 MM	78 MM	116 MM	<b>06605</b>
5.70 MM	.2244	6 MM	78 MM	116 MM	<b>06606</b>
5.80 MM	.2283	6 MM	78 MM	116 MM	<b>06607</b>
5.90 MM	.2323	6 MM	78 MM	116 MM	<b>06608</b>

(continued)



SPEEDS  
& FEEDS  
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# High Performance Carbide Drills for Aluminum

List No. 5605 12xD Coolant-Through (continued)

**12xD - WITH  
COOLANT HOLES**

SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.	SIZE	DEC EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
15/64	.2344	6 MM	78 MM	116 MM	<b>06609</b>	25/64	.3906	10 MM	120 MM	162 MM	<b>06654</b>
6.00 MM	.2362	6 MM	78 MM	116 MM	<b>06610</b>	10.00 MM	.3937	10 MM	120 MM	162 MM	<b>06655</b>
6.10 MM	.2402	8 MM	108 MM	146 MM	<b>06611</b>	10.10 MM	.3976	12 MM	156 MM	204 MM	<b>06656</b>
6.20 MM	.2441	8 MM	108 MM	146 MM	<b>06612</b>	10.20 MM	.4016	12 MM	156 MM	204 MM	<b>06657</b>
6.30 MM	.2480	8 MM	108 MM	146 MM	<b>06613</b>	10.30 MM	.4055	12 MM	156 MM	204 MM	<b>06658</b>
1/4 (E)	.2500	8 MM	108 MM	146 MM	<b>06614</b>	13/32	.4062	12 MM	156 MM	204 MM	<b>06659</b>
6.40 MM	.2520	8 MM	108 MM	146 MM	<b>06615</b>	10.40 MM	.4094	12 MM	156 MM	204 MM	<b>06660</b>
6.50 MM	.2559	8 MM	108 MM	146 MM	<b>06616</b>	10.50 MM	.4134	12 MM	156 MM	204 MM	<b>06661</b>
6.60 MM	.2598	8 MM	108 MM	146 MM	<b>06617</b>	27/64	.4219	12 MM	156 MM	204 MM	<b>06662</b>
6.70 MM	.2638	8 MM	108 MM	146 MM	<b>06618</b>	10.80 MM	.4252	12 MM	156 MM	204 MM	<b>06663</b>
17/64	.2656	8 MM	108 MM	146 MM	<b>06619</b>	11.00 MM	.4331	12 MM	156 MM	204 MM	<b>06664</b>
6.80 MM	.2677	8 MM	108 MM	146 MM	<b>06620</b>	11.10 MM	.4370	12 MM	156 MM	204 MM	<b>06665</b>
6.90 MM	.2717	8 MM	108 MM	146 MM	<b>06621</b>	7/16	.4375	12 MM	156 MM	204 MM	<b>06666</b>
7.00 MM	.2756	8 MM	108 MM	146 MM	<b>06622</b>	11.20 MM	.4409	12 MM	156 MM	204 MM	<b>06667</b>
7.10 MM	.2795	8 MM	108 MM	146 MM	<b>06623</b>	11.50 MM	.4528	12 MM	156 MM	204 MM	<b>06668</b>
9/32	.2812	8 MM	108 MM	146 MM	<b>06624</b>	29/64	.4531	12 MM	156 MM	204 MM	<b>06669</b>
7.20 MM	.2835	8 MM	108 MM	146 MM	<b>06625</b>	11.70 MM	.4606	12 MM	156 MM	204 MM	<b>06670</b>
7.30 MM	.2874	8 MM	108 MM	146 MM	<b>06626</b>	11.80 MM	.4646	12 MM	156 MM	204 MM	<b>06671</b>
7.40 MM	.2913	8 MM	108 MM	146 MM	<b>06627</b>	15/32	.4688	12 MM	156 MM	204 MM	<b>06672</b>
7.50 MM	.2953	8 MM	108 MM	146 MM	<b>06628</b>	12.00 MM	.4724	12 MM	156 MM	204 MM	<b>06673</b>
19/64	.2969	8 MM	108 MM	146 MM	<b>06629</b>	12.10 MM	.4764	14 MM	182 MM	230 MM	<b>06674</b>
7.70 MM	.3031	8 MM	108 MM	146 MM	<b>06630</b>	12.20 MM	.4803	14 MM	182 MM	230 MM	<b>06675</b>
7.80 MM	.3071	8 MM	108 MM	146 MM	<b>06631</b>	12.30 MM	.4843	14 MM	182 MM	230 MM	<b>06676</b>
7.90 MM	.3110	8 MM	108 MM	146 MM	<b>06632</b>	31/64	.4844	14 MM	182 MM	230 MM	<b>06677</b>
5/16	.3125	8 MM	108 MM	146 MM	<b>06633</b>	12.50 MM	.4921	14 MM	182 MM	230 MM	<b>06678</b>
8.00 MM	.3150	8 MM	108 MM	146 MM	<b>06634</b>	12.60 MM	.4961	14 MM	182 MM	230 MM	<b>06679</b>
8.10 MM	.3189	10 MM	120 MM	162 MM	<b>06635</b>	1/2	.5000	14 MM	182 MM	230 MM	<b>06680</b>
8.20 MM	.3228	10 MM	120 MM	162 MM	<b>06636</b>	13.00 MM	.5118	14 MM	182 MM	230 MM	<b>06681</b>
8.30 MM	.3268	10 MM	120 MM	162 MM	<b>06637</b>	13.30 MM	.5236	14 MM	182 MM	230 MM	<b>06682</b>
21/64	.3281	10 MM	120 MM	162 MM	<b>06638</b>	17/32	.5312	14 MM	182 MM	230 MM	<b>06683</b>
8.40 MM	.3307	10 MM	120 MM	162 MM	<b>06639</b>	13.50 MM	.5315	14 MM	182 MM	230 MM	<b>06684</b>
8.50 MM	.3346	10 MM	120 MM	162 MM	<b>06640</b>	14.00 MM	.5512	14 MM	182 MM	230 MM	<b>06685</b>
8.60 MM	.3386	10 MM	120 MM	162 MM	<b>06641</b>	9/16	.5625	16 MM	208 MM	260 MM	<b>06686</b>
8.70 MM	.3425	10 MM	120 MM	162 MM	<b>06642</b>	14.50 MM	.5709	16 MM	208 MM	260 MM	<b>06687</b>
11/32	.3438	10 MM	120 MM	162 MM	<b>06643</b>	15.00 MM	.5906	16 MM	208 MM	260 MM	<b>06688</b>
8.80 MM	.3465	10 MM	120 MM	162 MM	<b>06644</b>	15.50 MM	.6102	16 MM	208 MM	260 MM	<b>06689</b>
9.00 MM	.3543	10 MM	120 MM	162 MM	<b>06645</b>	5/8	.6250	16 MM	208 MM	260 MM	<b>06690</b>
23/64	.3594	10 MM	120 MM	162 MM	<b>06646</b>	16.00 MM	.6299	16 MM	208 MM	260 MM	<b>06691</b>
9.20 MM	.3622	10 MM	120 MM	162 MM	<b>06647</b>	16.50 MM	.6496	18 MM	234 MM	285 MM	<b>06692</b>
9.30 MM	.3661	10 MM	120 MM	162 MM	<b>06648</b>	17.00 MM	.6693	18 MM	234 MM	285 MM	<b>06693</b>
9.50 MM	.3740	10 MM	120 MM	162 MM	<b>06649</b>	17.50 MM	.6890	18 MM	234 MM	285 MM	<b>06694</b>
3/8	.3750	10 MM	120 MM	162 MM	<b>06650</b>	18.00 MM	.7087	18 MM	234 MM	285 MM	<b>06695</b>
9.60 MM	.3780	10 MM	120 MM	162 MM	<b>06651</b>	18.50 MM	.7283	20 MM	258 MM	310 MM	<b>06696</b>
9.80 MM	.3858	10 MM	120 MM	162 MM	<b>06652</b>	3/4	.7500	20 MM	258 MM	310 MM	<b>06697</b>
9.90 MM	.3898	10 MM	120 MM	162 MM	<b>06653</b>	19.50 MM	.7677	20 MM	258 MM	310 MM	<b>06698</b>
						20.00 MM	.7874	20 MM	258 MM	310 MM	<b>06699</b>





# High Performance Carbide Drills for Aluminum Speed and Feed Recommendations

## List No. 5604 Non-Coolant-Through Drills

Material	Drilling Depth	Surface Speed (SFM)*	Feed in Inches Per Revolution by Drill Diameter (IPR)					
			Inch Micro	Inch Sizes				
			< .1181	.1181 - .1969	.1970 - .3150	.3151 - .4724	.4725 - .6299	.6300 - .7874
			Metric Micro	Metric Sizes				
< 3.0	≥ 3.0 ≤ 5.0	> 5.0 ≤ 8.0	> 8.0 ≤ 12.0	> 12.0 ≤ 16.0	> 16.0 ≤ 20.0			
Wrought Aluminum Alloys	3xD	1070	200-250 SFM 1.5mm at .005 IPR 2.0mm at .007 IPR 2.5mm at .009 IPR	.012	.015	.019	.023	.025
	5xD	1005						
Low Silicon Aluminum Alloys < 12%	3xD	1070	390-500 SFM 1.5mm at .002 IPR 2.0mm at .003 IPR 2.5mm at .004 IPR	.013	.017	.022	.025	.027
	5xD	1005						
High Silicon Aluminum Alloys > 12%	3xD	1040	390-500 SFM 1.5mm at .002 IPR 2.0mm at .003 IPR 2.5mm at .004 IPR	.011	.015	.019	.023	.025
	5xD	975						
Copper & Copper Alloys	3xD	510	Not Recommended	.009	.011	.015	.015	.021
	5xD	445						

\* Except Micro Sizes

## List No. 5605 Coolant-Through Drills

Material	Drilling Depth	Surface Speed (SFM)	Feed in Inches Per Revolution by Drill Diameter (IPR)				
			Inch Sizes				
			.1181 - .1969	.1970 - .3150	.3151 - .4724	.4725 - .6299	.6300 - .7874
			Metric Sizes				
≥ 3.0 ≤ 5.0	> 5.0 ≤ 8.0	> 8.0 ≤ 12.0	> 12.0 ≤ 16.0	> 16.0 ≤ 20.0			
Wrought Aluminum Alloys	3xD	1115					
	5xD	1180	.012	.015	.019	.023	.025
	12xD	820					
Low Silicon Aluminum Alloys < 12%	3xD	1115					
	5xD	1180	.013	.017	.022	.025	.027
	12xD	820					
High Silicon Aluminum Alloys > 12%	3xD	1065					
	5xD	1145	.011	.015	.019	.023	.025
	12xD	800					
Copper & Copper Alloys	3xD	515					
	5xD	525	.009	.011	.015	.015	.021
	12xD	390					

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

NOTE: Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# High Performance Miniature Solid Carbide Drills



List No. 5373 Uncoated  
List No. 5373T ALTiN Coated

Solid Carbide - 12° Helix Angle  
135° 4-Facet Point (Sizes ≤ 1/32")  
135° Web Thinned Point (Sizes > 1/32")

**TOLERANCES - INCH SIZES**  
Diameter +.0000"/- .0003"  
Shank Dia. +.0000"/- .0002"

Recommended for High Performance  
Drilling in a Wide Range of Materials.

**TOLERANCES - METRIC SIZES**  
Diameter +.000mm/- .008mm  
Shank Dia. +.000mm/- .005mm

INCH	SIZE		DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	UNCOATED	ALTiN COATED
	WIRE GAGE	METRIC					EDP NO.	EDP NO.
	#102		.0039	1/8	.065	1-1/2	53620	—
		.10 mm	.0039	3.00 mm	1.70 mm	38 mm	53703	—
	#101		.0043	1/8	.065	1-1/2	53621	—
		.11 mm	.0043	3.00 mm	1.70 mm	38 mm	53704	—
	#100		.0047	1/8	.065	1-1/2	53622	—
		.12 mm	.0047	3.00 mm	1.70 mm	38 mm	53705	—
	#99		.0051	1/8	.065	1-1/2	53623	—
		.13 mm	.0051	3.00 mm	1.70 mm	38 mm	53706	—
	#98		.0055	1/8	.065	1-1/2	53624	—
		.14 mm	.0055	3.00 mm	1.70 mm	38 mm	53707	—
	#97		.0059	3.00 mm	2.50 mm	38 mm	53708	—
		.15 mm	.0060	1/8	.100	1-1/2	53625	—
	#96		.0063	1/8	.100	1-1/2	53626	—
		.16 mm	.0063	3.00 mm	2.50 mm	38 mm	53709	—
	#95		.0067	1/8	.100	1-1/2	53627	—
		.17 mm	.0067	3.00 mm	2.50 mm	38 mm	53710	—
			.0070	1/8	.100	1-1/2	53628	—
	#94		.0071	1/8	.100	1-1/2	53629	—
		.18 mm	.0071	3.00 mm	2.50 mm	38 mm	53711	—
	#93		.0075	1/8	.100	1-1/2	53630	—
		.19 mm	.0075	3.00 mm	2.50 mm	38 mm	53712	—
		.20 mm	.0078	3.00 mm	2.50 mm	38 mm	53713	—
	#92		.0079	1/8	.125	1-1/2	53631	—
			.0080	1/8	.125	1-1/2	53632	—
	#91		.0083	1/8	.125	1-1/2	53633	—
		.21 mm	.0083	3.00 mm	2.50 mm	38 mm	53714	—
	#90		.0087	1/8	.125	1-1/2	53634	—
		.22 mm	.0087	3.00 mm	2.50 mm	38 mm	53715	—
			.0090	1/8	.125	1-1/2	53635	—
	#89		.0091	1/8	.125	1-1/2	53636	—
		.23 mm	.0091	3.00 mm	2.50 mm	38 mm	53716	—
		.24 mm	.0094	3.00 mm	2.50 mm	38 mm	53717	—
	#88		.0095	1/8	.125	1-1/2	53637	—
		.25 mm	.0098	3.00 mm	3.20 mm	38 mm	53718	—
	#87		.0100	1/8	.150	1-1/2	53638	—
		.26 mm	.0102	3.00 mm	3.20 mm	38 mm	53719	—
	#86		.0105	1/8	.150	1-1/2	53639	—
		.27 mm	.0106	3.00 mm	3.20 mm	38 mm	53720	—
	#85		.0110	1/8	.150	1-1/2	53640	—
		.28 mm	.0110	3.00 mm	3.20 mm	38 mm	53721	—
		.29 mm	.0114	3.00 mm	3.20 mm	38 mm	53722	—
	#84		.0115	1/8	.150	1-1/2	53641	—
		.30 mm	.0118	3.00 mm	4.80 mm	38 mm	53723	93930
	#83		.0120	1/8	.190	1-1/2	53642	93870
		.31 mm	.0122	3.00 mm	4.80 mm	38 mm	53724	—

(continued)



Speeds & Feeds  
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# High Performance Miniature Solid Carbide Drills *(continued)*

List No. 5373 and 5373T

INCH	SIZE		DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	UNCOATED	ALTiN COATED
	WIRE GAGE	METRIC					EDP NO.	EDP NO.
	#82		.0125	1/8	.190	1-1/2	53643	93871
		.32 mm	.0126	3.00 mm	4.80 mm	38 mm	53725	—
	#81		.0130	1/8	.190	1-1/2	53644	93872
		.33 mm	.0130	3.00 mm	4.80 mm	38 mm	53726	—
		.34 mm	.0134	3.00 mm	4.80 mm	38 mm	53727	—
	#80		.0135	1/8	.190	1-1/2	53645	93873
		.35 mm	.0138	3.00 mm	4.80 mm	38 mm	53728	93931
		.36 mm	.0142	3.00 mm	4.80 mm	38 mm	53729	—
	#79		.0145	1/8	.190	1-1/2	53646	93874
		.37 mm	.0146	3.00 mm	4.80 mm	38 mm	53730	—
		.38 mm	.0150	3.00 mm	4.80 mm	38 mm	53731	—
		.39 mm	.0154	3.00 mm	4.80 mm	38 mm	53732	—
1/64			.0156	1/8	.190	1-1/2	53647	93875
		.40 mm	.0157	3.00 mm	4.80 mm	38 mm	53733	93932
	#78		.0160	1/8	.190	1-1/2	53648	93876
		.41 mm	.0161	3.00 mm	6.35 mm	38 mm	53734	—
		.42 mm	.0165	3.00 mm	6.35 mm	38 mm	53735	—
		.43 mm	.0169	3.00 mm	6.35 mm	38 mm	53736	—
		.44 mm	.0173	3.00 mm	6.35 mm	38 mm	53737	—
		.45 mm	.0177	3.00 mm	6.35 mm	38 mm	53738	93933
	#77		.0180	1/8	.250	1-1/2	53649	93877
		.46 mm	.0181	3.00 mm	6.35 mm	38 mm	53739	—
		.47 mm	.0185	3.00 mm	6.35 mm	38 mm	53740	—
		.48 mm	.0189	3.00 mm	6.35 mm	38 mm	53741	—
		.49 mm	.0193	3.00 mm	6.35 mm	38 mm	53742	—
		.50 mm	.0197	3.00 mm	6.35 mm	38 mm	53743	93934
	#76		.0200	1/8	.250	1-1/2	53650	93878
		.51 mm	.0201	3.00 mm	6.35 mm	38 mm	53744	—
		.52 mm	.0205	3.00 mm	6.35 mm	38 mm	53745	—
		.53 mm	.0209	3.00 mm	6.35 mm	38 mm	53746	93935
	#75		.0210	1/8	.250	1-1/2	53651	93879
		.54 mm	.0213	3.00 mm	6.35 mm	38 mm	53747	—
		.55 mm	.0217	3.00 mm	6.35 mm	38 mm	53748	93936
		.56 mm	.0220	3.00 mm	6.35 mm	38 mm	53749	—
		.57 mm	.0224	3.00 mm	6.35 mm	38 mm	53750	—
	#74		.0225	1/8	.250	1-1/2	53652	93880
		.58 mm	.0228	3.00 mm	6.35 mm	38 mm	53751	—
		.59 mm	.0232	3.00 mm	6.35 mm	38 mm	53752	—
		.60 mm	.0236	3.00 mm	6.35 mm	38 mm	53753	93937
	#73		.0240	1/8	.250	1-1/2	53653	93881
		.61 mm	.0240	3.00 mm	6.35 mm	38 mm	53754	—
		.62 mm	.0244	3.00 mm	6.35 mm	38 mm	53755	—
		.63 mm	.0248	3.00 mm	6.35 mm	38 mm	53756	—
	#72		.0250	1/8	.250	1-1/2	53654	93882
		.64 mm	.0252	3.00 mm	6.35 mm	38 mm	53757	—
		.65 mm	.0256	3.00 mm	6.35 mm	38 mm	53758	93938
	#71		.0260	1/8	.250	1-1/2	53655	93883
		.66 mm	.0260	3.00 mm	8.13 mm	38 mm	53759	—
		.67 mm	.0264	3.00 mm	8.13 mm	38 mm	53760	—
		.68 mm	.0268	3.00 mm	8.13 mm	38 mm	53761	—
		.69 mm	.0272	3.00 mm	8.13 mm	38 mm	53762	—
		.70 mm	.0276	3.00 mm	8.13 mm	38 mm	53763	93939
	#70		.0280	1/8	.320	1-1/2	53656	93884
		.71 mm	.0280	3.00 mm	8.13 mm	38 mm	53764	—
		.72 mm	.0283	3.00 mm	8.13 mm	38 mm	53765	—
		.73 mm	.0287	3.00 mm	8.13 mm	38 mm	53766	93940

*(continued)*



# High Performance Miniature Solid Carbide Drills (continued)

List No. 5373 and 5373T

INCH	SIZE		DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	UNCOATED	ALTiN COATED
	WIRE GAGE	METRIC					EDP NO.	EDP NO.
	#69	.74 mm	.0291	3.00 mm	8.13 mm	38 mm	53767	—
			.0292	1/8	.320	1-1/2	53657	93885
		.75 mm	.0295	3.00 mm	8.13 mm	38 mm	53768	93941
		.76 mm	.0299	3.00 mm	10.16 mm	38 mm	53769	—
		.77 mm	.0303	3.00 mm	10.16 mm	38 mm	53770	—
1/32	#68	.78 mm	.0307	3.00 mm	10.16 mm	38 mm	53771	—
			.0310	1/8	.400	1-1/2	53658	93886
		.79 mm	.0311	3.00 mm	10.16 mm	38 mm	53772	—
			.0312	1/8	.400	1-1/2	53659	93887
		.80 mm	.0315	3.00 mm	10.16 mm	38 mm	53773	93942
	#67	.81 mm	.0319	3.00 mm	10.16 mm	38 mm	53774	—
			.0320	1/8	.400	1-1/2	53660	93888
		.82 mm	.0323	3.00 mm	10.16 mm	38 mm	53775	—
	#66	.83 mm	.0327	3.00 mm	10.16 mm	38 mm	53776	—
			.0330	1/8	.400	1-1/2	53661	93889
	#65	.84 mm	.0331	3.00 mm	10.16 mm	38 mm	53777	—
		.85 mm	.0335	3.00 mm	10.16 mm	38 mm	53778	93943
		.86 mm	.0339	3.00 mm	10.16 mm	38 mm	53779	—
		.87 mm	.0343	3.00 mm	10.16 mm	38 mm	53780	—
		.88 mm	.0346	3.00 mm	10.16 mm	38 mm	53781	—
	#64	.89 mm	.0350	1/8	.400	1-1/2	53662	93890
		.90 mm	.0350	3.00 mm	10.16 mm	38 mm	53782	—
		.91 mm	.0354	3.00 mm	10.16 mm	38 mm	53783	93944
	#63	.92 mm	.0358	3.00 mm	10.16 mm	38 mm	53784	—
			.0360	1/8	.400	1-1/2	53663	93891
		.93 mm	.0362	3.00 mm	10.16 mm	38 mm	53785	—
	#62	.94 mm	.0366	3.00 mm	10.16 mm	38 mm	53786	—
			.0370	1/8	.400	1-1/2	53664	93892
		.95 mm	.0370	3.00 mm	10.16 mm	38 mm	53787	—
	#61	.96 mm	.0374	3.00 mm	10.16 mm	38 mm	53788	93945
			.0378	3.00 mm	10.16 mm	38 mm	53789	—
		.97 mm	.0380	1/8	.400	1-1/2	53665	93893
	#60	.98 mm	.0382	3.00 mm	10.16 mm	38 mm	53790	—
			.0386	3.00 mm	10.16 mm	38 mm	53791	—
		.99 mm	.0390	1/8	.400	1-1/2	53666	93894
	#59	1.00 mm	.0390	3.00 mm	10.16 mm	38 mm	53792	—
			.0394	3.00 mm	10.16 mm	38 mm	53793	93946
		1.05 mm	.0400	1/8	.400	1-1/2	53667	93895
	#58		.0410	1/8	.400	1-1/2	53668	93896
			.0413	3.00 mm	10.16 mm	38 mm	53794	93947
			.0420	1/8	.400	1-1/2	53669	93897
	#57		.0430	1/8	.400	1-1/2	53670	93898
		1.10 mm	.0433	3.00 mm	10.16 mm	38 mm	53795	93948
		1.15 mm	.0452	3.00 mm	10.16 mm	38 mm	53796	93949
3/64	#56		.0465	1/8	.400	1-1/2	53671	93899
			.0469	1/8	.400	1-1/2	53672	93900
		1.20 mm	.0472	3.00 mm	10.16 mm	38 mm	53797	93950
	#55	1.25 mm	.0492	3.00 mm	10.16 mm	38 mm	53798	93951
		1.30 mm	.0511	3.00 mm	10.16 mm	38 mm	53799	93952
			.0520	1/8	.400	1-1/2	53673	93901
	#54	1.35 mm	.0531	3.00 mm	10.16 mm	38 mm	53800	93953
			.0550	1/8	.400	1-1/2	53674	93902
		1.40 mm	.0551	3.00 mm	10.16 mm	38 mm	53801	93954
	#53	1.45 mm	.0571	3.00 mm	10.16 mm	38 mm	53802	93955
		1.50 mm	.0590	3.00 mm	10.16 mm	38 mm	53803	93956
			.0595	1/8	.400	1-1/2	53675	93903

(continued)



Speeds & Feeds  
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# High Performance Miniature Solid Carbide Drills

(continued)

List No. 5373 and 5373T

INCH	SIZE		DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	UNCOATED	ALTiN COATED	
	WIRE GAGE	METRIC					EDP NO.	EDP NO.	
1/16	#52	1.55 mm	.0610	3.00 mm	10.16 mm	38 mm	53804	93957	
			.0625	1/8	.480	1-1/2	53676	93904	
		1.60 mm	.0630	3.00 mm	12.19 mm	38 mm	53805	93958	
		#51		.0635	1/8	.480	1-1/2	53677	93905
	1.65 mm		.0649	3.00 mm	12.19 mm	38 mm	53806	93959	
		#50	1.70 mm	.0669	3.00 mm	12.19 mm	38 mm	53807	93960
					.0670	1/8	.480	1-1/2	53678
		#49	1.75 mm	.0689	3.00 mm	12.19 mm	38 mm	53808	93961
					.0700	1/8	.480	1-1/2	53679
		#48	1.80 mm	.0708	3.00 mm	12.19 mm	38 mm	53809	93962
				1.85 mm	.0728	3.00 mm	12.19 mm	38 mm	53810
		#47		.0730	1/8	.480	1-1/2	53680	93908
			1.90 mm	.0748	3.00 mm	12.19 mm	38 mm	53811	93964
	#46	1.95 mm	.0767	3.00 mm	12.19 mm	38 mm	53812	93965	
				.0781	1/8	.480	1-1/2	53682	93910
5/64	#45		.0785	1/8	.480	1-1/2	53683	93911	
		2.00 mm	.0787	3.00 mm	12.19 mm	38 mm	53813	93966	
		#44	2.05 mm	.0807	3.00 mm	12.19 mm	38 mm	53814	93967
					.0810	1/8	.480	1-1/2	53684
		#43		.0820	1/8	.480	1-1/2	53685	93913
				2.10 mm	.0827	3.00 mm	12.19 mm	38 mm	53815
		#42	2.15 mm	.0846	3.00 mm	12.19 mm	38 mm	53816	93969
					.0860	1/8	.480	1-1/2	53686
		#41	2.20 mm	.0866	3.00 mm	12.19 mm	38 mm	53817	93970
				2.25 mm	.0886	3.00 mm	12.19 mm	38 mm	53818
		#40		.0890	1/8	.480	1-1/2	53687	93915
				2.30 mm	.0906	3.00 mm	12.19 mm	38 mm	53819
	#39	2.35 mm	.0925	3.00 mm	12.19 mm	38 mm	53820	93973	
				.0935	1/8	.480	1-1/2	53688	93916
3/32	#38		.0938	1/8	.480	1-1/2	53689	93917	
		2.40 mm	.0945	3.00 mm	12.19 mm	38 mm	53821	93974	
		#37		.0960	1/8	.480	1-1/2	53690	93918
				2.45 mm	.0965	3.00 mm	12.19 mm	38 mm	53822
		#36		.0980	1/8	.480	1-1/2	53691	93919
				2.50 mm	.0984	3.00 mm	12.19 mm	38 mm	53823
		#35		.0995	1/8	.480	1-1/2	53692	93920
				2.55 mm	.1004	3.00 mm	12.19 mm	38 mm	53824
		#34		.1015	1/8	.480	1-1/2	53693	93921
				2.60 mm	.1024	3.00 mm	12.19 mm	38 mm	53825
		#33		.1040	1/8	.480	1-1/2	53694	93922
				2.65 mm	.1043	3.00 mm	12.19 mm	38 mm	53826
	#32		.1063	3.00 mm	12.19 mm	38 mm	53827	93980	
			2.70 mm	.1065	1/8	.480	1-1/2	53695	93923
	#31	2.75 mm	.1083	3.00 mm	12.19 mm	38 mm	53828	93981	
				.1094	1/8	.480	1-1/2	53696	93924
7/64	#30		.1100	1/8	.480	1-1/2	53697	93925	
		2.80 mm	.1102	3.00 mm	12.19 mm	38 mm	53829	93982	
		#29		.1110	1/8	.480	1-1/2	53698	93926
				2.85 mm	.1122	3.00 mm	12.19 mm	38 mm	53830
		#28		.1130	1/8	.480	1-1/2	53699	93927
				2.90 mm	.1142	3.00 mm	12.19 mm	38 mm	53831
		#27		.1160	1/8	.480	1-1/2	53700	93928
				2.95 mm	.1161	3.00 mm	12.19 mm	38 mm	53832
		#26	3.00 mm	.1181	3.00 mm	12.19 mm	38 mm	53833	93986
					.1200	1/8	.480	1-1/2	53701
	1/8	#25		.1250	1/8	.480	1-1/2	53702	93987

HIGH PERFORMANCE MINIATURE CARBIDE DRILLS



Speeds & Feeds  
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# High Performance Miniature Solid Carbide Drills

## Speed and Feed Recommendations

### List No. 5373 and 5373T

High Performance

	WORKPIECE MATERIAL	HARDNESS	COATING	SURFACE SPEED (SFM)	FEED PER REVOLUTION BY DRILL DIA. (IPR)				
					1/64"	1/32"	1/16"	3/32"	1/8"
ISO P	<b>Free Machining &amp; Low Carbon Steels:</b> 1006, 1008, 1015, 1018, B3: B34 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330	≤ 28 Rc	None	300	.0004	.0008	.0015	.0023	.0030
			ALTiN	360					
	<b>Medium Carbon &amp; High Carbon Steels, Alloy Steels &amp; Easy to Machine Tool Steels:</b> 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310	28 - 38 Rc	None	225	.0004	.0008	.0015	.0023	.0030
			ALTiN	270					
	<b>Tool Steels &amp; Die Steels:</b> O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	28 - 44 Rc	None	200	.0004	.0008	.0015	.0023	.0030
			ALTiN	240					
ISO H	<b>Hardened Steels:</b> A2 / 52100	35 - 55 Rc	None	50	.0002	.0004	.0007	.0011	.0014
			ALTiN	60					
ISO M	<b>Free Machining Stainless Steels:</b>	≤ 28 Rc	None	175	.0004	.0008	.0015	.0023	.0030
			ALTiN	210					
	<b>Austenitic Stainless Steels:</b> 304 / 316	≤ 28 Rc	None	200	.0004	.0008	.0015	.0023	.0030
			ALTiN	240					
	<b>Ferritic / Martensitic Stainless Steels:</b>	≤ 28 Rc	None	100	.0004	.0008	.0015	.0023	.0030
			ALTiN	120					
<b>Moderately Difficult Stainless Steels:</b> 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	> 28 Rc	None	75	.0004	.0008	.0015	.0023	.0030	
		ALTiN	90						
ISO N	<b>Aluminum &lt;10% Si:</b>		None	450	.0005	.0010	.0020	.0030	.0040
			ALTiN	-					
	<b>Aluminum &gt;10% Si:</b>		None	325	.0005	.0010	.0020	.0030	.0040
			ALTiN	-					
	<b>Plastics:</b>		None	550	.0005	.0010	.0020	.0030	.0040
			ALTiN	-					
<b>Composites / Fiber Reinforced Materials / Circuit Boards:</b>		None	650	.0005	.0010	.0020	.0030	.0040	
		ALTiN	-						
ISO K	<b>Cast Iron - Gray CG:</b> ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40	≤ 240 HB	None	400	.0004	.0008	.0015	.0023	.0030
			ALTiN	480					
	<b>Cast Iron - Ductile &amp; Malleable CGI:</b> 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450	> 240 HB	None	350	.0004	.0008	.0015	.0023	.0030
			ALTiN	420					
ISO S	<b>Titanium:</b> 6Al-4V	≤ 42 Rc	None	60	.0004	.0008	.0015	.0023	.0030
			ALTiN	70					
	<b>High Temp Alloys:</b> Inconel, Hastelloy, Waspeloy, Nickel Based Alloys, Monel	≤ 42 Rc	None	50	.0002	.0004	.0007	.0011	.0014
			ALTiN	60					

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.



# Miniature Solid Carbide Drills

Solid Carbide - 35° Helix Angle  
130° 4-Facet Point  
1/8" Shank Dia. - 1-1/2" Overall Length



List No. 5372 Uncoated

#### TOLERANCES - INCH SIZES

Diameter ≤ .010" +.0000"/-.0003"  
Diameter > .010" +.0000"/-.0005"  
Shank Dia. +.0000"/-.0002"

#### TOLERANCES - METRIC SIZES

Diameter ≤ .25mm +.000mm/-.008mm  
Diameter > .25mm +.000mm/-.013mm  
Shank Dia. +.000mm/-.005mm

Recommended for Production Drilling  
in a Wide Range of Materials.

INCH	SIZE WIRE GAGE	METRIC	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
	#102	.10 mm	.0039	1/8	.065	1-1/2	53835
	#101		.0043	1/8	.065	1-1/2	53836
	#100		.0047	1/8	.065	1-1/2	53837
	#99		.0051	1/8	.065	1-1/2	53838
	#98		.0055	1/8	.065	1-1/2	53839
	#97	.15 mm	.0059	3.175 mm (1/8)	2.50 mm	38 mm	53840
			.0060	1/8	.100	1-1/2	53841
	#96		.0063	1/8	.100	1-1/2	53842
	#95		.0067	1/8	.100	1-1/2	53843
			.0070	1/8	.100	1-1/2	53844
	#94		.0071	1/8	.100	1-1/2	53845
	#93		.0075	1/8	.100	1-1/2	53846
		.20 mm	.0078	3.175 mm (1/8)	3.20 mm	38 mm	53847
	#92		.0079	1/8	.125	1-1/2	53848
			.0080	1/8	.125	1-1/2	53849
	#91		.0083	1/8	.125	1-1/2	53850
	#90		.0087	1/8	.125	1-1/2	53851
			.0090	1/8	.125	1-1/2	53852
	#89		.0091	1/8	.125	1-1/2	53853
	#88		.0095	1/8	.125	1-1/2	53854
		.25 mm	.0098	3.175 mm (1/8)	3.80 mm	38 mm	53855
	#87		.0100	1/8	.150	1-1/2	53856
	#86		.0105	1/8	.150	1-1/2	53857
	#85		.0110	1/8	.150	1-1/2	53858
	#84		.0115	1/8	.150	1-1/2	53859
		.30 mm	.0118	3.175 mm (1/8)	4.80 mm	38 mm	53860
	#83		.0120	1/8	.190	1-1/2	53861
	#82		.0125	1/8	.190	1-1/2	53862
	#81		.0130	1/8	.190	1-1/2	53863
	#80		.0135	1/8	.190	1-1/2	53864
	#80		.0135	1/8	.250	1-1/2	53865
		.35 mm	.0138	3.175 mm (1/8)	4.80 mm	38 mm	53866
		.35 mm	.0138	3.175 mm (1/8)	6.35 mm	38 mm	53867
	#79		.0145	1/8	.190	1-1/2	53868
	#79		.0145	1/8	.250	1-1/2	53869
1/64			.0156	1/8	.190	1-1/2	53870
1/64			.0156	1/8	.250	1-1/2	53871
		.40 mm	.0157	3.175 mm (1/8)	4.80 mm	38 mm	53872
		.40 mm	.0157	3.175 mm (1/8)	6.35 mm	38 mm	53873

(continued)



# Miniature Solid Carbide Drills (continued)

List No. 5372

**Speeds & Feeds**  
Page 33

INCH	SIZE WIRE GAGE	METRIC	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
	#78		.0160	1/8	.190	1-1/2	53874
	#78		.0160	1/8	.250	1-1/2	53875
		.45 mm	.0177	3.175 mm (1/8)	4.80 mm	38 mm	53876
		.45 mm	.0177	3.175 mm (1/8)	6.35 mm	38 mm	53877
		.45 mm	.0177	3.175 mm (1/8)	8.13 mm	38 mm	53878
	#77		.0180	1/8	.190	1-1/2	53879
	#77		.0180	1/8	.250	1-1/2	53880
	#77		.0180	1/8	.320	1-1/2	54880
		.50 mm	.0197	3.175 mm (1/8)	4.80 mm	38 mm	54881
		.50 mm	.0197	3.175 mm (1/8)	6.35 mm	38 mm	54882
		.50 mm	.0197	3.175 mm (1/8)	8.13 mm	38 mm	54883
	#76		.0200	1/8	.190	1-1/2	54884
	#76		.0200	1/8	.250	1-1/2	54885
	#76		.0200	1/8	.320	1-1/2	54886
	#75		.0210	1/8	.190	1-1/2	54887
	#75		.0210	1/8	.250	1-1/2	54888
	#75		.0210	1/8	.320	1-1/2	54889
		.55 mm	.0217	3.175 mm (1/8)	4.80 mm	38 mm	54890
		.55 mm	.0217	3.175 mm (1/8)	6.35 mm	38 mm	54891
		.55 mm	.0217	3.175 mm (1/8)	8.13 mm	38 mm	54892
	#74		.0225	1/8	.190	1-1/2	54893
	#74		.0225	1/8	.250	1-1/2	54894
	#74		.0225	1/8	.320	1-1/2	54895
		.60 mm	.0236	3.175 mm (1/8)	4.80 mm	38 mm	54896
		.60 mm	.0236	3.175 mm (1/8)	6.35 mm	38 mm	54897
		.60 mm	.0236	3.175 mm (1/8)	8.13 mm	38 mm	54898
	#73		.0240	1/8	.190	1-1/2	54899
	#73		.0240	1/8	.250	1-1/2	54900
	#73		.0240	1/8	.320	1-1/2	54901
	#72		.0250	1/8	.190	1-1/2	54902
	#72		.0250	1/8	.250	1-1/2	54903
	#72		.0250	1/8	.320	1-1/2	54904
		.65 mm	.0256	3.175 mm (1/8)	4.80 mm	38 mm	54905
		.65 mm	.0256	3.175 mm (1/8)	6.35 mm	38 mm	54906
		.65 mm	.0256	3.175 mm (1/8)	8.13 mm	38 mm	54907
	#71		.0260	1/8	.190	1-1/2	54908
	#71		.0260	1/8	.250	1-1/2	54909
	#71		.0260	1/8	.320	1-1/2	54910
		.70 mm	.0276	3.175 mm (1/8)	6.35 mm	38 mm	54911
		.70 mm	.0276	3.175 mm (1/8)	8.13 mm	38 mm	54912
		.70 mm	.0276	3.175 mm (1/8)	10.16 mm	38 mm	54913
	#70		.0280	1/8	.250	1-1/2	54914
	#70		.0280	1/8	.320	1-1/2	54915
	#70		.0280	1/8	.400	1-1/2	54916
	#69		.0292	1/8	.250	1-1/2	54917
	#69		.0292	1/8	.320	1-1/2	54918
	#69		.0292	1/8	.400	1-1/2	54919
		.75 mm	.0295	3.175 mm (1/8)	6.35 mm	38 mm	54920
		.75 mm	.0295	3.175 mm (1/8)	8.13 mm	38 mm	54921
		.75 mm	.0295	3.175 mm (1/8)	10.16 mm	38 mm	54922

(continued)





# Miniature Solid Carbide Drills (continued)

List No. 5372

INCH	SIZE WIRE GAGE	METRIC	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
1/32	#68		.0310	1/8	.250	1-1/2	54923
	#68		.0310	1/8	.400	1-1/2	54924
			.0312	1/8	.250	1-1/2	54925
			.0312	1/8	.400	1-1/2	54926
			.80 mm	.0315	3.175 mm (1/8)	6.35 mm	38 mm
		.80 mm	.0315	3.175 mm (1/8)	10.16 mm	38 mm	54928
	#67		.0320	1/8	.250	1-1/2	54929
	#67		.0320	1/8	.400	1-1/2	54930
	#66		.0330	1/8	.250	1-1/2	54931
	#66		.0330	1/8	.400	1-1/2	54932
		.85 mm	.0335	3.175 mm (1/8)	6.35 mm	38 mm	54933
		.85 mm	.0335	3.175 mm (1/8)	10.16 mm	38 mm	54934
	#65		.0350	1/8	.400	1-1/2	54935
		.90 mm	.0354	3.175 mm (1/8)	10.16 mm	38 mm	54936
	#64		.0360	1/8	.400	1-1/2	54937
	#63		.0370	1/8	.400	1-1/2	54938
		.95 mm	.0374	3.175 mm (1/8)	10.16 mm	38 mm	54939
	#62		.0380	1/8	.400	1-1/2	54940
	#61		.0390	1/8	.400	1-1/2	54941
		1.00 mm	.0394	3.175 mm (1/8)	10.16 mm	38 mm	54942
	#60		.0400	1/8	.400	1-1/2	54943
	#59		.0410	1/8	.400	1-1/2	54944
		1.05 mm	.0413	3.175 mm (1/8)	10.16 mm	38 mm	54945
	#58		.0420	1/8	.400	1-1/2	54946
	#57		.0430	1/8	.400	1-1/2	54947
3/64		1.10 mm	.0433	3.175 mm (1/8)	10.16 mm	38 mm	54948
		1.15 mm	.0452	3.175 mm (1/8)	10.16 mm	38 mm	54949
	#56		.0465	1/8	.400	1-1/2	54950
			.0469	1/8	.400	1-1/2	54951
		1.20 mm	.0472	3.175 mm (1/8)	10.16 mm	38 mm	54952
		1.25 mm	.0492	3.175 mm (1/8)	10.16 mm	38 mm	54953
		1.30 mm	.0511	3.175 mm (1/8)	10.16 mm	38 mm	54954
	#55		.0520	1/8	.400	1-1/2	54955
		1.35 mm	.0531	3.175 mm (1/8)	10.16 mm	38 mm	54956
	#54		.0550	1/8	.400	1-1/2	54960
		1.40 mm	.0551	3.175 mm (1/8)	10.16 mm	38 mm	54961
		1.45 mm	.0571	3.175 mm (1/8)	10.16 mm	38 mm	54962
		1.50 mm	.0590	3.175 mm (1/8)	10.16 mm	38 mm	54963
	#53		.0595	1/8	.400	1-1/2	54964
		1.55 mm	.0610	3.175 mm (1/8)	10.16 mm	38 mm	54965
1/16			.0625	1/8	.480	1-1/2	54966
		1.60 mm	.0630	3.175 mm (1/8)	12.19 mm	38 mm	54967
	#52		.0635	1/8	.480	1-1/2	54968
		1.65 mm	.0649	3.175 mm (1/8)	12.19 mm	38 mm	54969
		1.70 mm	.0669	3.175 mm (1/8)	12.19 mm	38 mm	54970
	#51		.0670	1/8	.480	1-1/2	54971
		1.75 mm	.0689	3.175 mm (1/8)	12.19 mm	38 mm	54972
	#50		.0700	1/8	.480	1-1/2	54973
	1.80 mm	.0708	3.175 mm (1/8)	12.19 mm	38 mm	54974	

(continued)



# Miniature Solid Carbide Drills (continued)

List No. 5372

**Speeds & Feeds**  
Page 33

INCH	SIZE WIRE GAGE	METRIC	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
	#49	1.85 mm	.0728	3.175 mm (1/8)	12.19 mm	38 mm	54975
			.0730	1/8	.480	1-1/2	54976
	#48	1.90 mm	.0748	3.175 mm (1/8)	12.19 mm	38 mm	54977
			.0760	1/8	.480	1-1/2	54978
5/64	#48	1.95 mm	.0767	3.175 mm (1/8)	12.19 mm	38 mm	54979
			.0781	1/8	.480	1-1/2	54980
	#47		.0785	1/8	.480	1-1/2	54981
		2.00 mm	.0787	3.175 mm (1/8)	12.19 mm	38 mm	54982
	#46	2.05 mm	.0807	3.175 mm (1/8)	12.19 mm	38 mm	54983
			.0810	1/8	.480	1-1/2	54984
	#45		.0820	1/8	.480	1-1/2	54985
		2.10 mm	.0827	3.175 mm (1/8)	12.19 mm	38 mm	54986
	#44	2.15 mm	.0846	3.175 mm (1/8)	12.19 mm	38 mm	54987
			.0860	1/8	.480	1-1/2	54988
	#44	2.20 mm	.0866	3.175 mm (1/8)	12.19 mm	38 mm	54989
		2.25 mm	.0886	3.175 mm (1/8)	12.19 mm	38 mm	54990
	#43		.0890	1/8	.480	1-1/2	54991
		2.30 mm	.0906	3.175 mm (1/8)	12.19 mm	38 mm	54992
	#42	2.35 mm	.0925	3.175 mm (1/8)	12.19 mm	38 mm	54993
			.0935	1/8	.480	1-1/2	54994
3/32	#41		.0938	1/8	.480	1-1/2	54995
		2.40 mm	.0945	3.175 mm (1/8)	12.19 mm	38 mm	54996
	#40		.0960	1/8	.480	1-1/2	54997
		2.45 mm	.0965	3.175 mm (1/8)	12.19 mm	38 mm	54998
	#39		.0980	1/8	.480	1-1/2	54999
		2.50 mm	.0984	3.175 mm (1/8)	12.19 mm	38 mm	55000
	#38		.0995	1/8	.480	1-1/2	55001
		2.55 mm	.1004	3.175 mm (1/8)	12.19 mm	38 mm	55002
	#37		.1015	1/8	.480	1-1/2	55003
		2.60 mm	.1024	3.175 mm (1/8)	12.19 mm	38 mm	55004
	#36		.1040	1/8	.480	1-1/2	55005
		2.65 mm	.1043	3.175 mm (1/8)	12.19 mm	38 mm	55006
	#36	2.70 mm	.1063	3.175 mm (1/8)	12.19 mm	38 mm	55007
			.1065	1/8	.480	1-1/2	55008
	#36	2.75 mm	.1083	3.175 mm (1/8)	12.19 mm	38 mm	55009
			.1094	1/8	.480	1-1/2	55010
7/64	#35		.1100	1/8	.480	1-1/2	55011
		2.80 mm	.1102	3.175 mm (1/8)	12.19 mm	38 mm	55012
	#34		.1110	1/8	.480	1-1/2	55013
		2.85 mm	.1122	3.175 mm (1/8)	12.19 mm	38 mm	55014
	#33		.1130	1/8	.480	1-1/2	55015
		2.90 mm	.1142	3.175 mm (1/8)	12.19 mm	38 mm	55016
	#32		.1160	1/8	.480	1-1/2	55017
		2.95 mm	.1161	3.175 mm (1/8)	12.19 mm	38 mm	55018
	#31	3.00 mm	.1181	3.175 mm (1/8)	12.19 mm	38 mm	55019
			.1200	1/8	.480	1-1/2	55020
	#31	3.05 mm	.1201	3.175 mm (1/8)	12.19 mm	38 mm	55021
		3.10 mm	.1220	3.175 mm (1/8)	12.19 mm	38 mm	55022
1/8	#31	3.15 mm	.1240	3.175 mm (1/8)	12.19 mm	38 mm	55023
			.1250	1/8	.480	1-1/2	55024



# Miniature Solid Carbide Drills

## Speed and Feed Recommendations

### List No. 5372

	WORKPIECE MATERIAL	HARDNESS	SURFACE SPEED (SFM)	FEED PER REVOLUTION BY DRILL DIA. (IPR)				
				1/64"	1/32"	1/16"	3/32"	1/8"
<b>ISO P</b>	<b>Free Machining &amp; Low Carbon Steels:</b> 1006, 1008, 1015, 1018, B3: B34 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330	≤ 28 Rc	300	.0003	.0006	.0012	.0018	.0023
	<b>Medium Carbon &amp; High Carbon Steels, Alloy Steels &amp; Easy to Machine Tool Steels:</b> 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310	28 - 38 Rc	225	.0003	.0006	.0012	.0018	.0023
	<b>Tool Steels &amp; Die Steels:</b> O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	28 - 44 Rc	200	.0003	.0006	.0012	.0018	.0023
<b>ISO H</b>	<b>Hardened Steels:</b> A2 / 52100	35 - 45 Rc	50	.0001	.0003	.0005	.0008	.0010
<b>ISO M</b>	<b>Free Machining Stainless Steels:</b>	≤ 28 Rc	175	.0003	.0006	.0012	.0018	.0023
	<b>Austenitic Stainless Steels:</b> 304 / 316	≤ 28 Rc	200	.0003	.0006	.0012	.0018	.0023
	<b>Ferritic / Martensitic Stainless Steels:</b>	≤ 28 Rc	100	.0003	.0006	.0012	.0018	.0023
	<b>Moderately Difficult Stainless Steels:</b> 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	> 28 Rc	75	.0003	.0006	.0012	.0018	.0023
<b>ISO N</b>	<b>Aluminum &lt;10% Si:</b>		450	.0006	.0012	.0020	.0030	.0040
	<b>Aluminum &gt;10% Si:</b>		325	.0006	.0012	.0020	.0030	.0040
	<b>Plastics:</b>		550	.0006	.0012	.0020	.0030	.0040
	<b>Composites / Fiber Reinforced Materials / Circuit Boards:</b>		650	.001-.0015	.0020	.0030	.0040	.0050
<b>ISO K</b>	<b>Cast Iron - Gray CG:</b> ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40	≤ 240 HB	400	.0003	.0006	.0012	.0018	.0023
	<b>Cast Iron - Ductile &amp; Malleable CGI:</b> 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450	> 240 HB	350	.0003	.0006	.0012	.0018	.0023
<b>ISO S</b>	<b>Titanium:</b> 6Al-4V	≤ 42 Rc	60	.0003	.0006	.0012	.0018	.0023
	<b>High Temp Alloys:</b> Inconel, Hastelloy, Waspeloy, Nickel Based Alloys, Monel	≤ 42 Rc	50	.0001	.0003	.0005	.0008	.0010

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.



# Solid Carbide Screw Machine Length Drills For Tough Drilling Applications

Recommended for tough drilling applications including carbon steel, stainless steel, cast iron, inconel, titanium, high temperature alloy steel, tool steel, work hardened and gummy materials and other high strength ferrous materials.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Aluminum Titanium Nitride (ALTiN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

135° Self-centering split point eliminates "walking" and reduces thrust.



List No. 5375 - Uncoated

List No. 5375T - ALTiN Coated

**135° Point – 15° Helix Angle**  
Split Point on sizes 3/32" and larger.

**TOLERANCES**  
All sizes +.0000/-.0005

**STANDARD PACKAGE**  
All sizes — 1 each

**Speeds & Feeds: Page 42**



SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED		5375T ALTiN	
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/32	.0312	1/2	1-1/2	50860	92230		
1.0 mm	.0394	13 mm	38 mm	54825	93005		
#60	.0400	1/2	1-1/2	54826	93006		
#59	.0410	1/2	1-1/2	54827	93007		
#58	.0420	1/2	1-1/2	54828	93008		
#57	.0430	1/2	1-1/2	54829	93009		
56	.0465	1/2	1-1/2	50861	92231		
3/64	.0469	1/2	1-1/2	50862	92232		
55	.0520	1/2	1-1/2	50863	92233		
54	.0550	1/2	1-1/2	50864	92234		
1.5 mm	.0591	13 mm	38 mm	54830	93010		
53	.0595	1/2	1-1/2	50865	92235		
1/16	.0625	5/8	1-5/8	50866	92236		
52	.0635	11/16	1-11/16	50867	92237		
51	.0670	11/16	1-11/16	50868	92238		
50	.0700	11/16	1-11/16	50869	92239		
49	.0730	11/16	1-11/16	50870	92240		
48	.0760	11/16	1-11/16	50871	92241		
5/64	.0781	11/16	1-11/16	50872	92242		
47	.0785	3/4	1-3/4	50873	92243		
2.0 mm	.0787	19 mm	45 mm	54831	93011		
46	.0810	3/4	1-3/4	50874	92244		
45	.0820	3/4	1-3/4	50875	92245		
44	.0860	3/4	1-3/4	50876	92246		
43	.0890	3/4	1-3/4	50877	92247		
42	.0935	3/4	1-3/4	50878	92248		
3/32	.0938	3/4	1-3/4	50879	92249		
41	.0960	13/16	1-13/16	50880	92250		
40	.0980	13/16	1-13/16	50881	92251		
2.5 mm	.0984	21 mm	46 mm	54832	93012		
39	.0995	13/16	1-13/16	50882	92252		
38	.1015	13/16	1-13/16	50883	92253		
37	.1040	13/16	1-13/16	50884	92254		
36	.1065	13/16	1-13/16	50885	92255		
7/64	.1094	13/16	1-13/16	50886	92256		
35	.1100	7/8	1-7/8	50887	92257		
34	.1110	7/8	1-7/8	50888	92258		

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED		5375T ALTiN	
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
33	.1130	7/8	1-7/8	50889	92259		
32	.1160	7/8	1-7/8	50890	92260		
3.0 mm	.1181	22 mm	48 mm	54833	93013		
31	.1200	7/8	1-7/8	50891	92261		
1/8	.1250	7/8	1-7/8	50892	92262		
30	.1285	15/16	1-15/16	50893	92263		
29	.1360	15/16	1-15/16	50894	92264		
3.5 mm	.1378	24 mm	49 mm	54834	93014		
28	.1405	15/16	1-15/16	50895	92265		
9/64	.1406	15/16	1-15/16	50896	92266		
27	.1440	1	2-1/16	50897	92267		
26	.1470	1	2-1/16	50898	92268		
25	.1495	1	2-1/16	50899	92269		
24	.1520	1	2-1/16	50900	92270		
23	.1540	1	2-1/16	50901	92271		
5/32	.1562	1	2-1/16	50902	92272		
22	.1570	1-1/16	2-1/8	50903	92273		
4.0 mm	.1575	27 mm	54 mm	54835	93015		
21	.1590	1-1/16	2-1/8	50904	92274		
20	.1610	1-1/16	2-1/8	50905	92275		
19	.1660	1-1/16	2-1/8	50906	92276		
18	.1695	1-1/16	2-1/8	50907	92277		
11/64	.1719	1-1/16	2-1/8	50908	92278		
17	.1730	1-1/8	2-3/16	50909	92279		
16	.1770	1-1/8	2-3/16	50910	92280		
4.5 mm	.1772	29 mm	56 mm	54836	93016		
15	.1800	1-1/8	2-3/16	50911	92281		
14	.1820	1-1/8	2-3/16	50912	92282		
13	.1850	1-1/8	2-3/16	50913	92283		
3/16	.1875	1-1/8	2-3/16	50914	92284		
12	.1890	1-3/16	2-1/4	50915	92285		
11	.1910	1-3/16	2-1/4	50916	92286		
10	.1935	1-3/16	2-1/4	50917	92287		
9	.1960	1-3/16	2-1/4	50918	92288		
5.0 mm	.1969	30 mm	57 mm	54837	93017		
8	.1990	1-3/16	2-1/4	50919	92289		

(continued)

**Tool Coatings Also Available**

# Solid Carbide Screw Machine Length Drills

## For Tough Drilling Applications

Recommended for tough drilling applications including carbon steel, stainless steel, cast iron, inconel, titanium, high temperature alloy steel, tool steel, work hardened and gummy materials and other high strength ferrous materials.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Aluminum Titanium Nitride (ALTiN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

135° Self-centering split point eliminates "walking" and reduces thrust.



List No. 5375 - Uncoated

List No. 5375T - ALTiN Coated

135° Point - 15° Helix Angle

Split Point on sizes 3/32" and larger.

**TOLERANCES**

All sizes +.0000/-0.0005

**STANDARD PACKAGE**

All sizes — 1 each



(continued)

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED EDP NO.	5375T ALTiN EDP NO.	SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED EDP NO.	5375T ALTiN EDP NO.
7	.2010	1-3/16	2-1/4	50920	92290	Q	.3320	1-11/16	3	50951	92321
<b>13/64</b>	.2031	1-3/16	2-1/4	50921	92291	8.5 mm	.3346	43 mm	76 mm	54844	93024
6	.2040	1-1/4	2-3/8	50922	92292	R	.3390	1-11/16	3	50952	92322
5	.2055	1-1/4	2-3/8	50923	92293	<b>11/32</b>	.3438	1-11/16	3	50953	92323
4	.2090	1-1/4	2-3/8	50924	92294	S	.3480	1-3/4	3-1/16	50954	92324
3	.2130	1-1/4	2-3/8	50925	92295	9.0 mm	.3543	45 mm	78 mm	54845	93025
5.5 mm	.2165	32 mm	60 mm	54838	93018	T	.3580	1-3/4	3-1/16	50955	92325
<b>7/32</b>	.2188	1-1/4	2-3/8	50926	92296	<b>23/64</b>	.3594	1-3/4	3-1/16	50956	92326
2	.2210	1-5/16	2-7/16	50927	92297	U	.3680	1-13/16	3-1/8	50957	92327
1	.2280	1-5/16	2-7/16	50928	92298	9.5 mm	.3740	46 mm	79 mm	54846	93026
A	.2340	1-5/16	2-7/16	50929	92299	<b>3/8</b>	.3750	1-13/16	3-1/8	50958	92328
<b>15/64</b>	.2344	1-5/16	2-7/16	50930	92300	V	.3770	1-7/8	3-1/4	50959	92329
6.0 mm	.2362	33 mm	62 mm	54839	93019	W	.3860	1-7/8	3-1/4	50960	92330
B	.2380	1-3/8	2-1/2	50931	92301	<b>25/64</b>	.3906	1-7/8	3-1/4	50961	92331
C	.2420	1-3/8	2-1/2	50932	92302	10.0 mm	.3937	48 mm	83 mm	54847	93027
D	.2460	1-3/8	2-1/2	50933	92303	X	.3970	1-15/16	3-5/16	50962	92332
<b>1/4 (E)</b>	.2500	1-3/8	2-1/2	50934	92304	Y	.4040	1-15/16	3-5/16	50963	92333
6.5 mm	.2559	35 mm	64 mm	54840	93020	<b>13/32</b>	.4062	1-15/16	3-5/16	50964	92334
F	.2570	1-7/16	2-5/8	50935	92305	Z	.4130	2	3-3/8	50965	92335
G	.2610	1-7/16	2-5/8	50936	92306	10.5 mm	.4134	51 mm	86 mm	54848	93028
<b>17/64</b>	.2656	1-7/16	2-5/8	50937	92307	<b>27/64</b>	.4219	2	3-3/8	50966	92336
H	.2660	1-1/2	2-11/16	50938	92308	11.0 mm	.4331	51 mm	86 mm	54849	93029
I	.2720	1-1/2	2-11/16	50939	92309	<b>7/16</b>	.4375	2-1/16	3-7/16	50967	92337
7.0 mm	.2756	38 mm	68 mm	54841	93021	11.5 mm	.4528	52 mm	88 mm	54850	93030
J	.2770	1-1/2	2-11/16	50940	92310	<b>29/64</b>	.4531	2-1/8	3-9/16	50968	92338
K	.2810	1-1/2	2-11/16	50941	92311	<b>15/32</b>	.4688	2-1/8	3-5/8	50969	92339
<b>9/32</b>	.2812	1-1/2	2-11/16	50942	92312	12.0 mm	.4724	54 mm	92 mm	54851	93031
L	.2900	1-9/16	2-3/4	50943	92313	<b>31/64</b>	.4844	2-3/16	3-11/16	50970	92340
M	.2950	1-9/16	2-3/4	50944	92314	12.5 mm	.4921	56 mm	94 mm	54852	93032
7.5 mm	.2953	40 mm	70 mm	54842	93022	<b>1/2</b>	.5000	2-1/4	3-3/4	50971	92341
<b>19/64</b>	.2969	1-9/16	2-3/4	50945	92315	<b>33/64</b>	.5156	2-3/8	3-7/8	54853	93033
N	.3020	1-5/8	2-13/16	50946	92316	<b>17/32</b>	.5312	2-3/8	3-7/8	54854	93034
<b>5/16</b>	.3125	1-5/8	2-13/16	50947	92317	<b>35/64</b>	.5469	2-3/8	3-7/8	54855	93035
8.0 mm	.3150	41 mm	72 mm	54843	93023	<b>9/16</b>	.5625	2-1/2	4	54856	93036
O	.3160	1-11/16	2-15/16	50948	92318	<b>5/8</b>	.6250	2-3/4	4-1/4	54857	93037
P	.3230	1-11/16	2-15/16	50949	92319	<b>11/16</b>	.6875	3	4-5/8	54858	93038
<b>21/64</b>	.3281	1-11/16	2-15/16	50950	92320	<b>3/4</b>	.7500	3-1/8	5	54859	93039

Tool Coatings Also Available

# Solid Carbide Standard Length Drills

Recommended for drilling cast iron, non ferrous alloys, plastics, aluminum and other easily machined materials.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Aluminum Titanium Nitride (ALTiN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding.



List No. 5374 - Uncoated

List No. 5374T - ALTiN Coated

118° Point - Split Point for sizes over 1/16"

25° Helix Angle

**TOLERANCES**  
All sizes +.0000/-.0005

**STANDARD PACKAGE**  
All sizes — 1 each

**Speeds & Feeds: Page 42**



SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T ALTiN EDP NO.	SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T ALTiN EDP NO.
80	.0135	3/16	1-1/4	51000	—	47	.0785	7/8	1-3/4	51039	92105
79	.0145	3/16	1-1/4	51001	—	2.00 mm	.0787	7/8	1-3/4	50978	92106
<b>1/64</b>	.0156	3/16	1-1/4	51002	—	46	.0810	7/8	1-3/4	51040	92107
78	.0160	3/16	1-1/4	51003	—	45	.0820	7/8	1-3/4	51041	92108
77	.0180	3/16	1-1/4	51004	—	44	.0860	1	2	51042	92109
76	.0200	1/4	1-1/4	51005	—	43	.0890	1	2	51043	92110
75	.0210	1/4	1-1/4	51006	—	42	.0935	1	2	51044	92111
74	.0225	1/4	1-1/4	51007	—	<b>3/32</b>	.0938	1	2	51045	92112
73	.0240	1/4	1-1/4	51008	—	41	.0960	1	2	51046	92113
72	.0250	5/16	1-1/4	51009	—	40	.0980	1	2	51047	92114
71	.0260	5/16	1-1/4	51010	—	2.50 mm	.0984	1	2	50979	92115
70	.0280	5/16	1-1/4	51011	—	39	.0995	1-1/4	2-1/4	51048	92116
69	.0292	5/16	1-1/4	51012	—	38	.1015	1-1/4	2-1/4	51049	92117
68	.0310	5/16	1-1/4	51013	—	37	.1040	1-1/4	2-1/4	51050	92118
<b>1/32</b>	.0312	5/16	1-1/4	51014	92090	36	.1065	1-1/4	2-1/4	51051	92119
67	.0320	5/16	1-1/4	51015	—	<b>7/64</b>	.1094	1-1/4	2-1/4	51052	92120
66	.0330	5/16	1-1/4	51016	—	35	.1100	1-1/4	2-1/4	51053	92121
65	.0350	5/8	1-3/8	51017	—	34	.1110	1-1/4	2-1/4	51054	92122
64	.0360	5/8	1-3/8	51018	—	33	.1130	1-1/4	2-1/4	51055	92123
63	.0370	5/8	1-3/8	51019	—	32	.1160	1-1/4	2-1/4	51056	92124
62	.0380	5/8	1-3/8	51020	—	3.00 mm	.1181	1-1/4	2-1/4	50980	92125
61	.0390	5/8	1-3/8	51021	—	31	.1200	1-1/4	2-1/4	51057	92126
1.00 mm	.0394	5/8	1-1/2	51022	92091	<b>1/8</b>	.1250	1-1/4	2-1/4	51058	92127
60	.0400	3/4	1-1/2	51023	—	30	.1285	1-1/4	2-1/4	51059	92128
59	.0410	3/4	1-1/2	51024	—	29	.1360	1-3/8	2-1/2	51060	92129
58	.0420	3/4	1-1/2	51025	—	3.50 mm	.1378	1-3/8	2-1/2	50981	92130
57	.0430	3/4	1-1/2	51026	—	28	.1405	1-3/8	2-1/2	51061	92131
56	.0465	3/4	1-1/2	51027	92092	<b>9/64</b>	.1406	1-3/8	2-1/2	51062	92132
<b>3/64</b>	.0469	3/4	1-1/2	51028	92093	27	.1440	1-3/8	2-1/2	51063	92133
55	.0520	3/4	1-1/2	51029	92094	26	.1470	1-3/8	2-1/2	51064	92134
54	.0550	3/4	1-1/2	51030	92095	25	.1495	1-3/8	2-1/2	51065	92135
1.50 mm	.0591	3/4	1-1/2	50977	92096	24	.1520	1-3/8	2-1/2	51066	92136
53	.0595	3/4	1-1/2	51031	92097	23	.1540	1-3/8	2-1/2	51067	92137
<b>1/16</b>	.0625	3/4	1-1/2	51032	92098	<b>5/32</b>	.1562	1-3/8	2-1/2	51068	92138
52	.0635	3/4	1-1/2	51033	92099	22	.1570	1-3/8	2-1/2	51069	92139
51	.0670	3/4	1-1/2	51034	92100	4.00 mm	.1575	1-3/8	2-1/2	50982	92140
50	.0700	7/8	1-3/4	51035	92101	21	.1590	1-3/8	2-1/2	51070	92141
49	.0730	7/8	1-3/4	51036	92102	20	.1610	1-3/8	2-1/2	51071	92142
48	.0760	7/8	1-3/4	51037	92103	19	.1660	1-5/8	2-3/4	51072	92143
<b>5/64</b>	.0781	7/8	1-3/4	51038	92104	18	.1695	1-5/8	2-3/4	51073	92144

(continued)

**Tool Coatings Also Available**

# Solid Carbide Standard Length Drills

Recommended for drilling cast iron, non ferrous alloys, plastics, aluminum and other easily machined materials.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Aluminum Titanium Nitride (ALTiN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding.



List No. 5374 - Uncoated

List No. 5374T - ALTiN Coated

118° Point - Split Point for sizes over 1/16"

25° Helix Angle

**TOLERANCES**

All sizes +.0000/-.0005

**STANDARD PACKAGE**

All sizes — 1 each



(continued)

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T ALTiN EDP NO.
<b>11/64</b>	.1719	1-5/8	2-3/4	<b>51074</b>	<b>92145</b>
17	.1730	1-5/8	2-3/4	<b>51075</b>	<b>92146</b>
16	.1770	1-5/8	2-3/4	<b>51076</b>	<b>92147</b>
4.50 mm	.1772	1-5/8	2-3/4	<b>50983</b>	<b>92148</b>
15	.1800	1-5/8	2-3/4	<b>51077</b>	<b>92149</b>
14	.1820	1-5/8	2-3/4	<b>51078</b>	<b>92150</b>
13	.1850	1-5/8	2-3/4	<b>51079</b>	<b>92151</b>
<b>3/16</b>	.1875	1-5/8	2-3/4	<b>51080</b>	<b>92152</b>
12	.1890	1-5/8	2-3/4	<b>51081</b>	<b>92153</b>
11	.1910	1-5/8	2-3/4	<b>51082</b>	<b>92154</b>
10	.1935	1-5/8	2-3/4	<b>51083</b>	<b>92155</b>
9	.1960	1-3/4	3	<b>51084</b>	<b>92156</b>
5.00 mm	.1969	1-3/4	3	<b>50984</b>	<b>92157</b>
8	.1990	1-3/4	3	<b>51085</b>	<b>92158</b>
7	.2010	1-3/4	3	<b>51086</b>	<b>92159</b>
<b>13/64</b>	.2031	1-3/4	3	<b>51087</b>	<b>92160</b>
6	.2040	1-3/4	3	<b>51088</b>	<b>92161</b>
5	.2055	1-3/4	3	<b>51089</b>	<b>92162</b>
4	.2090	1-3/4	3	<b>51090</b>	<b>92163</b>
3	.2130	1-3/4	3	<b>51091</b>	<b>92164</b>
5.50 mm	.2165	1-3/4	3	<b>50985</b>	<b>92165</b>
<b>7/32</b>	.2188	1-3/4	3	<b>51092</b>	<b>92166</b>
2	.2210	1-3/4	3	<b>51093</b>	<b>92167</b>
1	.2280	1-3/4	3	<b>51094</b>	<b>92168</b>
A	.2340	2	3-1/4	<b>51095</b>	<b>92169</b>
<b>15/64</b>	.2344	2	3-1/4	<b>51096</b>	<b>92170</b>
6.00 mm	.2362	2	3-1/4	<b>50986</b>	<b>92171</b>
B	.2380	2	3-1/4	<b>51097</b>	<b>92172</b>
C	.2420	2	3-1/4	<b>51098</b>	<b>92173</b>
D	.2460	2	3-1/4	<b>51099</b>	<b>92174</b>
<b>1/4 (E)</b>	.2500	2	3-1/4	<b>51100</b>	<b>92175</b>
6.50 mm	.2559	2	3-1/4	<b>50987</b>	<b>92176</b>
F	.2570	2	3-1/4	<b>51102</b>	<b>92177</b>
G	.2610	2-1/8	3-1/2	<b>51103</b>	<b>92178</b>
<b>17/64</b>	.2656	2-1/8	3-1/2	<b>51104</b>	<b>92179</b>
H	.2660	2-1/8	3-1/2	<b>51105</b>	<b>92180</b>
I	.2720	2-1/8	3-1/2	<b>51106</b>	<b>92181</b>
7.00 mm	.2756	2-1/8	3-1/2	<b>50988</b>	<b>92182</b>
J	.2770	2-1/8	3-1/2	<b>51107</b>	<b>92183</b>
K	.2810	2-1/8	3-1/2	<b>51108</b>	<b>92184</b>
<b>9/32</b>	.2812	2-1/8	3-1/2	<b>51109</b>	<b>92185</b>

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T ALTiN EDP NO.
L	.2900	2-1/8	3-1/2	<b>51110</b>	<b>92186</b>
M	.2950	2-3/8	3-3/4	<b>51111</b>	<b>92187</b>
7.50 mm	.2953	2-3/8	3-3/4	<b>50989</b>	<b>92188</b>
<b>19/64</b>	.2969	2-3/8	3-3/4	<b>51112</b>	<b>92189</b>
N	.3020	2-3/8	3-3/4	<b>51113</b>	<b>92190</b>
<b>5/16</b>	.3125	2-3/8	3-3/4	<b>51114</b>	<b>92191</b>
8.00 mm	.3150	2-3/8	3-3/4	<b>50990</b>	<b>92192</b>
O	.3160	2-3/8	3-3/4	<b>51115</b>	<b>92193</b>
P	.3230	2-3/8	3-3/4	<b>51116</b>	<b>92194</b>
<b>21/64</b>	.3281	2-1/2	4	<b>51117</b>	<b>92195</b>
Q	.3320	2-1/2	4	<b>51118</b>	<b>92196</b>
8.50 mm	.3346	2-1/2	4	<b>50991</b>	<b>92197</b>
R	.3390	2-1/2	4	<b>51119</b>	<b>92198</b>
<b>11/32</b>	.3438	2-1/2	4	<b>51120</b>	<b>92199</b>
S	.3480	2-1/2	4	<b>51121</b>	<b>92200</b>
9.00 mm	.3543	2-1/2	4	<b>50992</b>	<b>92201</b>
T	.3580	2-3/4	4-1/4	<b>51122</b>	<b>92202</b>
<b>23/64</b>	.3594	2-3/4	4-1/4	<b>51123</b>	<b>92203</b>
U	.3680	2-3/4	4-1/4	<b>51124</b>	<b>92204</b>
9.50 mm	.3740	2-3/4	4-1/4	<b>50993</b>	<b>92205</b>
<b>3/8</b>	.3750	2-3/4	4-1/4	<b>51125</b>	<b>92206</b>
V	.3770	2-3/4	4-1/4	<b>51126</b>	<b>92207</b>
W	.3860	2-7/8	4-1/2	<b>51127</b>	<b>92208</b>
<b>25/64</b>	.3906	2-7/8	4-1/2	<b>51128</b>	<b>92209</b>
10.00 mm	.3937	2-7/8	4-1/2	<b>50994</b>	<b>92210</b>
X	.3970	2-7/8	4-1/2	<b>51129</b>	<b>92211</b>
Y	.4040	2-7/8	4-1/2	<b>51130</b>	<b>92212</b>
<b>13/32</b>	.4062	2-7/8	4-1/2	<b>51131</b>	<b>92213</b>
Z	.4130	2-7/8	4-1/2	<b>51132</b>	<b>92214</b>
10.50 mm	.4134	2-7/8	4-1/2	<b>50995</b>	<b>92215</b>
<b>27/64</b>	.4219	2-7/8	4-1/2	<b>51133</b>	<b>92216</b>
11.00 mm	.4331	2-7/8	4-1/2	<b>50996</b>	<b>92217</b>
<b>7/16</b>	.4375	2-7/8	4-1/2	<b>51134</b>	<b>92218</b>
11.50 mm	.4528	3	4-3/4	<b>50997</b>	<b>92219</b>
<b>29/64</b>	.4531	3	4-3/4	<b>51135</b>	<b>92220</b>
<b>15/32</b>	.4688	3	4-3/4	<b>51136</b>	<b>92221</b>
12.00 mm	.4724	3	4-3/4	<b>50998</b>	<b>92222</b>
<b>31/64</b>	.4844	3	4-3/4	<b>51137</b>	<b>92223</b>
12.50 mm	.4921	3	4-3/4	<b>50999</b>	<b>92224</b>
<b>1/2</b>	.5000	3	4-3/4	<b>51138</b>	<b>92225</b>

Tool Coatings Also Available

# Solid Carbide Straight Flute Drills

## For Hardened & Abrasive Applications

Recommended for hardened, high strength & abrasive materials. Produce close tolerance holes in stainless steels, alloy steels, aerospace alloys, exotic alloys, cryogenic alloys and other materials 40Rc hardness and higher.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Aluminum Titanium Nitride (ALTiN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.



List No. 5376 - Uncoated

List No. 5376T - ALTiN Coated

2-Flute - 140° Notch Point

**TOLERANCES**

All sizes +.0000/- .0005

**STANDARD PACKAGE**

All sizes — 1 each

**Speeds & Feeds: Page 42**



SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED EDP NO.	5376T ALTiN EDP NO.	SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED EDP NO.	5376T ALTiN EDP NO.
1/32	.0312	1/2	1-1/2	50720	92660	35	.1100	7/8	1-7/8	50751	92691
#65	.0350	1/2	1-1/2	54860	93040	34	.1110	7/8	1-7/8	50752	92692
#64	.0360	1/2	1-1/2	54861	93041	33	.1130	7/8	1-7/8	50753	92693
#63	.0370	1/2	1-1/2	54862	93042	32	.1160	7/8	1-7/8	50754	92694
#62	.0380	1/2	1-1/2	54863	93043	3.0 MM	.1181	7/8	1-7/8	50755	92695
#61	.0390	1/2	1-1/2	54864	93044	31	.1200	7/8	1-7/8	50756	92696
1.0 MM	.0394	1/2	1-1/2	50721	92661	1/8	.1250	7/8	1-7/8	50757	92697
#60	.0400	1/2	1-1/2	54865	93045	30	.1285	15/16	1-15/16	50758	92698
#59	.0410	1/2	1-1/2	54866	93046	29	.1360	15/16	1-15/16	50759	92699
#58	.0420	1/2	1-1/2	54867	93047	3.5 MM	.1378	15/16	1-15/16	50760	92700
#57	.0430	1/2	1-1/2	54868	93048	28	.1405	15/16	1-15/16	50761	92701
56	.0465	1/2	1-1/2	50722	92662	9/64	.1406	15/16	1-15/16	50762	92702
3/64	.0469	1/2	1-1/2	50723	92663	27	.1440	1	2-1/16	50763	92703
55	.0520	1/2	1-1/2	50724	92664	26	.1470	1	2-1/16	50764	92704
54	.0550	1/2	1-1/2	50725	92665	25	.1495	1	2-1/16	50765	92705
1.5 MM	.0591	1/2	1-1/2	50726	92666	24	.1520	1	2-1/16	50766	92706
53	.0595	1/2	1-1/2	50727	92667	23	.1540	1	2-1/16	50767	92707
1/16	.0625	5/8	1-5/8	50728	92668	5/32	.1562	1	2-1/16	50768	92708
52	.0635	11/16	1-11/16	50729	92669	22	.1570	1-1/16	2-1/8	50769	92709
51	.0670	11/16	1-11/16	50730	92670	4.0 MM	.1575	1-1/16	2-1/8	50770	92710
50	.0700	11/16	1-11/16	50731	92671	21	.1590	1-1/16	2-1/8	50771	92711
49	.0730	11/16	1-11/16	50732	92672	20	.1610	1-1/16	2-1/8	50772	92712
48	.0760	11/16	1-11/16	50733	92673	19	.1660	1-1/16	2-1/8	50773	92713
5/64	.0781	11/16	1-11/16	50734	92674	18	.1695	1-1/16	2-1/8	50774	92714
47	.0785	3/4	1-3/4	50735	92675	11/64	.1719	1-1/16	2-1/8	50775	92715
2.0 MM	.0787	3/4	1-3/4	50736	92676	17	.1730	1-1/8	2-3/16	50776	92716
46	.0810	3/4	1-3/4	50737	92677	16	.1770	1-1/8	2-3/16	50777	92717
45	.0820	3/4	1-3/4	50738	92678	4.5 MM	.1772	1-1/8	2-3/16	50778	92718
44	.0860	3/4	1-3/4	50739	92679	15	.1800	1-1/8	2-3/16	50779	92719
43	.0890	3/4	1-3/4	50740	92680	14	.1820	1-1/8	2-3/16	50780	92720
42	.0935	3/4	1-3/4	50741	92681	13	.1850	1-1/8	2-3/16	50781	92721
3/32	.0938	3/4	1-3/4	50742	92682	3/16	.1875	1-1/8	2-3/16	50782	92722
41	.0960	13/16	1-13/16	50743	92683	12	.1890	1-3/16	2-1/4	50783	92723
40	.0980	13/16	1-13/16	50744	92684	11	.1910	1-3/16	2-1/4	50784	92724
2.5 MM	.0984	13/16	1-13/16	50745	92685	10	.1935	1-3/16	2-1/4	50785	92725
39	.0995	13/16	1-13/16	50746	92686	9	.1960	1-3/16	2-1/4	50786	92726
38	.1015	13/16	1-13/16	50747	92687	5.0 MM	.1969	1-3/16	2-1/4	50787	92727
37	.1040	13/16	1-13/16	50748	92688	8	.1990	1-3/16	2-1/4	50788	92728
36	.1065	13/16	1-13/16	50749	92689	7	.2010	1-3/16	2-1/4	50789	92729
7/64	.1094	13/16	1-13/16	50750	92690						

(continued)

**Tool Coatings Also Available**



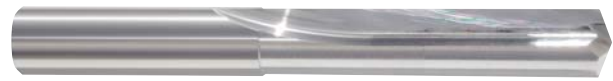
# Solid Carbide Straight Flute Drills

## For Hardened & Abrasive Materials

Recommended for hardened, high strength & abrasive materials. Produce close tolerance holes in stainless steels, alloy steels, aerospace alloys, exotic alloys, cryogenic alloys and other materials 40Rc hardness and higher.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Aluminum Titanium Nitride (ALTiN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.



List No. 5376 - Uncoated

List No. 5376T - ALTiN Coated

2-Flute - 140° Notch Point

**TOLERANCES**

All sizes +.0000/-.0005

**STANDARD PACKAGE**

All sizes — 1 each



(continued)

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED EDP NO.	5376T ALTiN EDP NO.
<b>13/64</b>	.2031	1-3/16	2-1/4	<b>50790</b>	<b>92730</b>
6	.2040	1-1/4	2-3/8	<b>50791</b>	<b>92731</b>
5	.2055	1-1/4	2-3/8	<b>50792</b>	<b>92732</b>
4	.2090	1-1/4	2-3/8	<b>50793</b>	<b>92733</b>
3	.2130	1-1/4	2-3/8	<b>50794</b>	<b>92734</b>
5.5 MM	.2165	1-1/4	2-3/8	<b>50795</b>	<b>92735</b>
<b>7/32</b>	.2188	1-1/4	2-3/8	<b>50796</b>	<b>92736</b>
2	.2210	1-5/16	2-7/16	<b>50797</b>	<b>92737</b>
1	.2280	1-5/16	2-7/16	<b>50798</b>	<b>92738</b>
A	.2340	1-5/16	2-7/16	<b>50799</b>	<b>92739</b>
<b>15/64</b>	.2344	1-5/16	2-7/16	<b>50800</b>	<b>92740</b>
6.0 MM	.2362	1-5/16	2-7/16	<b>50801</b>	<b>92741</b>
B	.2380	1-3/8	2-1/2	<b>50802</b>	<b>92742</b>
C	.2420	1-3/8	2-1/2	<b>50803</b>	<b>92743</b>
D	.2460	1-3/8	2-1/2	<b>50804</b>	<b>92744</b>
<b>1/4 (E)</b>	.2500	1-3/8	2-1/2	<b>50805</b>	<b>92745</b>
6.5 MM	.2559	1-3/8	2-1/2	<b>50806</b>	<b>92746</b>
F	.2570	1-7/16	2-5/8	<b>50807</b>	<b>92747</b>
G	.2610	1-7/16	2-5/8	<b>50808</b>	<b>92748</b>
<b>17/64</b>	.2656	1-7/16	2-5/8	<b>50809</b>	<b>92749</b>
H	.2660	1-1/2	2-11/16	<b>50810</b>	<b>92750</b>
I	.2720	1-1/2	2-11/16	<b>50811</b>	<b>92751</b>
7.0 MM	.2756	1-1/2	2-11/16	<b>50812</b>	<b>92752</b>
J	.2770	1-1/2	2-11/16	<b>50813</b>	<b>92753</b>
K	.2810	1-1/2	2-11/16	<b>50814</b>	<b>92754</b>
<b>9/32</b>	.2812	1-1/2	2-11/16	<b>50815</b>	<b>92755</b>
L	.2900	1-9/16	2-3/4	<b>50816</b>	<b>92756</b>
M	.2950	1-9/16	2-3/4	<b>50817</b>	<b>92757</b>
7.5 MM	.2953	1-9/16	2-3/4	<b>50818</b>	<b>92758</b>
<b>19/64</b>	.2969	1-9/16	2-3/4	<b>50819</b>	<b>92759</b>
N	.3020	1-5/8	2-13/16	<b>50820</b>	<b>92760</b>
<b>5/16</b>	.3125	1-5/8	2-13/16	<b>50821</b>	<b>92761</b>
8.0 MM	.3150	1-5/8	2-13/16	<b>50822</b>	<b>92762</b>
O	.3160	1-11/16	2-15/16	<b>50823</b>	<b>92763</b>
P	.3230	1-11/16	2-15/16	<b>50824</b>	<b>92764</b>
<b>21/64</b>	.3281	1-11/16	2-15/16	<b>50825</b>	<b>92765</b>
Q	.3320	1-11/16	3	<b>50826</b>	<b>92766</b>
8.5 MM	.3346	1-11/16	3	<b>50827</b>	<b>92767</b>

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED EDP NO.	5376T ALTiN EDP NO.
R	.3390	1-11/16	3	<b>50828</b>	<b>92768</b>
<b>11/32</b>	.3438	1-11/16	3	<b>50829</b>	<b>92769</b>
S	.3480	1-3/4	3-1/16	<b>50830</b>	<b>92770</b>
9.0 MM	.3543	1-3/4	3-1/16	<b>50831</b>	<b>92771</b>
T	.3580	1-3/4	3-1/16	<b>50832</b>	<b>92772</b>
<b>23/64</b>	.3594	1-3/4	3-1/16	<b>50833</b>	<b>92773</b>
U	.3680	1-13/16	3-1/8	<b>50834</b>	<b>92774</b>
9.5 MM	.3740	1-13/16	3-1/8	<b>50835</b>	<b>92775</b>
<b>3/8</b>	.3750	1-13/16	3-1/8	<b>50836</b>	<b>92776</b>
V	.3770	1-7/8	3-1/4	<b>50837</b>	<b>92777</b>
W	.3860	1-7/8	3-1/4	<b>50838</b>	<b>92778</b>
<b>25/64</b>	.3906	1-7/8	3-1/4	<b>50839</b>	<b>92779</b>
10.0 MM	.3937	1-7/8	3-1/4	<b>50840</b>	<b>92780</b>
X	.3970	1-15/16	3-5/16	<b>50841</b>	<b>92781</b>
Y	.4040	1-15/16	3-5/16	<b>50842</b>	<b>92782</b>
<b>13/32</b>	.4062	1-15/16	3-5/16	<b>50843</b>	<b>92783</b>
Z	.4130	2	3-3/8	<b>50844</b>	<b>92784</b>
10.5 MM	.4134	2	3-3/8	<b>50845</b>	<b>92785</b>
<b>27/64</b>	.4219	2	3-3/8	<b>50846</b>	<b>92786</b>
11.0 MM	.4331	2	3-3/8	<b>50847</b>	<b>92787</b>
<b>7/16</b>	.4375	2-1/16	3-7/16	<b>50848</b>	<b>92788</b>
11.5 MM	.4528	2-1/16	3-7/16	<b>50849</b>	<b>92789</b>
<b>29/64</b>	.4531	2-1/8	3-9/16	<b>50850</b>	<b>92790</b>
<b>15/32</b>	.4688	2-1/8	3-5/8	<b>50851</b>	<b>92791</b>
12.0 MM	.4724	2-1/8	3-5/8	<b>50852</b>	<b>92792</b>
<b>31/64</b>	.4844	2-3/16	3-11/16	<b>50853</b>	<b>92793</b>
12.5 MM	.4921	2-3/16	3-11/16	<b>50854</b>	<b>92794</b>
<b>1/2</b>	.5000	2-1/4	3-3/4	<b>50855</b>	<b>92795</b>
<b>33/64</b>	.5156	1-1/8	3-1/2	<b>54869</b>	<b>93049</b>
<b>17/32</b>	.5312	1-1/8	3-1/2	<b>54870</b>	<b>93050</b>
<b>35/64</b>	.5469	1-1/8	3-1/2	<b>54871</b>	<b>93051</b>
<b>9/16</b>	.5625	1-1/8	3-1/2	<b>54872</b>	<b>93052</b>
<b>5/8</b>	.6250	1-1/4	3-1/2	<b>54873</b>	<b>93053</b>
<b>11/16</b>	.6875	1-1/2	4	<b>54874</b>	<b>93054</b>
<b>3/4</b>	.7500	1-1/2	4	<b>54875</b>	<b>93055</b>

Tool Coatings Also Available

# Solid Carbide Spade Drills

Recommended for thin sheet applications, shallow hole drilling and spot drilling in a wide range of materials



**List No. 5377**  
118° Point - Heavy Duty Web

**TOLERANCES**  
All sizes +.0000/- .0005



SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/32	.0312	3/16	1-1/2	50440
3/64	.0469	7/32	1-1/2	50441
1/16	.0625	5/16	1-1/2	50442
3/32	.0938	7/16	1-1/2	50443
7/64	.1094	7/16	1-1/2	50444
1/8	.1250	1/2	1-1/2	50445
9/64	.1406	1/2	2	50446
5/32	.1562	9/16	2	50447
11/64	.1719	9/16	2	50448
3/16	.1875	11/16	2	50449

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
7/32	.2188	19/32	2	50450
1/4	.2500	11/16	2	50451
9/32	.2812	7/8	2-1/2	50452
5/16	.3125	7/8	2-1/2	50453
11/32	.3438	15/16	2-1/2	50454
3/8	.3750	1-1/8	2-1/2	50455
13/32	.4062	1-1/8	2-1/2	50456
7/16	.4375	1-3/16	2-1/2	50457
15/32	.4688	1-3/16	2-1/2	50458
1/2	.5000	1-3/16	2-1/2	50459

# Carbide Tipped Drills For Hardened Steel

For drilling hardened steel of 35 to 65 Rockwell C hardness without the need to anneal the workpiece



**List No. 5420**

120° Spade Type Point features short heavy construction for increased rigidity in tougher shallow hole applications up to 2 diameters deep. Drill body diameter is smaller than tip diameter to prevent galling.

**List No. 5420**

SIZE	DEC. EQUIV.	OAL	EDP NO.
3/32†	.0938	2	52006
1/8†	.1250	2	52008
5/32†	.1562	2	52010
3/16†	.1875	3	52012
7/32	.2188	3-1/2	52014
1/4	.2500	4	52016
5/16	.3125	4	52020
3/8	.3750	4	52024
7/16	.4375	4-1/2	52028
1/2	.5000	5	52032



**List No. 5423**

118° Point with two straight flutes. Drill body diameter is smaller than tip diameter to prevent galling.

† Sizes below 7/32" are Solid Carbide Spade Type, not the Fluted Type Shown.

**List No. 5423**

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	SHANK DIA.	EDP NO.
3/16	.1875	1-1/2	3-1/2	11/64	52112
7/32	.2188	1-3/4	3-3/4	13/64	52114
1/4	.2500	2	4	7/32	52116
9/32	.2812	2-1/4	4-1/4	1/4	52118
5/16	.3125	2-1/2	4-1/2	17/64	52120
11/32	.3438	2-3/4	4-3/4	19/64	52122
3/8	.3750	3	5	21/64	52124
7/16	.4375	3	5-1/2	25/64	52128
1/2	.5000	3-1/2	6	29/64	52132
9/16	.5625	3-1/2	6	17/32	52136
5/8	.6250	4	7	19/32	52140
3/4	.7500	4-3/4	8	23/32	52148

# Carbide Tipped Glass and Tile Drills

For drilling glass, tile, porcelain, ceramic and other hard fragile materials without chipping or cracking the material.



**List No. 5467 — Spear Point**

SIZE	DEC. EQUIV.	OAL	SHANK DIA.	EDP NO.
1/8	.1250	2-1/2	7/64	53551
3/16	.1875	2-1/2	5/32	53552
1/4	.2500	2-1/2	7/32	53553
5/16	.3125	3	1/4	53554
3/8	.3750	3-1/2	5/16	53555

SIZE	DEC. EQUIV.	OAL	SHANK DIA.	EDP NO.
7/16	.4375	3-1/2	3/8	53556
1/2	.5000	3-1/2	7/16	53557
9/16	.5625	4	1/2	53558
5/8	.6250	4	9/16	53559

# Carbide Tipped Jobber Length Drills

Excellent wear resistance. Recommended for drilling cast iron, non-ferrous metals, composites, hard plastics, fiberglass and other abrasive non-ferrous materials.

**NOT FOR USE IN STEEL.**



List No. 5330  
118° Point

**STANDARD PACKAGE** All sizes — 1 each

SIZE						
FRAC-TIONAL	LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/8			.1250	1-5/8	2-3/4	<b>50358</b>
		30	.1285	1-5/8	2-3/4	<b>50359*</b>
		29	.1360	1-3/4	2-7/8	<b>50360*</b>
		28	.1405	1-3/4	2-7/8	<b>50361*</b>
9/64			.1406	1-3/4	2-7/8	<b>50362</b>
		26	.1470	1-7/8	3	<b>50364*</b>
		25	.1495	1-7/8	3	<b>50365*</b>
5/32			.1540	2	3-1/8	<b>50367*</b>
			.1562	2	3-1/8	<b>50368</b>
		22	.1570	2	3-1/8	<b>50369*</b>
11/64			.1610	2-1/8	3-1/4	<b>50371*</b>
			.1719	2-1/8	3-1/4	<b>50374</b>
		15	.1800	2-3/16	3-3/8	<b>50377*</b>
3/16			.1850	2-5/16	3-1/2	<b>50379*</b>
			.1875	2-5/16	3-1/2	<b>50380</b>
			.2031	2-7/16	3-5/8	<b>50387</b>
13/64		6	.2040	2-1/2	3-3/4	<b>50388*</b>
		4	.2090	2-1/2	3-3/4	<b>50390*</b>
			.2187	2-1/2	3-3/4	<b>50392</b>
7/32		2	.2210	2-5/8	3-7/8	<b>50393*</b>
	A		.2340	2-5/8	3-7/8	<b>50395*</b>
			.2344	2-5/8	3-7/8	<b>50396</b>
15/64	B		.2380	2-3/4	4	<b>50397*</b>
	E		.2500	2-3/4	4	<b>50401</b>
			.2656	2-7/8	4-1/8	<b>50404</b>

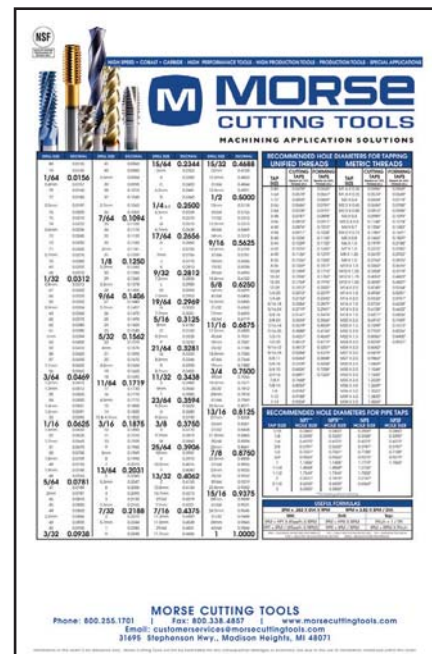
SIZE						
FRAC-TIONAL	LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	
9/32	J	.2770	2-7/8	4-1/8	<b>50407*</b>	
	K	.2810	2-15/16	4-1/4	<b>50408*</b>	
		.2812	2-15/16	4-1/4	<b>50409</b>	
	L	.2900	2-15/16	4-1/4	<b>50410*</b>	
19/64	M	.2950	3-1/16	4-3/8	<b>50411*</b>	
		.2969	3-1/16	4-3/8	<b>50412</b>	
	N	.3020	3-1/16	4-3/8	<b>50413*</b>	
5/16		.3125	3-3/16	4-1/2	<b>50414</b>	
		.3281	3-5/16	4-5/8	<b>50417</b>	
	R	.3390	3-7/16	4-3/4	<b>50419*</b>	
11/32		.3437	3-7/16	4-3/4	<b>50420</b>	
	S	.3480	3-1/2	4-7/8	<b>50421*</b>	
	T	.3580	3-1/2	4-7/8	<b>50422*</b>	
23/64		.3594	3-1/2	4-7/8	<b>50423</b>	
		.3750	3-5/8	5	<b>50425</b>	
	Y	.3906	3-3/4	5-1/8	<b>50428</b>	
25/64		.4040	3-7/8	5-1/4	<b>50430*</b>	
		.4062	3-7/8	5-1/4	<b>50431</b>	
	Z	.4130	3-7/8	5-1/4	<b>50432*</b>	
27/64		.4219	3-15/16	5-3/8	<b>50433</b>	
		.4375	4-1/16	5-1/2	<b>50434</b>	
		.4531	4-3/16	5-5/8	<b>50435</b>	
7/16		.4687	4-5/16	5-3/4	<b>50436</b>	
		.4844	4-3/8	5-7/8	<b>50437</b>	
	1/2	.5000	4-1/2	6	<b>50438</b>	

\* Available While Supplies Last

## Morse® Plastic Wall Chart

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24" x 36" printed on heavy duty .023" gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 EDP No. 01650





# Solid Carbide Drills

## Speed and Feed Recommendations

List No. 5374 Standard Length GP • List No. 5375 Screw Machine Length • List No. 5376 Straight Flute

Workpiece Material	Brinell Hardness (BHN)	Morse List No.	Surface Speed (SFM)	FEED PER REVOLUTION BY DRILL DIAMETER (IPR)			
				1/16"	1/8"	1/4"	1/2"
Low Carbon Steel 1018, 12L12, 1108, 1213	≤ 120	5374	250	0.0015	0.0030	0.0040	0.0080
		5375					
		5376					
Low & Medium Carbon Steel 1018, 1551, 11L44	120 - 250	5374	225	0.0020	0.0040	0.0060	0.0110
		5375					
		5376					
Medium Carbon and Alloyed Steel 1040, 1140, 4340, 8640	≤ 250	5374	200	0.0015	0.0030	0.0040	0.0080
		5375	150	0.0015	0.0030	0.0040	0.0080
		5376					
Tool and Die Steels P20, A2, D2, H12	≤ 250	5374	200	0.0015	0.0030	0.0040	0.0080
		5375					
		5376					
Tool and Die Steels P20, A2, D2, H12	250 - 350	5374	150	0.0010	0.0020	0.0030	0.0060
		5375	125	0.0010	0.0020	0.0030	0.0060
		5376	125	0.0010	0.0020	0.0030	0.0060
Hard Materials, Alloys, Tool Steels 40 Rockwell C and Higher	—	5374					
		5375					
		5376	60	0.0005	0.0010	0.0015	0.0020
Free Machining Stainless Steels 303, 410, 416, 440F	≤ 260	5374	100	0.0010	0.0020	0.0030	0.0060
		5375	100	0.0010	0.0020	0.0030	0.0060
		5376					
Moderate Machining Stainless Steels 304, 316	≤ 300	5374					
		5375	75	0.0010	0.0020	0.0030	0.0060
		5376	75	0.0010	0.0020	0.0030	0.0060
Difficult Machining Stainless Steels 17-4PH, 316L, AM350	≤ 450	5374					
		5375	60	0.0010	0.0020	0.0030	0.0060
		5376	60	0.0010	0.0020	0.0030	0.0060
Cast Iron - Soft Gray	≤ 160	5374	250	0.0015	0.0030	0.0040	0.0080
		5375	275	0.0020	0.0040	0.0060	0.0110
		5376	275	0.0015	0.0030	0.0040	0.0080
Cast Iron - Gray	160 - 260	5374	250	0.0015	0.0030	0.0040	0.0080
		5375	275	0.0020	0.0040	0.0060	0.0110
		5376	250	0.0015	0.0030	0.0040	0.0080
Cast Iron - Ductile	250	5374	180	0.0015	0.0030	0.0040	0.0080
		5375	180	0.0020	0.0040	0.0060	0.0110
		5376	175	0.0015	0.0030	0.0040	0.0080
Cast Iron - Malleable	250 - 330	5374	180	0.0015	0.0030	0.0040	0.0080
		5375	180	0.0020	0.0040	0.0060	0.0110
		5376	180	0.0015	0.0030	0.0040	0.0080
Titanium Alloys Commercially Pure 99.0	110 - 170	5374					
		5375	50	0.0005	0.0010	0.0020	0.0045
		5376	50	0.0005	0.0010	0.0020	0.0045
Titanium Alloys Ti-6Al-4V, ASTM B367 Grades C-3, C-4	≤ 250	5374					
		5375	50	0.0005	0.0010	0.0020	0.0045
		5376	50	0.0005	0.0010	0.0020	0.0045
High Temperature Alloys Inconel, Hastelloy, Waspaloy	150 - 250	5374					
		5375	60	0.0005	0.0010	0.0020	0.0045
		5376	60	0.0005	0.0010	0.0020	0.0045
Aluminum Alloys 2025, 6061, A140, 514.0	≤ 150	5374	350	0.0020	0.0040	0.0060	0.0110
		5375					
		5376					
Copper Alloys Brass and Bronze	≤ 200	5374	80	0.0020	0.0040	0.0060	0.0110
		5375					
		5376					
Composites & Plastics	≤ 128	5374	175	0.0010	0.0020	0.0030	0.0060
		5375					
		5376					
Magnesium Alloys AZ80A, HM12A, AM60A, ZE41A	50 - 90	5374	325	0.0020	0.0040	0.0060	0.0110
		5375					
		5376					

SPEEDS and FEEDS are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase speed and feed until drilling cycle is optimized.

NOTE: Information in this chart is for reference only. We will not be held liable for any consequential damages for economic loss due to the use of information contained within this chart.

# HPC COBALT HIGH PERFORMANCE WIDE LAND PARABOLIC FLUTE DRILLS



**130° Self-Centering Point • 38° Helix Angle**  
**Special Web Thinning • Heavy-Duty Web**

**AVAILABLE IN:**

**M35** Cobalt High Speed Steel

**TiN** — Titanium Nitride Coated

**TiALN** — Titanium Aluminum Nitride Coated



## PARABOLIC FLUTE DRILLS

Feature a unique flute design that greatly enhances chip flow, coolant flow to the drill point and heat dissipation. Recommended for Deep Hole Drilling greater than three diameters deep without the need to reduce feed rate or withdraw the drill to clear chips (a constant heavy feed rate is recommended).

## WIDE LAND PARABOLIC FLUTE DRILLS

The next generation in parabolic flute design, are effective in a wider range of materials and applications than standard parabolic flute drills. An Enhanced Flute Design with reinforced web provides increased drill strength and rigidity, straighter closer tolerance holes, improved chip formation and evacuation, improved coolant flow to the drill point and higher speeds and feeds for increased productivity.

## PREMIUM M35 COBALT STEEL

Offers increased hardness, toughness, wear resistance and heat resistance. Highly recommended for drilling tough, high tensile strength materials up to 35 Rc hardness and materials that generate higher cutting temperatures. Applications include high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.

## TiN — TITANIUM NITRIDE COATING

An excellent all around coating, offers increased hardness and wear resistance, improved heat resistance, high lubricity, reduced edge build-up, improved surface finish and higher speeds and feeds. Increase productivity and tool life.

## TiALN — TITANIUM ALUMINUM NITRIDE COATING

Is especially recommended for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials which generate higher cutting temperatures. TiALN actually forms a hard aluminum oxide layer in hot dry machining applications which reflects heat back into the chip and away from the tool while allowing higher speeds and feeds. High productivity with increased tool life.

# Screw Machine Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills



- List No. 1360 Bright Finish
- List No. 1360G TiN — Titanium Nitride Coated
- List No. 1360T TiALN — Titanium Aluminum Nitride Coated

**Speeds & Feeds: Page 56**

Short flute length and short overall length for maximum rigidity

**DIN 1897**



Fract.	Size		Dec. Equiv.	Flute Length MM	OAL MM	List No. 1360	List No. 1360G	List No. 1360T	
	Wire	Letter				Metric	Bright Finish	TiN Coated	TiALN Coated
						EDP No.	EDP No.	EDP No.	
5/64	—	—	—	0.0780	12	38	12185	91500	60000
—	47	—	—	0.0783	12	38	12186	91501	60001
—	—	—	2.00	0.0787	12	38	12187	91502	60002
—	46	—	—	0.0810	12	38	12188	91503	60003
—	45	—	—	0.0820	12	38	12189	91504	60004
—	—	—	2.10	0.0827	12	38	12190	91505	60005
—	44	—	—	0.0860	13	40	12191	91506	60006
—	—	—	2.20	0.0866	13	40	12192	91507	60007
—	43	—	—	0.0890	13	40	12193	91508	60008
—	—	—	2.30	0.0906	13	40	12194	91509	60009
—	42	—	—	0.0935	14	43	12195	91510	60010
3/32	—	—	—	0.0938	14	43	12196	91511	60011
—	—	—	2.40	0.0945	14	43	12197	91512	60012
—	41	—	—	0.0960	14	43	12198	91513	60013
—	40	—	—	0.0980	14	43	12199	91514	60014
—	—	—	2.50	0.0984	14	43	12200	91515	60015
—	39	—	—	0.0995	14	43	12201	91516	60016
—	38	—	—	0.1015	14	43	12202	91517	60017
—	—	—	2.60	0.1024	14	43	12203	91518	60018
—	37	—	—	0.1040	14	43	12204	91519	60019
—	—	—	2.70	0.1063	16	46	12205	91520	60020
—	36	—	—	0.1067	16	46	12206	91521	60021
7/64	—	—	—	0.1094	16	46	12207	91522	60022
—	35	—	—	0.1100	16	46	12208	91523	60023
—	—	—	2.80	0.1102	16	46	12209	91524	60024
—	34	—	—	0.1110	16	46	12210	91525	60025
—	33	—	—	0.1130	16	46	12211	91526	60026
—	—	—	2.90	0.1142	16	46	12212	91527	60027
—	32	—	—	0.1160	16	46	12213	91528	60028
—	—	—	3.00	0.1181	16	46	12214	91529	60029
—	31	—	—	0.1200	18	49	12215	91530	60030
—	—	—	3.10	0.1220	18	49	12216	91531	60031
1/8	—	—	—	0.1250	18	49	12217	91532	60032
—	—	—	3.20	0.1260	18	49	12218	91533	60033
—	30	—	—	0.1285	18	49	12219	91534	60034
—	—	—	3.30	0.1299	18	49	12220	91535	60035
—	—	—	3.40	0.1339	20	52	12221	91536	60036
—	29	—	—	0.1360	20	52	12222	91537	60037
—	—	—	3.50	0.1378	20	52	12223	91538	60038
9/64	—	—	—	0.1406	20	52	12224	91539	60039
—	28	—	—	0.1405	20	52	12225	91540	60040
—	—	—	3.60	0.1417	20	52	12226	91541	60041
—	27	—	—	0.1440	20	52	12227	91542	60042
—	—	—	3.70	0.1457	20	52	12228	91543	60043
—	26	—	—	0.1470	20	52	12229	91544	60044
—	25	—	—	0.1495	22	55	12230	91545	60045

# Screw Machine Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills



- List No. 1360 Bright Finish  
List No. 1360G TiN — Titanium Nitride Coated  
List No. 1360T TiAlN — Titanium Aluminum Nitride Coated



Short flute length and short overall length for maximum rigidity

DIN 1897

Fract.	Size			Dec. Equiv.	Flute Length MM	OAL MM	List No. 1360	List No. 1360G	List No. 1360T
	Wire	Letter	Metric				Bright Finish EDP No.	TiN Coated EDP No.	TiAlN Coated EDP No.
—	24	—	—	0.1520	22	55	12231	91546	60046
—	—	—	3.90	0.1535	22	55	12232	91547	60047
—	23	—	—	0.1540	22	55	12233	91548	60048
5/32	—	—	—	0.1562	22	55	12234	91549	60049
—	22	—	—	0.1570	22	55	12235	91550	60050
—	—	—	4.00	0.1575	22	55	12236	91551	60051
—	21	—	—	0.1590	22	55	12237	91552	60052
—	20	—	—	0.1610	22	55	12238	91553	60053
—	—	—	4.10	0.1614	22	55	12239	91554	60054
—	—	—	4.20	0.1654	22	55	12240	91555	60055
—	19	—	—	0.1660	22	55	12241	91556	60056
—	—	—	4.30	0.1693	24	58	12242	91557	60057
—	18	—	—	0.1695	24	58	12243	91558	60058
11/64	—	—	—	0.1719	24	58	12244	91559	60059
—	17	—	—	0.1730	24	58	12245	91560	60060
—	—	—	4.40	0.1732	24	58	12246	91561	60061
—	16	—	—	0.1770	24	58	12247	91562	60062
—	—	—	4.50	0.1772	24	58	12248	91563	60063
—	15	—	—	0.1800	24	58	12249	91564	60064
—	—	—	4.60	0.1811	24	58	12250	91565	60065
—	14	—	—	0.1820	24	58	12251	91566	60066
—	13	—	—	0.1850	24	58	12252	91567	60067
—	—	—	4.70	0.1850	24	58	12253	91568	60068
3/16	—	—	—	0.1875	26	62	12254	91569	60069
—	—	—	4.80	0.1890	26	62	12255	91570	60070
—	12	—	—	0.1890	26	62	12256	91571	60071
—	11	—	—	0.1910	26	62	12257	91572	60072
—	—	—	4.90	0.1929	26	62	12258	91573	60073
—	10	—	—	0.1935	26	62	12259	91574	60074
—	9	—	—	0.1960	26	62	12260	91575	60075
—	—	—	5.00	0.1969	26	62	12261	91576	60076
—	8	—	—	0.1990	26	62	12262	91577	60077
—	—	—	5.10	0.2008	26	62	12263	91578	60078
—	7	—	—	0.2010	26	62	12264	91579	60079
13/64	—	—	—	0.2031	26	62	12265	91580	60080
—	6	—	—	0.2040	26	62	12266	91581	60081
—	—	—	5.20	0.2047	26	62	12267	91582	60082
—	5	—	—	0.2055	26	62	12268	91583	60083
—	—	—	5.30	0.2087	26	62	12269	91584	60084
—	4	—	—	0.2090	28	66	12270	91585	60085
—	—	—	5.40	0.2126	28	66	12271	91586	60086
—	3	—	—	0.2130	28	66	12272	91587	60087
—	—	—	5.50	0.2165	28	66	12273	91588	60088
7/32	—	—	—	0.2188	28	66	12274	91589	60089
—	—	—	5.60	0.2205	28	66	12275	91590	60090
—	2	—	—	0.2210	28	66	12276	91591	60091

HPC HIGH PERFORMANCE DRILLS

# Screw Machine Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills



- List No. 1360 Bright Finish
- List No. 1360G TiN — Titanium Nitride Coated
- List No. 1360T TiALN — Titanium Aluminum Nitride Coated

**Speeds & Feeds: Page 56**



Short flute length and short overall length for maximum rigidity

**DIN 1897**

Fract.	Size		Dec. Equiv.	Flute Length MM	OAL MM	List No. 1360	List No. 1360G	List No. 1360T	
	Wire	Letter				Metric	Bright Finish	TiN Coated	TiALN Coated
						EDP No.	EDP No.	EDP No.	
—	—	—	5.70	0.2244	28	66	12277	91592	60092
—	1	—	—	0.2280	28	66	12278	91593	60093
—	—	—	5.80	0.2283	28	66	12279	91594	60094
—	—	—	5.90	0.2323	28	66	12280	91595	60095
15/64	—	—	—	0.2344	28	66	12281	91596	60096
—	—	—	6.00	0.2362	28	66	12282	91597	60097
—	—	—	6.10	0.2402	31	70	12283	91598	60098
—	—	—	6.20	0.2441	31	70	12284	91599	60099
—	—	—	6.30	0.2480	31	70	12285	91600	60100
1/4	—	E	—	0.2500	31	70	12286	91601	60101
—	—	—	6.40	0.2520	31	70	12287	91602	60102
—	—	—	6.50	0.2559	31	70	12288	91603	60103
—	—	—	6.60	0.2598	31	70	12289	91604	60104
—	—	—	6.70	0.2638	31	70	12290	91605	60105
17/64	—	—	—	0.2656	34	74	12291	91606	60106
—	—	—	6.80	0.2677	34	74	12292	91607	60107
—	—	—	6.90	0.2717	34	74	12293	91608	60108
—	—	—	7.00	0.2756	34	74	12294	91609	60109
—	—	—	7.10	0.2795	34	74	12295	91610	60110
9/32	—	—	—	0.2812	34	74	12296	91611	60111
—	—	—	7.20	0.2835	34	74	12297	91612	60112
—	—	—	7.30	0.2874	34	74	12298	91613	60113
—	—	—	7.40	0.2913	34	74	12299	91614	60114
—	—	—	7.50	0.2953	34	74	12300	91615	60115
19/64	—	—	—	0.2969	37	79	12301	91616	60116
—	—	—	7.60	0.2992	37	79	12302	91617	60117
—	—	—	7.70	0.3031	37	79	12303	91618	60118
—	—	—	7.80	0.3071	37	79	12304	91619	60119
—	—	—	7.90	0.3110	37	79	12305	91620	60120
5/16	—	—	—	0.3125	37	79	12306	91621	60121
—	—	—	8.00	0.3150	37	79	12307	91622	60122
—	—	—	8.10	0.3189	37	79	12308	91623	60123
—	—	—	8.20	0.3228	37	79	12309	91624	60124
—	—	—	8.30	0.3268	37	79	12310	91625	60125
21/64	—	—	—	0.3281	37	79	12311	91626	60126
—	—	—	8.40	0.3307	37	79	12312	91627	60127
—	—	—	8.50	0.3346	37	79	12313	91628	60128
—	—	—	8.60	0.3386	40	84	12314	91629	60129
—	—	—	8.70	0.3425	40	84	12315	91630	60130
11/32	—	—	—	0.3438	40	84	12316	91631	60131
—	—	—	8.80	0.3465	40	84	12317	91632	60132
—	—	—	8.90	0.3504	40	84	12318	91633	60133
—	—	—	9.00	0.3543	40	84	12319	91634	60134
—	—	—	9.10	0.3583	40	84	12320	91635	60135
23/64	—	—	—	0.3594	40	84	12321	91636	60136
—	—	—	9.20	0.3622	40	84	12322	91637	60137



# Screw Machine Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills



- List No. 1360 Bright Finish
- List No. 1360G TiN — Titanium Nitride Coated
- List No. 1360T TiALN — Titanium Aluminum Nitride Coated

DIN 1897



Short flute length and short overall length for maximum rigidity

Size				Dec. Equiv.	Flute Length MM	OAL MM	List No. 1360	List No. 1360G	List No. 1360T
Fract.	Wire	Letter	Metric				Bright Finish	TiN Coated	TiALN Coated
							EDP No.	EDP No.	EDP No.
—	—	—	9.30	0.3661	40	84	12323	91638	60138
—	—	—	9.40	0.3701	40	84	12324	91639	60139
—	—	—	9.50	0.3740	40	84	12325	91640	60140
3/8	—	—	—	0.3750	43	89	12326	91641	60141
—	—	—	9.60	0.3780	43	89	12327	91642	60142
—	—	—	9.70	0.3819	43	89	12328	91643	60143
—	—	—	9.80	0.3858	43	89	12329	91644	60144
—	—	—	9.90	0.3898	43	89	12330	91645	60145
25/64	—	—	—	0.3906	43	89	12331	91646	60146
—	—	—	10.00	0.3937	43	89	12332	91647	60147
13/32	—	—	—	0.4062	43	89	12333	91648	60148
27/64	—	—	—	0.4219	47	95	12334	91649	60149
7/16	—	—	—	0.4375	47	95	12335	91650	60150
29/64	—	—	—	0.4531	47	95	12336	91651	60151
15/32	—	—	—	0.4688	51	102	12337	91652	60152
31/64	—	—	—	0.4844	51	102	12338	91653	60153
1/2	—	—	—	0.5000	51	102	12339	91654	60154

## TOOL COATINGS

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish.

### TiN – Titanium Nitride

A good general purpose coating for a wide range of ferrous materials. Not recommended for non-ferrous materials. Has higher heat resistance than TiCN coating.

### TiCN – Titanium Carbonitride

Enhanced toughness, hardness & wear resistance for aggressive speeds & feeds. Recommended for difficult-to-machine, gummy & abrasive materials where moderate cutting temperatures are generated.

### TiALN – Titanium Aluminum Nitride

### ALTiN – Aluminum Titanium Nitride

Excellent all around coatings featuring high heat resistance. Recommended for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. ALTiN has higher AL content for increased hardness & heat resistance.

### CrN – Chromium Nitride

### CrC – Chromium Carbide

Especially recommended for titanium and non-ferrous materials including aluminum, copper & brass. CrC has slightly higher hardness than CrN. These coatings resist adhesion of the material being machined and resist chipping and cracking.

### DLC – Amorphous Diamond-Like Carbon

A thin carbon based amorphous (non-crystalline) coating featuring very high hardness & low coefficient of friction. Recommended for graphite and some non-ferrous materials. Typically used on solid carbide tools.

**Jobber Length  
HPC Cobalt  
High Performance  
Wide Land  
Parabolic Flute Drills**



- List No. 1361 Bright Finish
- List No. 1361G TiN — Titanium Nitride Coated
- List No. 1361T TiALN — Titanium Aluminum Nitride Coated

**Speeds & Feeds: Page 56**



Select the shortest drill possible for your application for maximum rigidity, hole accuracy and economy.

**DIN 338**

Size				Dec.	Flute Length	OAL	List No. 1361	List No. 1361G	List No. 1361T
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	Bright Finish	TiN Coated	TiALN Coated
							EDP No.	EDP No.	EDP No.
5/64	—	—	—	0.0780	24	49	12350	91660	60160
—	47	—	—	0.0783	24	49	12351	91661	60161
—	—	—	2.00	0.0787	24	49	12352	91662	60162
—	46	—	—	0.0810	24	49	12353	91663	60163
—	45	—	—	0.0820	24	49	12354	91664	60164
—	—	—	2.10	0.0827	24	49	12355	91665	60165
—	44	—	—	0.0860	27	53	12356	91666	60166
—	—	—	2.20	0.0866	27	53	12357	91667	60167
—	43	—	—	0.0890	27	53	12358	91668	60168
—	—	—	2.30	0.0906	27	53	12359	91669	60169
—	42	—	—	0.0935	30	57	12360	91670	60170
3/32	—	—	—	0.0938	30	57	12361	91671	60171
—	—	—	2.40	0.0945	30	57	12362	91672	60172
—	41	—	—	0.0960	30	57	12363	91673	60173
—	40	—	—	0.0980	30	57	12364	91674	60174
—	—	—	2.50	0.0984	30	57	12365	91675	60175
—	39	—	—	0.0995	30	57	12366	91676	60176
—	38	—	—	0.1015	30	57	12367	91677	60177
—	—	—	2.60	0.1024	30	57	12368	91678	60178
—	37	—	—	0.1040	30	57	12369	91679	60179
—	—	—	2.70	0.1063	33	61	12370	91680	60180
—	36	—	—	0.1067	33	61	12371	91681	60181
7/64	—	—	—	0.1094	33	61	12372	91682	60182
—	35	—	—	0.1100	33	61	12373	91683	60183
—	—	—	2.80	0.1102	33	61	12374	91684	60184
—	34	—	—	0.1110	33	61	12375	91685	60185
—	33	—	—	0.1130	33	61	12376	91686	60186
—	—	—	2.90	0.1142	33	61	12377	91687	60187
—	32	—	—	0.1160	33	61	12378	91688	60188
—	—	—	3.00	0.1181	33	61	12379	91689	60189
—	31	—	—	0.1200	36	65	12380	91690	60190
—	—	—	3.10	0.1220	36	65	12381	91691	60191
1/8	—	—	—	0.1250	36	65	12382	91692	60192
—	—	—	3.20	0.1260	36	65	12383	91693	60193
—	30	—	—	0.1285	36	65	12384	91694	60194
—	—	—	3.30	0.1299	36	65	12385	91695	60195
—	—	—	3.40	0.1339	39	70	12386	91696	60196
—	29	—	—	0.1360	39	70	12387	91697	60197
—	—	—	3.50	0.1378	39	70	12388	91698	60198
9/64	—	—	—	0.1406	39	70	12389	91699	60199
—	28	—	—	0.1405	39	70	12390	91700	60200
—	—	—	3.60	0.1417	39	70	12391	91701	60201
—	27	—	—	0.1440	39	70	12392	91702	60202
—	—	—	3.70	0.1457	39	70	12393	91703	60203
—	26	—	—	0.1470	39	70	12394	91704	60204
—	25	—	—	0.1495	43	75	12395	91705	60205
—	24	—	—	0.1520	43	75	12396	91706	60206
—	—	—	3.90	0.1535	43	75	12397	91707	60207
—	23	—	—	0.1540	43	75	12398	91708	60208
5/32	—	—	—	0.1562	43	75	12399	91709	60209

# Jobber Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills



- List No. 1361 Bright Finish
- List No. 1361G TiN — Titanium Nitride Coated
- List No. 1361T TiALN — Titanium Aluminum Nitride Coated



Select the shortest drill possible for your application for maximum rigidity, hole accuracy and economy.

## DIN 338

Fract.	Size			Dec. Equiv.	Flute Length MM	OAL MM	List No. 1361	List No. 1361G	List No. 1361T
	Wire	Letter	Metric				Bright Finish	TiN Coated	TiALN Coated
							EDP No.	EDP No.	EDP No.
—	22	—	—	0.1570	43	75	12400	91710	60210
—	—	—	4.00	0.1575	43	75	12401	91711	60211
—	21	—	—	0.1590	43	75	12402	91712	60212
—	20	—	—	0.1610	43	75	12403	91713	60213
—	—	—	4.10	0.1614	43	75	12404	91714	60214
—	—	—	4.20	0.1654	43	75	12405	91715	60215
—	19	—	—	0.1660	43	75	12406	91716	60216
—	—	—	4.30	0.1693	47	80	12407	91717	60217
—	18	—	—	0.1695	47	80	12408	91718	60218
11/64	—	—	—	0.1719	47	80	12409	91719	60219
—	17	—	—	0.1730	47	80	12410	91720	60220
—	—	—	4.40	0.1732	47	80	12411	91721	60221
—	16	—	—	0.1770	47	80	12412	91722	60222
—	—	—	4.50	0.1772	47	80	12413	91723	60223
—	15	—	—	0.1800	47	80	12414	91724	60224
—	—	—	4.60	0.1811	47	80	12415	91725	60225
—	14	—	—	0.1820	47	80	12416	91726	60226
—	13	—	—	0.1850	47	80	12417	91727	60227
—	—	—	4.70	0.1850	47	80	12418	91728	60228
3/16	—	—	—	0.1875	52	86	12419	91729	60229
—	—	—	4.80	0.1890	52	86	12420	91730	60230
—	12	—	—	0.1890	52	86	12421	91731	60231
—	11	—	—	0.1910	52	86	12422	91732	60232
—	—	—	4.90	0.1929	52	86	12423	91733	60233
—	10	—	—	0.1935	52	86	12424	91734	60234
—	9	—	—	0.1960	52	86	12425	91735	60235
—	—	—	5.00	0.1969	52	86	12426	91736	60236
—	8	—	—	0.1990	52	86	12427	91737	60237
—	—	—	5.10	0.2008	52	86	12428	91738	60238
—	7	—	—	0.2010	52	86	12429	91739	60239
13/64	—	—	—	0.2031	52	86	12430	91740	60240
—	6	—	—	0.2040	52	86	12431	91741	60241
—	—	—	5.20	0.2047	52	86	12432	91742	60242
—	5	—	—	0.2055	52	86	12433	91743	60243
—	—	—	5.30	0.2087	52	86	12434	91744	60244
—	4	—	—	0.2090	57	93	12435	91745	60245
—	—	—	5.40	0.2126	57	93	12436	91746	60246
—	3	—	—	0.2130	57	93	12437	91747	60247
—	—	—	5.50	0.2165	57	93	12438	91748	60248
7/32	—	—	—	0.2188	57	93	12439	91749	60249
—	—	—	5.60	0.2205	57	93	12440	91750	60250
—	2	—	—	0.2210	57	93	12441	91751	60251
—	—	—	5.70	0.2244	57	93	12442	91752	60252
—	1	—	—	0.2280	57	93	12443	91753	60253
—	—	—	5.80	0.2283	57	93	12444	91754	60254
—	—	—	5.90	0.2323	57	93	12445	91755	60255
—	—	A	—	0.2340	57	93	12446	91756	60256
15/64	—	—	—	0.2344	57	93	12447	91757	60257
—	—	—	6.00	0.2362	57	93	12448	91758	60258
—	—	B	—	0.2380	63	101	12449	91759	60259

# Jobber Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills



- List No. 1361 Bright Finish
- List No. 1361G TiN — Titanium Nitride Coated
- List No. 1361T TiALN — Titanium Aluminum Nitride Coated

**Speeds & Feeds: Page 56**



Select the shortest drill possible for your application for maximum rigidity, hole accuracy and economy.

**DIN 338**

Size				Dec. Equiv.	Flute Length MM	OAL MM	List No. 1361	List No. 1361G	List No. 1361T
Fract.	Wire	Letter	Metric				Bright Finish	TiN Coated	TiALN Coated
							EDP No.	EDP No.	EDP No.
—	—	—	6.10	0.2402	63	101	12450	91760	60260
—	—	C	—	0.2420	63	101	12451	91761	60261
—	—	—	6.20	0.2441	63	101	12452	91762	60262
—	—	D	—	0.2460	63	101	12453	91763	60263
—	—	—	6.30	0.2480	63	101	12454	91764	60264
1/4	—	E	—	0.2500	63	101	12455	91765	60265
—	—	—	6.40	0.2520	63	101	12457	91767	60267
—	—	—	6.50	0.2559	63	101	12458	91768	60268
—	—	F	—	0.2570	63	101	12459	91769	60269
—	—	—	6.60	0.2598	63	101	12460	91770	60270
—	—	G	—	0.2610	63	101	12461	91771	60271
—	—	—	6.70	0.2638	63	101	12462	91772	60272
17/64	—	—	—	0.2656	69	109	12463	91773	60273
—	—	H	—	0.2660	69	109	12464	91774	60274
—	—	—	6.80	0.2677	69	109	12465	91775	60275
—	—	—	6.90	0.2717	69	109	12466	91776	60276
—	—	I	—	0.2720	69	109	12467	91777	60277
—	—	—	7.00	0.2756	69	109	12468	91778	60278
—	—	J	—	0.2770	69	109	12469	91779	60279
—	—	—	7.10	0.2795	69	109	12470	91780	60280
—	—	K	—	0.2810	69	109	12471	91781	60281
9/32	—	—	—	0.2812	69	109	12472	91782	60282
—	—	—	7.20	0.2835	69	109	12473	91783	60283
—	—	—	7.30	0.2874	69	109	12474	91784	60284
—	—	L	—	0.2900	69	109	12475	91785	60285
—	—	—	7.40	0.2913	69	109	12476	91786	60286
—	—	M	—	0.2950	69	109	12477	91787	60287
—	—	—	7.50	0.2953	69	109	12478	91788	60288
19/64	—	—	—	0.2969	75	117	12479	91789	60289
—	—	—	7.60	0.2992	75	117	12480	91790	60290
—	—	N	—	0.3020	75	117	12481	91791	60291
—	—	—	7.70	0.3031	75	117	12482	91792	60292
—	—	—	7.80	0.3071	75	117	12483	91793	60293
—	—	—	7.90	0.3110	75	117	12484	91794	60294
5/16	—	—	—	0.3125	75	117	12485	91795	60295
—	—	—	8.00	0.3150	75	117	12486	91796	60296
—	—	O	—	0.3160	75	117	12487	91797	60297
—	—	—	8.10	0.3189	75	117	12488	91798	60298
—	—	—	8.20	0.3228	75	117	12489	91799	60299
—	—	P	—	0.3230	75	117	12490	91800	60300
—	—	—	8.30	0.3268	75	117	12491	91801	60301
21/64	—	—	—	0.3281	75	117	12492	91802	60302
—	—	—	8.40	0.3307	75	117	12493	91803	60303
—	—	Q	—	0.3320	75	117	12494	91804	60304
—	—	—	8.50	0.3346	75	117	12495	91805	60305
—	—	—	8.60	0.3386	81	125	12496	91806	60306
—	—	R	—	0.3390	81	125	12497	91807	60307
—	—	—	8.70	0.3425	81	125	12498	91808	60308
11/32	—	—	—	0.3438	81	125	12499	91809	60309

# Jobber Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills



- List No. 1361** Bright Finish  
**List No. 1361G** TiN — Titanium Nitride Coated  
**List No. 1361T** TiALN — Titanium Aluminum Nitride Coated



Select the shortest drill possible for your application for maximum rigidity, hole accuracy and economy.

**DIN 338**

Size				Dec. Equiv.	Flute Length MM	OAL MM	List No. 1361	List No. 1361G	List No. 1361T
Fract.	Wire	Letter	Metric				Bright Finish	TiN Coated	TiALN Coated
							EDP No.	EDP No.	EDP No.
—	—	—	8.80	0.3465	81	125	12500	91810	60310
—	—	S	—	0.3480	81	125	12501	91811	60311
—	—	—	8.90	0.3504	81	125	12502	91812	60312
—	—	—	9.00	0.3543	81	125	12503	91813	60313
—	—	T	—	0.3580	81	125	12504	91814	60314
—	—	—	9.10	0.3583	81	125	12505	91815	60315
23/64	—	—	—	0.3594	81	125	12506	91816	60316
—	—	—	9.20	0.3622	81	125	12507	91817	60317
—	—	—	9.30	0.3661	81	125	12508	91818	60318
—	—	U	—	0.3680	81	125	12509	91819	60319
—	—	—	9.40	0.3701	81	125	12510	91820	60320
—	—	—	9.50	0.3740	81	125	12511	91821	60321
3/8	—	—	—	0.3750	87	133	12512	91822	60322
—	—	V	—	0.3770	87	133	12513	91823	60323
—	—	—	9.60	0.3780	87	133	12514	91824	60324
—	—	—	9.70	0.3819	87	133	12515	91825	60325
—	—	—	9.80	0.3858	87	133	12516	91826	60326
—	—	W	—	0.3860	87	133	12517	91827	60327
—	—	—	9.90	0.3898	87	133	12518	91828	60328
25/64	—	—	—	0.3906	87	133	12519	91829	60329
—	—	—	10.00	0.3937	87	133	12520	91830	60330
—	—	X	—	0.3970	87	133	12521	91831	60331
—	—	—	10.10	0.3976	87	133	12522	91832	60332
—	—	—	10.20	0.4016	87	133	12523	91833	60333
—	—	Y	—	0.4040	87	133	12524	91834	60334
—	—	—	10.30	0.4055	87	133	12525	91835	60335
13/32	—	—	—	0.4062	87	133	12526	91836	60336
—	—	—	10.40	0.4094	87	133	12527	91837	60337
—	—	Z	—	0.4130	87	133	12528	91838	60338
—	—	—	10.50	0.4134	87	133	12529	91839	60339
—	—	—	10.60	0.4173	87	133	12530	91840	60340
—	—	—	10.70	0.4213	94	142	12531	91841	60341
27/64	—	—	—	0.4219	94	142	12532	91842	60342
—	—	—	10.80	0.4252	94	142	12533	91843	60343
—	—	—	10.90	0.4291	94	142	12534	91844	60344
—	—	—	11.00	0.4331	94	142	12535	91845	60345
—	—	—	11.10	0.4370	94	142	12536	91846	60346
7/16	—	—	—	0.4375	94	142	12537	91847	60347
—	—	—	11.20	0.4409	94	142	12538	91848	60348
—	—	—	11.30	0.4449	94	142	12539	91849	60349
—	—	—	11.40	0.4488	94	142	12540	91850	60350
—	—	—	11.50	0.4528	94	142	12541	91851	60351
29/64	—	—	—	0.4531	94	142	12542	91852	60352
—	—	—	11.60	0.4567	94	142	12543	91853	60353
—	—	—	11.70	0.4606	94	142	12544	91854	60354
—	—	—	11.80	0.4646	94	142	12545	91855	60355
—	—	—	11.90	0.4685	101	151	12546	91856	60356
15/32	—	—	—	0.4688	101	151	12547	91857	60357
—	—	—	12.00	0.4724	101	151	12548	91858	60358
—	—	—	12.10	0.4764	101	151	12549	91859	60359
—	—	—	12.20	0.4803	101	151	12550	91860	60360
31/64	—	—	—	0.4844	101	151	12551	91861	60361
—	—	—	12.40	0.4882	101	151	12552	91862	60362
—	—	—	12.50	0.4921	101	151	12553	91863	60363
—	—	—	12.60	0.4961	101	151	12554	91864	60364
1/2	—	—	—	0.5000	101	151	12555	91865	60365
—	—	—	12.80	0.5039	101	151	12556	91866	60366
—	—	—	12.90	0.5079	101	151	12557	91867	60367
—	—	—	13.00	0.5118	101	151	12558	91868	60368

**HPC HIGH PERFORMANCE DRILLS**

# Taper Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

Longer flute length and longer overall length for increased reach and deeper hole drilling.

DIN 340



Speeds & Feeds: Page 56

- List No. 1362 Bright Finish
- List No. 1362G TiN — Titanium Nitride Coated
- List No. 1362T TiALN — Titanium Aluminum Nitride Coated

Size				Dec. Equiv.	Flute Length MM	OAL MM	List No. 1362	List No. 1362G	List No. 1362T
Fract.	Wire	Letter	Metric				Bright Finish	TiN Coated	TiALN Coated
							EDP No.	EDP No.	EDP No.
5/64	—	—	—	0.0780	56	85	12560	91880	60380
—	47	—	—	0.0783	56	85	12561	91881	60381
—	—	—	2.00	0.0787	56	85	12562	91882	60382
—	46	—	—	0.0810	56	85	12563	91883	60383
—	45	—	—	0.0820	56	85	12564	91884	60384
—	—	—	2.10	0.0827	56	85	12565	91885	60385
—	44	—	—	0.0860	59	90	12566	91886	60386
—	—	—	2.20	0.0866	59	90	12567	91887	60387
—	43	—	—	0.0890	59	90	12568	91888	60388
—	—	—	2.30	0.0906	59	90	12569	91889	60389
—	42	—	—	0.0935	62	95	12570	91890	60390
3/32	—	—	—	0.0938	62	95	12571	91891	60391
—	—	—	2.40	0.0945	62	95	12572	91892	60392
—	41	—	—	0.0960	62	95	12573	91893	60393
—	40	—	—	0.0980	62	95	12574	91894	60394
—	—	—	2.50	0.0984	62	95	12575	91895	60395
—	39	—	—	0.0995	62	95	12576	91896	60396
—	38	—	—	0.1015	62	95	12577	91897	60397
—	—	—	2.60	0.1024	62	95	12578	91898	60398
—	37	—	—	0.1040	62	95	12579	91899	60399
—	—	—	2.70	0.1063	66	100	12580	91900	60400
—	36	—	—	0.1067	66	100	12581	91901	60401
7/64	—	—	—	0.1094	66	100	12582	91902	60402
—	35	—	—	0.1100	66	100	12583	91903	60403
—	—	—	2.80	0.1102	66	100	12584	91904	60404
—	34	—	—	0.1110	66	100	12585	91905	60405
—	33	—	—	0.1130	66	100	12586	91906	60406
—	—	—	2.90	0.1142	66	100	12587	91907	60407
—	32	—	—	0.1160	66	100	12588	91908	60408
—	—	—	3.00	0.1181	66	100	12589	91909	60409
—	31	—	—	0.1200	69	106	12590	91910	60410
—	—	—	3.10	0.1220	69	106	12591	91911	60411
1/8	—	—	—	0.1250	69	106	12592	91912	60412
—	—	—	3.20	0.1260	69	106	12593	91913	60413
—	30	—	—	0.1285	69	106	12594	91914	60414
—	—	—	3.30	0.1299	69	106	12595	91915	60415
—	—	—	3.40	0.1339	73	112	12596	91916	60416
—	29	—	—	0.1360	73	112	12597	91917	60417
—	—	—	3.50	0.1378	73	112	12598	91918	60418
9/64	—	—	—	0.1406	73	112	12599	91919	60419
—	28	—	—	0.1405	73	112	12600	91920	60420
—	—	—	3.60	0.1417	73	112	12601	91921	60421
—	27	—	—	0.1440	73	112	12602	91922	60422
—	—	—	3.70	0.1457	73	112	12603	91923	60423
—	26	—	—	0.1470	73	112	12604	91924	60424
—	25	—	—	0.1495	78	119	12605	91925	60425
—	24	—	—	0.1520	78	119	12606	91926	60426
—	—	—	3.90	0.1535	78	119	12607	91927	60427
—	23	—	—	0.1540	78	119	12608	91928	60428
5/32	—	—	—	0.1562	78	119	12609	91929	60429

# Taper Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

Longer flute length and longer overall length for increased reach and deeper hole drilling.

DIN 340



- List No. 1362 Bright Finish
- List No. 1362G TiN — Titanium Nitride Coated
- List No. 1362T TiALN — Titanium Aluminum Nitride Coated

Fract.	Size			Dec. Equiv.	Flute Length MM	OAL MM	List No. 1362	List No. 1362G	List No. 1362T
	Wire	Letter	Metric				Bright Finish EDP No.	TiN Coated EDP No.	TiALN Coated EDP No.
—	22	—	—	0.1570	78	119	12610	91930	60430
—	—	—	4.00	0.1575	78	119	12611	91931	60431
—	21	—	—	0.1590	78	119	12612	91932	60432
—	20	—	—	0.1610	78	119	12613	91933	60433
—	—	—	4.10	0.1614	78	119	12614	91934	60434
—	—	—	4.20	0.1654	78	119	12615	91935	60435
—	19	—	—	0.1660	78	119	12616	91936	60436
—	—	—	4.30	0.1693	82	126	12617	91937	60437
—	18	—	—	0.1695	82	126	12618	91938	60438
11/64	—	—	—	0.1719	82	126	12619	91939	60439
—	17	—	—	0.1730	82	126	12620	91940	60440
—	—	—	4.40	0.1732	82	126	12621	91941	60441
—	16	—	—	0.1770	82	126	12622	91942	60442
—	—	—	4.50	0.1772	82	126	12623	91943	60443
—	15	—	—	0.1800	82	126	12624	91944	60444
—	—	—	4.60	0.1811	82	126	12625	91945	60445
—	14	—	—	0.1820	82	126	12626	91946	60446
—	13	—	—	0.1850	82	126	12627	91947	60447
—	—	—	4.70	0.1850	82	126	12628	91948	60448
3/16	—	—	—	0.1875	87	132	12629	91949	60449
—	—	—	4.80	0.1890	87	132	12630	91950	60450
—	12	—	—	0.1890	87	132	12631	91951	60451
—	11	—	—	0.1910	87	132	12632	91952	60452
—	—	—	4.90	0.1929	87	132	12633	91953	60453
—	10	—	—	0.1935	87	132	12634	91954	60454
—	9	—	—	0.1960	87	132	12635	91955	60455
—	—	—	5.00	0.1969	87	132	12636	91956	60456
—	8	—	—	0.1990	87	132	12637	91957	60457
—	—	—	5.10	0.2008	87	132	12638	91958	60458
—	7	—	—	0.2010	87	132	12639	91959	60459
13/64	—	—	—	0.2031	87	132	12640	91960	60460
—	6	—	—	0.2040	87	132	12641	91961	60461
—	—	—	5.20	0.2047	87	132	12642	91962	60462
—	5	—	—	0.2055	87	132	12643	91963	60463
—	—	—	5.30	0.2087	87	132	12644	91964	60464
—	4	—	—	0.2090	91	139	12645	91965	60465
—	—	—	5.40	0.2126	91	139	12646	91966	60466
—	3	—	—	0.2130	91	139	12647	91967	60467
—	—	—	5.50	0.2165	91	139	12648	91968	60468
7/32	—	—	—	0.2188	91	139	12649	91969	60469
—	—	—	5.60	0.2205	91	139	12650	91970	60470
—	2	—	—	0.2210	91	139	12651	91971	60471
—	—	—	5.70	0.2244	91	139	12652	91972	60472
—	1	—	—	0.2280	91	139	12653	91973	60473
—	—	—	5.80	0.2283	91	139	12654	91974	60474
—	—	—	5.90	0.2323	91	139	12655	91975	60475
—	—	A	—	0.2340	91	139	12656	91976	60476
15/64	—	—	—	0.2344	91	139	12657	91977	60477
—	—	—	6.00	0.2362	91	139	12658	91978	60478
—	—	B	—	0.2380	97	148	12659	91979	60479

HPC HIGH PERFORMANCE DRILLS

# Taper Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

Longer flute length and longer overall length for increased reach and deeper hole drilling.

**DIN 340**



**Speeds & Feeds: Page 56**

- List No. 1362** Bright Finish
- List No. 1362G** TiN — Titanium Nitride Coated
- List No. 1362T** TiALN — Titanium Aluminum Nitride Coated



Size				Dec. Equiv.	Flute Length MM	OAL MM	List No. 1362	List No. 1362G	List No. 1362T
Fract.	Wire	Letter	Metric				Bright Finish	TiN Coated	TiALN Coated
							EDP No.	EDP No.	EDP No.
—	—	—	6.10	0.2402	97	148	12660	91980	60480
—	—	C	—	0.2420	97	148	12661	91981	60481
—	—	—	6.20	0.2441	97	148	12662	91982	60482
—	—	D	—	0.2460	97	148	12663	91983	60483
—	—	—	6.30	0.2480	97	148	12664	91984	60484
1/4	—	E	—	0.2500	97	148	12665	91985	60485
—	—	—	6.40	0.2520	97	148	12667	91987	60487
—	—	—	6.50	0.2559	97	148	12668	91988	60488
—	—	F	—	0.2570	97	148	12669	91989	60489
—	—	—	6.60	0.2598	97	148	12670	91990	60490
—	—	G	—	0.2610	97	148	12671	91991	60491
—	—	—	6.70	0.2638	97	148	12672	91992	60492
17/64	—	—	—	0.2656	102	156	12673	91993	60493
—	—	H	—	0.2660	102	156	12674	91994	60494
—	—	—	6.80	0.2677	102	156	12675	91995	60495
—	—	—	6.90	0.2717	102	156	12676	91996	60496
—	—	I	—	0.2720	102	156	12677	91997	60497
—	—	—	7.00	0.2756	102	156	12678	91998	60498
—	—	J	—	0.2770	102	156	12679	91999	60499
—	—	—	7.10	0.2795	102	156	12680	92000	60500
—	—	K	—	0.2810	102	156	12681	92001	60501
9/32	—	—	—	0.2812	102	156	12682	92002	60502
—	—	—	7.20	0.2835	102	156	12683	92003	60503
—	—	—	7.30	0.2874	102	156	12684	92004	60504
—	—	L	—	0.2900	102	156	12685	92005	60505
—	—	—	7.40	0.2913	102	156	12686	92006	60506
—	—	M	—	0.2950	102	156	12687	92007	60507
—	—	—	7.50	0.2953	102	156	12688	92008	60508
19/64	—	—	—	0.2969	109	165	12689	92009	60509
—	—	—	7.60	0.2992	109	165	12690	92010	60510
—	—	N	—	0.3020	109	165	12691	92011	60511
—	—	—	7.70	0.3031	109	165	12692	92012	60512
—	—	—	7.80	0.3071	109	165	12693	92013	60513
—	—	—	7.90	0.3110	109	165	12694	92014	60514
5/16	—	—	—	0.3125	109	165	12695	92015	60515
—	—	—	8.00	0.3150	109	165	12696	92016	60516
—	—	O	—	0.3160	109	165	12697	92017	60517
—	—	—	8.10	0.3189	109	165	12698	92018	60518
—	—	—	8.20	0.3228	109	165	12699	92019	60519
—	—	P	—	0.3230	109	165	12700	92020	60520
—	—	—	8.30	0.3268	109	165	12701	92021	60521
21/64	—	—	—	0.3281	109	165	12702	92022	60522
—	—	—	8.40	0.3307	109	165	12703	92023	60523
—	—	Q	—	0.3320	109	165	12704	92024	60524
—	—	—	8.50	0.3346	109	165	12705	92025	60525
—	—	—	8.60	0.3386	115	175	12706	92026	60526
—	—	R	—	0.3390	115	175	12707	92027	60527
—	—	—	8.70	0.3425	115	175	12708	92028	60528
11/32	—	—	—	0.3438	115	175	12709	92029	60529



# Taper Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

DIN 340



- List No. 1362 Bright Finish
- List No. 1362G TiN — Titanium Nitride Coated
- List No. 1362T TiALN — Titanium Aluminum Nitride Coated



Size				Dec. Equiv.	Flute Length MM	OAL MM	List No. 1362	List No. 1362G	List No. 1362T
Fract.	Wire	Letter	Metric				Bright Finish	TiN Coated	TiALN Coated
							EDP No.	EDP No.	EDP No.
—	—	—	8.80	0.3465	115	175	12710	92030	60530
—	—	S	—	0.3480	115	175	12711	92031	60531
—	—	—	8.90	0.3504	115	175	12712	92032	60532
—	—	—	9.00	0.3543	115	175	12713	92033	60533
—	—	T	—	0.3580	115	175	12714	92034	60534
—	—	—	9.10	0.3583	115	175	12715	92035	60535
23/64	—	—	—	0.3594	115	175	12716	92036	60536
—	—	—	9.20	0.3622	115	175	12717	92037	60537
—	—	—	9.30	0.3661	115	175	12718	92038	60538
—	—	U	—	0.3680	115	175	12719	92039	60539
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—	—	—	9.40	0.3701	115	175	12720	92040	60540
—	—	—	9.50	0.3740	115	175	12721	92041	60541
3/8	—	—	—	0.3750	121	184	12722	92042	60542
—	—	V	—	0.3770	121	184	12723	92043	60543
—	—	—	9.60	0.3780	121	184	12724	92044	60544
—	—	—	9.70	0.3819	121	184	12725	92045	60545
—	—	—	9.80	0.3858	121	184	12726	92046	60546
—	—	W	—	0.3860	121	184	12727	92047	60547
—	—	—	9.90	0.3898	121	184	12728	92048	60548
25/64	—	—	—	0.3906	121	184	12729	92049	60549
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—	—	—	10.00	0.3937	121	184	12730	92050	60550
—	—	X	—	0.3970	121	184	12731	92051	60551
—	—	—	10.10	0.3976	121	184	12732	92052	60552
—	—	—	10.20	0.4016	121	184	12733	92053	60553
—	—	Y	—	0.4040	121	184	12734	92054	60554
—	—	—	10.30	0.4055	121	184	12735	92055	60555
13/32	—	—	—	0.4062	121	184	12736	92056	60556
—	—	—	10.40	0.4094	121	184	12737	92057	60557
—	—	Z	—	0.4130	121	184	12738	92058	60558
—	—	—	10.50	0.4134	121	184	12739	92059	60559
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—	—	—	10.60	0.4173	121	184	12740	92060	60560
—	—	—	10.70	0.4213	128	195	12741	92061	60561
27/64	—	—	—	0.4219	128	195	12742	92062	60562
—	—	—	10.80	0.4252	128	195	12743	92063	60563
—	—	—	10.90	0.4291	128	195	12744	92064	60564
—	—	—	11.00	0.4331	128	195	12745	92065	60565
—	—	—	11.10	0.4370	128	195	12746	92066	60566
7/16	—	—	—	0.4375	128	195	12747	92067	60567
—	—	—	11.20	0.4409	128	195	12748	92068	60568
—	—	—	11.30	0.4449	128	195	12749	92069	60569
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—	—	—	11.40	0.4488	128	195	12750	92070	60570
—	—	—	11.50	0.4528	128	195	12751	92071	60571
29/64	—	—	—	0.4531	128	195	12752	92072	60572
—	—	—	11.60	0.4567	128	195	12753	92073	60573
—	—	—	11.70	0.4606	128	195	12754	92074	60574
—	—	—	11.80	0.4646	128	195	12755	92075	60575
—	—	—	11.90	0.4685	134	205	12756	92076	60576
15/32	—	—	—	0.4688	134	205	12757	92077	60577
—	—	—	12.00	0.4724	134	205	12758	92078	60578
—	—	—	12.10	0.4764	134	205	12759	92079	60579
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—	—	—	12.20	0.4803	134	205	12760	92080	60580
31/64	—	—	—	0.4844	134	205	12761	92081	60581
—	—	—	12.40	0.4882	134	205	12762	92082	60582
—	—	—	12.50	0.4921	134	205	12763	92083	60583
—	—	—	12.60	0.4961	134	205	12764	92084	60584
1/2	—	—	—	0.5000	134	205	12765	92085	60585
—	—	—	12.80	0.5039	134	205	12766	92086	60586
—	—	—	12.90	0.5079	134	205	12767	92087	60587
—	—	—	13.00	0.5118	134	205	12768	92088	60588

HPC HIGH PERFORMANCE DRILLS

# Speeds and Feeds

## HPC Cobalt High Performance Wide Land

### Parabolic Flute Drills



WORKPIECE MATERIAL	BRINELL HARDNESS BHN	SURFACE SPEED SFM	FEED PER REVOLUTION BY DRILL DIAMETER			
			1/8"	1/4"	3/8"	1/2"
<b>Low Carbon Steels</b> 1018, 12L12, 1108, 1213	≤ 120	110	0.0030	0.0040	0.0060	0.0080
<b>Low &amp; Medium Carbon Steels</b> 1018, 1551, 11L44	120 - 250	65	0.0040	0.0060	0.0085	0.0110
<b>Medium Carbon and Alloyed Steels</b> 1040, 1140, 4340, 8640	≤ 250	60	0.0030	0.0040	0.0060	0.0080
<b>Tool and Die Steels</b> P20, A2, D2, H12	≤ 250	50 - 60	0.0030	0.0040	0.0060	0.0080
<b>Tool and Die Steels</b> P20, A2, D2, H12	250 - 350	35 - 45	0.0020	0.0032	0.0049	0.0066
<b>Tool and Die Steels</b> P20, A2, D2, H12	350 - 400	15 - 25	0.0013	0.0022	0.0031	0.0040
<b>Free Machining Stainless Steels</b> 303, 410, 416, 440F	≤ 250	60	0.0020	0.0032	0.0049	0.0066
<b>Moderate Machining Stainless Steels</b> 304, 316	≤ 300	45	0.0032	0.0050	0.0063	0.0075
<b>Difficult Machining Stainless Steels</b> 17-4PH, 316L, AM350	≤ 300	30	0.0020	0.0031	0.0047	0.0062
<b>Cast Iron</b> Grey & Free Machining Malleable	≤ 250	80	0.0030	0.0040	0.0060	0.0080
<b>Cast Iron</b> Hard Grey	≤ 300	55	0.0020	0.0032	0.0049	0.0066
<b>Titanium Alloys</b> Commercially Pure 99.0	≤ 200	90	0.0030	0.0040	0.0060	0.0080
<b>Titanium Alloys</b> Ti-6Al-4V, ASTM B367 Grades C-3, C-4	≤ 350	20 - 30	0.0020	0.0032	0.0049	0.0066
<b>High Temperature Alloys</b> Inconel, Hastelloy, Waspaloy	≤ 150	50	0.0030	0.0040	0.0060	0.0080
<b>High Temperature Alloys</b> Inconel, Hastelloy, Waspaloy	150 - 250	20	0.0010	0.0020	0.0033	0.0045
<b>Aluminum Alloys</b> 2025, 6061, A140, 514.0	≤ 150	325	0.0040	0.0060	0.0085	0.0110
<b>Copper Alloys</b> Brass and Bronze	≤ 200	80	0.0040	0.0060	0.0085	0.0110
<b>Composite &amp; Plastics</b>	≤ 128	175	0.0020	0.0030	0.0045	0.0060
<b>Magnesium Alloys</b> AZ80A, HM12A, AM60A, ZE41A	50 - 90	325	0.0040	0.0060	0.0085	0.0110

**NOTE:** The speeds and feeds shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase speed and feed until drilling cycle is optimized.

For TiN coated drills increase speed by up to 20% depending on actual material and machining conditions.

For TiAlN coated drills increase speed by up to 50% depending on actual material and machining conditions.

SIZE SPECIFICATIONS:	
Screw Machine Length	Din 1897
Jobber Length	Din 338
Taper Length	Din 340

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# Jobber Length Drills

**Straight Shank - High Speed Steel**  
**118° Point - General Purpose**

Designed for drilling a wide variety of materials.

**Black Oxide Surface Treatment** increases wear resistance, reduces galling and chip welding, improves chip flow and increases drill lubricant retention.

**Bright Finish** with polished flutes enhances chip ejection especially for aluminum and other non-ferrous materials.

**Titanium Nitride (TiN) Coating** increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Enhanced hole quality at higher speeds and feeds.

**STANDARD PACKAGE**

**Fractional Sizes**

- 1/64" thru 3/8" - 12 each
- 25/64" thru 1/2" - 6 each
- 33/64" thru 11/16" - 1 each

**Letter Sizes**

- A thru V - 12 each
- W thru Z - 6 each

**Wire Gage Sizes**

- #1 thru #80 - 12 each



BLACK OXIDE TREATED

- List No. 1330 Fractional
- List No. 1332 Letter
- List No. 1340 Wire Gage



BRIGHT FINISH

- List No. 1330B Fractional
- List No. 1332B Letter
- List No. 1340B Wire Gage



TITANIUM NITRIDE COATED

- List No. 1330G All Sizes

FRAC-TIONAL	SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL	1330, 1332,	1330B, 1332B,	1330G
	WIRE GAGE					1340 EDP NO.	1340B EDP NO.	EDP NO.
1/64	80		.0135	1/8	3/4	11351	11551	—
	79		.0145	1/8	3/4	11352	11552	—
			.0156	3/16	3/4	11353	11553	—
	78		.0160	3/16	7/8	11354	11554	—
	77		.0180	3/16	7/8	11355	11555	—
			.0200	3/16	7/8	11356	11556	—
1/32	76		.0210	1/4	1	11357	11557	—
	74		.0225	1/4	1	11358	11558	—
	73		.0240	5/16	1 1/8	11359	11559	—
	72		.0250	5/16	1 1/8	11360	11560	—
	71		.0260	3/8	1 1/4	11361	11561	—
	70		.0280	3/8	1 1/4	11362	11562	—
	69		.0292	1/2	1 3/8	11363	11563	—
	68		.0310	1/2	1 3/8	11364	11564	—
			.0312	1/2	1 3/8	11365	11565	—
			.0320	1/2	1 3/8	11366	11566	—
3/64	66		.0330	1/2	1 3/8	11367	11567	—
	65		.0350	5/8	1 1/2	11368	11568	—
	64		.0360	5/8	1 1/2	11369	11569	—
	63		.0370	5/8	1 1/2	11370	11570	—
	62		.0380	5/8	1 1/2	11371	11571	—
	61		.0390	1 1/16	1 5/8	11372	11572	—
	60		.0400	1 1/16	1 5/8	11373	11573	91373
	59		.0410	1 1/16	1 5/8	11374	11574	91374
	58		.0420	1 1/16	1 5/8	11375	11575	91375
			.0430	3/4	1 3/4	11376	11576	91376
1/16	56		.0465	3/4	1 3/4	11377	11577	91377
			.0469	3/4	1 3/4	11378	11578	91378
	55		.0520	7/8	1 7/8	11379	11579	91379
	54		.0550	7/8	1 7/8	11380	11580	91380
	53		.0595	7/8	1 7/8	11381	11581	91381
			.0625	7/8	1 7/8	11382	11582	91382
1/8	52		.0635	7/8	1 7/8	11383	11583	91383
	51		.0670	1	2	11384	11584	91384
	50		.0700	1	2	11385	11585	91385
	49		.0730	1	2	11386	11586	91386

(continued)



# Jobber Length Drills (continued)

List Nos. 1330/B, 1332/B, 1340/B and 1330G

FRAC-TIONAL	SIZE		FLUTE LENGTH	OAL	1330, 1332,	1330B, 1332B,	1330G	
	WIRE GAGE	DEC. EQUIV.			1340 EDP NO.	1340B EDP NO.	EDP NO.	
5/64	48	.0760	1	2	11387	11587	91387	
		.0781	1	2	11388	11588	91388	
	47	.0785	1	2	11389	11589	91389	
	46	.0810	1 1/8	2 1/8	11390	11590	91390	
	45	.0820	1 1/8	2 1/8	11391	11591	91391	
3/32	44	.0860	1 1/8	2 1/8	11392	11592	91392	
	43	.0890	1 1/4	2 1/4	11393	11593	91393	
	42	.0935	1 1/4	2 1/4	11394	11594	91394	
		.0937	1 1/4	2 1/4	11395	11595	91395	
	41	.0960	1 3/8	2 3/8	11396	11596	91396	
	40	.0980	1 3/8	2 3/8	11397	11597	91397	
	39	.0995	1 3/8	2 3/8	11398	11598	91398	
	38	.1015	1 7/16	2 1/2	11399	11599	91399	
1/8	37	.1040	1 7/16	2 1/2	11400	11600	91400	
	36	.1065	1 7/16	2 1/2	11401	11601	91401	
	7/64		.1094	1 1/2	2 5/8	11402	11602	91402
		35	.1100	1 1/2	2 5/8	11403	11603	91403
		34	.1110	1 1/2	2 5/8	11404	11604	91404
		33	.1130	1 1/2	2 5/8	11405	11605	91405
	32	.1160	1 5/8	2 3/4	11406	11606	91406	
9/64	31	.1200	1 5/8	2 3/4	11407	11607	91407	
		.1250	1 5/8	2 3/4	11408	11608	91408	
	30	.1285	1 5/8	2 3/4	11409	11609	91409	
	29	.1360	1 3/4	2 7/8	11410	11610	91410	
	28	.1405	1 3/4	2 7/8	11411	11611	91411	
5/32		.1406	1 3/4	2 7/8	11412	11612	91412	
	27	.1440	1 7/8	3	11413	11613	91413	
	26	.1470	1 7/8	3	11414	11614	91414	
	25	.1495	1 7/8	3	11415	11615	91415	
	24	.1520	2	3 1/8	11416	11616	91416	
	3/16	23	.1540	2	3 1/8	11417	11617	91417
		.1562	2	3 1/8	11418	11618	91418	
22		.1570	2	3 1/8	11419	11619	91419	
21		.1590	2 1/8	3 1/4	11420	11620	91420	
20		.1610	2 1/8	3 1/4	11421	11621	91421	
1/4	19	.1660	2 1/8	3 1/4	11422	11622	91422	
	18	.1695	2 1/8	3 1/4	11423	11623	91423	
		.1719	2 1/8	3 1/4	11424	11624	91424	
	17	.1730	2 3/16	3 3/8	11425	11625	91425	
	16	.1770	2 3/16	3 3/8	11426	11626	91426	
		.1800	2 3/16	3 3/8	11427	11627	91427	
5/16	15	.1800	2 3/16	3 3/8	11427	11627	91427	
	14	.1820	2 3/16	3 3/8	11428	11628	91428	
	13	.1850	2 5/16	3 1/2	11429	11629	91429	
		.1875	2 5/16	3 1/2	11430	11630	91430	
	12	.1890	2 5/16	3 1/2	11431	11631	91431	
		.1910	2 5/16	3 1/2	11432	11632	91432	
3/8	11	.1910	2 5/16	3 1/2	11432	11632	91432	
	10	.1935	2 7/16	3 5/8	11433	11633	91433	
	9	.1960	2 7/16	3 5/8	11434	11634	91434	
	8	.1990	2 7/16	3 5/8	11435	11635	91435	
	7	.2010	2 7/16	3 5/8	11436	11636	91436	
		.2031	2 7/16	3 5/8	11437	11637	91437	
7/16	6	.2040	2 1/2	3 3/4	11438	11638	91438	
	5	.2055	2 1/2	3 3/4	11439	11639	91439	
	4	.2090	2 1/2	3 3/4	11440	11640	91440	
	3	.2130	2 1/2	3 3/4	11441	11641	91441	
		.2187	2 1/2	3 3/4	11442	11642	91442	
1/2	2	.2210	2 5/8	3 7/8	11443	11643	91443	
	1	.2280	2 5/8	3 7/8	11444	11644	91444	

(continued)



# Jobber Length Drills (continued)

List Nos. 1330/B, 1332/B and 1330G

**DRILLS**

SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL	1330, 1332 EDP NO.	1330B, 1332B EDP NO.	1330G EDP NO.	
FRAC-TIONAL	LETTER							
15/64	A	.2340	2 <sup>5</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	11445	11645	91445	
		.2344	2 <sup>5</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	11446	11646	91446	
	B	.2380	2 <sup>3</sup> / <sub>4</sub>	4	11447	11647	91447	
	C	.2420	2 <sup>3</sup> / <sub>4</sub>	4	11448	11648	91448	
1/4	D	.2460	2 <sup>3</sup> / <sub>4</sub>	4	11449	11649	91449	
	E	.2500	2 <sup>3</sup> / <sub>4</sub>	4	11450	11650	91450	
	F	.2570	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	11452	11652	91452	
	G	.2610	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	11453	11653	91453	
17/64		.2656	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	11454	11654	91454	
	H	.2660	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	11455	11655	91455	
	I	.2720	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	11456	11656	91456	
	J	.2770	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	11457	11657	91457	
9/32	K	.2810	2 <sup>15</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>4</sub>	11458	11658	91458	
		.2812	2 <sup>15</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>4</sub>	11459	11659	91459	
	L	.2900	2 <sup>15</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>4</sub>	11460	11660	91460	
	19/64	M	.2950	3 <sup>1</sup> / <sub>16</sub>	4 <sup>3</sup> / <sub>8</sub>	11461	11661	91461
		.2969	3 <sup>1</sup> / <sub>16</sub>	4 <sup>3</sup> / <sub>8</sub>	11462	11662	91462	
N		.3020	3 <sup>1</sup> / <sub>16</sub>	4 <sup>3</sup> / <sub>8</sub>	11463	11663	91463	
5/16			.3125	3 <sup>3</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	11464	11664	91464
	O	.3160	3 <sup>3</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	11465	11665	91465	
	21/64	P	.3230	3 <sup>5</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>8</sub>	11466	11666	91466
			.3281	3 <sup>5</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>8</sub>	11467	11667	91467
Q		.3320	3 <sup>7</sup> / <sub>16</sub>	4 <sup>3</sup> / <sub>4</sub>	11468	11668	91468	
11/32		R	.3390	3 <sup>7</sup> / <sub>16</sub>	4 <sup>3</sup> / <sub>4</sub>	11469	11669	91469
		.3437	3 <sup>7</sup> / <sub>16</sub>	4 <sup>3</sup> / <sub>4</sub>	11470	11670	91470	
	23/64	S	.3480	3 <sup>1</sup> / <sub>2</sub>	4 <sup>7</sup> / <sub>8</sub>	11471	11671	91471
			.3580	3 <sup>1</sup> / <sub>2</sub>	4 <sup>7</sup> / <sub>8</sub>	11472	11672	91472
T		.3594	3 <sup>1</sup> / <sub>2</sub>	4 <sup>7</sup> / <sub>8</sub>	11473	11673	91473	
3/8		U	.3680	3 <sup>5</sup> / <sub>8</sub>	5	11474	11674	91474
		.3750	3 <sup>5</sup> / <sub>8</sub>	5	11475	11675	91475	
	25/64	V	.3770	3 <sup>5</sup> / <sub>8</sub>	5	11476	11676	91476
			.3860	3 <sup>3</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>8</sub>	11477	11677	91477
W		.3906	3 <sup>3</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>8</sub>	11478	11678	91478	
7/16		X	.3970	3 <sup>3</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>8</sub>	11479	11679	91479
	Y	.4040	3 <sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	11480	11680	91480	
	13/32	Z	.4062	3 <sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	11481	11681	91481
			.4130	3 <sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	11482	11682	91482
27/64		.4219	3 <sup>15</sup> / <sub>16</sub>	5 <sup>3</sup> / <sub>8</sub>	11483	11683	91483	
29/64			.4375	4 <sup>1</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>2</sub>	11484	11684	91484
		.4531	4 <sup>3</sup> / <sub>16</sub>	5 <sup>3</sup> / <sub>8</sub>	11485	11685	91485	
	15/32		.4687	4 <sup>5</sup> / <sub>16</sub>	5 <sup>3</sup> / <sub>4</sub>	11486	11686	91486
		31/64	.4844	4 <sup>3</sup> / <sub>8</sub>	5 <sup>7</sup> / <sub>8</sub>	11487	11687	91487
1/2		.5000	4 <sup>1</sup> / <sub>2</sub>	6	11488	11688	91488	
33/64			.5156	4 <sup>13</sup> / <sub>16</sub>	6 <sup>5</sup> / <sub>8</sub>	11489	—	—
	17/32	.5312	4 <sup>13</sup> / <sub>16</sub>	6 <sup>5</sup> / <sub>8</sub>	11490	—	—	
	35/64		.5469	4 <sup>13</sup> / <sub>16</sub>	6 <sup>5</sup> / <sub>8</sub>	11491	—	—
		9/16	.5625	4 <sup>13</sup> / <sub>16</sub>	6 <sup>5</sup> / <sub>8</sub>	11492	—	—
37/64		.5781	4 <sup>13</sup> / <sub>16</sub>	6 <sup>5</sup> / <sub>8</sub>	11493	—	—	
19/32			.5938	5 <sup>3</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>8</sub>	11494	—	—
	39/64	.6094	5 <sup>3</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>8</sub>	11495	—	—	
	5/8	.6250	5 <sup>3</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>8</sub>	11496	—	—	
	41/64		.6406	5 <sup>3</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>8</sub>	11497	—	—
21/32		.6562	5 <sup>3</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>8</sub>	11498	—	—	
43/64		.6719	5 <sup>5</sup> / <sub>8</sub>	7 <sup>5</sup> / <sub>8</sub>	11499	—	—	
11/16		.6875	5 <sup>5</sup> / <sub>8</sub>	7 <sup>5</sup> / <sub>8</sub>	11500	—	—	

# Aircraft Type A Jobber Length Drills



List No. 1396 – NAS 907, Type A

**Straight Shank — High Speed Steel**  
**118° Split Point — Black Oxide Treated**

118° Self-centering split point eliminates “walking” and reduces thrust. Recommended for drilling a wide range of materials.

**STANDARD PACKAGE** Fractional Sizes  
7/64” thru 3/8” – 12 each  
25/64” thru 1/2” – 6 each

**Letter Sizes**  
A thru V – 12 each  
W thru Z – 6 each

**Wire Gage Sizes**  
#1 thru #40 – 12 each



SIZE					
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	40	.0980	1-3/8	2-3/8	14601
	39	.0995	1-3/8	2-3/8	14602
	38	.1015	1-7/16	2-1/2	14603
	37	.1040	1-7/16	2-1/2	14604
	36	.1065	1-7/16	2-1/2	14605
7/64		.1094	1-1/2	2-5/8	14606
	35	.1100	1-1/2	2-5/8	14607
	34	.1110	1-1/2	2-5/8	14608
	33	.1130	1-1/2	2-5/8	14609
	32	.1160	1-5/8	2-3/4	14610
1/8	31	.1200	1-5/8	2-3/4	14611
		.1250	1-5/8	2-3/4	14612
	30	.1285	1-5/8	2-3/4	14613
	29	.1360	1-3/4	2-7/8	14614
	28	.1405	1-3/4	2-7/8	14615
9/64		.1406	1-3/4	2-7/8	14616
	27	.1440	1-7/8	3	14617
	26	.1470	1-7/8	3	14618
	25	.1495	1-7/8	3	14619
	24	.1520	2	3-1/8	14620
5/32	23	.1540	2	3-1/8	14621
		.1562	2	3-1/8	14622
	22	.1570	2	3-1/8	14623
	21	.1590	2-1/8	3-1/4	14624
	20	.1610	2-1/8	3-1/4	14625
	19	.1660	2-1/8	3-1/4	14626
	18	.1695	2-1/8	3-1/4	14627
11/64		.1719	2-1/8	3-1/4	14628
	17	.1730	2-3/16	3-3/8	14629
	16	.1770	2-3/16	3-3/8	14630
3/16	15	.1800	2-3/16	3-3/8	14631
	14	.1820	2-3/16	3-3/8	14632
	13	.1850	2-5/16	3-1/2	14633
		.1875	2-5/16	3-1/2	14634
	12	.1890	2-5/16	3-1/2	14635
	11	.1910	2-5/16	3-1/2	14636

SIZE					
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	10	.1935	2-7/16	3-5/8	14637
	9	.1960	2-7/16	3-5/8	14638
	8	.1990	2-7/16	3-5/8	14639
	7	.2010	2-7/16	3-5/8	14640
13/64		.2031	2-7/16	3-5/8	14641
	6	.2040	2-1/2	3-3/4	14642
	5	.2055	2-1/2	3-3/4	14643
	4	.2090	2-1/2	3-3/4	14644
	3	.2130	2-1/2	3-3/4	14645
7/32		.2187	2-1/2	3-3/4	14646
	2	.2210	2-5/8	3-7/8	14647
	1	.2280	2-5/8	3-7/8	14648
15/64		.2344	2-5/8	3-7/8	14650
1/4	E	.2500	2-3/4	4	14678
17/64		.2656	2-7/8	4-1/8	14658
9/32		.2812	2-15/16	4-1/4	14663
19/64		.2969	3-1/16	4-3/8	14665
	N	.3020	3-1/16	4-3/8	14695*
5/16		.3125	3-3/16	4-1/2	14667
21/64		.3281	3-5/16	4-5/8	14670
11/32		.3437	3-7/16	4-3/4	14673
	T	.3580	3-1/2	4-7/8	14701*
23/64		.3594	3-1/2	4-7/8	14675
3/8		.3750	3-5/8	5	14677
25/64		.3906	3-3/4	5-1/8	14680
13/32		.4062	3-7/8	5-1/4	14683
27/64		.4219	3-15/16	5-3/8	14685
7/16		.4375	4-1/16	5-1/2	14686
29/64		.4531	4-3/16	5-5/8	14687
15/32		.4687	4-5/16	5-3/4	14688
31/64		.4844	4-3/8	5-7/8	14689
1/2		.5000	4-1/2	6	14690

\* Available While Supplies Last

**CUTTING FLUIDS** provide many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Left Hand Jobber Length Drills

Straight Shank - High Speed Steel  
118° Point

Used extensively in screw machine operations and in close center multiple spindle gear driven drilling heads where adjacent spindles operate alternately right and left hand.



List No. 1330L - Bright Finish

**STANDARD PACKAGE** Fractional Sizes  
1/32" thru 3/8" — 12 each  
25/64" thru 1/2" — 6 each

**Wire Gage Sizes**  
#1 thru #80 — 12 each

Tool  
Coatings  
Also  
Available



SIZE					
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	77	.0180	3/16	7/8	11954*
	75	.0210	1/4	1	11956*
	66	.0330	1/2	1-3/8	11966*
	63	.0370	5/8	1-1/2	11969*
	62	.0380	5/8	1-1/2	11970*
	61	.0390	11/16	1-5/8	11971*
	60	.0400	11/16	1-5/8	11972*
1/16	56	.0465	3/4	1-3/4	11976*
		.0625	7/8	1-7/8	11981
	52	.0635	7/8	1-7/8	11982
	51	.0670	1	2	11983
	50	.0700	1	2	11984
	49	.0730	1	2	11985
	48	.0760	1	2	11986
5/64		.0781	1	2	11987
	47	.0785	1	2	11988
	46	.0810	1-1/8	2-1/8	11989
	45	.0820	1-1/8	2-1/8	11990
	44	.0860	1-1/8	2-1/8	11991
	43	.0890	1-1/4	2-1/4	11992
3/32	42	.0935	1-1/4	2-1/4	11993
		.0937	1-1/4	2-1/4	11994
	41	.0960	1-3/8	2-3/8	11995
	40	.0980	1-3/8	2-3/8	11996
	39	.0995	1-3/8	2-3/8	11997
	38	.1015	1-7/16	2-1/2	11998
	37	.1040	1-7/16	2-1/2	11999
7/64	36	.1065	1-7/16	2-1/2	12000
		.1094	1-1/2	2-5/8	12001
	35	.1100	1-1/2	2-5/8	12002
	34	.1110	1-1/2	2-5/8	12003
	33	.1130	1-1/2	2-5/8	12004
	32	.1160	1-5/8	2-3/4	12005
	31	.1200	1-5/8	2-3/4	12006
1/8		.1250	1-5/8	2-3/4	12007
	30	.1285	1-5/8	2-3/4	12008
	29	.1360	1-3/4	2-7/8	12009
	28	.1405	1-3/4	2-7/8	12010
9/64		.1406	1-3/4	2-7/8	12011
	27	.1440	1-7/8	3	12012
	26	.1470	1-7/8	3	12013
	25	.1495	1-7/8	3	12014
	24	.1520	2	3-1/8	12015
	23	.1540	2	3-1/8	12016

SIZE					
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
5/32		.1562	2	3-1/8	12017
	22	.1570	2	3-1/8	12018
	21	.1590	2-1/8	3-1/4	12019
	20	.1610	2-1/8	3-1/4	12020
	19	.1660	2-1/8	3-1/4	12021
	18	.1695	2-1/8	3-1/4	12022
11/64		.1719	2-1/8	3-1/4	12023
	17	.1730	2-3/16	3-3/8	12024
	16	.1770	2-3/16	3-3/8	12025
	15	.1800	2-3/16	3-3/8	12026
	14	.1820	2-3/16	3-3/8	12027
	13	.1850	2-5/16	3-1/2	12028
3/16		.1875	2-5/16	3-1/2	12029
	12	.1890	2-5/16	3-1/2	12030
	11	.1910	2-5/16	3-1/2	12031
	10	.1935	2-7/16	3-5/8	12032
	9	.1960	2-7/16	3-5/8	12033
	8	.1990	2-7/16	3-5/8	12034
	7	.2010	2-7/16	3-5/8	12035
13/64		.2031	2-7/16	3-5/8	12036
	6	.2040	2-1/2	3-3/4	12037
	5	.2055	2-1/2	3-3/4	12038
	4	.2090	2-1/2	3-3/4	12039
	3	.2130	2-1/2	3-3/4	12040
7/32		.2187	2-1/2	3-3/4	12041
	2	.2210	2-5/8	3-7/8	12042
	1	.2280	2-5/8	3-7/8	12043
15/64		.2344	2-5/8	3-7/8	12044
1/4		.2500	2-3/4	4	12045
17/64		.2656	2-7/8	4-1/8	12046
9/32		.2812	2-15/16	4-1/4	12047
19/64		.2969	3-1/16	4-3/8	12048
5/16		.3125	3-3/16	4-1/2	12049
21/64		.3281	3-5/16	4-5/8	12050
11/32		.3437	3-7/16	4-3/4	12051
23/64		.3594	3-1/2	4-7/8	12052
3/8		.3750	3-5/8	5	12053
25/64		.3906	3-3/4	5-1/8	12054
13/32		.4062	3-7/8	5-1/4	12055
27/64		.4219	3-15/16	5-3/8	12056
7/16		.4375	4-1/16	5-1/2	12057
29/64		.4531	4-3/16	5-5/8	12058
15/32		.4687	4-5/16	5-3/4	12059
31/64		.4844	4-3/8	5-7/8	12060
1/2		.5000	4-1/2	6	12061

\* Available While Supplies Last

# Automotive Series Jobber Length Drills

**Straight Shank — High Speed Steel**  
**118° Point — Black Oxide Treated**

Tanged shank allows use with ASA split sleeve drivers.

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/8	.1250	1-5/8	2-3/4	<b>12101</b>
30	.1285	1-5/8	2-3/4	<b>12102</b>
29	.1360	1-3/4	2-7/8	<b>12103</b>
9/64	.1406	1-3/4	2-7/8	<b>12104</b>
26	.1470	1-7/8	3	<b>12106</b>
5/32	.1562	2	3-1/8	<b>12108</b>
20	.1610	2-1/8	3-1/4	<b>12109</b>
19	.1660	2-1/8	3-1/4	<b>12110</b>
11/64	.1719	2-1/8	3-1/4	<b>12112</b>
17	.1730	2-3/16	3-3/8	<b>12113</b>
16	.1770	2-3/16	3-3/8	<b>12114</b>
15	.1800	2-3/16	3-3/8	<b>12115</b>
3/16	.1875	2-5/16	3-1/2	<b>12117</b>
11	.1910	2-5/16	3-1/2	<b>12118</b>
13/64	.2031	2-7/16	3-5/8	<b>12122</b>
7/32	.2187	2-1/2	3-3/4	<b>12125</b>
15/64	.2344	2-5/8	3-7/8	<b>12127</b>
1/4 - E	.2500	2-3/4	4	<b>12129</b>
G	.2610	2-7/8	4-1/8	<b>12131</b>
17/64	.2656	2-7/8	4-1/8	<b>12132</b>
J	.2770	2-7/8	4-1/8	<b>12134</b>
9/32	.2812	2-15/16	4-1/4	<b>12135</b>

## Metric Sizes - Tanged Shank

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
3.40 mm	.1339	44	73	<b>12172*</b>
6.10 mm	.2402	70	102	<b>12175*</b>
9.00 mm	.3543	89	124	<b>12180*</b>

\* Available While Supplies Last

# Metric Jobber Length Drills

**Straight Shank — High Speed Steel**  
**118° Point - Black Oxide Treated**  
**DIN 338 Lengths**

SIZE MM	DEC. EQUIV.	FLUTE LENGTH MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.
.15	.0059	1.5	1/16	19	3/4	<b>12893*</b>
.34	.0134	4	5/32	19	3/4	<b>13000*</b>
.50	.0197	6	1/4	22	7/8	<b>13004</b>
.55	.0217	7	9/32	24	15/16	<b>13005</b>
.60	.0236	7	9/32	24	15/16	<b>13006</b>
.65	.0265	8	5/16	26	1-1/32	<b>13007</b>
.70	.0276	9	11/32	28	1-3/32	<b>13008</b>
.75	.0295	9	11/32	28	1-3/32	<b>13009</b>
.80	.0315	10	13/32	30	1-3/16	<b>13010</b>
.85	.0335	10	13/32	30	1-3/16	<b>13011</b>
.90	.0354	11	7/16	32	1-1/4	<b>13012</b>
.95	.0374	11	7/16	32	1-1/4	<b>13013</b>
1.00	.0394	12	15/32	34	1-11/32	<b>13014</b>
1.05	.0413	12	15/32	34	1-11/32	<b>13015</b>
1.10	.0433	14	9/16	36	1-7/16	<b>13016</b>
1.15	.0453	14	9/16	36	1-7/16	<b>13017</b>
1.20	.0472	16	5/8	38	1-1/2	<b>13018</b>
1.25	.0492	16	5/8	38	1-1/2	<b>13019</b>
1.30	.0512	16	5/8	38	1-1/2	<b>13020</b>
1.35	.0531	18	11/16	40	1-9/16	<b>13021</b>
1.40	.0551	18	11/16	40	1-9/16	<b>13022</b>

\* Available While Supplies Last



## List No. 1330A - Tanged Shank

**STANDARD PACKAGE** Fractional Sizes  
1/8" thru 3/8" — 12 each  
25/64" thru 1/2" — 6 each

**Wire Gage Sizes**  
12 each  
**Letter Sizes**  
12 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
19/64	.2969	3-1/16	4-3/8	<b>12136</b>
5/16	.3125	3-3/16	4-1/2	<b>12138</b>
21/64	.3281	3-5/16	4-5/8	<b>12141</b>
Q	.3320	3-7/16	4-3/4	<b>12142</b>
11/32	.3437	3-7/16	4-3/4	<b>12144</b>
S	.3480	3-1/2	4-7/8	<b>12145</b>
23/64	.3594	3-1/2	4-7/8	<b>12146</b>
U	.3680	3-5/8	5	<b>12147</b>
3/8	.3750	3-5/8	5	<b>12148</b>
25/64	.3906	3-3/4	5-1/8	<b>12150</b>
13/32	.4062	3-7/8	5-1/4	<b>12152</b>
27/64	.4219	3-15/16	5-3/8	<b>12153</b>
7/16	.4375	4-1/16	5-1/2	<b>12154</b>
29/64	.4531	4-3/16	5-5/8	<b>12155</b>
15/32	.4687	4-5/16	5-3/4	<b>12156</b>
1/2	.5000	4-1/2	6	<b>12158</b>
35/64	.5469	4-13/16	6-5/8	<b>12161*</b>
9/16	.5625	4-13/16	6-5/8	<b>12162</b>
5/8	.6250	5-3/16	7-1/8	<b>12166</b>
41/64	.6406	5-3/16	7-1/8	<b>12167</b>
43/64	.6719	5-5/8	7-5/8	<b>12169*</b>
11/16	.6875	5-5/8	7-5/8	<b>12170</b>



## List No. 1333

**STANDARD PACKAGE** .15 mm thru 9.5 mm — 12 each  
9.6 mm thru 13.0 mm — 6 each  
13.5mm thru 17.5 mm — 1 each

SIZE MM	DEC. EQUIV.	FLUTE LENGTH MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.
1.45	.0571	18	11/16	40	1-9/16	<b>13023</b>
1.50	.0591	18	11/16	40	1-9/16	<b>13024</b>
1.55	.0610	20	25/32	43	1-11/16	<b>13025</b>
1.60	.0630	20	25/32	43	1-11/16	<b>13026</b>
1.65	.0650	20	25/32	43	1-11/16	<b>13027</b>
1.70	.0669	20	25/32	43	1-11/16	<b>13028</b>
1.75	.0689	22	7/8	46	1-13/16	<b>13029</b>
1.80	.0709	22	7/8	46	1-13/16	<b>13030</b>
1.85	.0728	22	7/8	46	1-13/16	<b>13031</b>
1.90	.0748	22	7/8	46	1-13/16	<b>13032</b>
1.95	.0768	24	15/16	49	1-15/16	<b>13033</b>
2.00	.0787	24	15/16	49	1-15/16	<b>13034</b>
2.05	.0807	24	15/16	49	1-15/16	<b>13035</b>
2.10	.0827	24	15/16	49	1-15/16	<b>13036</b>
2.15	.0846	27	1-1/16	53	2-3/32	<b>13037</b>
2.20	.0866	27	1-1/16	53	2-3/32	<b>13038</b>
2.25	.0886	27	1-1/16	53	2-3/32	<b>13039</b>
2.30	.0906	27	1-1/16	53	2-3/32	<b>13040</b>
2.35	.0925	27	1-1/16	53	2-3/32	<b>13041</b>
2.40	.0945	30	1-3/16	57	2-1/4	<b>13042</b>
2.45	.0965	30	1-3/16	57	2-1/4	<b>13043</b>

(continued)





# Metric Jobber Length Drills (continued)

List No. 1333

**DRILLS**

SIZE MM	DEC. EQUIV.	FLUTE LENGTH		OAL		EDP NO.
		MM	IN.	MM	IN.	
2.50	.0984	30	1-3/16	57	2-1/4	<b>13044</b>
2.60	.1024	30	1-3/16	57	2-1/4	<b>13045</b>
2.70	.1063	33	1-5/16	61	2-13/32	<b>13046</b>
2.75	.1083	33	1-5/16	61	2-13/32	<b>13047</b>
2.80	.1102	33	1-5/16	61	2-13/32	<b>13048</b>
2.90	.1142	33	1-5/16	61	2-13/32	<b>13049</b>
3.00	.1181	33	1-5/16	61	2-13/32	<b>13050</b>
3.10	.1220	36	1-7/16	65	2-9/16	<b>13051</b>
3.20	.1260	36	1-7/16	65	2-9/16	<b>13052</b>
3.25	.1280	36	1-7/16	65	2-9/16	<b>13053</b>
3.30	.1299	36	1-7/16	65	2-9/16	<b>13054</b>
3.40	.1339	39	1-17/32	70	2-3/4	<b>13055</b>
3.50	.1378	39	1-17/32	70	2-3/4	<b>13056</b>
3.60	.1417	39	1-17/32	70	2-3/4	<b>13057</b>
3.70	.1457	39	1-17/32	70	2-3/4	<b>13058</b>
3.75	.1476	39	1-17/32	70	2-3/4	<b>13059</b>
3.80	.1496	43	1-11/16	75	2-15/16	<b>13060</b>
3.90	.1535	43	1-11/16	75	2-15/16	<b>13061</b>
4.00	.1575	43	1-11/16	75	2-15/16	<b>13062</b>
4.10	.1614	43	1-11/16	75	2-15/16	<b>13063</b>
4.20	.1654	43	1-11/16	75	2-15/16	<b>13064</b>
4.25	.1673	43	1-11/16	75	2-15/16	<b>13065</b>
4.30	.1693	47	1-27/32	80	3-5/32	<b>13066</b>
4.40	.1732	47	1-27/32	80	3-5/32	<b>13067</b>
4.50	.1772	47	1-27/32	80	3-5/32	<b>13068</b>
4.60	.1811	47	1-27/32	80	3-5/32	<b>13069</b>
4.70	.1850	47	1-27/32	80	3-5/32	<b>13070</b>
4.75	.1870	47	1-27/32	80	3-5/32	<b>13071</b>
4.80	.1890	52	2-1/16	86	3-3/8	<b>13072</b>
4.90	.1929	52	2-1/16	86	3-3/8	<b>13073</b>
5.00	.1968	52	2-1/16	86	3-3/8	<b>13074</b>
5.10	.2008	52	2-1/16	86	3-3/8	<b>13075</b>
5.20	.2047	52	2-1/16	86	3-3/8	<b>13076</b>
5.25	.2067	52	2-1/16	86	3-3/8	<b>13077</b>
5.30	.2087	52	2-1/16	86	3-3/8	<b>13078</b>
5.40	.2126	57	2-1/4	93	3-21/32	<b>13079</b>
5.50	.2165	57	2-1/4	93	3-21/32	<b>13080</b>
5.60	.2205	57	2-1/4	93	3-21/32	<b>13081</b>
5.70	.2244	57	2-1/4	93	3-21/32	<b>13082</b>
5.75	.2264	57	2-1/4	93	3-21/32	<b>13083</b>
5.80	.2283	57	2-1/4	93	3-21/32	<b>13084</b>
5.90	.2323	57	2-1/4	93	3-21/32	<b>13085</b>
6.00	.2362	57	2-1/4	93	3-21/32	<b>13086</b>
6.10	.2402	63	2-15/32	101	3-31/32	<b>13087</b>
6.20	.2441	63	2-15/32	101	3-31/32	<b>13088</b>
6.25	.2461	63	2-15/32	101	3-31/32	<b>13089</b>
6.30	.2480	63	2-15/32	101	3-31/32	<b>13090</b>
6.40	.2520	63	2-15/32	101	3-31/32	<b>13091</b>
6.50	.2559	63	2-15/32	101	3-31/32	<b>13092</b>
6.60	.2598	63	2-15/32	101	3-31/32	<b>13093</b>
6.70	.2638	63	2-15/32	101	3-31/32	<b>13094</b>
6.75	.2657	69	2-23/32	109	4-9/32	<b>13095</b>
6.80	.2677	69	2-23/32	109	4-9/32	<b>13096</b>
6.90	.2717	69	2-23/32	109	4-9/32	<b>13097</b>
7.00	.2756	69	2-23/32	109	4-9/32	<b>13098</b>
7.10	.2795	69	2-23/32	109	4-9/32	<b>13099</b>

SIZE MM	DEC. EQUIV.	FLUTE LENGTH		OAL		EDP NO.
		MM	IN.	MM	IN.	
7.20	.2835	69	2-23/32	109	4-9/32	<b>13100</b>
7.25	.2854	69	2-23/32	109	4-9/32	<b>13101</b>
7.30	.2874	69	2-23/32	109	4-9/32	<b>13102</b>
7.40	.2913	69	2-23/32	109	4-9/32	<b>13103</b>
7.50	.2953	69	2-23/32	109	4-9/32	<b>13104</b>
7.60	.2992	75	2-15/16	117	4-19/32	<b>13105</b>
7.70	.3031	75	2-15/16	117	4-19/32	<b>13106</b>
7.75	.3051	75	2-15/16	117	4-19/32	<b>13107</b>
7.80	.3071	75	2-15/16	117	4-19/32	<b>13108</b>
7.90	.3110	75	2-15/16	117	4-19/32	<b>13109</b>
8.00	.3150	75	2-15/16	117	4-19/32	<b>13110</b>
8.10	.3189	75	2-15/16	117	4-19/32	<b>13111</b>
8.20	.3228	75	2-15/16	117	4-19/32	<b>13112</b>
8.25	.3248	75	2-15/16	117	4-19/32	<b>13113</b>
8.30	.3268	75	2-15/16	117	4-19/32	<b>13114</b>
8.40	.3307	75	2-15/16	117	4-19/32	<b>13115</b>
8.50	.3346	75	2-15/16	117	4-19/32	<b>13116</b>
8.60	.3386	81	3-3/16	125	4-29/32	<b>13117</b>
8.70	.3425	81	3-3/16	125	4-29/32	<b>13118</b>
8.75	.3445	81	3-3/16	125	4-29/32	<b>13119</b>
8.80	.3465	81	3-3/16	125	4-29/32	<b>13120</b>
8.90	.3504	81	3-3/16	125	4-29/32	<b>13121</b>
9.00	.3543	81	3-3/16	125	4-29/32	<b>13122</b>
9.10	.3583	81	3-3/16	125	4-29/32	<b>13123</b>
9.20	.3622	81	3-3/16	125	4-29/32	<b>13124</b>
9.25	.3642	81	3-3/16	125	4-29/32	<b>13125</b>
9.30	.3661	81	3-3/16	125	4-29/32	<b>13126</b>
9.40	.3701	81	3-3/16	125	4-29/32	<b>13127</b>
9.50	.3740	81	3-3/16	125	4-29/32	<b>13128</b>
9.60	.3780	87	3-7/16	133	5-1/4	<b>13129</b>
9.70	.3819	87	3-7/16	133	5-1/4	<b>13130</b>
9.75	.3839	87	3-7/16	133	5-1/4	<b>13131</b>
9.80	.3898	87	3-7/16	133	5-1/4	<b>13132</b>
9.90	.3998	87	3-7/16	133	5-1/4	<b>13133</b>
10.00	.3937	87	3-7/16	133	5-1/4	<b>13134</b>
10.20	.4016	87	3-7/16	133	5-1/4	<b>12858</b>
10.30	.4055	87	3-7/16	133	5-1/4	<b>12859</b>
10.50	.4134	87	3-7/16	133	5-1/4	<b>13135</b>
10.80	.4252	94	3-11/16	142	5-19/32	<b>12863</b>
11.00	.4331	94	3-11/16	142	5-19/32	<b>13136</b>
11.20	.4409	94	3-11/16	142	5-19/32	<b>12866</b>
11.50	.4528	94	3-11/16	142	5-19/32	<b>13137</b>
11.80	.4646	94	3-11/16	142	5-19/32	<b>12871</b>
12.00	.4724	101	3-31/32	151	5-15/16	<b>13138</b>
12.20	.4803	101	3-31/32	151	5-15/16	<b>12874</b>
12.50	.4921	101	3-31/32	151	5-15/16	<b>13139</b>
13.00	.5118	101	3-31/32	151	5-15/16	<b>13140</b>
13.50	.5315	108	4-1/4	160	6-5/16	<b>12881</b>
14.00	.5512	108	4-1/4	160	6-5/16	<b>12882</b>
14.50	.5709	114	4-1/2	169	6-5/8	<b>12883</b>
15.00	.5906	114	4-1/2	169	6-5/8	<b>12884</b>
15.50	.6102	120	4-3/4	178	7	<b>12885</b>
16.00	.6299	120	4-3/4	178	7	<b>12886</b>
16.50	.6496	125	4-29/32	184	7-1/4	<b>12887</b>
17.00	.6693	125	4-29/32	184	7-1/4	<b>12888</b>
17.50	.6890	130	5-3/32	191	7-17/32	<b>12890</b>

# Low Helix & High Helix Jobber Length Drills

**Straight Shank — High Speed Steel**  
**118° Point — Bright Finish**

**Low Helix** drills are recommended for drilling brass, bronze, hard plastic and hard rubber. Wide flutes and low helix angle enhance chip ejection at high rates of penetration.

**High Helix** drills are recommended for deep hole drilling in low tensile strength materials such as aluminum, magnesium, zinc, copper, soft steels and some plastics. Wide polished flutes and a high helix angle enhance chip ejection.



List No. 1344 — Low Helix - All Sizes



List No. 1363 — High Helix-Fractional

List No. 1364 — High Helix-Wire Gage

**STANDARD PACKAGE** Fractional Sizes  
1/16" thru 3/8" — 12 each  
25/64" thru 1/2" — 6 each

**Wire Gage Sizes**  
#1 thru #60 — 12 each

**Tool Coatings  
Also Available**



FRAC-TIONAL	SIZE	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1344 EDP NO.	1363, 1364 EDP NO.
		60	.0400	11/16	15/8	14023	14172
		59	.0410	11/16	15/8	14024	14173
		58	.0420	11/16	15/8	14025	14174
		57	.0430	3/4	13/4	14026	14175
		56	.0465	3/4	13/4	14027	14176
		55	.0520	7/8	17/8	14028	14178
		54	.0550	7/8	17/8	14029	14179
		53	.0595	7/8	17/8	14030	14180
1/16			.0625	7/8	17/8	14031	14181
		52	.0635	7/8	17/8	14032	14182
		51	.0670	1	2	14033	14183
		50	.0700	1	2	14034	14184
		49	.0730	1	2	14035	14185
		48	.0760	1	2	14036	14186
5/64			.0781	1	2	14037	14187
		47	.0785	1	2	14038	14188
		46	.0810	1 1/8	2 1/8	14039	14189
		45	.0820	1 1/8	2 1/8	14040	14190
		44	.0860	1 1/8	2 1/8	14041	14191
		43	.0890	1 1/4	2 1/4	14042	14192
		42	.0935	1 1/4	2 1/4	14043	14193
3/32			.0937	1 1/4	2 1/4	14044	14194
		41	.0960	1 3/8	2 3/8	14045	14195
		40	.0980	1 3/8	2 3/8	14046	14196
		39	.0995	1 3/8	2 3/8	14047	14197
		38	.1015	1 7/16	2 1/2	14048	14198
		37	.1040	1 7/16	2 1/2	14049	14199
		36	.1065	1 7/16	2 1/2	14050	14200
7/64			.1094	1 1/2	2 5/8	14051	14201
		35	.1100	1 1/2	2 5/8	14052	14202
		34	.1110	1 1/2	2 5/8	14053	14203
		33	.1130	1 1/2	2 5/8	14054	14204
		32	.1160	1 5/8	2 3/4	14055	14205
		31	.1200	1 5/8	2 3/4	14056	14206
1/8			.1250	1 5/8	2 3/4	14057	14207
		30	.1285	1 5/8	2 3/4	14058	14208
		29	.1360	1 3/4	2 7/8	14059	14209
		28	.1405	1 3/4	2 7/8	14060	14210
9/64			.1406	1 3/4	2 7/8	14061	14211
		27	.1440	1 7/8	3	14062	14212

(continued)

# Low Helix & High Helix Jobber Length Drills (continued)

List Nos. 1344, 1363 and 1364



**DRILLS**

FRAC-TIONAL	SIZE	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1344 EDP NO.	1363, 1364 EDP NO.
		26	.1470	1 $\frac{7}{8}$	3	14063	14213
		25	.1495	1 $\frac{7}{8}$	3	14064	14214
		24	.1520	2	3 $\frac{1}{8}$	14065	14215
		23	.1540	2	3 $\frac{1}{8}$	14066	14216
	5/32		.1562	2	3 $\frac{1}{8}$	14067	14217
		22	.1570	2	3 $\frac{1}{8}$	14068	14218
		21	.1590	2 $\frac{1}{8}$	3 $\frac{1}{4}$	14069	14219
		20	.1610	2 $\frac{1}{8}$	3 $\frac{1}{4}$	14070	14220
		19	.1660	2 $\frac{1}{8}$	3 $\frac{1}{4}$	14071	14221
		18	.1695	2 $\frac{1}{8}$	3 $\frac{1}{4}$	14072	14222
	1 $\frac{1}{64}$		.1719	2 $\frac{1}{8}$	3 $\frac{1}{4}$	14073	14223
		17	.1730	2 $\frac{3}{16}$	3 $\frac{3}{8}$	14074	14224
		16	.1770	2 $\frac{3}{16}$	3 $\frac{3}{8}$	14075	14225
		15	.1800	2 $\frac{3}{16}$	3 $\frac{3}{8}$	14076	14226
		14	.1820	2 $\frac{3}{16}$	3 $\frac{3}{8}$	14077	14227
		13	.1850	2 $\frac{5}{16}$	3 $\frac{1}{2}$	14078	14228
	3/16		.1875	2 $\frac{5}{16}$	3 $\frac{1}{2}$	14079	14229
		12	.1890	2 $\frac{5}{16}$	3 $\frac{1}{2}$	14080	14230
		11	.1910	2 $\frac{5}{16}$	3 $\frac{1}{2}$	14081	14231
		10	.1935	2 $\frac{7}{16}$	3 $\frac{5}{8}$	14082	14232
		9	.1960	2 $\frac{7}{16}$	3 $\frac{5}{8}$	14083	14233
		8	.1990	2 $\frac{7}{16}$	3 $\frac{5}{8}$	14084	14234
		7	.2010	2 $\frac{7}{16}$	3 $\frac{5}{8}$	14085	14235
	1 $\frac{3}{64}$		.2031	2 $\frac{7}{16}$	3 $\frac{5}{8}$	14086	14236
		6	.2040	2 $\frac{1}{2}$	3 $\frac{3}{4}$	14087	14237
		5	.2055	2 $\frac{1}{2}$	3 $\frac{3}{4}$	14088	14238
		4	.2090	2 $\frac{1}{2}$	3 $\frac{3}{4}$	14089	14239
		3	.2130	2 $\frac{1}{2}$	3 $\frac{3}{4}$	14090	14240
	7/32		.2187	2 $\frac{1}{2}$	3 $\frac{3}{4}$	14091	14241
		2	.2210	2 $\frac{5}{8}$	3 $\frac{7}{8}$	14092	14242
		1	.2280	2 $\frac{5}{8}$	3 $\frac{7}{8}$	14093	14243
	1 $\frac{5}{64}$		.2344	2 $\frac{5}{8}$	3 $\frac{7}{8}$	14095	14245
	1/4		.2500	2 $\frac{3}{4}$	4	14099	14249
	1 $\frac{7}{64}$		.2656	2 $\frac{7}{8}$	4 $\frac{1}{8}$	14103	14253
	9/32		.2812	2 $\frac{15}{16}$	4 $\frac{1}{4}$	14108	14258
	1 $\frac{9}{64}$		.2969	3 $\frac{1}{16}$	4 $\frac{3}{8}$	14111	14261
	5/16		.3125	3 $\frac{3}{16}$	4 $\frac{1}{2}$	14113	14263
	2 $\frac{1}{64}$		.3281	3 $\frac{5}{16}$	4 $\frac{5}{8}$	14116	14266
	1 $\frac{1}{32}$		.3437	3 $\frac{7}{16}$	4 $\frac{3}{4}$	14119	14269
	2 $\frac{3}{64}$		.3593	3 $\frac{1}{2}$	4 $\frac{7}{8}$	14122	14272
	3/8		.3750	3 $\frac{3}{8}$	5	14124	14274
	2 $\frac{5}{64}$		.3906	3 $\frac{3}{4}$	5 $\frac{1}{8}$	14127	14277
	1 $\frac{3}{32}$		.4062	3 $\frac{7}{8}$	5 $\frac{1}{4}$	14130	14280
	2 $\frac{7}{64}$		.4219	3 $\frac{15}{16}$	5 $\frac{3}{8}$	14132	14282
	7/16		.4375	4 $\frac{1}{16}$	5 $\frac{1}{2}$	14133	14283
	2 $\frac{9}{64}$		.4531	4 $\frac{3}{16}$	5 $\frac{5}{8}$	14134	14284
	1 $\frac{5}{32}$		.4687	4 $\frac{5}{16}$	5 $\frac{3}{4}$	14135	14285
	3 $\frac{1}{64}$		.4844	4 $\frac{3}{8}$	5 $\frac{7}{8}$	14136	14286
	1/2		.5000	4 $\frac{1}{2}$	6	14137	14287

# Parabolic Flute Jobber Length Drills

**Straight Shank - High Speed Steel  
135° Split Point**

**Parabolic Flute** drills feature a unique flute design that greatly enhances chip flow, coolant flow to the drill point and heat dissipation in deep hole drilling greater than three diameters deep. Recommended for drilling aluminum and other low to medium tensile strength materials.

**Titanium Nitride (TiN) Coating** increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Enhanced hole quality at higher speeds and feeds.

135° Self-centering split point eliminates "walking" and reduces thrust.



List No. 1355 — Bright Finish



List No. 1355G — TiN Coated

**STANDARD PACKAGE** Fractional Sizes  
1/16" thru 3/8" — 12 each  
25/64" Thru 1/2" — 6 each

**Wire Gages**  
#1 thru #52 — 12 each

Tool Coatings Also Available



FRAC-TIONAL	SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL	1355	1355G
	WIRE GAGE					BRIGHT EDP NO.	TIN COAT EDP NO.
1/16			.0625	7/8	1-7/8	13330	93330
	52		.0635	7/8	1-7/8	13329	93329
	51		.0670	1	2	13328	93328
	50		.0700	1	2	13327	93327
	49		.0730	1	2	13326	93326
5/64	48		.0760	1	2	13325	93325
			.0781	1	2	13331	93331
	47		.0785	1	2	13324	93324
	46		.0810	1-1/8	2-1/8	13323	93323
	45		.0820	1-1/8	2-1/8	13322	93322
3/32			.0860	1-1/8	2-1/8	13321	93321
			.0890	1-1/4	2-1/4	13320	93320
			.0935	1-1/4	2-1/4	13319	93319
			.0938	1-1/4	2-1/4	13332	93332
			.0960	1-3/8	2-3/8	13318	93318
			.0980	1-3/8	2-3/8	13317	93317
			.0995	1-3/8	2-3/8	13316	93316
7/64			.1015	1-7/16	2-1/2	13315	93315
			.1040	1-7/16	2-1/2	13314	93314
			.1065	1-7/16	2-1/2	13313	93313
			.1094	1-1/2	2-5/8	13333	93333
			.1100	1-1/2	2-5/8	13312	93312
1/8			.1110	1-1/2	2-5/8	13311	93311
			.1130	1-1/2	2-5/8	13310	93310
			.1160	1-5/8	2-3/4	13309	93309
			.1200	1-5/8	2-3/4	13308	93308
			.1250	1-5/8	2-3/4	13334	93334
9/64			.1285	1-5/8	2-3/4	13307	93307
			.1360	1-3/4	2-7/8	13306	93306
			.1405	1-3/4	2-7/8	13305	93305
			.1406	1-3/4	2-7/8	13335	93335
			.1440	1-7/8	3	13304	93304
5/32			.1470	1-7/8	3	13303	93303
			.1495	1-7/8	3	13302	93302
			.1520	2	3-1/8	13301	93301
			.1540	2	3-1/8	13300	93300
			.1562	2	3-1/8	13336	93336
11/64			.1570	2	3-1/8	13299	93299
			.1590	2-1/8	3-1/4	13298	93298
			.1610	2-1/8	3-1/4	13297	93297
			.1660	2-1/8	3-1/4	13296	93296
			.1695	2-1/8	3-1/4	13295	93295
		.1719	2-1/8	3-1/4	13337	93337	

(continued)



# Parabolic Flute Jobber Length Drills (continued)

List Nos. 1355 and 1355G

FRAC-TIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1355 BRIGHT EDP NO.	1355G TIN COAT EDP NO.
	17	.1730	2-3/16	3-3/8	13294	93294
	16	.1770	2-3/16	3-3/8	13293	93293
	15	.1800	2-3/16	3-3/8	13292	93292
	14	.1820	2-3/16	3-3/8	13291	93291
	13	.1850	2-5/16	3-1/2	13290	93290
3/16		.1875	2-5/16	3-1/2	13338	93338
	12	.1890	2-5/16	3-1/2	13289	93289
	11	.1910	2-5/16	3-1/2	13288	93288
	10	.1935	2-7/16	3-5/8	13287	93287
	9	.1960	2-7/16	3-5/8	13286	93286
	8	.1990	2-7/16	3-5/8	13285	93285
	7	.2010	2-7/16	3-5/8	13284	93284
13/64		.2031	2-7/16	3-5/8	13339	93339
	6	.2040	2-1/2	3-3/4	13283	93283
	5	.2055	2-1/2	3-3/4	13282	93282
	4	.2090	2-1/2	3-3/4	13281	93281
	3	.2130	2-1/2	3-3/4	13280	93280
7/32		.2188	2-1/2	3-3/4	13340	93340
	2	.2210	2-5/8	3-7/8	13279	93279
	1	.2280	2-5/8	3-7/8	13278	93278
15/64		.2344	2-5/8	3-7/8	13341	93341
1/4		.2500	2-3/4	4	13342	93342
17/64		.2656	2-7/8	4-1/8	13343	93343
9/32		.2812	2-15/16	4-1/4	13344	93344
19/64		.2969	3-1/16	4-3/8	13345	93345
5/16		.3125	3-3/16	4-1/2	13346	93346
21/64		.3281	3-5/16	4-5/8	13347	93347
11/32		.3438	3-7/16	4-3/4	13348	93348
23/64		.3594	3-1/2	4-7/8	13349	93349
3/8		.3750	3-5/8	5	13350	93350
25/64		.3906	3-3/4	5-1/8	13351	93351
13/32		.4062	3-7/8	5-1/4	13352	93352
27/64		.4219	3-15/16	5-3/8	13353	93353
7/16		.4375	4-1/16	5-1/2	13354	93354
29/64		.4531	4-3/16	5-5/8	13355	93355
15/32		.4688	4-5/16	5-3/4	13356	93356
31/64		.4844	4-3/8	5-7/8	13357	93357
1/2		.5000	4-1/2	6	13358	93358

## TOOL COATING SERVICE

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish. **PLEASE INQUIRE.**

**TiN** — Titanium Nitride

**TiCN** — Titanium Carbonitride

**TiAlN** — Titanium Aluminum Nitride

**AlTiN** — Aluminum Titanium Nitride

**CrN** — Chromium Nitride

**CrC** — Chromium Carbide

**DLC** — Amorphous Diamond-Like Carbon

# Ambore™ Heavy Duty Jobber Length Drills

**Straight Shank — High Speed Steel**  
**135° Split Point — Heavy Duty**

135° Self-centering split point eliminates "walking" and reduces thrust. Recommended for a wide variety of low to medium tensile strength materials.

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/16	.0625	7/8	1 7/8	12062
5/64	.0781	1	2	12063
3/32	.0938	1 1/4	2 1/4	12064
7/64	.1094	1 1/2	2 5/8	12065
1/8	.1250	1 5/8	2 3/4	12066
9/64	.1406	1 3/4	2 7/8	12067
5/32	.1562	2	3 1/8	12068
11/64	.1719	2 1/8	3 1/4	12069
3/16	.1875	2 5/16	3 1/2	12070
13/64	.2031	2 7/16	3 5/8	12071
7/32	.2188	2 1/2	3 3/4	12072
15/64	.2344	2 5/8	3 7/8	12073
1/4	.2500	2 3/4	4	12074
17/64	.2656	2 7/8	4 1/8	12075
9/32	.2812	2 15/16	4 1/4	12076



## List No. 1384 — Gold & Black Finish

**STANDARD PACKAGE** Fractional Sizes  
1/16" thru 3/8" — 12 each  
25/64" thru 1/2" — 6 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
19/64	.2969	3 1/16	4 3/8	12077
5/16	.3125	3 3/16	4 1/2	12078
21/64	.3281	3 5/16	4 5/8	12079
11/32	.3438	3 7/16	4 3/4	12080
23/64	.3594	3 1/2	4 7/8	12081
3/8	.3750	3 3/8	5	12082
25/64	.3906	3 3/4	5 1/8	12083
13/32	.4062	3 7/8	5 1/4	12084
27/64	.4219	3 15/16	5 3/8	12085
7/16	.4375	4 1/16	5 1/2	12086
29/64	.4531	4 3/16	5 5/8	12087
15/32	.4688	4 5/16	5 3/4	12088
31/64	.4844	4 3/8	5 7/8	12089
1/2	.5000	4 1/2	6	12090



# Aircraft Type B Heavy Duty Jobber Length Drills

**Straight Shank — High Speed Steel**  
**135° Split Point — Black Oxide Treated**

135° Self-centering split point eliminates "walking" and reduces thrust. Recommended for a wide variety of low to medium tensile strength materials.



## List No. 1385 - NAS 907, Type B

**STANDARD PACKAGE** Fractional Sizes  
1/64" thru 3/8" — 12 each  
25/64" thru 1/2" — 6 each

**Letter Sizes**  
A thru V — 12 each  
W thru Z — 6 each

**Wire Gage Sizes**  
#1 thru #80 — 12 each

SIZE	FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/64		80	.0135	1/8	3/4	14301*
		79	.0145	1/8	3/4	14302*
			.0156	3/16	3/4	14303*
		78	.0160	3/16	7/8	14304*
		77	.0180	3/16	7/8	14305*
1/32		76	.0200	3/16	7/8	14306*
		75	.0210	1/4	1	14307*
		74	.0225	1/4	1	14308*
		73	.0240	5/16	1 1/8	14309*
		72	.0250	5/16	1 1/8	14310*
		71	.0260	3/8	1 1/4	14311*
		70	.0280	3/8	1 1/4	14312*
1/16		69	.0292	1/2	1 3/8	14313*
		68	.0310	1/2	1 3/8	14314*
			.0312	1/2	1 3/8	14315*
		67	.0320	1/2	1 3/8	14316*
		66	.0330	1/2	1 3/8	14317*

SIZE	FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
3/64		65	.0350	5/8	1 1/2	14318*
		64	.0360	5/8	1 1/2	14319*
		63	.0370	5/8	1 1/2	14320*
		62	.0380	5/8	1 1/2	14321*
		61	.0390	1 1/16	1 5/8	14322*
		60	.0400	1 1/16	1 5/8	14323*
		59	.0410	1 1/16	1 5/8	14324*
		58	.0420	1 1/16	1 5/8	14325*
		57	.0430	3/4	1 3/4	14326*
		56	.0465	3/4	1 3/4	14327*
1/8			.0469	3/4	1 3/4	14328*
		55	.0520	7/8	1 7/8	14329*
		54	.0550	7/8	1 7/8	14330*
		53	.0595	7/8	1 7/8	14331*
			.0625	7/8	1 7/8	14451
1/4		52	.0635	7/8	1 7/8	14452
		51	.0670	1	2	14453

\* Sizes #53 and smaller furnished with 135° regular point

(continued)

SIZE					
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	50	.0700	1	2	<b>14454</b>
	49	.0730	1	2	<b>14455</b>
	48	.0760	1	2	<b>14456</b>
5/64		.0781	1	2	<b>14457</b>
	47	.0785	1	2	<b>14458</b>
	46	.0810	1 1/8	2 1/8	<b>14459</b>
	45	.0820	1 1/8	2 1/8	<b>14460</b>
	44	.0860	1 1/8	2 1/8	<b>14461</b>
	43	.0890	1 1/4	2 1/4	<b>14462</b>
	42	.0935	1 1/4	2 1/4	<b>14463</b>
3/32		.0937	1 1/4	2 1/4	<b>14464</b>
	41	.0960	1 3/8	2 3/8	<b>14465</b>
	40	.0980	1 3/8	2 3/8	<b>14466</b>
	39	.0995	1 3/8	2 3/8	<b>14467</b>
	38	.1015	1 7/16	2 1/2	<b>14468</b>
	37	.1040	1 7/16	2 1/2	<b>14469</b>
	36	.1065	1 7/16	2 1/2	<b>14470</b>
7/64		.1094	1 1/2	2 5/8	<b>14471</b>
	35	.1100	1 1/2	2 5/8	<b>14472</b>
	34	.1110	1 1/2	2 5/8	<b>14473</b>
	33	.1130	1 1/2	2 5/8	<b>14474</b>
	32	.1160	1 5/8	2 3/4	<b>14475</b>
	31	.1200	1 5/8	2 3/4	<b>14476</b>
1/8		.1250	1 5/8	2 3/4	<b>14477</b>
	30	.1285	1 5/8	2 3/4	<b>14478</b>
	29	.1360	1 3/4	2 7/8	<b>14479</b>
	28	.1405	1 3/4	2 7/8	<b>14480</b>
9/64		.1406	1 3/4	2 7/8	<b>14481</b>
	27	.1440	1 7/8	3	<b>14482</b>
	26	.1470	1 7/8	3	<b>14483</b>
	25	.1495	1 7/8	3	<b>14484</b>
	24	.1520	2	3 1/8	<b>14485</b>
	23	.1540	2	3 1/8	<b>14486</b>
5/32		.1562	2	3 1/8	<b>14487</b>
	22	.1570	2	3 1/8	<b>14488</b>
	21	.1590	2 1/8	3 1/4	<b>14489</b>
	20	.1610	2 1/8	3 1/4	<b>14490</b>
	19	.1660	2 1/8	3 1/4	<b>14491</b>
	18	.1695	2 1/8	3 1/4	<b>14492</b>
1 1/64		.1719	2 1/8	3 1/4	<b>14493</b>
	17	.1730	2 3/16	3 3/8	<b>14494</b>
	16	.1770	2 3/16	3 3/8	<b>14495</b>
	15	.1800	2 3/16	3 3/8	<b>14496</b>
	14	.1820	2 3/16	3 3/8	<b>14497</b>
	13	.1850	2 5/16	3 1/2	<b>14498</b>
3/16		.1875	2 5/16	3 1/2	<b>14499</b>
	12	.1890	2 5/16	3 1/2	<b>14500</b>
	11	.1910	2 5/16	3 1/2	<b>14501</b>
	10	.1935	2 7/16	3 5/8	<b>14502</b>
	9	.1960	2 7/16	3 5/8	<b>14503</b>
	8	.1990	2 7/16	3 5/8	<b>14504</b>
	7	.2010	2 7/16	3 5/8	<b>14505</b>
1 3/64		.2031	2 7/16	3 5/8	<b>14506</b>
	6	.2040	2 1/2	3 3/4	<b>14507</b>
	5	.2055	2 1/2	3 3/4	<b>14508</b>
	4	.2090	2 1/2	3 3/4	<b>14509</b>
	3	.2130	2 1/2	3 3/4	<b>14510</b>
7/32		.2187	2 1/2	3 3/4	<b>14511</b>
	2	.2210	2 5/8	3 7/8	<b>14512</b>
	1	.2280	2 5/8	3 7/8	<b>14513</b>

SIZE					
FRAC-TIONAL	LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	A	.2340	2 5/8	3 7/8	<b>14514</b>
1 5/64		.2344	2 5/8	3 7/8	<b>14515</b>
	B	.2380	2 3/4	4	<b>14516</b>
	C	.2420	2 3/4	4	<b>14517</b>
	D	.2460	2 3/4	4	<b>14518</b>
1/4	E	.2500	2 3/4	4	<b>14519</b>
	F	.2570	2 7/8	4 1/8	<b>14521</b>
	G	.2610	2 7/8	4 1/8	<b>14522</b>
1 7/64		.2656	2 7/8	4 1/8	<b>14523</b>
	H	.2660	2 7/8	4 1/8	<b>14524</b>
	I	.2720	2 7/8	4 1/8	<b>14525</b>
	J	.2770	2 7/8	4 1/8	<b>14526</b>
	K	.2810	2 15/16	4 1/4	<b>14527</b>
9/32		.2812	2 15/16	4 1/4	<b>14528</b>
	L	.2900	2 15/16	4 1/4	<b>14529</b>
	M	.2950	3 1/16	4 3/8	<b>14530</b>
1 9/64		.2969	3 1/16	4 3/8	<b>14531</b>
	N	.3020	3 1/16	4 3/8	<b>14532</b>
5/16		.3125	3 3/16	4 1/2	<b>14533</b>
	O	.3160	3 3/16	4 1/2	<b>14534</b>
	P	.3230	3 5/16	4 5/8	<b>14535</b>
2 1/64		.3281	3 5/16	4 5/8	<b>14536</b>
	Q	.3320	3 7/16	4 3/4	<b>14537</b>
	R	.3390	3 7/16	4 3/4	<b>14538</b>
1 1/32		.3437	3 7/16	4 3/4	<b>14539</b>
	S	.3480	3 1/2	4 7/8	<b>14540</b>
	T	.3580	3 1/2	4 7/8	<b>14541</b>
2 3/64		.3594	3 1/2	4 7/8	<b>14542</b>
	U	.3680	3 5/8	5	<b>14543</b>
3/8		.3750	3 5/8	5	<b>14544</b>
	V	.3770	3 5/8	5	<b>14545</b>
	W	.3860	3 3/4	5 1/8	<b>14546</b>
2 5/64		.3906	3 3/4	5 1/8	<b>14547</b>
	X	.3970	3 3/4	5 1/8	<b>14548</b>
	Y	.4040	3 7/8	5 1/4	<b>14549</b>
1 3/32		.4062	3 7/8	5 1/4	<b>14550</b>
	Z	.4130	3 7/8	5 1/4	<b>14551</b>
2 7/64		.4219	3 15/16	5 3/8	<b>14552</b>
7/16		.4375	4 1/16	5 1/2	<b>14553</b>
2 9/64		.4531	4 3/16	5 5/8	<b>14554</b>
1 5/32		.4687	4 5/16	5 3/4	<b>14555</b>
3 1/64		.4844	4 3/8	5 7/8	<b>14556</b>
1/2		.5000	4 1/2	6	<b>14557</b>

**CUTTING FLUIDS** provide many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Ambore™ Wide Land Parabolic Flute Heavy Duty Jobber Length Drills

**Straight Shank – High Speed Steel**  
**135° Split Point – Heavy Duty**

135° Self-centering split point eliminates “walking” and reduces thrust. **Parabolic Flute** design enhances chip flow, coolant flow and heat dissipation especially in deeper drilling applications. **Wide Land Parabolic Flute** recommended for a wide range of material types.



**List No. 1354 — Gold & Black Finish  
Wide Land Parabolic Flute**

**STANDARD PACKAGE**

**Fractional Sizes**  
1/16" thru 3/8" — 12 each  
25/64" thru 1/2" — 6 each



SIZE	DECIMAL EQUIV.	FLUTE LENGTH	OVERALL LENGTH	EDP NO.
1/16	.0625	7/8	1-7/8	15401
5/64	.0781	1	2	15402
3/32	.0937	1-1/4	2-1/4	15403
7/64	.1094	1-1/2	2-5/8	15404
1/8	.1250	1-5/8	2-3/4	15405
9/64	.1406	1-3/4	2-7/8	15406
5/32	.1562	2	3-1/8	15407
11/64	.1719	2-1/8	3-1/4	15408
3/16	.1875	2-5/16	3-1/2	15409
13/64	.2031	2-7/16	3-5/8	15410
7/32	.2187	2-1/2	3-3/4	15411
15/64	.2344	2-5/8	3-7/8	15412
1/4	.2500	2-3/4	4	15413
17/64	.2656	2-7/8	4-1/8	15414
9/32	.2812	2-15/16	4-1/4	15415

SIZE	DECIMAL EQUIV.	FLUTE LENGTH	OVERALL LENGTH	EDP NO.
19/64	.2969	3-1/16	4-3/8	15416
5/16	.3125	3-3/16	4-1/2	15417
21/64	.3281	3-5/16	4-5/8	15418
11/32	.3437	3-7/16	4-3/4	15419
23/64	.3594	3-1/2	4-7/8	15420
3/8	.3750	3-5/8	5	15421
25/64	.3906	3-3/4	5-1/8	15422
13/32	.4062	3-7/8	5-1/4	15423
27/64	.4219	3-15/16	5-3/8	15424
7/16	.4375	4-1/16	5-1/2	15425
29/64	.4531	4-3/16	5-5/8	15426
15/32	.4687	4-5/16	5-3/4	15427
31/64	.4844	4-3/8	5-7/8	15428
1/2	.5000	4-1/2	6	15429

# Ambore™ Wide Land Parabolic Flute Heavy Duty Jobber Length Drill Set

**Gold & Black — High Speed Steel – 135° Split Point**

SIZE RANGE	PIECES PER SET	EDP NO.
1/16 to 1/2 by 64ths	29	18180



## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**



# Metric - M42 Cobalt - Aircraft Type J Jobber Length Drills

## Straight Shank - Cobalt 135° Split Point - Heavy Duty

\*Sizes 1.5mm and smaller furnished with 135° regular point.

Heavy duty construction. Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.



## List No. 2345 NAS-907, Type J

**STANDARD PACKAGE** .90 mm thru 9.5 mm - 12 each  
9.6 mm thru 13.0 mm - 6 each

135° Self-centering split point eliminates "walking" and reduces thrust.

SIZE MM	DEC. EQUIV.	FLUTE LENGTH		OAL		EDP NO.
		MM	IN.	MM	IN.	
.90	.0354	16	5/8	38	1-1/2	17600*
.95	.0374	16	5/8	38	1-1/2	17601*
1.00	.0394	17	11/16	41	1-5/8	17602*
1.05	.0413	17	11/16	41	1-5/8	17603*
1.10	.0433	19	3/4	44	1-3/4	17604*
1.20	.0472	22	7/8	48	1-7/8	17605*
1.30	.0512	22	7/8	48	1-7/8	17606*
1.40	.0551	22	7/8	48	1-7/8	17607*
1.50	.0591	22	7/8	48	1-7/8	17608*
1.60	.0630	22	7/8	48	1-7/8	17609
1.70	.0669	25	1	51	2	17610
1.80	.0709	25	1	51	2	17611
1.90	.0748	25	1	51	2	17612
2.00	.0787	25	1	51	2	17613
2.05	.0807	29	1-5/32	54	2-1/8	17614
2.10	.0827	29	1-5/32	54	2-1/8	17615
2.20	.0866	32	1-1/4	57	2-1/4	17616
2.30	.0906	32	1-1/4	57	2-1/4	17617
2.40	.0945	35	1-3/8	60	2-23/64	17618
2.50	.0984	35	1-3/8	60	2-23/64	17619
2.60	.1024	37	1-15/32	64	2-1/2	17620
2.70	.1063	37	1-15/32	64	2-1/2	17621
2.80	.1102	38	1-1/2	67	2-5/8	17622
2.90	.1142	41	1-5/8	70	2-3/4	17623
3.00	.1181	41	1-5/8	70	2-3/4	17624
3.10	.1220	41	1-5/8	70	2-3/4	17625
3.20	.1260	41	1-5/8	70	2-3/4	17626
3.30	.1299	45	1-3/4	73	2-7/8	17627
3.40	.1339	45	1-3/4	73	2-7/8	17628
3.50	.1378	45	1-3/4	73	2-7/8	17629
3.60	.1417	48	1-7/8	76	3	17630
3.70	.1457	48	1-7/8	76	3	17631
3.80	.1496	48	1-7/8	76	3	17632
3.90	.1535	51	2	79	3-1/8	17633
4.00	.1575	54	2-1/8	83	3-1/4	17634
4.10	.1614	54	2-1/8	83	3-1/4	17635
4.20	.1654	54	2-1/8	83	3-1/4	17636
4.30	.1693	54	2-1/8	83	3-1/4	17637
4.40	.1732	56	2-13/64	86	3-3/8	17638
4.50	.1772	56	2-13/64	86	3-3/8	17639
4.60	.1811	56	2-13/64	86	3-3/8	17640
4.70	.1850	59	2-21/64	89	3-1/2	17641
4.80	.1890	59	2-21/64	89	3-1/2	17642
4.90	.1929	62	2-7/16	92	3-5/8	17643
5.00	.1969	62	2-7/16	92	3-5/8	17644
5.10	.2008	62	2-7/16	92	3-5/8	17645
5.20	.2047	64	2-1/2	95	3-3/4	17646
5.30	.2087	64	2-1/2	95	3-3/4	17647
5.40	.2126	64	2-1/2	95	3-3/4	17648
5.50	.2165	64	2-1/2	95	3-3/4	17649
5.60	.2205	67	2-5/8	98	3-7/8	17650
5.70	.2244	67	2-5/8	98	3-7/8	17651

SIZE MM	DEC. EQUIV.	FLUTE LENGTH		OAL		EDP NO.
		MM	IN.	MM	IN.	
5.80	.2283	67	2-5/8	98	3-7/8	17652
5.90	.2323	67	2-5/8	98	3-7/8	17653
6.00	.2362	70	2-3/4	102	4	17654
6.10	.2402	70	2-3/4	102	4	17655
6.20	.2441	70	2-3/4	102	4	17656
6.30	.2480	70	2-3/4	102	4	17657
6.40	.2520	73	2-7/8	105	4-1/8	17658
6.50	.2559	73	2-7/8	105	4-1/8	17659
6.60	.2598	73	2-7/8	105	4-1/8	17660
6.70	.2638	73	2-7/8	105	4-1/8	17661
6.80	.2677	73	2-7/8	105	4-1/8	17662
6.90	.2717	73	2-7/8	105	4-1/8	17663
7.00	.2756	73	2-7/8	105	4-1/8	17664
7.10	.2795	75	2-61/64	108	4-1/4	17665
7.20	.2835	75	2-61/64	108	4-1/4	17666
7.30	.2874	75	2-61/64	108	4-1/4	17667
7.40	.2913	78	3	111	4-3/8	17668
7.50	.2953	78	3	111	4-3/8	17669
7.60	.2992	78	3	111	4-3/8	17670
7.70	.3031	81	3-3/16	114	4-1/2	17671
7.80	.3071	81	3-3/16	114	4-1/2	17672
7.90	.3110	81	3-3/16	114	4-1/2	17673
8.00	.3150	81	3-3/16	114	4-1/2	17674
8.10	.3189	84	3-5/16	117	4-9/16	17675
8.20	.3228	84	3-5/16	117	4-9/16	17676
8.30	.3268	84	3-5/16	117	4-9/16	17677
8.40	.3307	87	3-27/64	121	4-3/4	17678
8.50	.3346	87	3-27/64	121	4-3/4	17679
8.60	.3386	87	3-27/64	121	4-3/4	17680
8.70	.3425	87	3-27/64	121	4-3/4	17681
8.80	.3465	89	3-1/2	124	4-7/8	17682
8.90	.3504	89	3-1/2	124	4-7/8	17683
9.00	.3543	89	3-1/2	124	4-7/8	17684
9.10	.3583	89	3-1/2	124	4-7/8	17685
9.20	.3622	92	3-5/8	127	5	17686
9.30	.3661	92	3-5/8	127	5	17687
9.40	.3701	92	3-5/8	127	5	17688
9.50	.3740	92	3-5/8	127	5	17689
9.60	.3780	95	3-3/4	130	5-1/8	17690
9.70	.3819	95	3-3/4	130	5-1/8	17691
9.80	.3858	95	3-3/4	130	5-1/8	17692
10.00	.3937	95	3-3/4	130	5-1/8	17693
10.20	.4016	98	3-55/64	133	5-1/4	17694
10.50	.4134	98	3-55/64	133	5-1/4	17695
10.80	.4252	103	4-1/16	140	5-1/2	17696
11.00	.4331	103	4-1/16	140	5-1/2	17697
11.20	.4409	106	4-7/32	143	5-5/8	17698
11.50	.4528	106	4-7/32	143	5-5/8	17699
11.80	.4646	110	4-11/32	146	5-3/4	17700
12.00	.4724	111	4-3/8	149	5-7/8	17701
12.20	.4803	111	4-3/8	149	5-7/8	17702
12.50	.4921	114	4-1/2	152	6	17703
13.00	.5118	114	4-1/2	152	6	17704

# M42 Cobalt — Aircraft Type J Jobber Length Drills

**Straight Shank — 135° Split Point — Heavy Duty**

Heavy duty construction. Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.

Self-centering split point eliminates "walking" and reduces thrust.

**STANDARD PACKAGE**

**Fractional Sizes**

3/64" thru 3/8" — 12 each  
25/64" thru 1/2" — 6 each

**Letter Sizes**

A thru V — 12 each  
W thru Z — 6 each

**Wire Gage Sizes**

#1 thru #60 — 12 each



Uncoated - NAS-907, Type J

List No. 2330 Fractional

List No. 2332 Letter

List No. 2340 Wire Gage



AlTiN Coated - NAS-907, Type J

List No. 2330T Fractional

List No. 2332T Letter

List No. 2340T Wire Gage

AlTiN - Aluminum Titanium Nitride - Increases wear & heat resistance, improves chip flow & resists chip welding.



SIZE		WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED	AlTiN
FRAC-TIONAL	LETTER					EDP NO.	EDP NO.
1/64			.0156	3/16	3/4	17099*	—
1/32			.0312	1/2	1-3/8	17100*	93865*
		60	.0400	11/16	1-5/8	17101*	93750*
		59	.0410	11/16	1-5/8	17102*	93751*
		58	.0420	11/16	1-5/8	17103*	93752*
		57	.0430	3/4	1-3/4	17104*	93753*
		56	.0465	3/4	1-3/4	17105*	93754*
3/64			.0469	3/4	1-3/4	17106*	93864*
		55	.0520	7/8	1-7/8	17107*	93755*
		54	.0550	7/8	1-7/8	17108*	93756*
		53	.0595	7/8	1-7/8	17109*	93757*
1/16			.0625	7/8	1-7/8	17110	93758
		52	.0635	7/8	1-7/8	17111	93759
		51	.0670	1	2	17112	93760
		50	.0700	1	2	17113	93761
		49	.0730	1	2	17114	93762
		48	.0760	1	2	17115	93763
5/64			.0781	1	2	17116	93764
		47	.0785	1	2	17117	93765
		46	.0810	1-1/8	2-1/8	17118	93766
		45	.0820	1-1/8	2-1/8	17119	93767
		44	.0860	1-1/8	2-1/8	17120	93768
		43	.0890	1-1/4	2-1/4	17121	93769
		42	.0935	1-1/4	2-1/4	17122	93770
3/32			.0937	1-1/4	2-1/4	17123	93771
		41	.0960	1-3/8	2-3/8	17124	93772
		40	.0980	1-3/8	2-3/8	17125	93773
		39	.0995	1-3/8	2-3/8	17126	93774
		38	.1015	1-7/16	2-1/2	17127	93775
		37	.1040	1-7/16	2-1/2	17128	93776
		36	.1065	1-7/16	2-1/2	17129	93777
7/64			.1094	1-1/2	2-5/8	17130	93778
		35	.1100	1-1/2	2-5/8	17131	93779
		34	.1110	1-1/2	2-5/8	17132	93780
		33	.1130	1-1/2	2-5/8	17133	93781
		32	.1160	1-5/8	2-3/4	17134	93782
		31	.1200	1-5/8	2-3/4	17135	93783
1/8			.1250	1-5/8	2-3/4	17136	93784
		30	.1285	1-5/8	2-3/4	17137	93785
		29	.1360	1-3/4	2-7/8	17138	93786
		28	.1405	1-3/4	2-7/8	17139	93787
9/64			.1406	1-3/4	2-7/8	17140	93788
		27	.1440	1-7/8	3	17141	93789
		26	.1470	1-7/8	3	17142	93790
		25	.1495	1-7/8	3	17143	93791
		24	.1520	2	3-1/8	17144	93792
		23	.1540	2	3-1/8	17145	93793

SIZE		WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED	AlTiN
FRAC-TIONAL	LETTER					EDP NO.	EDP NO.
5/32			.1562	2	3-1/8	17146	93794
		22	.1570	2	3-1/8	17147	93795
		21	.1590	2-1/8	3-1/4	17148	93796
		20	.1610	2-1/8	3-1/4	17149	93797
		19	.1660	2-1/8	3-1/4	17150	93798
		18	.1695	2-1/8	3-1/4	17151	93799
11/64			.1719	2-1/8	3-1/4	17152	93800
		17	.1730	2-3/16	3-3/8	17153	93801
		16	.1770	2-3/16	3-3/8	17154	93802
		15	.1800	2-3/16	3-3/8	17155	93803
		14	.1820	2-3/16	3-3/8	17156	93804
		13	.1850	2-5/16	3-1/2	17157	93805
3/16			.1875	2-5/16	3-1/2	17158	93806
		12	.1890	2-5/16	3-1/2	17159	93807
		11	.1910	2-5/16	3-1/2	17160	93808
		10	.1935	2-7/16	3-5/8	17161	93809
		9	.1960	2-7/16	3-5/8	17162	93810
		8	.1990	2-7/16	3-5/8	17163	93811
		7	.2010	2-7/16	3-5/8	17164	93812
13/64			.2031	2-7/16	3-5/8	17165	93813
		6	.2040	2-1/2	3-3/4	17166	93814
		5	.2055	2-1/2	3-3/4	17167	93815
		4	.2090	2-1/2	3-3/4	17168	93816
		3	.2130	2-1/2	3-3/4	17169	93817
7/32			.2187	2-1/2	3-3/4	17170	93818
		2	.2210	2-5/8	3-7/8	17171	93819
		1	.2280	2-5/8	3-7/8	17172	93820
15/64	A		.2340	2-5/8	3-7/8	17173	93821
			.2344	2-5/8	3-7/8	17174	93822
	B		.2380	2-3/4	4	17175	93823
	C		.2420	2-3/4	4	17176	93824
	D		.2460	2-3/4	4	17177	93825
1/4	E		.2500	2-3/4	4	17178	93826
	F		.2570	2-7/8	4-1/8	17180	93827
	G		.2610	2-7/8	4-1/8	17181	93828
17/64			.2656	2-7/8	4-1/8	17182	93829
	H		.2660	2-7/8	4-1/8	17183	93830
	I		.2720	2-7/8	4-1/8	17184	93831
	J		.2770	2-7/8	4-1/8	17185	93832
	K		.2810	2-15/16	4-1/4	17186	93833
9/32			.2812	2-15/16	4-1/4	17187	93834
	L		.2900	2-15/16	4-1/4	17188	93835
	M		.2950	3-1/16	4-3/8	17189	93836
19/64			.2969	3-1/16	4-3/8	17190	93837
	N		.3020	3-1/16	4-3/8	17191	93838

\*Sizes #53 and smaller furnished with 135° Regular Point

(continued)

# M42 Cobalt — Jobber Length Drills (continued)



SIZE		WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED	ALTIM
FRAC-TIONAL	LETTER					EDP NO.	EDP NO.
5/16			.3125	3-3/16	4-1/2	17192	93839
	O		.3160	3-3/16	4-1/2	17193	93840
	P		.3230	3-5/16	4-5/8	17194	93841
21/64			.3281	3-5/16	4-5/8	17195	93842
	Q		.3320	3-7/16	4-3/4	17196	93843
11/32	R		.3390	3-7/16	4-3/4	17197	93844
			.3437	3-7/16	4-3/4	17198	93845
	S		.3480	3-1/2	4-7/8	17199	93846
	T		.3580	3-1/2	4-7/8	17200	93847
23/64			.3594	3-1/2	4-7/8	17201	93848
3/8	U		.3680	3-5/8	5	17202	93849
			.3750	3-5/8	5	17203	93850
	V		.3770	3-5/8	5	17204	93851

SIZE		WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED	ALTIM
FRAC-TIONAL	LETTER					EDP NO.	EDP NO.
25/64	W		.3860	3-3/4	5-1/8	17205	93852
			.3906	3-3/4	5-1/8	17206	93853
	X		.3970	3-3/4	5-1/8	17207	93854
13/32	Y		.4040	3-7/8	5-1/4	17208	93855
			.4062	3-7/8	5-1/4	17209	93856
27/64	Z		.4130	3-7/8	5-1/4	17210	93857
			.4219	3-15/16	5-3/8	17211	93858
7/16			.4375	4-1/16	5-1/2	17212	93859
29/64			.4531	4-3/16	5-5/8	17213	93860
15/32			.4688	4-5/16	5-3/4	17214	93861
31/64			.4844	4-3/8	5-7/8	17215	93862
1/2			.5000	4-1/2	6	17216	93863

## Drill Accessories

### Drill Counter Display

- All steel welded outer shell with a clear, hinged polycarbonate front for high visibility and shatterproof durability.
- Lockable with own set of two keys.
- Steel drill gauge on top assures correct sizing of drills.
- All compartments display drills vertically to use less counter space and are rounded to make small drills readily accessible.
- Compact, takes less counterspace.
- 12-3/4"W x 14"D x 14-1/4"H. Weight: 14 lbs.



List No. 9020

**Drills not included.**  
For fractional drills 1/16" to 1/2" by 64ths.

CAPACITY	SIZE RANGE	EDP NO.
29 SIZES	1/16 to 1/2 by 64ths	08211

### 1/4" Hex Shank Drills

**High Speed Steel — Bright Finish**  
**135° Split Point — Heavy Duty**



List No. 1353

135° Self-centering split point eliminates "walking" and reduces thrust. **Recommended** for a wide variety of low to medium tensile strength materials.

**Hex shank drills** can be used in quick change hex screwdriver chucks and in standard drill chucks. The hex shank prevents the drill from slipping in the chuck and increases torque.

**STANDARD PACKAGE**  
All sizes — 12 each



SIZE	DECIMAL EQUIV.	FLUTE LENGTH	OVERALL LENGTH	EDP NO.
1/16	.0625	7/8	2-1/2	15289*
5/64	.0781	1	2-5/8	15290*
3/32	.0938	1-1/4	2-3/4	15291*
7/64	.1094	1-1/2	3-1/4	15292
1/8	.1250	1-5/8	3-3/8	15293
9/64	.1406	1-3/4	3-1/2	15294
5/32	.1562	2	3-3/4	15295

SIZE	DECIMAL EQUIV.	FLUTE LENGTH	OVERALL LENGTH	EDP NO.
11/64	.1719	2-1/8	3-7/8	15296
3/16	.1875	2-5/16	4	15297
13/64	.2031	2-7/16	4-1/4	15298
7/32	.2188	2-1/2	4-3/8	15299
15/64	.2344	2-5/8	4-1/2	15300
1/4-E	.2500	2-3/4	4-5/8	15301
17/64	.2656	2-7/8	4-7/8	15302

\* Sizes 3/32" and smaller furnished with 135° Regular Point

# Drill Blanks

High Speed Steel

Hardened and Ground

Made to the same length as jobber length drills. Applications include use as blanks for small cutting tools, checking hole sizes and use as punches, pins and drifts.

**Tolerance:** Up to 1/4" +0/-0.0005  
1/4" or larger +0/-0.0007

SIZE				
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	OAL	EDP NO.
	78	.0160	7/8	15454*
	77	.0180	7/8	15455*
	76	.0200	7/8	15456*
	75	.0210	1	15457*
	74	.0225	1	15458*
	68	.0310	1 3/8	15464*
	67	.0320	1 3/8	15466*
	66	.0330	1 3/8	15467*
	64	.0360	1 1/2	15469*
	60	.0400	1 5/8	15473
	59	.0410	1 5/8	15474
	58	.0420	1 5/8	15475
	57	.0430	1 3/4	15476
	56	.0465	1 3/4	15477
3/64		.0469	1 3/4	15478
	55	.0520	1 7/8	15479
	54	.0550	1 7/8	15480
	53	.0595	1 7/8	15481
1/16		.0625	1 7/8	15482
	52	.0635	1 7/8	15483
	51	.0670	2	15484
	50	.0700	2	15485
	49	.0730	2	15486
	48	.0760	2	15487
5/64		.0781	2	15488
	47	.0785	2	15489
	46	.0810	2 1/8	15490
	45	.0820	2 1/8	15491
	44	.0860	2 1/8	15492
	43	.0890	2 1/4	15493
	42	.0935	2 1/4	15494
3/32		.0937	2 1/4	15495
	41	.0960	2 3/8	15496
	40	.0980	2 3/8	15497
	39	.0995	2 3/8	15498
	38	.1015	2 1/2	15499
	37	.1040	2 1/2	15500
	36	.1065	2 1/2	15501
7/64		.1094	2 5/8	15502
	35	.1100	2 5/8	15503
	34	.1110	2 5/8	15504
	33	.1130	2 5/8	15505
	32	.1160	2 3/4	15506
	31	.1200	2 3/4	15507
1/8		.1250	2 3/4	15508
	30	.1285	2 3/4	15509
	29	.1360	2 7/8	15510
	28	.1405	2 7/8	15511

\*Available While Supplies Last

## List No. 1439

**STANDARD PACKAGE** Fractional Sizes  
1/64" thru 3/8" — 12 each  
25/64" thru 1/2" — 6 each

**Wire Gage Sizes**  
#1 thru #80 — 12 each



SIZE				
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	OAL	EDP NO.
9/64		.1406	27/8	15512
	27	.1440	3	15513
	26	.1470	3	15514
	25	.1495	3	15515
	24	.1520	3 1/8	15516
	23	.1540	3 1/8	15517
5/32		.1562	3 1/8	15518
	22	.1570	3 1/8	15519
	21	.1590	3 1/4	15520
	20	.1610	3 1/4	15521
	19	.1660	3 1/4	15522
	18	.1695	3 1/4	15523
11/64		.1719	3 1/4	15524
	17	.1730	3 3/8	15525
	16	.1770	3 3/8	15526
	15	.1800	3 3/8	15527
	14	.1820	3 3/8	15528
	13	.1850	3 1/2	15529
3/16		.1875	3 1/2	15530
	12	.1890	3 1/2	15531
	11	.1910	3 1/2	15532
	10	.1935	3 5/8	15533
	9	.1960	3 5/8	15534
	8	.1990	3 5/8	15535
	7	.2010	3 5/8	15536
13/64		.2031	3 5/8	15537
	6	.2040	3 3/4	15538
	5	.2055	3 3/4	15539
	4	.2090	3 3/4	15540
	3	.2130	3 3/4	15541
7/32		.2187	3 3/4	15542
	2	.2210	3 7/8	15543
	1	.2280	3 7/8	15544
15/64		.2344	3 7/8	15546
1/4	E	.2500	4	15550
17/64		.2656	4 1/8	15554
9/32		.2812	4 1/4	15559
19/64		.2969	4 3/8	15562
5/16		.3125	4 1/2	15564
21/64		.3281	4 5/8	15567
11/32		.3437	4 3/4	15570
23/64		.3594	4 7/8	15573
3/8		.3750	5	15575
25/64		.3906	5 1/8	15578
	Y	.4040	5 1/4	15580*
		.4062	5 1/4	15581
13/32	Z	.4130	5 1/4	15582*
		.4219	5 3/8	15583
27/64		.4375	5 1/2	15584
7/16		.4531	5 5/8	15585
29/64		.4687	5 3/4	15586
15/32		.4844	5 7/8	15587
31/64		.5000	6	15588
1/2				

# Ambore™ Mechanic Length Drills

High Speed Steel — Gold & Black Finish  
135° Split Point - 3/8" Reduced Shank  
3-Flat Shanks



List No. 1383

- Shorter length — in-between a jobber and screw machine length — allows access to those tight jobs
- 135° self-centering split point eliminates "walking" and reduces thrust. Recommended for a wide variety of low to medium tensile strength materials.
- Shorter length results in a sturdier, more rigid drill that is less prone to breakage
- 3/8" reduced shank on drills above 13/32" expands the size range capacity of smaller drill chucks
- 3/16" and above feature 3-flats on the shank to eliminate slipping in the drill chuck. Sizes below 3/16" feature standard round shank.

**STANDARD PACKAGE**

Sizes 1/16" thru 3/8" - 12 each  
Sizes 25/64" thru 1/2" - 6 each



SIZE	DECIMAL EQUIV.	FLUTE LENGTH	OVERALL LENGTH	EDP NO.
1/16	.0625	7/8	1-7/8	15303
5/64	.0781	1	2	15304
3/32	.0938	1-1/4	2-1/4	15305
7/64	.1094	1-5/16	2-3/8	15306
1/8	.1250	1-7/16	2-1/2	15307
9/64	.1406	1-9/16	2-5/8	15308
5/32	.1562	1-11/16	2-3/4	15309
11/64	.1719	1-13/16	2-7/8	15310
3/16	.1875	1-7/8	3	15311
13/64	.2031	1-15/16	3-1/8	15312

SIZE	DECIMAL EQUIV.	FLUTE LENGTH	OVERALL LENGTH	EDP NO.
7/32	.2188	2	3-1/4	15313
15/64	.2344	2-1/16	3-3/8	15314
1/4	.2500	2	3-1/2	15315
17/64	.2656	2-1/8	3-5/8	15316
9/32	.2812	2-1/4	3-3/4	15317
19/64	.2969	2-3/8	3-7/8	15318
5/16	.3125	2-1/2	4	15319
21/64	.3281	2-9/16	4-1/16	15320
11/32	.3438	2-5/8	4-1/8	15321
23/64	.3594	2-11/16	4-3/16	15322
3/8	.3750	2-11/16	4-1/4	15323
25/64	.3906	2-3/4	4-5/16	15324
13/32	.4062	2-13/16	4-3/8	15325
27/64	.4219	2-7/8	4-7/16	15326
7/16	.4375	2-15/16	4-1/2	15327
29/64	.4531	3	4-5/8	15328
15/32	.4688	3-1/8	4-3/4	15329
31/64	.4844	3-1/4	4-7/8	15330
1/2	.5000	3-3/8	5	15331

## Ambore™ Mechanic Length Drill Sets

List No. 1383

29-Pc. Set  
1/16" - 1/2" by 64ths  
Indexed Case

EDP No. 18006



29-Pc. Set  
1/16" - 1/2" by 64ths  
Clip-On Drill Index

- Clips onto tool caddy, utility belt, tool bucket or ladder
- High impact, break resistant plastic
- Screw-on domed cover
- Weather resistant for both inside and outside usage



EDP No. 18007

# Screw Machine Length Drills



High Speed Steel - 118° Point  
General Purpose  
Bright Finish or TiN Coated

- List No. 1435 Fractional - Bright Finish
- List No. 1436 Letter - Bright Finish
- List No. 1437 Wire Gage - Bright Finish

Developed primarily for use in screw machines, these short length drills provide maximum rigidity resulting in increased hole accuracy and extended tool life. Recommended for drilling a wide variety of materials including non-ferrous materials and low tensile strength steels.



**Titanium Nitride (TiN) Coating** increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Enhanced hole quality at higher speeds and feeds.

- List No. 1435G Fractional - TiN Coated
- List No. 1437G Wire Gage - TiN Coated

<b>SHANK DIAMETERS</b>	<b>Drill Size</b>	<b>Shank Diameter</b>
	Up to 1"	Same as drill dia.
	Over 1" to 1¼"	1"
	Over 1¼" to 1½"	1¼"
	Over 1½"	1½"

<b>STANDARD PACKAGE</b>	<b>Fractional Sizes</b>	<b>Wire Gages</b>
	1/16" thru 3/8" — 12 each	#1 thru #60 — 12 each
	25/64" thru 1/2" — 6 each	
	All other sizes — 1 each	
	<b>Letter Sizes</b>	
	A thru V — 12 each	
	W thru Z — 6 each	

FRAC-TIONAL	SIZE	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	BRIGHT EDP NO.	TIN COAT EDP NO.
		60	.0400	½	1⅜	15101	—
		59	.0410	½	1⅜	15102	—
		58	.0420	½	1⅜	15103	—
		57	.0430	½	1⅜	15104	—
		56	.0465	½	1⅜	15105	—
		55	.0520	⅝	1⅝	15107	—
		54	.0550	⅝	1⅝	15108	—
		53	.0595	⅝	1⅝	15109	—
1/16			.0625	⅝	1⅝	15110	95110
		52	.0635	11/16	111/16	15111	—
		51	.0670	11/16	111/16	15112	—
		50	.0700	11/16	111/16	15113	—
		49	.0730	11/16	111/16	15114	—
		48	.0760	11/16	111/16	15115	—
5/64			.0781	11/16	111/16	15116	95116
		47	.0785	¾	1¾	15117	—
		46	.0810	¾	1¾	15118	—
		45	.0820	¾	1¾	15119	—
		44	.0860	¾	1¾	15120	—
		43	.0890	¾	1¾	15121	—
		42	.0935	¾	1¾	15122	—
3/32			.0937	¾	1¾	15123	95123
		41	.0960	13/16	113/16	15124	—
		40	.0980	13/16	113/16	15125	95125
		39	.0995	13/16	113/16	15126	95126
		38	.1015	13/16	113/16	15127	95127
		37	.1040	13/16	113/16	15128	95128
		36	.1065	13/16	113/16	15129	95129
7/64			.1094	13/16	113/16	15130	95130
		35	.1100	7/8	17/8	15131	95131
		34	.1110	7/8	17/8	15132	95132
		33	.1130	7/8	17/8	15133	95133
		32	.1160	7/8	17/8	15134	95134
		31	.1200	7/8	17/8	15135	95135
1/8			.1250	7/8	17/8	15136	95136
		30	.1285	15/16	115/16	15137	95137
		29	.1360	15/16	115/16	15138	95138
		28	.1405	15/16	115/16	15139	95139
9/64			.1406	15/16	115/16	15140	95140
		27	.1440	1	21/16	15141	95141
		26	.1470	1	21/16	15142	95142
		25	.1495	1	21/16	15143	95143

(continued)



# Screw Machine Length Drills (continued)

List Nos. 1435, 1436

**DRILLS**

FRAC-TIONAL	SIZE		WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	BRIGHT EDP	TIN COAT EDP
	LETTER						NO.	NO.
5/32			24	.1520	1	2 1/16	15144	95144
			23	.1540	1	2 1/16	15145	95145
				.1562	1	2 1/16	15146	95146
			22	.1570	1 1/16	2 1/8	15147	95147
			21	.1590	1 1/16	2 1/8	15148	95148
11/64			20	.1610	1 1/16	2 1/8	15149	95149
			19	.1660	1 1/16	2 1/8	15150	95150
			18	.1695	1 1/16	2 1/8	15151	95151
				.1719	1 1/16	2 1/8	15152	95152
			17	.1730	1 1/8	2 3/16	15153	95153
3/16			16	.1770	1 1/8	2 3/16	15154	95154
			15	.1800	1 1/8	2 3/16	15155	95155
			14	.1820	1 1/8	2 3/16	15156	95156
			13	.1850	1 1/8	2 3/16	15157	95157
				.1875	1 1/8	2 3/16	15158	95158
13/64			12	.1890	1 3/16	2 1/4	15159	95159
			11	.1910	1 3/16	2 1/4	15160	95160
			10	.1935	1 3/16	2 1/4	15161	95161
			9	.1960	1 3/16	2 1/4	15162	95162
			8	.1990	1 3/16	2 1/4	15163	95163
			7	.2010	1 3/16	2 1/4	15164	95164
				.2031	1 3/16	2 1/4	15165	95165
			6	.2040	1 1/4	2 3/8	15166	95166
7/32			5	.2055	1 1/4	2 3/8	15167	95167
			4	.2090	1 1/4	2 3/8	15168	95168
			3	.2130	1 1/4	2 3/8	15169	95169
				.2187	1 1/4	2 3/8	15170	95170
			2	.2210	1 5/16	2 7/16	15171	95171
			1	.2280	1 5/16	2 7/16	15172	95172
		A		.2340	1 5/16	2 7/16	15173	—
				.2344	1 5/16	2 7/16	15174	95174
15/64		B		.2380	1 3/8	2 1/2	15175	—
		C		.2420	1 3/8	2 1/2	15176	—
		D		.2460	1 3/8	2 1/2	15177	—
		E		.2500	1 3/8	2 1/2	15178	95178
	17/64		F		.2570	1 7/16	2 5/8	15180
		G		.2610	1 7/16	2 5/8	15181	—
				.2656	1 7/16	2 5/8	15182	95182
		H		.2660	1 1/2	2 11/16	15183	—
		I		.2720	1 1/2	2 11/16	15184	—
9/32		J		.2770	1 1/2	2 11/16	15185	—
		K		.2810	1 1/2	2 11/16	15186	—
				.2812	1 1/2	2 11/16	15187	95187
		L		.2900	1 9/16	2 3/4	15188	—
		M		.2950	1 9/16	2 3/4	15189	—
19/64				.2969	1 9/16	2 3/4	15190	95190
	5/16	N		.3020	1 5/8	2 13/16	15191	—
				.3125	1 5/8	2 13/16	15192	95192
21/64		O		.3160	1 11/16	2 15/16	15193	—
		P		.3230	1 11/16	2 15/16	15194	—
				.3281	1 11/16	2 15/16	15195	95195
11/32		Q		.3320	1 11/16	3	15196	—
		R		.3390	1 11/16	3	15197	—
				.3437	1 11/16	3	15198	95198
23/64		S		.3480	1 3/4	3 1/16	15199	—
		T		.3580	1 3/4	3 1/16	15200	—
				.3594	1 3/4	3 1/16	15201	95201
3/8		U		.3680	1 13/16	3 1/8	15202	—
				.3750	1 13/16	3 1/8	15203	95203
		V		.3770	1 7/8	3 1/4	15204	—
25/64		W		.3860	1 7/8	3 1/4	15205	—
				.3906	1 7/8	3 1/4	15206	95206

(continued)



# Screw Machine Length Drills (continued)

List Nos. 1435, 1436

SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL	BRIGHT EDP NO.	TIN COAT EDP NO.
FRAC-TIONAL	LETTER					
	X	.3970	1 <sup>15</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>16</sub>	15207	—
	Y	.4040	1 <sup>15</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>16</sub>	15208	—
1 <sup>3</sup> / <sub>32</sub>		.4062	1 <sup>15</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>16</sub>	15209	95209
	Z	.4130	2	3 <sup>3</sup> / <sub>8</sub>	15210	—
2 <sup>7</sup> / <sub>64</sub>		.4219	2	3 <sup>3</sup> / <sub>8</sub>	15211	95211
7 <sup>1</sup> / <sub>16</sub>		.4375	2 <sup>1</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>16</sub>	15212	95212
2 <sup>9</sup> / <sub>64</sub>		.4531	2 <sup>1</sup> / <sub>8</sub>	3 <sup>9</sup> / <sub>16</sub>	15213	95213
1 <sup>5</sup> / <sub>32</sub>		.4687	2 <sup>1</sup> / <sub>8</sub>	3 <sup>5</sup> / <sub>8</sub>	15214	95214
3 <sup>1</sup> / <sub>64</sub>		.4844	2 <sup>3</sup> / <sub>16</sub>	3 <sup>11</sup> / <sub>16</sub>	15215	95215
1 <sup>1</sup> / <sub>2</sub>		.5000	2 <sup>1</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>4</sub>	15216	95216
3 <sup>3</sup> / <sub>64</sub>		.5156	2 <sup>3</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	15217	—
1 <sup>7</sup> / <sub>32</sub>		.5313	2 <sup>3</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	15218	—
3 <sup>5</sup> / <sub>64</sub>		.5469	2 <sup>1</sup> / <sub>2</sub>	4	15219	—
9 <sup>1</sup> / <sub>16</sub>		.5625	2 <sup>1</sup> / <sub>2</sub>	4	15220	—
3 <sup>7</sup> / <sub>64</sub>		.5781	2 <sup>5</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	15221	—
1 <sup>9</sup> / <sub>32</sub>		.5938	2 <sup>5</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	15222	—
3 <sup>9</sup> / <sub>64</sub>		.6094	2 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>4</sub>	15223	—
5 <sup>1</sup> / <sub>8</sub>		.6250	2 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>4</sub>	15224	—
4 <sup>1</sup> / <sub>64</sub>		.6406	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	15225	—
2 <sup>1</sup> / <sub>32</sub>		.6562	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	15226	—
4 <sup>3</sup> / <sub>64</sub>		.6719	2 <sup>7</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>	15227	—
1 <sup>1</sup> / <sub>16</sub>		.6875	2 <sup>7</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>	15228	—
4 <sup>5</sup> / <sub>64</sub>		.7031	3	4 <sup>3</sup> / <sub>4</sub>	15229	—
2 <sup>3</sup> / <sub>32</sub>		.7188	3	4 <sup>3</sup> / <sub>4</sub>	15230	—
4 <sup>7</sup> / <sub>64</sub>		.7344	3 <sup>1</sup> / <sub>8</sub>	5	15231	—
3 <sup>1</sup> / <sub>4</sub>		.7500	3 <sup>1</sup> / <sub>8</sub>	5	15232	—
4 <sup>9</sup> / <sub>64</sub>		.7657	3 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>8</sub>	15233	—
2 <sup>5</sup> / <sub>32</sub>		.7812	3 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>8</sub>	15234	—
5 <sup>1</sup> / <sub>64</sub>		.7969	3 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	15235	—
1 <sup>3</sup> / <sub>16</sub>		.8125	3 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	15236	—
5 <sup>3</sup> / <sub>64</sub>		.8281	3 <sup>1</sup> / <sub>2</sub>	5 <sup>3</sup> / <sub>8</sub>	15237	—
2 <sup>7</sup> / <sub>32</sub>		.8438	3 <sup>1</sup> / <sub>2</sub>	5 <sup>3</sup> / <sub>8</sub>	15238	—
5 <sup>5</sup> / <sub>64</sub>		.8594	3 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>2</sub>	15239	—
7 <sup>1</sup> / <sub>8</sub>		.8750	3 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>2</sub>	15240	—
5 <sup>7</sup> / <sub>64</sub>		.8906	3 <sup>5</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>8</sub>	15241	—
2 <sup>9</sup> / <sub>32</sub>		.9062	3 <sup>5</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>8</sub>	15242	—
5 <sup>9</sup> / <sub>64</sub>		.9219	3 <sup>3</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>4</sub>	15243	—
1 <sup>5</sup> / <sub>16</sub>		.9375	3 <sup>3</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>4</sub>	15244	—
6 <sup>1</sup> / <sub>64</sub>		.9531	3 <sup>7</sup> / <sub>8</sub>	5 <sup>7</sup> / <sub>8</sub>	15245	—
3 <sup>1</sup> / <sub>32</sub>		.9688	3 <sup>7</sup> / <sub>8</sub>	5 <sup>7</sup> / <sub>8</sub>	15246	—
6 <sup>3</sup> / <sub>64</sub>		.9844	4	6	15247	—
1		1.0000	4	6	15248	—
1 <sup>1</sup> / <sub>16</sub>		1.0625	4	6 <sup>1</sup> / <sub>4</sub>	15249	—
1 <sup>1</sup> / <sub>8</sub>		1.1250	4	6 <sup>3</sup> / <sub>8</sub>	15250	—
1 <sup>3</sup> / <sub>16</sub>		1.1875	4 <sup>1</sup> / <sub>4</sub>	6 <sup>5</sup> / <sub>8</sub>	15251	—
1 <sup>1</sup> / <sub>4</sub>		1.2500	4 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>4</sub>	15252	—
1 <sup>5</sup> / <sub>16</sub>		1.3125	4 <sup>3</sup> / <sub>8</sub>	7	15253	—
1 <sup>3</sup> / <sub>8</sub>		1.3750	4 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>8</sub>	15254	—
1 <sup>7</sup> / <sub>16</sub>		1.4375	4 <sup>3</sup> / <sub>4</sub>	7 <sup>3</sup> / <sub>8</sub>	15255	—
1 <sup>1</sup> / <sub>2</sub>		1.5000	4 <sup>7</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>2</sub>	15256	—
1 <sup>9</sup> / <sub>16</sub>		1.5625	4 <sup>7</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>4</sub>	15257	—
1 <sup>5</sup> / <sub>8</sub>		1.6250	4 <sup>7</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>4</sub>	15258	—
1 <sup>11</sup> / <sub>16</sub>		1.6875	5 <sup>1</sup> / <sub>8</sub>	8	15259	—
1 <sup>3</sup> / <sub>4</sub>		1.7500	5 <sup>1</sup> / <sub>8</sub>	8	15260	—
1 <sup>13</sup> / <sub>16</sub>		1.8125	5 <sup>3</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>4</sub>	15261	—
1 <sup>7</sup> / <sub>8</sub>		1.8750	5 <sup>3</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>4</sub>	15262	—
1 <sup>15</sup> / <sub>16</sub>		1.9375	5 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>	15263	—
2		2.0000	5 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>	15264	—



# Aircraft Type C Heavy Duty Screw Machine Length Drills

**Straight Shank – High Speed Steel**  
**135° Split Point – Black Oxide Treated**  
**Heavy Duty**

Heavy duty construction. 135° self-centering split point eliminates “walking” and reduces thrust. Short length provides maximum rigidity for increased hole accuracy and extended tool life. Recommended for drilling a wide range of low to medium tensile strength materials.



List No. 1398  
NAS-907, Type C



**DRILLS**

**STANDARD PACKAGE** Fractional Sizes  
3/64" thru 3/8" — 12 each  
25/64" thru 1/2" — 6 each

**Letter Sizes**  
A - V — 12 each  
W - Z — 6 each

**Wire Gage Sizes**  
#1 thru #60 — 12 each

\*Sizes #53 and smaller furnished with 135° regular point

SIZE					
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	60	.0400	1/2	1 3/8	14880*
	59	.0410	1/2	1 3/8	14881*
	58	.0420	1/2	1 3/8	14882*
	57	.0430	1/2	1 3/8	14883*
	56	.0465	1/2	1 3/8	14884*
3/64		.0469	1/2	1 3/8	14901*
	55	.0520	5/8	1 5/8	14885*
	54	.0550	5/8	1 5/8	14886*
	53	.0595	5/8	1 5/8	14887*
1/16		.0625	5/8	1 5/8	14902
	52	.0635	11/16	1 11/16	14888
	51	.0670	11/16	1 11/16	14889
	50	.0700	11/16	1 11/16	14890
	49	.0730	11/16	1 11/16	14891
	48	.0760	11/16	1 11/16	14892
5/64		.0781	11/16	1 11/16	14903
	47	.0785	3/4	1 3/4	14893
	46	.0810	3/4	1 3/4	14894
	45	.0820	3/4	1 3/4	14895
	44	.0860	3/4	1 3/4	14896
	43	.0890	3/4	1 3/4	14897
	42	.0935	3/4	1 3/4	14898
3/32		.0937	3/4	1 3/4	14904
	41	.0960	13/16	1 13/16	14899
	40	.0980	13/16	1 13/16	14905
	39	.0995	13/16	1 13/16	14906
	38	.1015	13/16	1 13/16	14907
	37	.1040	13/16	1 13/16	14908
	36	.1065	13/16	1 13/16	14909
7/64		.1094	13/16	1 13/16	14910
	35	.1100	7/8	1 7/8	14911
	34	.1110	7/8	1 7/8	14912
	33	.1130	7/8	1 7/8	14913
	32	.1160	7/8	1 7/8	14914
	31	.1200	7/8	1 7/8	14915
1/8		.1250	7/8	1 7/8	14916
	30	.1285	15/16	1 15/16	14917
	29	.1360	15/16	1 15/16	14918
	28	.1405	15/16	1 15/16	14919
9/64		.1406	15/16	1 15/16	14920
	27	.1440	1	2 1/16	14921
	26	.1470	1	2 1/16	14922
	25	.1495	1	2 1/16	14923
	24	.1520	1	2 1/16	14924
	23	.1540	1	2 1/16	14925

SIZE						
FRAC-TIONAL	LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
5/32			.1562	1	2 1/16	14926
		22	.1570	1 1/16	2 1/8	14927
		21	.1590	1 1/16	2 1/8	14928
		20	.1610	1 1/16	2 1/8	14929
		19	.1660	1 1/16	2 1/8	14930
		18	.1695	1 1/16	2 1/8	14931
11/64			.1719	1 1/16	2 1/8	14932
		17	.1730	1 1/8	2 3/16	14933
		16	.1770	1 1/8	2 3/16	14934
		15	.1800	1 1/8	2 3/16	14935
		14	.1820	1 1/8	2 3/16	14936
		13	.1850	1 1/8	2 3/16	14937
3/16			.1875	1 1/8	2 3/16	14938
		12	.1890	1 3/16	2 1/4	14939
		11	.1910	1 3/16	2 1/4	14940
		10	.1935	1 3/16	2 1/4	14941
		9	.1960	1 3/16	2 1/4	14942
		8	.1990	1 3/16	2 1/4	14943
		7	.2010	1 3/16	2 1/4	14944
13/64			.2031	1 3/16	2 1/4	14945
		6	.2040	1 1/4	2 3/8	14946
		5	.2055	1 1/4	2 3/8	14947
		4	.2090	1 1/4	2 3/8	14948
		3	.2130	1 1/4	2 3/8	14949
7/32			.2187	1 1/4	2 3/8	14950
		2	.2210	1 5/16	2 7/16	14951
		1	.2280	1 5/16	2 7/16	14952
15/64	A		.2340	1 5/16	2 7/16	14953
			.2344	1 5/16	2 7/16	14954
	B		.2380	1 3/8	2 1/2	14955
	C		.2420	1 3/8	2 1/2	14956
	D		.2460	1 3/8	2 1/2	14957
1/4	E		.2500	1 3/8	2 1/2	14958
	F		.2570	1 7/16	2 5/8	14959
	G		.2610	1 7/16	2 5/8	14960
17/64			.2656	1 7/16	2 5/8	14963
	H		.2660	1 1/2	2 11/16	14964
	I		.2720	1 1/2	2 11/16	14965
	J		.2770	1 1/2	2 11/16	14966
	K		.2810	1 1/2	2 11/16	14967
9/32			.2812	1 1/2	2 11/16	14968
	L		.2900	1 9/16	2 3/4	14969
	M		.2950	1 9/16	2 3/4	14970
19/64			.2969	1 9/16	2 3/4	14971

(continued)

# Aircraft Type C Screw Machine Length Drills (continued)

List No. 1398



SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
FRAC-TIONAL	LETTER				
5/16	N	.3020	1-5/8	2-13/16	<b>14972</b>
		.3125	1-5/8	2-13/16	<b>14973</b>
	O	.3160	1-11/16	2-15/16	<b>14974</b>
	P	.3230	1-11/16	2-15/16	<b>14975</b>
21/64		.3281	1-11/16	2-15/16	<b>14976</b>
	Q	.3320	1-11/16	3	<b>14977</b>
11/32	R	.3390	1-11/16	3	<b>14978</b>
		.3437	1-11/16	3	<b>14979</b>
	S	.3480	1-3/4	3-1/16	<b>14980</b>
23/64	T	.3580	1-3/4	3-1/16	<b>14981</b>
		.3594	1-3/4	3-1/16	<b>14982</b>
3/8	U	.3680	1-13/16	3-1/8	<b>14983</b>
		.3750	1-13/16	3-1/8	<b>14984</b>

SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
FRAC-TIONAL	LETTER				
25/64	V	.3770	1-7/8	3-1/4	<b>14985</b>
	W	.3860	1-7/8	3-1/4	<b>14986</b>
		.3906	1-7/8	3-1/4	<b>14987</b>
	X	.3970	1-15/16	3-5/16	<b>14988</b>
	Y	.4040	1-15/16	3-5/16	<b>14989</b>
13/32		.4062	1-15/16	3-5/16	<b>14990</b>
	Z	.4130	2	3-3/8	<b>14991</b>
27/64		.4219	2	3-3/8	<b>14992</b>
7/16		.4375	2-1/16	3-7/16	<b>14993</b>
29/64		.4531	2-1/8	3-9/16	<b>14994</b>
15/32		.4687	2-1/8	3-5/8	<b>14995</b>
31/64		.4844	2-3/16	3-11/16	<b>14996</b>
1/2		.5000	2-1/4	3-3/4	<b>14997</b>

## M42 Cobalt Screw Machine Length Drills

135° Split Point — Heavy Duty

\*Sizes #53 and smaller 135° Regular Point

Heavy duty construction. Self-centering split point eliminates "walking" and reduces thrust. Short length provides maximum rigidity for increased hole accuracy and extended tool life.

Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials and materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.

### STANDARD PACKAGE

#### Fractional Sizes

1/16" thru 3/8" — 12 each  
25/64" thru 19/32" — 6 each

#### Letter Sizes

A thru V — 12 each  
W thru Z — 6 each

#### Wire Gage Sizes

#1 thru #60 — 12 each



Uncoated  
List No. 2435



AlTiN Coated  
List No. 2435T

AlTiN - Aluminum Titanium Nitride - Increases wear & heat resistance, improves chip flow & resists chip welding.

SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED	ALTiN
FRAC-TIONAL	WIRE GAGE				EDP NO.	EDP NO.
1/16	60	.0400	1/2	1-3/8	<b>13149*</b>	<b>93636*</b>
	59	.0410	1/2	1-3/8	<b>13150*</b>	<b>93637*</b>
	58	.0420	1/2	1-3/8	<b>13151*</b>	<b>93638*</b>
	57	.0430	1/2	1-3/8	<b>13152*</b>	<b>93639*</b>
	56	.0465	1/2	1-3/8	<b>13153*</b>	<b>93640*</b>
	55	.0520	5/8	1-5/8	<b>13154*</b>	<b>93641*</b>
	54	.0550	5/8	1-5/8	<b>13155*</b>	<b>93642*</b>
	53	.0595	5/8	1-5/8	<b>13156*</b>	<b>93643*</b>
	52	.0625	5/8	1-5/8	<b>13157</b>	<b>93644</b>
	51	.0635	11/16	1-11/16	<b>13158</b>	<b>93645</b>
	50	.0670	11/16	1-11/16	<b>13159</b>	<b>93646</b>
	49	.0700	11/16	1-11/16	<b>13160</b>	<b>93647</b>
5/64	48	.0730	11/16	1-11/16	<b>13161</b>	<b>93648</b>
	47	.0760	11/16	1-11/16	<b>13162</b>	<b>93649</b>
	46	.0781	11/16	1-11/16	<b>13163</b>	<b>93650</b>

SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED	ALTiN
FRAC-TIONAL	WIRE GAGE				EDP NO.	EDP NO.
3/32	47	.0785	3/4	1-3/4	<b>13164</b>	<b>93651</b>
	46	.0810	3/4	1-3/4	<b>13165</b>	<b>93652</b>
	45	.0820	3/4	1-3/4	<b>13166</b>	<b>93653</b>
	44	.0860	3/4	1-3/4	<b>13167</b>	<b>93654</b>
	43	.0890	3/4	1-3/4	<b>13168</b>	<b>93655</b>
	42	.0935	3/4	1-3/4	<b>13169</b>	<b>93656</b>
	41	.0937	3/4	1-3/4	<b>13170</b>	<b>93657</b>
	40	.0960	13/16	1-13/16	<b>13171</b>	<b>93658</b>
	39	.0980	13/16	1-13/16	<b>13172</b>	<b>93659</b>
	38	.0995	13/16	1-13/16	<b>13173</b>	<b>93660</b>
	37	.1015	13/16	1-13/16	<b>13174</b>	<b>93661</b>
	36	.1040	13/16	1-13/16	<b>13175</b>	<b>93662</b>
7/64	36	.1065	13/16	1-13/16	<b>13176</b>	<b>93663</b>
	35	.1094	13/16	1-13/16	<b>13177</b>	<b>93664</b>
	35	.1100	7/8	1-7/8	<b>13178</b>	<b>93665</b>

(continued)

# M42 Cobalt Screw Machine Length Drills (continued)



SIZE							SIZE								
FRAC-TIONAL	LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED EDP NO.	ALTIM EDP NO.	FRAC-TIONAL	LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED EDP NO.	ALTIM EDP NO.
1/8		34	.1110	7/8	1-7/8	13179	93666	15/64			.2344	1-5/16	2-7/16	13221	93708
		33	.1130	7/8	1-7/8	13180	93667		B		.2380	1-3/8	2-1/2	13222	93709
		32	.1160	7/8	1-7/8	13181	93668		C		.2420	1-3/8	2-1/2	13223	93710
		31	.1200	7/8	1-7/8	13182	93669		D		.2460	1-3/8	2-1/2	13224	93711
			.1250	7/8	1-7/8	13183	93670		1/4	E		.2500	1-3/8	2-1/2	13225
9/64		30	.1285	15/16	1-15/16	13184	93671	F		.2570	1-7/16	2-5/8	13226	93713	
		29	.1360	15/16	1-15/16	13185	93672	G		.2610	1-7/16	2-5/8	13227	93714	
		28	.1405	15/16	1-15/16	13186	93673	17/64		.2656	1-7/16	2-5/8	13228	93715	
			.1406	15/16	1-15/16	13187	93674		H		.2660	1-1/2	2-11/16	13229	93716
		27	.1440	1	2-1/16	13188	93675		I		.2720	1-1/2	2-11/16	13230	93717
5/32		26	.1470	1	2-1/16	13189	93676	J		.2770	1-1/2	2-11/16	13231	93718	
		25	.1495	1	2-1/16	13190	93677	K		.2810	1-1/2	2-11/16	13232	93719	
		24	.1520	1	2-1/16	13191	93678	9/32		.2812	1-1/2	2-11/16	13233	93720	
		23	.1540	1	2-1/16	13192	93679		L		.2900	1-9/16	2-3/4	13234	93721
			.1562	1	2-1/16	13193	93680		M		.2950	1-9/16	2-3/4	13235	93722
11/64		22	.1570	1-1/16	2-1/8	13194	93681	19/64		.2969	1-9/16	2-3/4	13236	93723	
		21	.1590	1-1/16	2-1/8	13195	93682		N		.3020	1-5/8	2-13/16	13237	93724
		20	.1610	1-1/16	2-1/8	13196	93683	5/16		.3125	1-5/8	2-13/16	13238	93725	
		19	.1660	1-1/16	2-1/8	13197	93684		O		.3160	1-11/16	2-15/16	13239	93726
		18	.1695	1-1/16	2-1/8	13198	93685		P		.3230	1-11/16	2-15/16	13240	93727
3/16		17	.1719	1-1/16	2-1/8	13199	93686	21/64		.3281	1-11/16	2-15/16	13241	93728	
		16	.1730	1-1/8	2-3/16	13200	93687		Q		.3320	1-11/16	3	13242	93729
		15	.1800	1-1/8	2-3/16	13202	93689	R		.3390	1-11/16	3	13243	93730	
		14	.1820	1-1/8	2-3/16	13203	93690	11/32		.3437	1-11/16	3	13244	93731	
		13	.1850	1-1/8	2-3/16	13204	93691		S		.3480	1-3/4	3-1/16	13245	93732
7/32		12	.1875	1-1/8	2-3/16	13205	93692	23/64		.3580	1-3/4	3-1/16	13246	93733	
		11	.1890	1-3/16	2-1/4	13206	93693		T		.3594	1-3/4	3-1/16	13247	93734
		10	.1935	1-3/16	2-1/4	13208	93695	3/8		.3680	1-13/16	3-1/8	13248	93735	
		9	.1960	1-3/16	2-1/4	13209	93696		U		.3750	1-13/16	3-1/8	13249	93736
		8	.1990	1-3/16	2-1/4	13210	93697		V		.3770	1-7/8	3-1/4	13250	93737
13/64		7	.2010	1-3/16	2-1/4	13211	93698	25/64		.3860	1-7/8	3-1/4	13251	93738	
		6	.2040	1-1/4	2-3/8	13213	93700		W		.3906	1-7/8	3-1/4	13252	93739
		5	.2055	1-1/4	2-3/8	13214	93701	X		.3970	1-15/16	3-5/16	13253	93740	
		4	.2090	1-1/4	2-3/8	13215	93702	Y		.4040	1-15/16	3-5/16	13254	93741	
		3	.2130	1-1/4	2-3/8	13216	93703	13/32		.4062	1-15/16	3-5/16	13255	93742	
	2	.2210	1-5/16	2-7/16	13218	93705	Z			.4130	2	3-3/8	13256	93743	
A		1	.2280	1-5/16	2-7/16	13219	93706	27/64		.4219	2	3-3/8	13257	93744	
			.2340	1-5/16	2-7/16	13220	93707	7/16		.4375	2-1/16	3-7/16	13258	93745	
								29/64		.4531	2-1/8	3-9/16	13259	93746	
							15/32		.4687	2-1/8	3-5/8	13260	93747		
							31/64		.4844	2-3/16	3-11/16	13261	93748		
							1/2		.5000	2-1/4	3-3/4	13262	93749		

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# 1/2" Reduced Shank Silver & Deming Drills

## 118° Point - High Speed Steel

Expand the size range capacity of 1/2" drill chucks. Recommended for drilling a wide range of materials of low to medium tensile strength.

**STANDARD PACKAGE** All sizes — 1 each



**List No. 1424R**  
Round Shank

## 118° Standard Point



**List No. 1424S**  
Ambore™ - Gold & Black Finish

3-Flat Shank for positive hold.

118° Self-Centering Split Point reduces "wandering" and thrust.



SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	LIST 1424R EDP NO.	LIST 1424S EDP NO.
33/64	.5156	3-1/8	6	17031	19031
17/32	.5312	3-1/8	6	17032	19032
35/64	.5469	3-1/8	6	17033	19033
9/16	.5625	3-1/8	6	17034	19034
37/64	.5781	3-1/8	6	17035	19035
19/32	.5938	3-1/8	6	17036	19036
39/64	.6094	3-1/8	6	17037	19037
5/8	.6250	3-1/8	6	17038	19038
41/64	.6406	3-1/8	6	17039	19039
21/32	.6562	3-1/8	6	17040	19040
43/64	.6719	3-1/8	6	17041	19041
11/16	.6875	3-1/8	6	17042	19042
45/64	.7031	3-1/8	6	17043	19043
23/32	.7188	3-1/8	6	17044	19044
47/64	.7344	3-1/8	6	17045	19045
3/4	.7500	3-1/8	6	17046	19046
49/64	.7656	3-1/8	6	17047	19047
25/32	.7812	3-1/8	6	17048	19048
51/64	.7969	3-1/8	6	17049	19049
13/16	.8125	3-1/8	6	17050	19050
53/64	.8281	3-1/8	6	17051	19051
27/32	.8438	3-1/8	6	17052	19052
55/64	.8594	3-1/8	6	17053	19053
7/8	.8750	3-1/8	6	17054	19054
57/64	.8902	3-1/8	6	17055	19055
29/32	.9062	3-1/8	6	17056	19056
59/64	.9219	3-1/8	6	17057	19057
15/16	.9375	3-1/8	6	17058	19058
61/64	.9531	3-1/8	6	17059	19059
31/32	.9688	3-1/8	6	17060	19060
63/64	.9844	3-1/8	6	17061	19061
1	1.0000	3-1/8	6	17062	19062
1-1/64	1.0156	3-1/8	6	17063	19063
1-1/32	1.0312	3-1/8	6	17064	19064
1-3/64	1.0469	3-1/8	6	17065	—
1-1/16	1.0625	3-1/8	6	17066	19065
1-5/64	1.0781	3-1/8	6	17067	—
1-3/32	1.0937	3-1/8	6	17068	19066
1-7/64	1.1094	3-1/8	6	17069	—
1-1/8	1.1250	3-1/8	6	17070	19067
1-9/64	1.1406	3-1/8	6	17071	—
1-5/32	1.1562	3-1/8	6	17072	19068
1-11/64	1.1719	3-1/8	6	17073	—
1-3/16	1.1875	3-1/8	6	17074	19069
1-13/64	1.2031	3-1/8	6	17075	—
1-7/32	1.2188	3-1/8	6	17076	19070
1-15/64	1.2344	3-1/8	6	17077	—
1-1/4	1.2500	3-1/8	6	17078	19071
1-17/64	1.2656	3-1/8	6	17079	—
1-9/32	1.2812	3-1/8	6	17080	—
1-19/64	1.2969	3-1/8	6	17081	—
1-5/16	1.3125	3-1/8	6	17082	19072

(continued)

# 1/2" Reduced Shank Silver & Deming Drills (continued)

List No. 1424R, 1424S



SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	LIST 1424R EDP NO.	LIST 1424S EDP NO.
1-21/64	1.3281	3-1/8	6	17083	—
1-11/32	1.3438	3-1/8	6	17084	—
1-23/64	1.3594	3-1/8	6	17085	—
1-3/8	1.3750	3-1/8	6	17086	19073
1-25/64	1.3906	3-1/8	6	17087	—
1-13/32	1.4062	3-1/8	6	17088	—
1-27/64	1.4219	3-1/8	6	17089	—
1-7/16	1.4375	3-1/8	6	17090	19074
1-29/64	1.4531	3-1/8	6	17091	—
1-15/32	1.4687	3-1/8	6	17092	—
1-31/64	1.4844	3-1/8	6	17093	—
1-1/2	1.5000	3-1/8	6	17094	19075

## 3/8" Reduced Shank Jobber Length Drills

118° Point – High Speed Steel  
Black Oxide Treated

For 3/8" chuck power drills in portable applications.



List No. 1422

STANDARD PACKAGE All sizes — 6 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
25/64	.3906	3-3/4	5-1/8	15001
13/32	.4062	3-7/8	5-1/4	15002
27/64	.4219	3-15/16	5-3/8	15003
7/16	.4375	4-1/16	5-1/2	15004

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
29/64	.4531	4-3/16	5-5/8	15005
15/32	.4687	4-5/16	5-3/4	15006
31/64	.4844	4-3/8	5-7/8	15007
1/2	.5000	4-1/2	6	15008

## Ambore™ Mighty Bite™ Hole Enlarger

4 Flute – 118° Chamfer

Specifically designed to enlarge holes, preventing hogging usually experienced when using S&D drills. The four flute design offers a good surface finish, improved hole accuracy and allows for increased metal removal rates.

Manufactured with premium tool steel, unique gold and black finish, close tolerance, and 3-flat reduced shanks.



List No. 1458

Will not drill solid material.

STANDARD PACKAGE All sizes — 1 each

SIZE	MIN. STARTING HOLE SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
3/8	1/4	.3750	3/8	1-7/8	4-5/16	16170
1/2	5/16	.5000	1/2	1-7/8	4-5/16	16171
9/16	3/8	.5625	1/2	1-7/8	4-5/16	16172
5/8	25/64	.6250	1/2	1-7/8	4-5/16	16173
11/16	7/16	.6875	1/2	1-7/8	4-5/16	16174
3/4	15/32	.7500	1/2	1-7/8	4-5/16	16175

# Taper Length Drills

**Straight Shank – High Speed Steel**  
**118° Point – Black Oxide Treated**  
**General Purpose**

Taper length drills have approximately the same flute lengths and overall lengths as taper shank drills, for deeper hole drilling. Shanks are the same diameter as the drill body. Recommended for drilling a wide range of materials.



**List No. 1314 Fractional**  
**List No. 1322 Wire Gage**

**STANDARD PACKAGE** **Fractional Sizes**  
 3/64" thru 15/64" — 12 each  
 1/4" thru 3/8" — 6 each  
 25/64" and over — 1 each

**Wire Gage Sizes**  
 #1 thru #60 — 12 each



FRAC-TIONAL	SIZE	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1314, 1322 EDP NO.
		60	.0400	1 1/8	2 1/4	11051
		59	.0410	1 1/8	2 1/4	11052
		58	.0420	1 1/8	2 1/4	11053
		57	.0430	1 1/8	2 1/4	11054
		56	.0465	1 1/8	2 1/4	11055
3/64			.0469	1 1/8	2 1/4	10553
		55	.0520	1 3/4	3	11056
		54	.0550	1 3/4	3	11057
		53	.0595	1 3/4	3	11058
1/16			.0625	1 3/4	3	10554
		52	.0635	2	3 3/4	11059
		51	.0670	2	3 3/4	11060
		50	.0700	2	3 3/4	11061
		49	.0730	2	3 3/4	11062
		48	.0760	2	3 3/4	11063
5/64			.0781	2	3 3/4	10555
		47	.0785	2 1/4	4 1/4	11064
		46	.0810	2 1/4	4 1/4	11065
		45	.0820	2 1/4	4 1/4	11066
		44	.0860	2 1/4	4 1/4	11067
		43	.0890	2 1/4	4 1/4	11068
		42	.0935	2 1/4	4 1/4	11069
3/32			.0938	2 1/4	4 1/4	10556
		41	.0960	2 1/2	4 5/8	11070
		40	.0980	2 1/2	4 5/8	11071
		39	.0995	2 1/2	4 5/8	11072
		38	.1015	2 1/2	4 5/8	11073
		37	.1040	2 1/2	4 5/8	11074
		36	.1065	2 1/2	4 5/8	11075
7/64			.1094	2 1/2	4 5/8	10557
		35	.1100	2 3/4	5 1/8	11076
		34	.1110	2 3/4	5 1/8	11077
		33	.1130	2 3/4	5 1/8	11078
		32	.1160	2 3/4	5 1/8	11079
		31	.1200	2 3/4	5 1/8	11080
1/8			.1250	2 3/4	5 1/8	10558
		30	.1285	3	5 3/8	11081
		29	.1360	3	5 3/8	11082
		28	.1405	3	5 3/8	11083
9/64			.1406	3	5 3/8	10559
		27	.1440	3	5 3/8	11084
		26	.1470	3	5 3/8	11085
		25	.1495	3	5 3/8	11086

(continued)



# Taper Length Drills (continued)

List No. 1314, 1322

**DRILLS**

SIZE					1314, 1322
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	24	.1520	3	5 <sup>3</sup> / <sub>8</sub>	11087
	23	.1540	3	5 <sup>3</sup> / <sub>8</sub>	11088
5 <sup>3</sup> / <sub>32</sub>		.1562	3	5 <sup>3</sup> / <sub>8</sub>	10560
	22	.1570	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11089
	21	.1590	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11090
	20	.1610	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11091
	19	.1660	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11092
1 <sup>1</sup> / <sub>64</sub>	18	.1695	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11093
		.1719	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	10561
	17	.1730	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11094
	16	.1770	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11095
	15	.1800	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11096
	14	.1820	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11097
3 <sup>3</sup> / <sub>16</sub>	13	.1850	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	11098
		.1875	3 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	10562
	12	.1890	3 <sup>5</sup> / <sub>8</sub>	6	11099
	11	.1910	3 <sup>5</sup> / <sub>8</sub>	6	11100
	10	.1935	3 <sup>5</sup> / <sub>8</sub>	6	11101
	9	.1960	3 <sup>5</sup> / <sub>8</sub>	6	11102
	8	.1990	3 <sup>5</sup> / <sub>8</sub>	6	11103
1 <sup>3</sup> / <sub>64</sub>	7	.2010	3 <sup>5</sup> / <sub>8</sub>	6	11104
		.2031	3 <sup>5</sup> / <sub>8</sub>	6	10563
	6	.2040	3 <sup>5</sup> / <sub>8</sub>	6	11105
	5	.2055	3 <sup>5</sup> / <sub>8</sub>	6	11106
	4	.2090	3 <sup>5</sup> / <sub>8</sub>	6	11107
	3	.2130	3 <sup>5</sup> / <sub>8</sub>	6	11108
7 <sup>3</sup> / <sub>32</sub>		.2188	3 <sup>5</sup> / <sub>8</sub>	6	10564
	2	.2210	3 <sup>3</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>	11109
	1	.2280	3 <sup>3</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>	11110
1 <sup>5</sup> / <sub>64</sub>		.2344	3 <sup>3</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>	10565
1 <sup>1</sup> / <sub>4</sub>		.2500	3 <sup>3</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>	10566
1 <sup>7</sup> / <sub>64</sub>		.2656	3 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>4</sub>	10567
9 <sup>3</sup> / <sub>32</sub>		.2812	3 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>4</sub>	10568
1 <sup>9</sup> / <sub>64</sub>		.2969	4	6 <sup>3</sup> / <sub>8</sub>	10569
5 <sup>1</sup> / <sub>16</sub>		.3125	4	6 <sup>3</sup> / <sub>8</sub>	10570
2 <sup>1</sup> / <sub>64</sub>		.3281	4 <sup>1</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	10571
1 <sup>1</sup> / <sub>32</sub>		.3438	4 <sup>1</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	10572
2 <sup>3</sup> / <sub>64</sub>		.3594	4 <sup>1</sup> / <sub>4</sub>	6 <sup>3</sup> / <sub>4</sub>	10573
3 <sup>3</sup> / <sub>8</sub>		.3750	4 <sup>1</sup> / <sub>4</sub>	6 <sup>3</sup> / <sub>4</sub>	10574
2 <sup>5</sup> / <sub>64</sub>		.3906	4 <sup>3</sup> / <sub>8</sub>	7	10575
1 <sup>3</sup> / <sub>32</sub>		.4062	4 <sup>3</sup> / <sub>8</sub>	7	10576
2 <sup>7</sup> / <sub>64</sub>		.4219	4 <sup>5</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>4</sub>	10577
7 <sup>1</sup> / <sub>16</sub>		.4375	4 <sup>5</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>4</sub>	10578
2 <sup>9</sup> / <sub>64</sub>		.4531	4 <sup>3</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	10579
1 <sup>5</sup> / <sub>32</sub>		.4688	4 <sup>3</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	10580
3 <sup>1</sup> / <sub>64</sub>		.4844	4 <sup>3</sup> / <sub>4</sub>	7 <sup>3</sup> / <sub>4</sub>	10581
1 <sup>1</sup> / <sub>2</sub>		.5000	4 <sup>3</sup> / <sub>4</sub>	7 <sup>3</sup> / <sub>4</sub>	10582
3 <sup>3</sup> / <sub>64</sub>		.5156	4 <sup>3</sup> / <sub>4</sub>	8	10583
1 <sup>7</sup> / <sub>32</sub>		.5312	4 <sup>3</sup> / <sub>4</sub>	8	10584
3 <sup>5</sup> / <sub>64</sub>		.5469	4 <sup>7</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>4</sub>	10585
9 <sup>1</sup> / <sub>16</sub>		.5625	4 <sup>7</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>4</sub>	10586
3 <sup>7</sup> / <sub>64</sub>		.5781	4 <sup>7</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	10587
1 <sup>9</sup> / <sub>32</sub>		.5938	4 <sup>7</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	10588
3 <sup>9</sup> / <sub>64</sub>		.6094	4 <sup>7</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	10589
5 <sup>3</sup> / <sub>8</sub>		.6250	4 <sup>7</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	10590
4 <sup>1</sup> / <sub>64</sub>		.6406	5 <sup>1</sup> / <sub>8</sub>	9	10591

(continued)



# Taper Length Drills (continued)

List No. 1314

SIZE FRAC- TIONAL	DEC. EQUIV.	FLUTE LENGTH	OAL	1314 EDP NO.
21/32	.6562	5-1/8	9	10592
43/64	.6719	5-3/8	9-1/4	10593
11/16	.6875	5-3/8	9-1/4	10594
45/64	.7031	5-5/8	9-1/2	10595
23/32	.7188	5-5/8	9-1/2	10596
47/64	.7344	5-7/8	9-3/4	10597
3/4	.7500	5-7/8	9-3/4	10598
49/64	.7656	6	9-7/8	10599
25/32	.7812	6	9-7/8	10600
51/64	.7969	6-1/8	10	10601
13/16	.8125	6-1/8	10	10602
53/64	.8281	6-1/8	10	10603
27/32	.8438	6-1/8	10	10604
55/64	.8594	6-1/8	10	10605
7/8	.8750	6-1/8	10	10606
57/64	.8906	6-1/8	10	10607
29/32	.9062	6-1/8	10	10608
59/64	.9219	6-1/8	10-3/4	10609
15/16	.9375	6-1/8	10-3/4	10610
61/64	.9531	6-3/8	11	10611
31/32	.9688	6-3/8	11	10612
63/64	.9844	6-3/8	11	10613
1	1.0000	6-3/8	11	10614
1-1/64	1.0156	6-1/2	11-1/8	10615
1-1/32	1.0312	6-1/2	11-1/8	10616

SIZE FRAC- TIONAL	DEC. EQUIV.	FLUTE LENGTH	OAL	1314 EDP NO.
1-3/64	1.0469	6-5/8	11-1/4	10617
1-1/16	1.0625	6-5/8	11-1/4	10618
1-5/64	1.0781	6-7/8	11-1/2	10619
1-3/32	1.0938	6-7/8	11-1/2	10620
1-7/64	1.1094	7-1/8	11-3/4	10621
1-1/8	1.1250	7-1/8	11-3/4	10622
1-9/64	1.1406	7-1/4	11-7/8	10623
1-5/32	1.1562	7-1/4	11-7/8	10624
1-11/64	1.1719	7-3/8	12	10625
1-3/16	1.1875	7-3/8	12	10626
1-13/64	1.2031	7-1/2	12-1/8	10627
1-7/32	1.2188	7-1/2	12-1/8	10628
1-15/64	1.2344	7-7/8	12-1/2	10629
1-1/4	1.2500	7-7/8	12-1/2	10630
1-5/16	1.3125	8-5/8	14-1/4	10632
1-3/8	1.3750	8-7/8	14-1/2	10634
1-7/16	1.4375	9-1/8	14-3/4	10636
1-15/32	1.4688	9-1/4	14-7/8	10637
1-1/2	1.5000	9-3/8	15	10638
1-9/16	1.5625	9-5/8	15-1/4	10639

## Coolant Hole Drills

**Straight Shank — High Speed Steel**  
**118° Notched Point — Black Oxide Treated**  
**Taper Length**

Heavy duty construction. Low 14° helix angle is recommended for harder materials and improved chip ejection in horizontal applications. Coolant fed to the drill point reduces friction and heat, enhances chip ejection, permits higher feed rates and extends tool life. Recommended for all production work, especially deep hole drilling, in a wide variety of materials.



List No. 1479

STANDARD All Sizes — 1 each  
 PACKAGE

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
23/32	.7188	6-3/16	9-1/2	16323*
25/32	.7812	6-1/2	9-7/8	16327*
27/32	.8438	6-3/4	10-1/4	16331*
29/32	.9062	7	10-5/8	16335*
31/32	.9688	7-1/8	10-7/8	16339*
1-1/32	1.0312	7-5/16	11-1/8	16342*
1-1/16	1.0625	7-3/8	11-1/4	16343*
1-3/32	1.0938	7-5/8	11-1/2	16344*

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1-1/8	1.1250	7-7/8	11-3/4	16345*
1-5/32	1.1562	8	11-7/8	16346*
1-7/32	1.2188	8-1/8	12-1/8	16348*
1-1/4	1.2500	8-1/2	12-1/2	16349*
1-5/16	1.3125	9-1/4	14-1/4	16350*
1-3/8	1.3750	9-1/2	14-1/2	16351*
1-7/16	1.4375	9-5/8	14-3/4	16352*
1-1/2	1.5000	9-7/8	15	16353*

\*Available While Supplies Last



# Automotive Taper Length Drills

**Straight Shank — High Speed Steel**  
**118° Point — Black Oxide Treated**

Designed for high production drilling of a wide variety of materials. Tanged shank allows for use with ASA split sleeve drivers.

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/8	.1250	2-3/4	5-1/8	<b>10808</b>
9/64	.1406	3	5-3/8	<b>10809</b>
5/32	.1562	3	5-3/8	<b>10810</b>
11/64	.1719	3-3/8	5-3/4	<b>10811</b>
3/16	.1875	3-3/8	5-3/4	<b>10812</b>
13/64	.2031	3-5/8	6	<b>10813</b>
7/32	.2187	3-5/8	6	<b>10814</b>
15/64	.2344	3-3/4	6-1/8	<b>10815</b>
1/4	.2500	3-3/4	6-1/8	<b>10816</b>
17/64	.2656	3-7/8	6-1/4	<b>10817</b>
9/32	.2812	3-7/8	6-1/4	<b>10818</b>
19/64	.2969	4	6-3/8	<b>10819</b>
5/16	.3125	4	6-3/8	<b>10820</b>
21/64	.3281	4-1/8	6-1/2	<b>10821</b>
11/32	.3437	4-1/8	6-1/2	<b>10822</b>
23/64	.3594	4-1/4	6-3/4	<b>10823</b>

\* Available While Supplies Last



## List No. 1314A – Tanged Shank

**STANDARD** 1/8" thru 15/64" — 12 each  
**PACKAGE** 1/4" thru 3/8" — 6 each  
25/64" and over — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
3/8	.3750	4-1/4	6-3/4	<b>10824</b>
25/64	.3906	4-3/8	7	<b>10825</b>
13/32	.4062	4-3/8	7	<b>10826</b>
27/64	.4219	4-5/8	7-1/4	<b>10827</b>
7/16	.4375	4-5/8	7-1/4	<b>10828</b>
29/64	.4531	4-3/4	7-1/2	<b>10829</b>
15/32	.4687	4-3/4	7-1/2	<b>10830</b>
31/64	.4844	4-3/4	7-3/4	<b>10831</b>
1/2	.5000	4-3/4	7-3/4	<b>10832</b>
33/64	.5156	4-3/4	8	<b>10833*</b>
17/32	.5312	4-3/4	8	<b>10834</b>
19/32	.5937	4-7/8	8-3/4	<b>10838</b>
39/64	.6094	4-7/8	8-3/4	<b>10839</b>
5/8	.6250	4-7/8	8-3/4	<b>10840</b>
43/64	.6719	5-3/8	9-1/4	<b>10843*</b>
11/16	.6875	5-3/8	9-1/4	<b>10844*</b>



# Heavy Duty Taper Length Drills

**Straight Shank — High Speed Steel**  
**118° Notched Point — Black Oxide Treated**

Heavy duty construction. Recommended for tough drilling applications including alloy steels, steel forgings and other medium to high tensile strength materials. Flute length 20% longer for deeper holes and more regrinds. Tanged shank allows use with ASA split sleeve drivers.

SIZE	SHANK DIA.	FITS DRILL DRIVER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/8	1/8	1	.1250	3-3/8	5-1/8	<b>11008</b>
9/64	9/64	1	.1406	3-5/8	5-3/8	<b>11009*</b>
5/32	5/32	1	.1562	3-3/4	5-3/8	<b>11010</b>
3/16	3/16	1	.1875	4-1/8	5-3/4	<b>11012</b>
13/64	13/64	1	.2031	4-3/8	6	<b>11013</b>
7/32	7/32	1	.2188	4-3/8	6	<b>11014</b>
15/64	15/64	1	.2344	4-13/16	6-1/8	<b>11015</b>
1/4	1/4	1	.2500	4-13/16	6-1/8	<b>11016</b>
9/32	9/32	1	.2812	5	6-1/4	<b>11018*</b>
5/16	5/16	1	.3125	5-1/8	6-3/8	<b>11020</b>

\* Available While Supplies Last



## List No. 1320 – Tanged Shank

**STANDARD** 1/8" thru 15/64" — 12 each  
**PACKAGE** 1/4" thru 3/8" — 6 each  
25/64" and over — 1 each

SIZE	SHANK DIA.	FITS DRILL DRIVER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
3/8	3/8	2	.3750	5-3/8	6-3/4	<b>11024</b>
25/64	25/64	2	.3906	5-3/8	7	<b>11025</b>
13/32	13/32	2	.4062	5-5/8	7	<b>11026</b>
7/16	7/16	2	.4375	5-11/16	7-1/4	<b>11028</b>
31/64	31/64	2	.4844	5-3/4	7-3/4	<b>11031</b>
1/2	1/2	2	.5000	5-3/4	7-3/4	<b>11032</b>
33/64	1/2	2	.5156	6	8	<b>11033</b>
17/32	1/2	2	.5312	6	8	<b>11034</b>
37/64	1/2	2	.5781	6-1/2	8-3/4	<b>11037</b>
11/16	5/8	3	.6875	6-7/8	9-1/4	<b>11042*</b>

# M42 Cobalt Heavy Duty Taper Length Drills

**Straight Shank — Cobalt**

Heavy duty construction. Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials and materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.

135° Self-centering split point eliminates “walking” and reduces thrust.



**List No. 2314 - Fractional**  
 $\frac{3}{32}$ " thru  $\frac{1}{2}$ " — 135° Split Point  
 Over  $\frac{1}{2}$ " — 118° Notched Point\*

**List No. 2322 - Wire Gage**  
 135° Point\*

**STANDARD PACKAGE**    **Fractional Sizes**  
 3/32" thru 15/64" — 12 each  
 1/4" thru 3/8" — 6 each  
 25/64" thru 61/64" — 1 each

**Wire Gage Sizes\***  
 12 each



FRAC-TIONAL	SIZE	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	2314, 2322 EDP NO.
3/32			.0938	2-1/4	4-1/4	10764
1/8			.1250	2-3/4	5-1/8	10766
9/64			.1406	3	5-3/8	10767
5/32			.1562	3	5-3/8	10707
11/64			.1719	3-3/8	5-3/4	10708
		13	.1850	3-3/8	5-3/4	10863*
3/16			.1875	3-3/8	5-3/4	10709
		7	.2010	3-5/8	6	10857*
13/64			.2031	3-5/8	6	10710
7/32			.2188	3-5/8	6	10711
15/64			.2344	3-3/4	6-1/8	10712
1/4			.2500	3-3/4	6-1/8	10713
17/64			.2656	3-7/8	6-1/4	10714
9/32			.2812	3-7/8	6-1/4	10715
19/64			.2969	4	6-3/8	10716
5/16			.3125	4	6-3/8	10717
21/64			.3281	4-1/8	6-1/2	10718
11/32			.3438	4-1/8	6-1/2	10719
23/64			.3594	4-1/4	6-3/4	10720
3/8			.3750	4-1/4	6-3/4	10721
25/64			.3906	4-3/8	7	10722
13/32			.4062	4-3/8	7	10723
27/64			.4219	4-5/8	7-1/4	10724
7/16			.4375	4-5/8	7-1/4	10725
29/64			.4531	4-3/4	7-1/2	10726
15/32			.4688	4-3/4	7-1/2	10727
31/64			.4844	4-3/4	7-3/4	10728
1/2			.5000	4-3/4	7-3/4	10729
61/64			.9531	6-3/8	11	10758*

\*Available While Supplies Last

# High Helix Taper Length Drills

**Straight Shank — High Speed Steel**  
**118° Point — Bright Finish**

High Helix drills are recommended for deep hole drilling in low tensile strength materials such as aluminum, magnesium, zinc, copper, soft steels and some plastics. Wide polished flutes and a high helix angle enhance chip ejection.



List No. 1325

**STANDARD PACKAGE** Fractional Sizes  
1/16" thru 15/64" — 12 each  
1/4" thru 3/8" — 6 each  
25/64" and over — 1 each

**Wire Gage Sizes**  
#1 thru #60 — 12 each

**Tool Coatings Also Available**



SIZE					
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	60	.0400	1-1/8	2-1/4	<b>11201</b>
	59	.0410	1-1/8	2-1/4	<b>11202</b>
	58	.0420	1-1/8	2-1/4	<b>11203</b>
	57	.0430	1-1/8	2-1/4	<b>11204</b>
	56	.0465	1-1/8	2-1/4	<b>11205</b>
1/16	55	.0520	1-3/4	3	<b>11206</b>
	54	.0550	1-3/4	3	<b>11207</b>
	53	.0595	1-3/4	3	<b>11208</b>
		.0625	1-3/4	3	<b>11209</b>
	52	.0635	2	3-3/4	<b>11210</b>
5/64	51	.0670	2	3-3/4	<b>11211</b>
	50	.0700	2	3-3/4	<b>11212</b>
	49	.0730	2	3-3/4	<b>11213</b>
	48	.0760	2	3-3/4	<b>11214</b>
	.0781	2	3-3/4	<b>11215</b>	
3/32	47	.0785	2-1/4	4-1/4	<b>11216</b>
	46	.0810	2-1/4	4-1/4	<b>11217</b>
	45	.0820	2-1/4	4-1/4	<b>11218</b>
	44	.0860	2-1/4	4-1/4	<b>11219</b>
	43	.0890	2-1/4	4-1/4	<b>11220</b>
	42	.0935	2-1/4	4-1/4	<b>11221</b>
	.0937	2-1/4	4-1/4	<b>11222</b>	
	41	.0960	2-1/2	4-5/8	<b>11223</b>
	40	.0980	2-1/2	4-5/8	<b>11224</b>
	39	.0995	2-1/2	4-5/8	<b>11225</b>
7/64	38	.1015	2-1/2	4-5/8	<b>11226</b>
	37	.1040	2-1/2	4-5/8	<b>11227</b>
	36	.1065	2-1/2	4-5/8	<b>11228</b>
		.1094	2-1/2	4-5/8	<b>11229</b>
	35	.1100	2-3/4	5-1/8	<b>11230</b>
1/8	34	.1110	2-3/4	5-1/8	<b>11231</b>
	33	.1130	2-3/4	5-1/8	<b>11232</b>
	32	.1160	2-3/4	5-1/8	<b>11233</b>
	31	.1200	2-3/4	5-1/8	<b>11234</b>
		.1250	2-3/4	5-1/8	<b>11235</b>
9/64	30	.1285	3	5-3/8	<b>11236</b>
	29	.1360	3	5-3/8	<b>11237</b>
	28	.1405	3	5-3/8	<b>11238</b>
		.1406	3	5-3/8	<b>11239</b>
	27	.1440	3	5-3/8	<b>11240</b>
5/32	26	.1470	3	5-3/8	<b>11241</b>
	25	.1495	3	5-3/8	<b>11242</b>
	24	.1520	3	5-3/8	<b>11243</b>
	23	.1540	3	5-3/8	<b>11244</b>
		.1562	3	5-3/8	<b>11245</b>

SIZE						
FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	
	22	.1570	3-3/8	5-3/4	<b>11246</b>	
	21	.1590	3-3/8	5-3/4	<b>11247</b>	
	20	.1610	3-3/8	5-3/4	<b>11248</b>	
	19	.1660	3-3/8	5-3/4	<b>11249</b>	
	18	.1695	3-3/8	5-3/4	<b>11250</b>	
11/64		.1719	3-3/8	5-3/4	<b>11251</b>	
		17	.1730	3-3/8	5-3/4	<b>11252</b>
		16	.1770	3-3/8	5-3/4	<b>11253</b>
		15	.1800	3-3/8	5-3/4	<b>11254</b>
	14	.1820	3-3/8	5-3/4	<b>11255</b>	
3/16	13	.1850	3-3/8	5-3/4	<b>11256</b>	
		.1875	3-3/8	5-3/4	<b>11257</b>	
		12	.1890	3-5/8	6	<b>11258</b>
		11	.1910	3-5/8	6	<b>11259</b>
	10	.1935	3-5/8	6	<b>11260</b>	
13/64	9	.1960	3-5/8	6	<b>11261</b>	
	8	.1990	3-5/8	6	<b>11262</b>	
	7	.2010	3-5/8	6	<b>11263</b>	
		.2031	3-5/8	6	<b>11264</b>	
		6	.2040	3-5/8	6	<b>11265</b>
		5	.2055	3-5/8	6	<b>11266</b>
7/32	4	.2090	3-5/8	6	<b>11267</b>	
		3	.2130	3-5/8	6	<b>11268</b>
		.2187	3-5/8	6	<b>11269</b>	
	2	.2210	3-3/4	6-1/8	<b>11270</b>	
	1	.2280	3-3/4	6-1/8	<b>11271</b>	
15/64		.2344	3-3/4	6-1/8	<b>11272</b>	
1/4		.2500	3-3/4	6-1/8	<b>11273</b>	
17/64		.2656	3-7/8	6-1/4	<b>11274</b>	
9/32		.2812	3-7/8	6-1/4	<b>11275</b>	
19/64		.2969	4	6-3/8	<b>11276</b>	
5/16		.3125	4	6-3/8	<b>11277</b>	
21/64		.3281	4-1/8	6-1/2	<b>11278</b>	
11/32		.3437	4-1/8	6-1/2	<b>11279</b>	
23/64		.3594	4-1/4	6-3/4	<b>11280</b>	
3/8		.3750	4-1/4	6-3/4	<b>11281</b>	
25/64		.3906	4-3/8	7	<b>11282</b>	
13/32		.4062	4-3/8	7	<b>11283</b>	
27/64		.4219	4-5/8	7-1/4	<b>11284</b>	
7/16		.4375	4-5/8	7-1/4	<b>11285</b>	
29/64		.4531	4-3/4	7-1/2	<b>11286</b>	
15/32		.4687	4-3/4	7-1/2	<b>11287</b>	
31/64		.4844	4-3/4	7-3/4	<b>11288</b>	
1/2		.5000	4-3/4	7-3/4	<b>11289</b>	

# Parabolic Flute Taper Length Drills

**Straight Shank — High Speed Steel**  
**135° Split Point — Tanged Shank (1/8" & Larger)**

**Parabolic Flute** drills feature a unique flute design that greatly enhances chip flow, coolant flow to the drill point and heat dissipation in deep hole drilling greater than three diameters deep. Recommended for drilling aluminum and other low to medium tensile strength materials.

**Titanium Nitride (TiN) Coating** increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Enhanced hole quality at higher speeds and feeds.

135° Self-centering split point eliminates "walking" and reduces thrust.



List No. 1356 — Bright Finish



List No. 1356G — TiN Coated

**STANDARD PACKAGE** Fractional Sizes  
1/16" thru 15/64" — 12 each  
1/4" thru 3/8" — 6 each  
25/64" and over — 1 each

**Wire Gage Sizes**  
#1 thru #40 — 12 each

**Tool Coatings Also Available**



FRAC-TIONAL	SIZE	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1356 EDP NO.	1356G EDP NO.
1/16	40	39	.0625	1 3/4	3	13385	93385
			.0781	2	3 3/4	13386	93386
			.0938	2 1/4	4 1/4	13387	93387
			.0980	2 1/2	4 5/8	13461	93461
			.0995	2 1/2	4 5/8	13460	93460
			1/8	38	37	.1015	2 1/2
.1040	2 1/2	4 5/8				13458	93458
.1065	2 1/2	4 5/8				13457	93457
.1094	2 1/2	4 5/8				13388	93388
.1100	2 3/4	5 1/8				13456	93456
3/16	35	34				.1110	2 3/4
			.1130	2 3/4	5 1/8	13454	93454
			.1160	2 3/4	5 1/8	13453	93453
			.1200	2 3/4	5 1/8	13452	93452
			.1250	3 3/8	5 1/8	13389	93389
			1/4	30	29	.1285	3
.1360	3	5 3/8				13450	93450
.1405	3	5 3/8				13449	93449
.1406	3 5/8	5 3/8				13390	93390
.1440	3	5 3/8				13448	93448
5/16	27	26				.1470	3
			.1495	3	5 3/8	13446	93446
			.1520	3	5 3/8	13445	93445
			.1540	3	5 3/8	13444	93444
			.1562	3 3/4	5 3/8	13391	93391
			3/8	22	21	.1570	3 3/8
.1590	3 3/8	5 3/4				13442	93442
.1610	3 3/8	5 3/4				13441	93441
.1660	3 3/8	5 3/4				13440	93440
.1695	3 3/8	5 3/4				13439	93439
7/16	18	17				.1719	4 1/8
			.1730	3 3/8	5 3/4	13438	93438
			.1770	3 3/8	5 3/4	13437	93437
			.1800	3 3/8	5 3/4	13436	93436
			.1820	3 3/8	5 3/4	13435	93435
			1/2	13	12	.1850	3 3/8
.1875	4 1/8	5 3/4				13393	93393
.1890	3 5/8	6				13433	93433
.1910	3 5/8	6				13432	93432
.1935	3 5/8	6				13431	93431
5/8	9	8				.1960	3 5/8
			.1990	3 5/8	6	13429	93429
			.2010	3 5/8	6	13428	93428
			.2031	4 3/8	6	13394	93394
			.2040	3 5/8	6	13427	93427

(continued)

SIZE FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1356	1356G
					EDP NO.	EDP NO.
7/32	5	.2055	3-5/8	6	13426	93426
	4	.2090	3-5/8	6	13425	93425
	3	.2130	3-5/8	6	13424	93424
		.2188	4-3/8	6	13395	93395
		.2210	3-3/4	6-1/8	13423	93423
15/64	1	.2280	3-3/4	6-1/8	13422	93422
		.2344	4-13/16	6-1/8	13396	93396
1/4		.2500	4-13/16	6-1/8	13397	93397
17/64		.2656	5	6-1/4	13398	93398
9/32		.2812	5	6-1/4	13399	93399
19/64		.2969	5-1/8	6-3/8	13400	93400
5/16		.3125	5-1/8	6-3/8	13401	93401
21/64		.3281	5-1/4	6-1/2	13402	93402
11/32		.3438	5-1/4	6-1/2	13403	93403
23/64		.3594	5-3/8	6-3/4	13404	93404
3/8		.3750	5-3/8	6-3/4	13405	93405
25/64		.3906	5-5/8	7	13406	93406
13/32		.4062	5-5/8	7	13407	93407
27/64		.4219	5-11/16	7-1/4	13408	93408
7/16		.4375	5-11/16	7-1/4	13409	93409
29/64		.4531	5-3/4	7-1/2	13410	93410
15/32		.4688	5-3/4	7-1/2	13411	93411
31/64		.4844	5-3/4	7-3/4	13412	93412
1/2		.5000	5-3/4	7-3/4	13413	93413

## Metric Taper Length Drills

**Straight Shank — High Speed Steel**  
**118° Point — Black Oxide Treated**

Taper length drills have approximately the same flute lengths and overall lengths as taper shank drills, for deeper hole drilling.



### List No. 1317

**STANDARD PACKAGE** 1.7mm thru 6.5mm — 12 each  
 6.8mm thru 9.50mm — 6 each  
 10.0mm thru 20.0mm — 1 each

SIZE MM	DEC. EQUIV.	FLUTE LENGTH		OAL		EDP NO.
		MM	IN.	MM	IN.	
1.70	.0669	-	2	-	3-3/4	17403*
1.85	.0728	-	2	-	3-3/4	17406*
1.95	.0768	-	2	-	3-3/4	17408*
2.00	.0787	56	2-13/64	85	3-11/32	17409†
2.05	.0807	-	2-1/4	-	4-1/4	17410*
2.10	.0827	-	2-1/4	-	4-1/4	17411*
2.15	.0846	-	2-1/4	-	4-1/4	17412*
2.20	.0866	-	2-1/4	-	4-1/4	17413*
2.25	.0886	-	2-1/4	-	4-1/4	17414*
2.35	.0925	59	2-21/64	90	3-35/64	17416†
2.45	.0965	-	2-1/2	-	4-5/8	17418*
2.60	.1024	-	2-1/2	-	4-5/8	17420*
2.70	.1063	-	2-1/2	-	4-5/8	17421*
3.00	.1181	66	2-19/32	100	3-15/16	17424†
3.10	.1220	-	2-3/4	-	5-1/8	17425*
3.70	.1457	-	3	-	5-3/8	17431*
3.80	.1496	-	3	-	5-3/8	17432*
3.90	.1535	-	3	-	5-3/8	17433*
4.00	.1575	78	3-5/64	119	4-11/16	17434†
4.10	.1614	-	3-3/8	-	5-3/4	17435*
4.50	.1772	-	3-3/8	-	5-3/4	17439*
4.70	.1850	-	3-3/8	-	5-3/4	17441*
5.00	.1968	87	3-27/64	132	5-13/64	17444†
5.60	.2205	-	3-3/4	-	6-1/8	17450*
5.90	.2323	-	3-3/4	-	6-1/8	17453*
6.00	.2362	91	3-37/64	139	5-15/32	17454†

SIZE MM	DEC. EQUIV.	FLUTE LENGTH		OAL		EDP NO.
		MM	IN.	MM	IN.	
6.50	.2559	97	3-13/16	148	5-53/64	17460†
6.80	.2677	102	4-1/64	156	6-9/64	17461†
7.00	.2756	102	4-1/64	156	6-9/64	17462†
7.20	.2835	-	4	-	6-3/8	17463*
8.00	.3150	109	4-9/32	165	6-1/2	17466†
8.20	.3228	-	4-1/8	-	6-1/2	17467*
8.50	.3346	109	4-9/32	165	6-1/2	17468†
9.00	.3543	115	4-17/32	175	6-57/64	17470†
10.00	.3937	121	4-49/64	184	7-15/64	17474†
10.20	.4016	121	4-49/64	184	7-15/64	17475†
10.50	.4134	121	4-49/64	184	7-15/64	17476†
11.00	.4331	128	5-1/32	195	7-43/64	17478†
11.20	.4409	128	5-1/32	195	7-43/64	17479†
13.20	.5197	-	4-3/4	-	8	17487*
13.80	.5433	-	4-7/8	-	8-1/4	17489*
14.25	.5610	-	4-7/8	-	8-1/4	17491*
14.75	.5807	-	4-7/8	-	8-3/4	17493*
15.00	.5906	144	5-43/64	220	8-21/32	17494†
15.75	.6201	-	4-7/8	-	8-3/4	17497*
16.00	.6299	149	5-55/64	227	8-15/16	17498†
16.25	.6398	-	5-1/8	-	9	17499*
16.75	.6594	-	5-3/8	-	9-1/4	17501*
17.00	.6693	149	5-55/64	235	9-1/4	17502†
17.25	.6791	-	5-3/8	-	9-1/4	17503*
18.00	.7087	143	5-5/8	241	9-31/64	17505†
18.50	.7283	-	5-7/8	-	9-3/4	17506*
20.00	.7874	156	6-9/64	254	10	17509†

†Replenishment to DIN 338 Lengths

\*Available While Supplies Last

# Aircraft Extension Drills



**Straight Shank — High Speed Steel**  
**135° Split Point — Black Oxide Treated**

**List No. 1390**  
**List No. 1391**

**6" Overall Length**  
**12" Overall Length**

**NAS 907, Type B**

Drilling in mild steel where extra length is required.  
 135° split point is self-centering, and reduces thrust.

Sizes #53 and smaller furnished with 135° Regular Point

**STANDARD PACKAGE** **Fractional Sizes**  
 3/64" thru 11/32" — 12 each  
 23/64" thru 1/2" — 1 each

**Letter Sizes**  
 A thru V — 6 each  
 W thru Z — 1 each

**Wire Gage Sizes**  
 #1 thru #60 — 12 each



FRAC-TIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	1390 EDP NO.	1391 EDP NO.
	60*	.0400	11/16	16673	16789
	59*	.0410	11/16	16672	16788
	58*	.0420	11/16	16671	16787
	57*	.0430	3/4	16670	16786
	56*	.0465	3/4	16669	16785
3/64*		.0469	3/4	16600	16700
	55*	.0520	7/8	16668	16784
	54*	.0550	7/8	16667	16783
1/16	53*	.0595	7/8	16666	16782
		.0625	7/8	16601	16701
	52	.0635	7/8	16665	16781
	51	.0670	1	16664	16780
	50	.0700	1	16663	16779
	49	.0730	1	16662	16778
	48	.0780	1	16661	16777
5/64		.0781	1	16602	16702
	47	.0785	1	16660	16776
	46	.0810	1-1/8	16659	16775
	45	.0820	1-1/8	16658	16774
	44	.0860	1-1/8	16657	16773
	43	.0890	1-1/4	16656	16772
3/32	42	.0935	1-1/4	16655	16771
		.0938	1-1/4	16603	16703
	41	.0960	1-3/8	16654	16770
	40	.0980	1-3/8	16653	16769
	39	.0995	1-3/8	16652	16768
	38	.1015	1-7/16	16651	16767
	37	.1040	1-7/16	16650	16766
7/64	36	.1065	1-7/16	16649	16765
		.1094	1-1/2	16604	16704
	35	.1100	1-1/2	16648	16764
	34	.1110	1-1/2	16647	16763
	33	.1130	1-1/2	16646	16762
	32	.1160	1-5/8	16645	16761
	31	.1200	1-5/8	16644	16760
1/8		.1250	1-5/8	16605	16705
	30	.1285	1-5/8	16643	16759
	29	.1360	1-3/4	16642	16758
9/64	28	.1405	1-3/4	16641	16757
		.1406	1-3/4	16606	16706
	27	.1440	1-7/8	16640	16756
	26	.1470	1-7/8	16639	16755
	25	.1495	1-7/8	16638	16754
	24	.1520	2	16637	16753
	23	.1540	2	16636	16752
5/32		.1562	2	16607	16707
	22	.1570	2	16635	16751
	21	.1590	2-1/8	16634	16750
	20	.1610	2-1/8	16633	16749

\*Note: NOT Split Point

(continued)



# Aircraft Extension Drills (continued)

List Nos. 1390 and 1391

**DRILLS**

FRAC-TIONAL	SIZE LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	1390 EDP NO.	1391 EDP NO.
11/64		19	.1660	2-1/8	16632	16748
		18	.1695	2-1/8	16631	16747
			.1719	2-1/8	16608	16708
		17	.1730	2-3/16	16630	16746
		16	.1770	2-3/16	16629	16745
3/16		15	.1800	2-3/16	16628	16744
		14	.1820	2-3/16	16627	16743
		13	.1850	2-5/16	16626	16742
			.1875	2-5/16	16609	16709
		12	.1890	2-5/16	16625	16741
13/64		11	.1910	2-5/16	16624	16740
		10	.1935	2-7/16	16623	16739
		9	.1960	2-7/16	16622	16738
		8	.1990	2-7/16	16621	16737
		7	.2010	2-7/16	16620	16736
7/32			.2031	2-7/16	16610	16710
		6	.2040	2-1/2	16619	16735
		5	.2055	2-1/2	16618	16734
		4	.2090	2-1/2	16617	16733
		3	.2130	2-1/2	16616	16732
15/64			.2187	2-1/2	16611	16711
		2	.2210	2-5/8	16615	16731
		1	.2280	2-5/8	16614	16730
1/4	E		.2344	2-5/8	16612	16712
17/64			.2500	2-3/4	16613	16713
17/64	H*		.2656	2-7/8	16584	16714
			.2660	2-7/8	—	16796
			.2770	2-7/8	—	16798
9/32	J*		.2812	2-15/16	16585	16715
			.2900	2-15/16	16684	—
19/64			.2969	3-1/16	16586	16716
5/16			.3125	3-3/16	16587	16717
21/64			.3281	3-5/16	16588	16718
11/32	T*		.3437	3-7/16	16589	16719
			.3580	3-1/2	—	16808
23/64			.3594	3-1/2	16590	16720
3/8	V*		.3750	3-5/8	16591	16721
			.3770	3-5/8	16694	—
25/64	X*		.3906	3-3/4	16592	16722
			.3970	3-3/4	16696	—
13/32	Z*		.4062	3-7/8	16593	16723
			.4130	3-7/8	—	16814
27/64			.4219	3-15/16	16594	16724
7/16			.4375	4-1/16	16595	16725
29/64			.4531	4-3/16	16596	16726
15/32			.4687	4-5/16	16597	16727
31/64			.4844	4-3/8	16598	16728
1/2			.5000	4-1/2	16599	16729

\*Available While Supplies Last

# Extra Long Straight Shank Drills

**Straight Shank — High Speed Steel  
118° Notch Point**



List No. 1315 - Bright Finish

**STANDARD PACKAGE** All sizes — 1 each

**Tool  
Coatings  
Also  
Available**

For general purpose drilling in applications where extra reach is required.



## 5½" Flute, 8" Overall Length

SIZE	DEC. EQUIV.	EDP NO.
1/8	.1250	10902
9/64	.1406	10905
5/32	.1562	10909
11/64	.1719	10912
3/16	.1875	10915
13/64	.2031	10920
7/32	.2188	10923
15/64	.2344	10927
1/4	.2500	10928
17/64	.2656	10932
9/32	.2812	10935
19/64	.2969	10936
5/16	.3125	10941

SIZE	DEC. EQUIV.	EDP NO.
21/64	.3281	10942
11/32	.3438	10305
23/64	.3594	10306
3/8	.3750	10951
25/64	.3906	10952
13/32	.4062	10309
27/64	.4219	10310
7/16	.4375	10961
29/64	.4531	10311
15/32	.4688	10307
31/64	.4844	10967
1/2	.5000	10308

## 7½" Flute, 10" Overall Length

SIZE	DEC. EQUIV.	EDP NO.
1/8	.1250	10903
5/32	.1562	10910
3/16	.1875	10917
7/32	.2188	10925
15/64	.2344	10929
1/4	.2500	10930
9/32	.2812	10937

SIZE	DEC. EQUIV.	EDP NO.
5/16	.3125	10943
11/32	.3438	10947
3/8	.3750	10953
13/32	.4062	10957
7/16	.4375	10962
15/32	.4688	10966
1/2	.5000	10969

## 9" Flute, 12" Overall Length

SIZE	DEC. EQUIV.	EDP NO.
1/8	.1250	10904
5/32	.1562	10911
3/16	.1875	10918
7/32	.2188	10926
1/4	.2500	10931
9/32	.2812	10938
5/16	.3125	10944
11/32	.3438	10948
3/8	.3750	10954
13/32	.4062	10958

SIZE	DEC. EQUIV.	EDP NO.
7/16	.4375	10963
15/32	.4688	10983
1/2	.5000	10971
17/32	.5312	10974
9/16	.5625	10975
19/32	.5938	10977
5/8	.6250	10978
21/32	.6562	10301
11/16	.6875	10313
23/32	.7188	10302
3/4	.7500	10303

## 14" Flute, 18" Overall Length

SIZE	DEC. EQUIV.	EDP NO.
1/4	.2500	10653
9/32	.2812	10990
5/16	.3125	10945
11/32	.3438	10657
3/8	.3750	10955

SIZE	DEC. EQUIV.	EDP NO.
13/32	.4062	10660
7/16	.4375	10964
15/32	.4688	10663
1/2	.5000	10972



# Double End Body Drills

## High Speed Steel

### 135° Split Point — Black Oxide Treated

Designed for drilling auto and truck bodies and other thin sheet metal applications. 135° Self-centering split point eliminates "walking" of the drill point and reduces thrust for faster penetration.



List No. 1400

**STANDARD PACKAGE**

All sizes — 12 each



SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
7/64	.1094	9/16	1-7/8	<b>15010</b>
1/8	.1250	9/16	1-7/8	<b>15011</b>
9/64	.1406	9/16	1-15/16	<b>15012</b>
5/32	.1562	9/16	2-1/16	<b>15013</b>
3/16	.1897	9/16	2-1/16	<b>15014</b>

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
7/32	.2188	11/16	2-1/2	<b>15015</b>
1/4	.2500	3/4	2-1/2	<b>15016</b>
11	.1910	9/16	2-7/32	<b>15017</b>
20	.1610	9/16	2-1/16	<b>15018</b>
30	.1285	9/16	1-7/8	<b>15019</b>

## M42 Cobalt DRILL-MILL™

Solid Carbide  
Drill-Mills  
Page 295

Specially designed to perform both drilling and milling operations with the same tool in vertical milling machine applications. Increased productivity with fewer tool changes.

**DRILL-MILL™ performs:** drilling, spotting countersinking, chamfering, slotting, side milling, profile milling and other drilling & milling operations

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.



List No. 1980

90° Point Angle

2-Flute

30° Right Hand Helix

Tool Coatings Also Available

**STANDARD PACKAGE**

All sizes — 1 each



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH* OF CUT	OAL*	EDP NO.
1/8	.1250	3/8	3/8	2-5/16	<b>44619</b>
3/16	.1875	3/8	7/16	2-5/16	<b>44620</b>
1/4	.2500	3/8	5/8	2-7/16	<b>44621</b>
5/16	.3125	3/8	23/32	2-15/32	<b>44622</b>
3/8	.3750	3/8	3/4	2-1/2	<b>44623</b>
7/16	.4375	3/8	1-1/32	2-23/32	<b>44624</b>
1/2	.5000	1/2	1-1/4	3-1/4	<b>44625</b>
9/16	.5625	1/2	1-13/32	3-13/32	<b>44626</b>
5/8	.6250	5/8	1-5/8	3-3/4	<b>44627</b>
11/16	.6875	5/8	1-21/32	3-25/32	<b>44628</b>
3/4	.7500	3/4	1-11/16	3-15/16	<b>44629</b>
13/16	.8125	3/4	1-29/32	4-5/32	<b>44630</b>
7/8	.8750	3/4	1-15/16	4-3/16	<b>44631</b>
15/16	.9375	3/4	1-31/32	4-7/32	<b>44632</b>
1	1.0000	3/4	2	4-1/4	<b>44633</b>

\* Lengths include the 90° conical cutting point.

# Taper Shank Drills



**Morse Taper Shank — High Speed Steel  
118° Point — Black Oxide Treated**

**General Purpose**

Recommended for production work in wide variety of materials. Black Oxide Surface Treatment increases wear resistance, reduces galling and chip welding, improves chip flow and increases drill lubricant retention. Standard series shanks furnished unless otherwise specified.

List No. 1302

**STANDARD PACKAGE** All sizes — 1 each



## Standard Morse Taper Shank Drills

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/8	1	.1250	1 7/8	5 1/8	10008
9/64	1	.1406	2 1/8	5 3/8	10009
5/32	1	.1562	2 1/8	5 3/8	10010
11/64	1	.1719	2 1/2	5 3/4	10011
3/16	1	.1875	2 1/2	5 3/4	10012
13/64	1	.2031	2 3/4	6	10013
7/32	1	.2188	2 3/4	6	10014
15/64	1	.2344	2 7/8	6 1/8	10015
1/4	1	.2500	2 7/8	6 1/8	10016
17/64	1	.2656	3	6 1/4	10017
9/32	1	.2812	3	6 1/4	10018
19/64	1	.2969	3 1/8	6 3/8	10019
5/16	1	.3125	3 1/8	6 3/8	10020
21/64	1	.3281	3 1/4	6 1/2	10021
11/32	1	.3438	3 1/4	6 1/2	10022
23/64	1	.3594	3 1/2	6 3/4	10023
3/8	1	.3750	3 1/2	6 3/4	10024
25/64	1	.3906	3 5/8	7	10025
13/32	1	.4062	3 5/8	7	10026
27/64	1	.4219	3 7/8	7 1/4	10027
7/16	1	.4375	3 7/8	7 1/4	10028
29/64	1	.4531	4 1/8	7 1/2	10029
15/32	1	.4688	4 1/8	7 1/2	10030
31/64	2	.4844	4 3/8	8 1/4	10031
1/2	2	.5000	4 3/8	8 1/4	10032
33/64	2	.5156	4 5/8	8 1/2	10033
17/32	2	.5312	4 5/8	8 1/2	10034
35/64	2	.5469	4 7/8	8 3/4	10035
9/16	2	.5625	4 7/8	8 3/4	10036
37/64	2	.5781	4 7/8	8 3/4	10037
19/32	2	.5938	4 7/8	8 3/4	10038
39/64	2	.6094	4 7/8	8 3/4	10039
5/8	2	.6250	4 7/8	8 3/4	10040
41/64	2	.6406	5 1/8	9	10041
21/32	2	.6562	5 1/8	9	10042
43/64	2	.6719	5 3/8	9 1/4	10043
11/16	2	.6875	5 3/8	9 1/4	10044
45/64	2	.7031	5 3/8	9 1/2	10045
23/32	2	.7188	5 3/8	9 1/2	10046
47/64	2	.7344	5 7/8	9 3/4	10047
3/4	2	.7500	5 7/8	9 3/4	10048
49/64	2	.7656	6	9 7/8	10049
25/32	2	.7812	6	9 7/8	10050
51/64	3	.7969	6 1/8	10 3/4	10051
13/16	3	.8125	6 1/8	10 3/4	10052

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
53/64	3	.8281	6 1/8	10 3/4	10053
27/32	3	.8438	6 1/8	10 3/4	10054
55/64	3	.8594	6 1/8	10 3/4	10055
7/8	3	.8750	6 1/8	10 3/4	10056
57/64	3	.8906	6 1/8	10 3/4	10057
29/32	3	.9062	6 1/8	10 3/4	10058
59/64	3	.9219	6 1/8	10 3/4	10059
15/16	3	.9375	6 1/8	10 3/4	10060
61/64	3	.9531	6 3/8	11	10061
31/32	3	.9688	6 3/8	11	10062
63/64	3	.9844	6 3/8	11	10063
1	3	1.0000	6 3/8	11	10064
1 1/64	3	1.0156	6 1/2	11 1/8	10065
1 1/32	3	1.0312	6 1/2	11 1/8	10066
1 3/64	3	1.0469	6 5/8	11 1/4	10067
1 1/16	3	1.0625	6 5/8	11 1/4	10068
1 5/64	4	1.0781	6 7/8	12 1/2	10069
1 3/32	4	1.0938	6 7/8	12 1/2	10070
1 7/64	4	1.1094	7 1/8	12 3/4	10071
1 1/8	4	1.1250	7 1/8	12 3/4	10072
1 9/64	4	1.1406	7 1/4	12 7/8	10073
1 5/32	4	1.1562	7 1/4	12 7/8	10074
1 11/64	4	1.1719	7 3/8	13	10075
1 1/16	4	1.1875	7 3/8	13	10076
1 13/64	4	1.2031	7 1/2	13 1/8	10077
1 7/32	4	1.2188	7 1/2	13 1/8	10078
1 15/64	4	1.2344	7 7/8	13 1/2	10079
1 1/4	4	1.2500	7 7/8	13 1/2	10080
1 17/64	4	1.2656	8 1/2	14 1/8	10081
1 9/32	4	1.2812	8 1/2	14 1/8	10082
1 19/64	4	1.2969	8 5/8	14 1/4	10083
1 5/16	4	1.3125	8 5/8	14 1/4	10084
1 21/64	4	1.3281	8 3/4	14 3/8	10085
1 11/32	4	1.3438	8 3/4	14 3/8	10086
1 23/64	4	1.3594	8 7/8	14 1/2	10087
1 3/8	4	1.3750	8 7/8	14 1/2	10088
1 25/64	4	1.3906	9	14 5/8	10089
1 13/32	4	1.4062	9	14 5/8	10090
1 27/64	4	1.4219	9 1/8	14 3/4	10091
1 7/16	4	1.4375	9 1/8	14 3/4	10092
1 29/64	4	1.4531	9 1/4	14 7/8	10093
1 15/32	4	1.4688	9 1/4	14 7/8	10094
1 31/64	4	1.4844	9 3/8	15	10095
1 1/2	4	1.5000	9 3/8	15	10096
1 17/32	5	1.5312	9 3/8	16 3/8	10097

(continued)

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1-9/16	5	1.5625	9-5/8	16-5/8	10098
1-19/32	5	1.5938	9-7/8	16-7/8	10099
1-5/8	5	1.6250	10	17	10100
1-21/32	5	1.6562	10-1/8	17-1/8	10101
1-11/16	5	1.6875	10-1/8	17-1/8	10102
1-23/32	5	1.7188	10-1/8	17-1/8	10103
1-3/4	5	1.7500	10-1/8	17-1/8	10104
1-25/32	5	1.7812	10-1/8	17-1/8	10105
1-13/16	5	1.8125	10-1/8	17-1/8	10106
1-27/32	5	1.8438	10-1/8	17-1/8	10107
1-7/8	5	1.8750	10-3/8	17-3/8	10108
1-29/32	5	1.9062	10-3/8	17-3/8	10109
1-15/16	5	1.9375	10-3/8	17-3/8	10110
1-31/32	5	1.9688	10-3/8	17-3/8	10111

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
2	5	2.0000	10-3/8	17-3/8	10112
2-1/32	5	2.0312	10-3/8	17-3/8	10113
2-1/16	5	2.0625	10-1/4	17-3/8	10114
2-1/8	5	2.1250	10-1/4	17-3/8	10116
2-5/32	5	2.1562	10-1/4	17-3/8	10117
2-3/16	5	2.1875	10-1/4	17-3/8	10118
2-7/32	5	2.2188	10-1/8	17-3/8	10119
2-1/4	5	2.2500	10-1/8	17-3/8	10120
2-5/16	5	2.3125	10-1/8	17-3/8	10121
2-3/8	5	2.3750	10-1/8	17-3/8	10122
2-7/16	5	2.4375	11-1/4	18-3/4	10123
2-1/2	5	2.5000	11-1/4	18-3/4	10124

Alternate Morse Taper Shank Drills — List No. 1302

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
33/64	1	.5156	4-5/8	8	10210*
9/16	1	.5625	4-7/8	8-1/4	10213*
45/64	3	.7031	5-5/8	10-1/4	10218*
7/8	2	.8750	6-1/8	10	10229

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1-1/4	3	1.2500	7-7/8	12-1/2	10246
1-37/64	4	1.5781	9-7/8	15-1/2	10251*
1-31/32	4	1.9688	10-5/8	16-5/8	10269*
2	4	2.0000	10-5/8	16-5/8	10270

\*Available While Supplies Last

## Carbide Tipped Masonry Drills

For drilling in brick, stone, concrete, slate, plaster and other masonry materials.

**Regular Helix** features wide flutes for fast dust removal especially in softer materials.

**High Helix** provides exceptional strength to minimize chipping of the carbide tip. Recommended for drilling in hard concrete aggregates and hard masonry products.



List No. 5463 Regular Helix



List No. 5464 High Helix

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	OAL	SHANK DIA.	5463 EDP NO.	5464 EDP NO.
1/8	.1250	3	1/8	53401	53451
3/16	.1875	3	3/16	53402	53452
1/4	.2500	4	1/4	53403	53453
1/4	.2500	6	1/4	53404	53454
5/16	.3125	4	1/4	53405	53455
5/16	.3125	6	1/4	53406	53456
3/8	.3750	4	1/4	53407	53457
3/8	.3750	6	1/4	53408	53458
7/16	.4375	4	1/4	—	53459
7/16	.4375	6	1/4	—	53460
1/2	.5000	4	1/4	—	53462
1/2	.5000	6	1/4	53410	53463
1/2	.5000	6	3/8	53411	53464
9/16	.5625	6	3/8	53412	53465
5/8	.6250	6	1/2	53413	53466
11/16	.6875	6	1/2	53414	53467
3/4	.7500	6	1/2	53415	53468
7/8	.8750	6	1/2	53416	53469
1	1.000	6	1/2	53417	53470



# Morse Drill Sets

## Jobber Length

High Speed Steel — 118° Point  
General Purpose

PIECES PER SET	SIZE RANGE	BRIGHT EDP NO.	TREATED EDP NO.
21	1/16 to 3/8 by 64ths	18143	18100
29	1/16 to 1/2 by 64ths	18144	18101
15	1/16 to 1/2 by 32nds	18145	18102
60	Nos. 1 to 60	18146	18103
26	A to Z	18147	18104
13	1/16 to 1/4 by 64ths	18148	18105
20	Nos. 61 to 80	—	18106
25	1.0mm to 13.0mm by .5mms	—	18107
13	1.0mm to 7.0mm by .5mms	—	18108

List No. 8030  
In Indexed Case



Drill Counter Display Page 73

## TiN Coated

## Jobber Length

High Speed Steel — 118° Point  
General Purpose

PIECES PER SET	SIZE RANGE	TIN COAT EDP NO.
29	1/16 to 1/2 by 64ths	18183



List No. 8030  
In Indexed Case

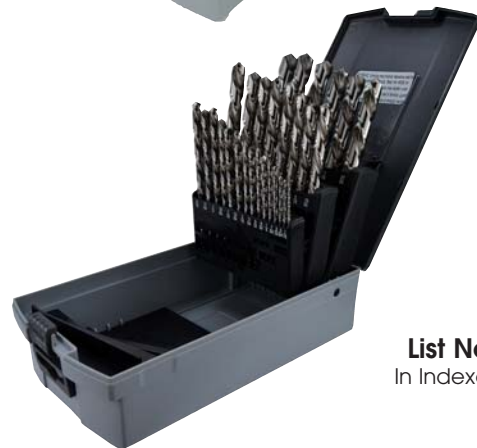
## Left Hand

## Jobber Length

High Speed Steel — 118° Point  
General Purpose

Bright Finish

PIECES PER SET	SIZE RANGE	EDP NO.
29	1/16 to 1/2 by 64ths	18005



List No. 8020  
In Indexed Case

## 3-in-1 Combination Jobber Length

High Speed Steel — 118° Point  
General Purpose

PCS. PER SET	SIZE RANGE	BRIGHT EDP NO.	TREATED EDP NO.
115	1/16 to 1/2 by 64ths A-Z and Nos. 1-60	18004	18003



List No. 8000  
In Metal Indexed Case

# Morse Drill Sets

## 3/8" Reduced Shank Jobber Length

High Speed Steel – 118° Point  
Black Oxide Treated  
General Purpose

List No. 8035  
In Indexed Case



PIECES PER SET	SIZE RANGE	EDP NO.
29	1/16 to 1/2 by 64ths	18400
15	1/16 to 1/2 by 32nds	18401



## Heavy Duty Jobber Length

High Speed Steel — 135° Split Point  
Black Oxide Treated — NAS 907, Type B

List No. 8080  
In Indexed Case



PIECES PER SET	SIZE RANGE	EDP NO.
29	1/16 to 1/2 by 64ths	18172
60	Nos. 1 to 60	18174

## Ambore™ Heavy Duty Jobber Length

High Speed Steel — 135° Split Point  
Gold and Black Finish

List No. 8080  
In Indexed Case



PIECES PER SET	SIZE RANGE	EDP NO.
29	1/16 to 1/2 by 64ths	18182



## M42 Cobalt Heavy Duty Jobber Length

135° Split Point — NAS 907, Type J

List No. 8070  
In Indexed Case



PIECES PER SET	SIZE RANGE	EDP NO.
29	1/16 to 1/2 by 64ths	18166
15	1/16 to 1/2 by 32nds	18167
60	Nos. 1 to 60	18168
26	A to Z	18169



# Morse Drill Sets

## Ambore™ Wide Land Parabolic Flute Heavy Duty Jobber Length

Gold & Black — High Speed Steel - 135° Split Point

SIZE RANGE	PIECES PER SET	EDP NO.
1/16 to 1/2 by 64ths	29	18180



List No. 8080 —  
In Indexed  
Case

## Ambore™ Mechanic Length

List No. 1383

29-Pc. Set  
1/16" - 1/2" by 64ths  
Indexed Case

EDP No.  
18006



29-Pc. Set  
1/16" - 1/2" by 64ths  
Clip-On Drill Index

- Clips onto tool caddy, utility belt, tool bucket or ladder
- High impact, break resistant plastic
- Screw-on domed cover
- Weather resistant for both inside and outside usage



EDP No. 18007

## Screw Machine Length

High Speed Steel — Bright Finish  
118° Point  
General Purpose

PIECES PER SET	SIZE RANGE	EDP NO.
29	1/16 to 1/2 by 64ths	18177
15	1/16 to 1/2 by 32nds	18178
13	1/16 to 1/4 by 64ths	18181



List No. 8090 —  
In Indexed Case

## Taper Length

High Speed Steel — 118° Point  
Black Oxide Treated  
General Purpose  
Straight Shank

PIECES PER SET	SIZE RANGE	EDP NO.
29	1/16 to 1/2 by 64ths	18184



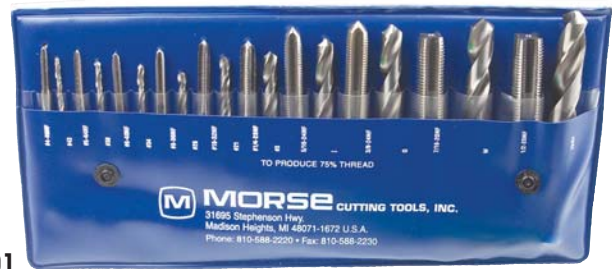
List No. 8095 —  
In Metal Indexed  
Case

# Tap and Drill Kits

3 Series Available • NC, NF, Metric

**ALL KITS INCLUDE**

- 10 popular sized high speed steel hand taps.
- 10 popular sized high speed steel screw machine length drills.
- 128 page Machinist's Guide for Taps.
- Packaged in a durable plastic pouch.



List No. 8001

EDP NO. 37103		EDP NO. 37104		EDP NO. 37105	
SET NO. 103 - NC TAPS		SET NO. 104 - NF TAPS		SET NO. 105 - METRIC TAPS	
NC TAPS	DRILLS	NF TAPS	DRILLS	METRIC TAPS	DRILLS
#4-40	#44	#4-48	#43	M3 x 0.5	#40
#5-40	#39	#5-44	#38	M3.5 x 0.6	#33
#6-32	#36	#6-40	#34	M4 x 0.7	#30
#8-32	#30	#8-36	#29	M4.5 x 0.75	#26
#10-24	#25	#10-32	#21	M5 x 0.8	#19
1/4-20	#7	1/4-28	#3	M6 x 1	#9
5/16-18	F	5/16-24	I	M7 x 1	15/64
3/8-16	5/16	3/8-24	Q	M8 x 1.25	17/64
7/16-14	U	7/16-20	W	M10 x 1.5	Q
1/2-13	27/64	1/2-20	29/64	M12 x 1.75	Y



Drill Counter Display Page 73

## 33-Pc. 1/2" Shank S & D Drill Sets

In metal indexed stand



List No. 8040  
**Ambore™** – Gold & Black Finish  
 3-Flat Shank  
 118° Self-Centering Split Point  
 High Speed Steel  
 (List No. 1424S)

## 8-Pc. 1/2" Shank S & D Drill Sets

In metal indexed case



List No. 8040  
**Ambore™** – Gold & Black Finish  
 3-Flat Shank  
 118° Self-Centering Split Point  
 High Speed Steel  
 (List No. 1424S)

List No. 8040R  
 Round Shanks  
 118° Point  
 High Speed Steel  
 (List No. 1424R)

PIECES PER SET	SIZE RANGE	8040 EDP NO.	8040R EDP NO.
33	1/2" to 1" by 64ths	18111	18112

List No. 8040R  
 Round Shanks  
 118° Point  
 High Speed Steel  
 (List No. 1424R)

PIECES PER SET	SIZE RANGE	8040 EDP NO.	8040R EDP NO.
8	9/16-5/8-11/16-3/4 13/16-7/8-15/16-1	18110	18109

# High Speed Steel & Cobalt Drills

## Speed and Feed Recommendations



WORKPIECE MATERIAL	BRINELL HARDNESS BHN	SURFACE SPEED SFM	FEED PER REVOLUTION BY DRILL DIAMETER				
			1/8"	1/4"	1/2"	3/4"	1"
<b>Low Carbon Steel</b> 1018, 12L12, 1108, 1213	≤120	110	0.0030	0.0040	0.0080	0.0100	0.0110
<b>Low &amp; Medium Carbon Steel</b> 1018, 1551, 11L44	120 - 250	65	0.0040	0.0060	0.0110	0.0130	0.0140
<b>Medium Carbon and Alloyed Steel</b> 1040, 1140, 4340, 8640	≤250	60	0.0030	0.0040	0.0080	0.0100	0.0110
<b>Tool and Die Steels</b> P20, A2, D2, H12	≤250	50	0.0030	0.0040	0.0080	0.0100	0.0110
<b>Tool and Die Steels</b> P20, A2, D2, H12	250 - 350	35	0.0020	0.0030	0.0060	0.0070	0.0080
<b>Free Machining Stainless Steels</b> 303, 410, 416, 440F	≤250	60	0.0040	0.0060	0.0110	0.0130	0.0140
<b>Moderate Machining Stainless Steels</b> 304, 316	≤300	45	0.0020	0.0030	0.0060	0.0070	0.0080
<b>Difficult Machining Stainless Steels</b> 17-4PH, 316L, AM350	≤300	20	0.0020	0.0030	0.0060	0.0070	0.0080
<b>Cast Iron</b> Soft Gray	≤160	105	0.0040	0.0060	0.0110	0.0130	0.0140
<b>Cast Iron</b> Gray	160 - 260	90	0.0040	0.0060	0.0110	0.0130	0.0140
<b>Cast Iron</b> Ductile	250	80	0.0030	0.0040	0.0080	0.0100	0.0110
<b>Cast Iron</b> Malleable	250 - 330	55	0.0020	0.0030	0.0060	0.0070	0.0080
<b>Titanium Alloys</b> Commercially Pure 99.0	110 - 170	90	0.0030	0.0040	0.0080	0.0100	0.0110
<b>Titanium Alloys</b> Ti-6Al-4V, ASTM B367 Grades C-3, C-4	≤250	50	0.0030	0.0040	0.0080	0.0100	0.0110
<b>High Temperature Alloys</b> Inconel, Hastelloy, Waspaloy	≤150	50	0.0030	0.0040	0.0080	0.0100	0.0110
<b>High Temperature Alloys</b> Inconel, Hastelloy, Waspaloy	150 - 250	20	0.0010	0.0020	0.0045	0.0060	0.0070
<b>Aluminum Alloys</b> 2025, 6061, A140, 514.0	≤150	325	0.0040	0.0060	0.0110	0.0130	0.0140
<b>Copper Alloys</b> Brass and Bronze	≤200	80	0.0040	0.0060	0.0110	0.0130	0.0140
<b>Composites &amp; Plastics</b>	≤128	175	0.0020	0.0030	0.0060	0.0070	0.0080
<b>Magnesium Alloys</b> AZ80A, HM12A, AM60A, ZE41A	50 - 90	325	0.0040	0.0060	0.0110	0.0130	0.0140

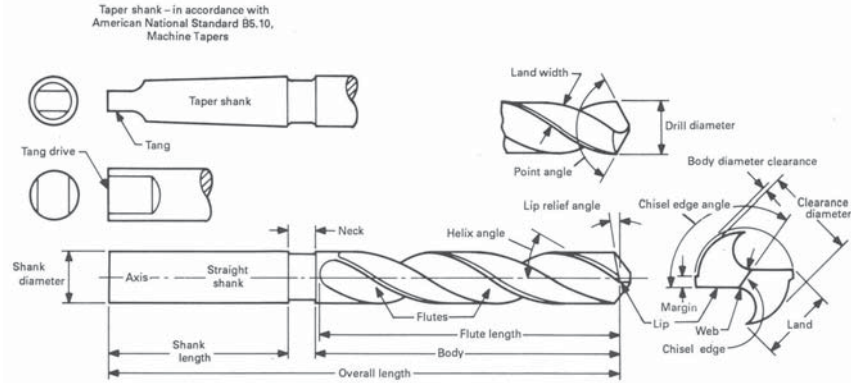
**NOTE:** The speeds and feeds shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase speed and feed until drilling cycle is optimized.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

**Tool Coatings Also Available**



# Drill Terminology



**Twist Drill** — A rotary end cutting tool having one or more cutting lips, and having one or more helical or straight flutes for the passage of chips and the admission of a cutting fluid.

**Axis** — The imaginary straight line which forms the longitudinal center line of the drill.

**Back Taper** — A slight decrease in diameter from front to back in the body of the drill.

**Body** — The portion of the drill extending from the shank or neck to the outer corners of the cutting lips.

**Body Diameter Clearance** — That portion of the land that has been cut away so it will not rub against the walls of the hole.

**Chip Packing** — The failure of chips to pass through the flute during the cutting action, generally resulting in tool failure.

**Chipping** — The breakdown at a cutting lip or margin by loss of fragments broken away during the cutting action.

**Chisel Edge** — The edge at the end of the web that connects the cutting lips.

**Chisel Edge Angle** — The angle included between the chisel edge and the cutting lip, as viewed from the end of the drill.

**Clearance** — The space provided to eliminate undesirable contact between the drill and the work piece.

**Clearance Diameter** — The diameter over the cut away portion of the drill lands.

**Drill Diameter** — The diameter over the margins of the drill measured at the point.

**Flutes** — Helical or straight grooves cut or formed in the body of the drill to provide cutting lips, to permit removal of chips, and to allow cutting fluid to reach the cutting lips.

**Flute Length** — The length from the outer corners of the cutting lips to the extreme back end of the flutes. It includes the sweep of the tool used to generate the flutes and, therefore, does not indicate the usable length of flutes.

**Heel** — The trailing edge of the land.

**Helical Flutes** — Flutes which are formed in a helical path around the axis.

**Helix Angle** — The angle made by the leading edge of the land with a plane containing the axis of the drill.

**Land** — The peripheral portion of the body between adjacent flutes.

**Land Clearance** — See preferred term Body Diameter Clearance.

**Land Width** — The distance between the leading edge and the heel of the land measured at a right angle to the leading edge.

**Length of Twist** — See preferred term Flute Length

**Lips** — The cutting edges of a two flute drill extending from the chisel edge to the periphery. (Core Drills) — The cutting edges extending from the bottom of the chamfer to the periphery.

**Lip Relief** — The axial relief angle at the outer corner of the lip. It is measured by projection into a plane tangent to the periphery at the outer corner of the lip.

**Margin** — The cylindrical portion of the land which is not cut away to provide clearance.

**Neck** — The section of reduced diameter between the body and the shank of the drill.

**Overall Length** — The length from the extreme end of the shank to the outer corners of the cutting lips. It does not include the conical shank end often used on straight shank drills, nor does it include the conical cutting point used on both straight and taper shank drills. (Core Drills) — For drills with an external center on the cutting end, same as for two flute drills. For those with internal centers on the cutting end, the overall length is from the extreme ends of the tool.

**Point** — The cutting end of a drill, made up of the ends of the lands and the web, in form it resembles a cone, but departs from a true cone to furnish clearance behind the cutting lips.

**Point Angle** — The angle included between the cutting lips projected upon a plane parallel to the drill axis and parallel to the two cutting lips.

**Relief** — The result of the removal of tool material behind or adjacent to the cutting lip and leading edge of the land to provide clearance and prevent rubbing (heel drag).

**Shank** — The part of the drill by which it is held and driven.

**Straight Flutes** — Flutes which form lands lying in an axial plane.

**Straight Shank Drills** — Those having cylindrical shanks which may be the same or different diameter than the body of the drill. The shank may be made with or without driving flats, tang, grooves or thread.

**Tang** — The flattened end of a taper shank, intended to fit into a driving slot in a socket.

**Tang Drive** — Two opposite parallel driving flats on the extreme end of a straight shank.

**Taper Shank Drills** — Those having conical shanks suitable for direct fitting into tapered holes in machine spindles, driving sleeves or sockets. Tapered shanks generally have a tang.

**Web** — The central portion of the body that joins the lands. The extreme end of the web forms the chisel edge on a two-flute drill.

**Web Thickness** — The thickness of the web at the point, unless another specific location is indicated.

# REAMERS

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## High Speed Steel Reamers Speed and Feed Recommendations

### REAMER CUTTING SPEED – SFM

For machine reaming, the recommended starting point is **2/3 the speed used for drilling** in the same material.

### REAMER FEED RATE – IPR

For machine reaming, the recommended starting point is **2 to 3 times the feed rate used for drilling** in the same material. It is important that the feed rate be high enough so that the reamer actually cuts rather than just rubbing or burnishing.

**DRILLING SPEEDS & FEEDS** are located on **Page 102** for reference.

### NOTE

The speeds and feeds shown are suggested starting points only and may be increased or decreased depending on the actual material and machining conditions. Start conservatively and adjust speed and feed until the reaming cycle is optimized while producing the required surface finish and hole accuracy.

# Solid Carbide Straight Shank Chucking Reamers

## Straight Flute

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

Recommended for general reaming of ferrous and non-ferrous materials including steel, alloy steel, stainless steel, plastic, aluminum and other abrasive non-ferrous materials.



List No. 5661

**STANDARD PACKAGE** All sizes — 1 each

### TOLERANCES

.0280" - .2500" - +.0000/+0.0002  
.2501" and up - +.0000/+0.0003

### NO. OF FLUTES

Up to .2550" - 4 Flute  
Over .2550" - 6 Flute



SIZE	DEC. SIZE	EDP NO.
70	.0280	53950
	.0285	54736
	.0290	54737
69	.0292	53951
	.0295	54738
	.0300	53952
	.0305	54739
68	.0310	53953
1/32	.0312	53954
	.0315	53955
67	.0320	53956
	.0325	53957
66	.0330	53958
	.0335	53959
	.0340	53960
	.0345	53961
65	.0350	53962
	.0355	53963
64	.0360	53964
	.0365	53965
63	.0370	53966
	.0375	53967
62	.0380	53968
	.0385	53969
61	.0390	53970
1.0 mm	.0394	53971
	.0395	53972
60	.0400	53973
	.0405	53974
59	.0410	53975
	.0415	53976
58	.0420	53977
	.0425	53978
57	.0430	53979
	.0435	53980
	.0440	53981
	.0445	53982
	.0450	53983
	.0455	53984
	.0460	53985
56	.0465	53986
3/64	.0469	53987

SIZE	DEC. SIZE	EDP NO.
	.0470	53988
	.0475	53989
	.0480	53990
	.0485	53991
	.0490	53992
	.0495	53993
	.0500	53994
	.0505	53995
	.0510	53996
	.0515	53997
55	.0520	53998
	.0525	53999
	.0530	54000
	.0535	54001
	.0540	54002
	.0545	54003
54	.0550	54004
	.0555	54005
	.0560	54006
	.0565	54007
	.0570	54008
	.0575	54009
	.0580	54010
	.0585	54011
	.0590	54012
1.5 mm	.0591	54013
53	.0595	54014
	.0600	54015
	.0605	54016
	.0610	54017
	.0615	54018
	.0620	54019
	.0622	54740
	.0623	54741
1/16	.0625	54020
	.0630	54021
52	.0635	54022
	.0640	54023
	.0645	54024
	.0650	54025
	.0655	54026
	.0660	54027

SIZE	DEC. SIZE	EDP NO.
	.0665	54028
51	.0670	54029
	.0675	54030
	.0680	54031
	.0685	54032
	.0690	54033
	.0695	54034
50	.0700	54035
	.0705	54036
	.0710	54037
	.0715	54038
	.0720	54039
	.0725	54040
49	.0730	54041
	.0735	54042
	.0740	54043
	.0745	54044
	.0750	54045
	.0755	54046
48	.0760	54047
	.0765	54048
	.0770	54049
	.0775	54050
	.0780	54051
5/64	.0781	54052
47	.0785	54053
2.0 mm	.0787	54054
	.0790	54055
	.0795	54056
	.0800	54057
	.0805	54058
46	.0810	54059
	.0815	54060
45	.0820	54061
	.0825	54062
	.0830	54063
	.0835	54064
	.0840	54065
	.0845	54066
	.0850	54067
	.0855	54068
44	.0860	54069

Tool Coatings Also Available

(continued)

SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2555"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2559"-.3165"	1-1/8	3-1/4	.4790"-.5625"	1-1/2	4
									.5905"-.7510"	1-3/4	4

# Solid Carbide Straight Shank Chucking Reamers



List No. 5661  
STANDARD PACKAGE All sizes — 1 each



(continued)

SIZE	DEC. SIZE	EDP NO.
	.0865	54070
	.0870	54071
	.0875	54072
	.0880	54073
	.0885	54074
43	.0890	54075
	.0895	54076
	.0900	54077
	.0905	54078
	.0910	54079
	.0915	54080
	.0920	54081
	.0925	54082
	.0930	54083
	.0933	54742
42	.0935	54084
	.0937	54743
3/32	.0938	54085
	.0940	54086
	.0945	54087
	.0950	54088
	.0955	54089
41	.0960	54090
	.0965	54091
	.0970	54092
	.0975	54093
40	.0980	54094
2.5 mm	.0984	54095
	.0985	54096
	.0990	54097
39	.0995	54098
	.1000	54099
	.1005	54100
	.1010	54101
38	.1015	54102
	.1020	54103
	.1025	54104
	.1030	54105
	.1035	54106
37	.1040	54107
	.1045	54108
	.1050	54109
	.1055	54110
	.1060	54111
36	.1065	54112
	.1070	54113
	.1075	54114
	.1080	54115
	.1085	54116
	.1090	54117
7/64	.1094	54118
	.1095	54119
35	.1100	54120
	.1105	54121
34	.1110	54122

SIZE	DEC. SIZE	EDP NO.
	.1115	54123
	.1120	54124
	.1125	54125
33	.1130	54126
	.1135	54127
	.1140	54128
	.1145	54129
	.1150	54130
	.1155	54131
32	.1160	54132
	.1165	54133
	.1170	54134
	.1175	54135
	.1180	54136
3.0 mm	.1181	54137
	.1185	54138
	.1190	54139
	.1195	54140
31	.1200	54141
	.1205	54142
	.1210	54143
	.1215	54144
	.1220	54145
	.1225	54146
.1230 D/P	.1230	54147
	.1235	54148
.1240 U/S	.1240	54149
	.1245	54150
.1247 D/P	.1247	54151
1/8	.1250	54152
	.1255	54153
.1260 O/S	.1260	54154
	.1265	54155
	.1270	54156
	.1275	54157
	.1280	54158
30	.1285	54159
	.1290	54160
	.1295	54161
	.1300	54162
	.1305	54163
	.1310	54164
	.1315	54165
	.1320	54166
	.1325	54167
	.1330	54168
	.1335	54169
	.1340	54170
	.1345	54171
	.1350	54172
	.1355	54173
29	.1360	54174
	.1365	54175
	.1370	54176
	.1375	54177

SIZE	DEC. SIZE	EDP NO.
3.5 mm	.1378	54178
	.1380	54179
	.1385	54180
	.1390	54181
	.1395	54182
	.1400	54183
28	.1405	54184
9/64	.1406	54185
	.1410	54186
	.1415	54187
	.1420	54188
	.1425	54189
	.1430	54190
	.1435	54191
27	.1440	54192
	.1445	54193
	.1450	54194
	.1455	54195
	.1460	54196
	.1465	54197
26	.1470	54198
	.1475	54199
	.1480	54200
	.1485	54201
	.1490	54202
25	.1495	54203
	.1500	54204
	.1505	54205
	.1507	54206
	.1510	54207
	.1515	54208
24	.1520	54209
	.1525	54210
	.1530	54211
	.1535	54212
23	.1540	54213
	.1541	54214
	.1545	54215
	.1550	54216
	.1555	54217
	.1560	54218
5/32	.1562	54219
	.1565	54220
22	.1570	54221
4.0 mm	.1575	54222
	.1580	54223
	.1585	54224
21	.1590	54225
	.1595	54226
	.1600	54227
	.1605	54228
20	.1610	54229
	.1615	54230
	.1620	54231

(continued)

SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2555"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2559"-.3165"	1-1/8	3-1/4	.4790"-.5625"	1-1/2	4
									.5905"-.7510"	1-3/4	4

# Solid Carbide Straight Shank Chucking Reamers

Tool  
Coatings  
Also  
Available

List No. 5661

STANDARD PACKAGE All sizes — 1 each



REAMERS

(continued)

SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.	
	.1625	54232	3/16	.1875	54286		.2135	54340	
	.1630	54233		.1877	54745		.2140	54341	
	.1635	54234		.1880	54287		.2145	54342	
	.1640	54235	.1885 O/S	.1885	54288		.2150	54343	
	.1645	54236	12	.1890	54289		.2155	54344	
19	.1650	54237		.1895	54290	5.5 mm	.2160	54345	
	.1655	54238		.1900	54291		.2165	54346	
	.1660	54239		.1905	54292		.2170	54347	
	.1665	54240	11	.1910	54293		.2175	54348	
	.1670	54241		.1915	54294		.2177	54349	
	.1675	54242			.1920		54295	7/32	.2180
.1680	54243		.1925	54296	.2185	54351			
.1685	54244	10	.1930	54297	.2188	54352			
.1690	54245		.1935	54298	.2190	54353			
.1695	54246		.1940	54299	.2195	54354			
18	.1700	54247		.1945	54300	2	.2200		54355
	.1705	54248		.1950	54301		.2205	54356	
	.1710	54249	9	.1955	54302		.2210	54357	
	.1715	54250		.1960	54303		.2215	54358	
	.1719	54251		.1965	54304		.2220	54359	
	11/64	.1720	54252	5.0 mm	.1969		54305		.2225
.1725		54253		.1970	54306		.2230	54361	
.1730		54254		.1975	54307		.2235	54362	
.1735		54255	8	.1980	54308		.2240	54363	
.1740		54256		.1985	54309		.2245	54364	
.1745		54257		.1990	54310	7	.2250	54365	
.1750	54258	.1995	54311	.2255	54366				
.1755	54259	.2000	54312	.2260	54367				
.1760	54260	.2005	54313	.2265	54368				
.1765	54261	.2010	54314	.2270	54369				
16	.1770	54262		.2015	54315		1	.2275	54370
	4.5 mm	54263		.2020	54316	.2280		54371	
	.1775	54264		.2025	54317	.2285		54372	
	.1780	54265	13/64	.2030	54318	.2290		54373	
	.1785	54266		.2031	54319	.2295		54374	
	.1790	54267		.2035	54320	.2300		54375	
15	.1795	54268	6	.2040	54321	.2305	54376		
	.1800	54269		.2045	54322	.2310	54377		
	.1805	54270		.2050	54323	.2315	54378		
	.1810	54271	5	.2055	54324	.2320	54379		
	.1814	54272		.2060	54325	.2325	54380		
	.1815	54273		.2065	54326	.2330	54381		
14	.1820	54274		.2070	54327	A	.2335	54382	
	.1825	54275		.2075	54328		.2340	54383	
	.1830	54276	4	.2080	54329		.2344	54384	
	.1835	54277		.2085	54330		.2345	54385	
	.1840	54278		.2090	54331		.2350	54386	
	13	.1845	54279	3	.2095		54332	.2355	54387
.1850		54280	.2100		54333	.2360	54388		
.1855 D/P		54281	.2105		54334	.2362	54389		
.1860		54282		.2110	54335	6.0 mm	.2365	54390	
.1865 U/S		54283		.2115	54336		.2370	54391	
.1867		54744		.2120	54337		.2375	54392	
.1870 D/P	.1870	54284		.2125	54338		B	.2380	54393
	.1872	54285		.2130	54339				

(continued)

SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2555"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2559"-.3165"	1-1/8	3-1/4	.4790"-.5625"	1-1/2	4
									.5905"-.7510"	1-3/4	4

# Solid Carbide Straight Shank Chucking Reamers



**List No. 5661**  
STANDARD PACKAGE All sizes — 1 each



(continued)

SIZE	DEC. SIZE	EDP NO.
	.2385	54394
	.2390	54395
	.2395	54396
	.2400	54397
	.2405	54398
C	.2410	54399
	.2415	54400
	.2420	54401
	.2425	54402
	.2430	54403
		.2435
	.2440	54405
	.2445	54406
	.2450	54407
	.2455	54408
D	.2460	54409
	.2465	54410
	.2470	54411
	.2475	54412
.2480 D/P	.2480	54413
	.2485	54414
.2490 U/S	.2490	54415
.2495 D/P	.2495	54416
	.2498	54746
<b>1/4 (E)</b>	.2500	54417
	.2502	54747
.2510 O/S	.2505	54418
	.2510	54419
	.2515	54420
	.2520	54421
	.2525	54422
	.2530	54423
	.2535	54424
	.2540	54425
	.2545	54426
6.5 mm	.2550	54427
	.2555	54748
	.2559	54428
	.2560	54429
	.2565	54430
F	.2570	54431
	.2575	54432
	.2580	54433
	.2590	54434
	.2600	54435
		.2610
G	.2620	54437
	.2630	54438
	.2635	54439
	.2640	54440
	.2650	54441
17/64 H	.2655	54749
	.2656	54442
	.2660	54443
	.2670	54444
	.2680	54445
	.2685	54750
	.2690	54446
	.2700	54447
.2710	54448	

SIZE	DEC. SIZE	EDP NO.	
I	.2720	54449	
	.2730	54450	
	.2740	54451	
	.2750	54452	
	.2756	54453	
	7.0 mm	.2760	54454
J	.2765	54751	
	.2770	54455	
	.2780	54456	
	.2785	54752	
		.2790	54457
		.2800	54458
K 9/32	.2805	54753	
	.2810	54459	
	.2812	54460	
	.2818	54461	
	.2820	54462	
	.2830	54463	
	.2840	54464	
	.2850	54465	
	.2860	54466	
	.2870	54467	
	.2880	54468	
	.2890	54469	
L	.2900	54470	
	.2910	54471	
	.2920	54472	
	.2930	54473	
	.2940	54474	
M	.2950	54475	
	.2953	54476	
	.2960	54477	
	.2969	54478	
19/64	.2970	54479	
	.2980	54480	
	.2990	54481	
	.3000	54482	
	.3010	54483	
	.3020	54484	
N	.3030	54485	
	.3040	54486	
	.3050	54487	
	.3060	54488	
	.3070	54489	
	.3080	54490	
	.3090	54491	
	.3100	54492	
.3105 D/P	.3105	54493	
	.3110	54494	
.3115 U/S	.3115	54495	
.3120 D/P	.3120	54496	
5/16	.3125	54497	
	.3130	54498	
	.3135 O/S	.3135	54499
	.3140	54500	
8.0 mm	.3145	54754	
	.3150	54501	
	.3155	54755	
	.3160	54502	
O	.3165	54756	

SIZE	DEC. SIZE	EDP NO.
	.3170	54503
	.3175	54757
	.3177	54758
	.3180	54504
	.3185	54759
	.3190	54505
	.3195	54760
	.3200	54506
	.3210	54507
	.3220	54508
P	.3230	54509
	.3240	54510
	.3250	54511
	.3255	54761
	.3260	54512
		.3270
21/64	.3280	54514
	.3281	54515
	.3290	54516
	.3300	54517
	.3310	54518
Q	.3320	54519
	.3330	54520
	.3340	54521
	.3346	54522
8.5 mm	.3350	54523
	.3360	54524
	.3365	54762
	.3370	54525
	.3380	54526
R	.3390	54527
	.3400	54528
	.3410	54529
	.3420	54530
	.3430	54531
	11/32	.3438
.3440		54533
.3450		54534
.3460		54535
	.3465	54763
	.3470	54536
S	.3480	54537
	.3490	54538
	.3500	54539
	.3510	54540
	.3520	54541
	.3530	54542
9.0 mm	.3540	54543
	.3543	54544
	.3550	54545
		.3560
	.3570	54547
T	.3580	54548
	.3590	54549
	.3594	54550
	23/64	.3600
.3610		54552
.3620		54553
.3630		54554
.3640		54555

(continued)

SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2555"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2559"-.3165"	1-1/8	3-1/4	.4790"-.5625"	1-1/2	4
									.5905"-.7510"	1-3/4	4

# Solid Carbide Straight Shank Chucking Reamers

Tool  
Coatings  
Also  
Available



List No. 5661

STANDARD PACKAGE All sizes — 1 each



REAMERS

(continued)

SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.		
U	.3650	54556	27/64	.4160	54614	12.0 mm	.4690	54675		
	.3660	54557		.4170	54615		.4700	54676		
	.3670	54558		.4180	54616		.4710	54677		
	.3675	54764		.4190	54617		.4720	54678		
	.3680	54559		.4200	54618		.4724	54679		
	.3690	54560		.4210	54619		.4730	54680		
.3730 D/P	.3700	54561	.4355 D/P	.4219	54620	31/64	.4740	54681		
	.3710	54562		.4230	54621		.4750	54682		
	.3720	54563		.4240	54622		.4760	54683		
9.5 mm .3745 D/P 3/8	.3730	54564	.4365 U/S	.4250	54623	12.5 mm	.4770	54684		
	.3735	54765		.4260	54624		.4780	54685		
	.3740	54565		.4270	54625		.4790	54686		
.3760 O/S V	.3745	54566	.4370 D/P 7/16	.4280	54626	.4980 D/P	.4800	54687		
	.3750	54567		.4290	54627		.4805	54688		
	.3755	54568		.4300	54628		.4810	54689		
.3760 O/S V	.3760	54569	.4385 O/S	.4310	54629	.4990 U/S	.4820	54690		
	.3765	54570		.4320	54630		.4830	54691		
	.3770	54571		.4330	54631		.4840	54692		
W	.3780	54572	.4400	.4331	54632	.4995 D/P	.4844	54693		
	.3790	54573		.4340	54633		.4850	54694		
	.3795	54766		.4350	54634		.4860	54695		
.3800	.3800	54574	.4410	.4355	54635	.5010 O/S	.4870	54696		
	.3810	54575		.4360	54636		.4880	54697		
	.3820	54576		.4365	54637		.4890	54698		
.3830	.3830	54577	.4420	.4370	54638	.5010 O/S	.4900	54699		
	.3840	54578		.4375	54639		.4910	54700		
	.3850	54579		.4380	54640		.4921	54701		
25/64	.3860	54580	.4430	.4385	54641	.5010 O/S	.4930	54702		
	.3870	54581		.4390	54642		.4940	54703		
	.3880	54582		.4400	54643		.4950	54704		
10.0 mm	.3890	54583	.4410	.4410	54644	.5010 O/S	.4960	54705		
	.3900	54584		.4420	54645		.4970	54706		
	.3906	54585		.4430	54646		.4980	54707		
X	.3910	54586	.4440	.4440	54647	.5010 O/S	.4990	54708		
	.3920	54587		.4450	54648		.4995	54709		
	.3930	54588		.4460	54649		.5000	54710		
.3937	.3937	54589	.4470	.4470	54650	.5010 O/S	.5005	54711		
	.3940	54590		.4480	54651		.5010	54712		
	.3950	54591		.4490	54652		.5015	54713		
.3960	.3960	54592	.4500	.4500	54653	.5010 O/S	.5020	54714		
	.3970	54593		.4510	.4510		54654	.5030	54715	
	.3980	54594			.4520		54655		.5040	54716
.3990	54595	.4528	54656		.5050	54717				
.4000	.4000	54596	.4530	.4530	54657	13.0 mm	.5118	54718		
	.4010	54597		.4531	54658		14.0 mm	.5512	54719	
	.4020	54598		.4540	54659			9/16	.5625	54720
.4030	54599	.4550	.4550	54660	15.0 mm	.5905			54721	
.4040	54600		.4560	54661		.6235	54722			
.4050	54601		.4570	54662		.6240	54723			
.4060	.4060	54602	.4580	.4580	54663	.6245	54724			
	.4062	54603		.4590	.4590		54664	5/8	.6250	54725
	.4070	54604			.4600		54665		.6255	54726
.4080	54605	.4610	54666		.6260	54727				
.4090	.4090	54606	.4620	.4620	54667	.6270	54728			
	.4100	54607		.4630	.4630		54668	16.0 mm	.6299	54729
	.4110	54608			.4640		54669		.6310	54730
.4120	54609	.4650	54670		.7490	54731				
.4130	.4130	54610	.4660	.4660	54671	.7495	54732			
	.4134	54611		.4670	.4670		54672	.7500	54733	
	.4140	54612			.4680		.4680		54673	3/4
.4150	54613	15/32	.4688			54674	.7510		54735	

SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2555"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2559"-.3165"	1-1/8	3-1/4	.4790"-.5625"	1-1/2	4
									.5905"-.7510"	1-3/4	4

# Straight Shank Chucking Reamers

High Speed Steel  
Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials



List No. 1655

**Diameter Tolerances**

up to 1/2" — +.0002/-0

over 1/2" to 5/8" — +.0003/-0

over 5/8" to 1 1/2" — +.0001/+0.0004

**STANDARD PACKAGE** All sizes - 1 each

Decimal Sizes: Pages 116-119  
Dowel Pin Sizes: Page 120  
Metric Sizes: Pages 114-115



FRAC-TIONAL	SIZE		OVER / UNDER	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
	LETTER	WIRE GAGE							
1/64		#80		.0135	.0135	3/8	3/4	2	22088
		#79		.0145	.0145	3/8	3/4	2	22089
				.0156	.0156	3/8	3/4	2	22090
		#78		.0160	.0160	3/8	7/8	2	22091
		#77		.0180	.0180	3/8	7/8	2	22092
1/32		#76		.0200	.0200	3/8	7/8	2	22093
		#75		.0210	.0210	1/2	1	3	22094
		#74		.0225	.0225	1/2	1	3	22095
		#73		.0240	.0240	1/2	1-1/8	3	22096
		#72		.0250	.0250	1/2	1-1/8	3	22097
		#71		.0260	.0260	1/2	1-1/4	3	22098
		#70		.0280	.0280	1/2	1-1/4	3	22099
		#69		.0292	.0292	1/2	1-3/8	3	22100
1/16		#68		.0310	.0310	1/2	1-3/8	3	29002
				.0312	.0312	1/2	1-3/8	3	29003
		#67		.0320	.0320	1/2	1-3/8	3	29005
		#66		.0330	.0330	1/2	1-3/8	3	29007
		#65		.0350	.0350	1/2	1-1/2	3	29011
		#64		.0360	.0360	1/2	1-1/2	3	29013
		#63		.0370	.0370	1/2	1-1/2	3	29015
		#62		.0380	.0380	1/2	1-1/2	3	29017
		#61		.0390	.0390	1/2	1-1/2	3	29019
		#60		.0400	.0390	1/2	2-1/2	4	22101
3/64		59		.0410	.0390	1/2	2-1/2	4	22102
		58		.0420	.0390	1/2	2-1/2	4	22103
		57		.0430	.0390	1/2	2-1/2	4	22104
		56		.0465	.0455	1/2	2-1/2	4	22105
				.0469	.0455	1/2	2-1/2	4	22106
		55		.0520	.0510	1/2	2-1/2	4	22107
		54		.0550	.0510	1/2	2-1/2	4	22108
		53		.0595	.0585	1/2	2-1/2	4	22109
1/8				.0625	.0585	1/2	2-1/2	4	22110
		52		.0635	.0585	1/2	2-1/2	4	22111
		51		.0670	.0660	3/4	3	4	22112
		50		.0700	.0660	3/4	3	4	22113
		49		.0730	.0660	3/4	3	4	22114
3/32		48		.0760	.0720	3/4	3	4	22115
				.0781	.0720	3/4	3	4	22116
		47		.0785	.0720	3/4	3	4	22117
		46		.0810	.0771	3/4	3	4	22118
		45		.0820	.0771	3/4	3	4	22119
1/4		44		.0860	.0810	3/4	3	4	22120
		43		.0890	.0810	3/4	3	4	22121
		42		.0935	.0880	3/4	3	4	22122
				.0938	.0880	3/4	3	4	22123

(continued)





# Straight Shank Chucking Reamers (continued)

List No. 1655

**REAMERS**

FRAC-TIONAL	SIZE		OVER / UNDER	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
	LETTER	WIRE GAGE							
		41		.0960	.0928	7/8	3-1/2	4	22124
		40		.0980	.0928	7/8	3-1/2	4	22125
		39		.0995	.0928	7/8	3-1/2	4	22126
		38		.1015	.0950	7/8	3-1/2	4	22127
		37		.1040	.0950	7/8	3-1/2	4	22128
7/64		36		.1065	.1030	7/8	3-1/2	4	22129
				.1094	.1030	7/8	3-1/2	4	22130
		35		.1100	.1030	7/8	3-1/2	4	22131
		34		.1110	.1055	7/8	3-1/2	4	22132
		33		.1130	.1055	7/8	3-1/2	4	22133
1/8		32		.1160	.1120	7/8	3-1/2	4	22134
		31		.1200	.1120	7/8	3-1/2	4	22135
			.1240	.1240	.1190	7/8	3-1/2	4	22136
				.1250	.1190	7/8	3-1/2	4	22137
			.1260	.1260	.1190	7/8	3-1/2	4	22138
			30		.1285	.1190	7/8	3-1/2	4
9/64		29		.1360	.1275	1	4	4	22140
		28		.1405	.1350	1	4	4	22141
				.1406	.1350	1	4	4	22142
		27		.1440	.1350	1	4	4	22143
		26		.1470	.1430	1	4	4	22144
5/32		25		.1495	.1430	1	4	4	22145
		24		.1520	.1460	1	4	4	22146
		23		.1540	.1460	1	4	4	22147
				.1562	.1510	1	4	6	22148
		22		.1570	.1510	1	4	6	22149
		21		.1590	.1530	1-1/8	4-1/2	6	22150
11/64		20		.1610	.1530	1-1/8	4-1/2	6	22151
		19		.1660	.1595	1-1/8	4-1/2	6	22152
		18		.1695	.1595	1-1/8	4-1/2	6	22153
				.1719	.1645	1-1/8	4-1/2	6	22154
		17		.1730	.1645	1-1/8	4-1/2	6	22155
		16		.1770	.1704	1-1/8	4-1/2	6	22156
		15		.1800	.1755	1-1/8	4-1/2	6	22157
3/16		14		.1820	.1755	1-1/8	4-1/2	6	22158
		13		.1850	.1805	1-1/8	4-1/2	6	22159
			.1865	.1865	.1805	1-1/8	4-1/2	6	22160
				.1875	.1805	1-1/8	4-1/2	6	22161
			.1885	.1885	.1805	1-1/8	4-1/2	6	22162
13/64		12		.1890	.1805	1-1/8	4-1/2	6	22163
		11		.1910	.1860	1-1/4	5	6	22164
		10		.1935	.1895	1-1/4	5	6	22165
		9		.1960	.1895	1-1/4	5	6	22166
		8		.1990	.1895	1-1/4	5	6	22167
		7		.2010	.1895	1-1/4	5	6	22168
				.2031	.1945	1-1/4	5	6	22169
7/32		6		.2040	.1945	1-1/4	5	6	22170
		5		.2055	.2016	1-1/4	5	6	22171
		4		.2090	.2016	1-1/4	5	6	22172
		3		.2130	.2075	1-1/4	5	6	22173
				.2187	.2075	1-1/4	5	6	22174
	2		.2210	.2173	1-1/2	6	6	22175	
	1		.2280	.2173	1-1/2	6	6	22176	

(continued)



# Straight Shank Chucking Reamers (continued)

List No. 1655

FRAC-TIONAL	SIZE		OVER / UNDER	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
	LETTER	WIRE GAGE							
15/64	A			.2340	.2265	1-1/2	6	6	22177
				.2344	.2265	1-1/2	6	6	22178
	B			.2380	.2329	1-1/2	6	6	22179
	C			.2420	.2329	1-1/2	6	6	22180
	D			.2460	.2329	1-1/2	6	6	22181
1/4			.2490	.2490	.2405	1-1/2	6	6	22182
	E			.2500	.2405	1-1/2	6	6	22183
			.2510	.2510	.2405	1-1/2	6	6	22185
	F			.2570	.2485	1-1/2	6	6	22186
	G			.2610	.2485	1-1/2	6	6	22187
17/64				.2656	.2485	1-1/2	6	6	22188
	H			.2660	.2485	1-1/2	6	6	22189
	I			.2720	.2485	1-1/2	6	6	22190
	J			.2770	.2485	1-1/2	6	6	22191
	K			.2810	.2485	1-1/2	6	6	22192
9/32				.2812	.2485	1-1/2	6	6	22193
	L			.2900	.2792	1-1/2	6	6	22194
	M			.2950	.2792	1-1/2	6	6	22195
19/64				.2969	.2792	1-1/2	6	6	22196
	N			.3020	.2792	1-1/2	6	6	22197
			.3115	.3115	.2792	1-1/2	6	6	22198
5/16				.3125	.2792	1-1/2	6	6	22199
			.3135	.3135	.2792	1-1/2	6	6	22200
	O			.3160	.2792	1-1/2	6	6	22201
	P			.3230	.2792	1-1/2	6	6	22202
	21/64				.3281	.2792	1-1/2	6	6
Q				.3320	.2792	1-1/2	6	6	22204
R				.3390	.2792	1-1/2	6	6	22205
11/32				.3437	.2792	1-1/2	6	6	22206
	S			.3480	.3105	1-3/4	7	6	22207
	T			.3580	.3105	1-3/4	7	6	22208
23/64				.3594	.3105	1-3/4	7	6	22209
	U			.3680	.3105	1-3/4	7	6	22210
			.3740	.3740	.3105	1-3/4	7	6	22211
3/8				.3750	.3105	1-3/4	7	6	22212
			.3760	.3760	.3105	1-3/4	7	6	22213
	V			.3770	.3105	1-3/4	7	6	22214
25/64	W			.3860	.3105	1-3/4	7	6	22215
				.3906	.3105	1-3/4	7	6	22216
	X			.3970	.3105	1-3/4	7	6	22217
	Y			.4040	.3105	1-3/4	7	6	22218
13/32				.4062	.3105	1-3/4	7	6	22219
	Z			.4130	.3730	1-3/4	7	6	22220
27/64				.4219	.3730	1-3/4	7	6	22221
			.4365	.4365	.3730	1-3/4	7	6	22222
7/16				.4375	.3730	1-3/4	7	6	22223
			.4385	.4385	.3730	1-3/4	7	6	22224
29/64				.4531	.3730	1-3/4	7	6	22225
15/32				.4688	.3730	1-3/4	7	6	22226
31/64				.4844	.4355	2	8	6	22227
1/2			.4990	.4990	.4355	2	8	6	22228
				.5000	.4355	2	8	6	22229
			.5010	.5010	.4355	2	8	6	22230

(continued)

Decimal Sizes: Pages 116-119  
Dowel Pin Sizes: Page 120  
Metric Sizes: Pages 114-115

FRAC-TIONAL	SIZE		OVER / UNDER	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
	LETTER	WIRE GAGE							
17/32				.5312	.4355	2	8	6	22231
			.5615	.5615	.4355	2	8	8	29932
9/16				.5625	.4355	2	8	8	22232
			.5635	.5635	.4355	2	8	8	29933
19/32				.5937	.4355	2	8	8	22233
			.6240	.6240	.5615	2-1/4	9	8	29850
5/8				.6250	.5615	2-1/4	9	8	22234
			.6260	.6260	.5615	2-1/4	9	8	29853
21/32				.6562	.5615	2-1/4	9	8	22235
			.6865	.6865	.5615	2-1/4	9	8	29862
11/16				.6875	.5615	2-1/4	9	8	22236
			.6885	.6885	.5615	2-1/4	9	8	29865
23/32				.7187	.5615	2-1/4	9	8	22237
			.7490	.7490	.6240	2-1/2	9-1/2	8	29873
3/4				.7500	.6240	2-1/2	9-1/2	8	22238
			.7510	.7510	.6240	2-1/2	9-1/2	8	29876
25/32				.7812	.6240	2-1/2	9-1/2	8	22239
			.8115	.8115	.6240	2-1/2	9-1/2	8	29887
13/16				.8125	.6240	2-1/2	9-1/2	8	22240
			.8135	.8135	.6240	2-1/2	9-1/2	8	29890
27/32				.8437	.6240	2-1/2	9-1/2	8	22241
			.8740	.8740	.7490	2-5/8	10	8	29899
7/8				.8750	.7490	2-5/8	10	8	22242
			.8760	.8760	.7490	2-5/8	10	8	29902
29/32				.9062	.7490	2-5/8	10	8	22243
			.9365	.9365	.7490	2-5/8	10	8	29912
15/16				.9375	.7490	2-5/8	10	8	22244
			.9385	.9385	.7490	2-5/8	10	8	29915
31/32				.9687	.7490	2-5/8	10	8	22245
			.9990	.9990	.8740	2-3/4	10-1/2	8	29924
1				1.0000	.8740	2-3/4	10-1/2	8	22246
			1.0010	1.0010	.8740	2-3/4	10-1/2	8	29927
1-1/16				1.0625	.8740	2-3/4	10-1/2	8	22247
1-1/8				1.1250	.8740	2-7/8	11	10	22248
1-3/16				1.1875	.9990	2-7/8	11	10	22249
1-1/4				1.2500	.9990	3	11-1/2	10	22250
1-3/8				1.3750	.9990	3-1/4	12	10	22251
1-1/2				1.5000	1.2490	3-1/2	12-1/2	10	22252

## Straight Shank Chucking Reamer Sets

High Speed Steel — Straight Flute  
Right Hand Cut

PCS. PER SET	SIZE RANGE	MATERIAL	LIST NO.	EDP NO.
29	1/16 to 1/2 by 64ths	High Speed Steel	1655	22301
26	A to Z	High Speed Steel	1655	22302
60	Nos. 1 to 60	High Speed Steel	1655	22303
14	.1240 to .5010 Over/Under Sizes	High Speed Steel	1655	22304
14	.1230 to .4995 Dowel Pin Sizes	High Speed Steel	1655D	22305
29	1/16 to 1/2 by 64ths	M42 Cobalt	2655	22306



List No. 1655  
In Metal Indexed Case

# Metric Straight Shank Chucking Reamers

High Speed Steel  
Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials.



List No. 1655M

Diameter Tolerances (Inches)

up to 12.5 mm — +.0002/-0

13.0 mm to 15.5 mm — +.0003/-0

16.0 mm to 25.0 mm — +.0001/+ .0004



**STANDARD** All sizes — 1 each  
**PACKAGE**

MM SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1.0	.0394	.0394	1/2	2 1/2	4	22350
1.5	.0591	.0510	1/2	2 1/2	4	22351
2.0	.0787	.0720	3/4	3	4	22352
2.5	.0984	.0928	3/8	3 1/2	4	22353
3.0	.1181	.1120	3/8	3 1/2	4	22354
3.5	.1378	.1350	1	4	4	22355
4.0	.1575	.1510	1	4	6	22356
4.5	.1772	.1704	1 1/8	4 1/2	6	22357
5.0	.1969	.1895	1 1/4	5	6	22358
5.5	.2165	.2075	1 1/4	5	6	22359
6.0	.2362	.2265	1 1/2	6	6	22360
6.5	.2559	.2405	1 1/2	6	6	22361
7.0	.2756	.2485	1 1/2	6	6	22362
7.5	.2953	.2792	1 1/2	6	6	22363
8.0	.3150	.2792	1 1/2	6	6	22364
8.5	.3346	.2792	1 1/2	6	6	22365
9.0	.3543	.3105	1 3/4	7	6	22366
9.5	.3740	.3105	1 3/4	7	6	22367
10.0	.3937	.3105	1 3/4	7	6	22368
10.5	.4134	.3730	1 3/4	7	6	22369
11.0	.4331	.3730	1 3/4	7	6	22370
11.5	.4528	.3730	1 3/4	7	6	22371
12.0	.4724	.4355	2	8	6	22372
12.5	.4921	.4355	2	8	6	22373
13.0	.5118	.4355	2	8	6	22374
13.5	.5315	.4355	2	8	6	22375

MM SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
14.0	.5512	.4355	2	8	8	22376
14.5	.5709	.4355	2	8	8	22377
15.0	.5906	.4355	2	8	8	22378
15.5	.6102	.5615	2 1/4	9	8	22379
16.0	.6299	.5615	2 1/4	9	8	22380
16.5	.6496	.5615	2 1/4	9	8	22381
17.0	.6693	.5615	2 1/4	9	8	22382
17.5	.6890	.5615	2 1/4	9	8	22383
18.0	.7087	.5615	2 1/4	9	8	22384
18.5	.7283	.6240	2 1/2	9	8	22385
19.0	.7480	.6240	2 1/2	9	8	22386
19.5	.7677	.6240	2 1/2	9	8	22387
20.0	.7874	.6240	2 1/2	9	8	22388
20.5	.8071	.6240	2 1/2	9	8	22389
21.0	.8268	.6240	2 1/2	9 1/2	8	22390
21.5	.8465	.7490	2 3/8	10	8	22391
22.0	.8661	.7490	2 3/8	10	8	22392
22.5	.8858	.7490	2 3/8	10	8	22393
23.0	.9055	.7490	2 3/8	10	8	22394
23.5	.9252	.7490	2 3/8	10	8	22395
24.0	.9449	.7490	2 3/8	10	8	22396
24.5	.9646	.7490	2 3/8	10	8	22397
25.0	.9843	.8740	2 3/4	10 1/2	8	22398

## Metric Straight Shank Chucking Reamer Sets

High Speed Steel Straight Flute — Right Hand Cut



List No. 1655M

**Over and Under Size Set**  
In Plastic Pouch

SIZES	PCS.	EDP NO.
.1565 .2766 .3927	14	23304
.1585 .3140 .3947		
.2352 .3160 .4714		
.2372 .3533 .4734		
.2746 .3553		



**Standard Size Set**  
In Metal Indexed Case

SIZES	PIECES	EDP NO.
1.0mm to 13.0mm by .5mm	25	23305

# M42 Cobalt Straight Shank Chucking Reamers



## Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials. **M42 Cobalt** steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for reaming high alloy steels, titanium, inconel, stainless steel and other difficult-to-ream materials. Longer tool life in production applications.

## List No. 2655 - Fractional

### Diameter Tolerances

up to 1/2" (including 12.5 mm) — +.0002/-0  
 over 1/2" to 5/8" — +.0003/-0  
 over 5/8" to 1 1/2" — +.0001/+0.0004

**STANDARD PACKAGE** All sizes — 1 each



SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1/16	.0625	.0585	1/2	2-1/2	4	<b>22400</b>
5/64	.0781	.0720	3/4	3	4	<b>22401</b>
3/32	.0938	.0880	3/4	3	4	<b>22402</b>
7/64	.1094	.1030	7/8	3-1/2	4	<b>22403</b>
1/8	.1250	.1190	7/8	3-1/2	4	<b>22404</b>
9/64	.1406	.1350	1	4	4	<b>22405</b>
5/32	.1562	.1510	1	4	6	<b>22406</b>
11/64	.1719	.1645	1-1/8	4-1/2	6	<b>22407</b>
3/16	.1875	.1805	1-1/8	4-1/2	6	<b>22408</b>
13/64	.2031	.1945	1-1/4	5	6	<b>22409</b>
7/32	.2188	.2075	1-1/4	5	6	<b>22410</b>
15/64	.2344	.2265	1-1/2	6	6	<b>22411</b>
1/4	.2500	.2405	1-1/2	6	6	<b>22413</b>
17/64	.2656	.2485	1-1/2	6	6	<b>22415</b>
9/32	.2812	.2485	1-1/2	6	6	<b>22416</b>
19/64	.2969	.2792	1-1/2	6	6	<b>22417</b>
5/16	.3125	.2792	1-1/2	6	6	<b>22419</b>
21/64	.3281	.2792	1-1/2	6	6	<b>22421</b>
11/32	.3438	.2792	1-1/2	6	6	<b>22422</b>
23/64	.3594	.3105	1-3/4	7	6	<b>22423</b>
3/8	.3750	.3105	1-3/4	7	6	<b>22425</b>
25/64	.3906	.3105	1-3/4	7	6	<b>22427</b>
13/32	.4062	.3105	1-3/4	7	6	<b>22428</b>

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
27/64	.4219	.3730	1-3/4	7	6	<b>22429</b>
7/16	.4375	.3730	1-3/4	7	6	<b>22431</b>
29/64	.4531	.3730	1-3/4	7	6	<b>22433</b>
15/32	.4688	.3730	1-3/4	7	6	<b>22434</b>
31/64	.4844	.4355	2	8	6	<b>22435</b>
1/2	.5000	.4355	2	8	6	<b>22437</b>
17/32	.5312	.4355	2	8	6	<b>22440</b>
9/16	.5625	.4355	2	8	8	<b>22443</b>
19/32	.5938	.4355	2	8	8	<b>22445</b>
5/8	.6250	.5615	2-1/4	9	8	<b>22448</b>
21/32	.6562	.5615	2-1/4	9	8	<b>22451</b>
11/16	.6875	.5615	2-1/4	9	8	<b>22454</b>
23/32	.7188	.5615	2-1/4	9	8	<b>22457</b>
3/4	.7500	.6240	2-1/2	9-1/2	8	<b>22460</b>
25/32	.7812	.6240	2-1/2	9-1/2	8	<b>22463</b>
13/16	.8125	.6240	2-1/2	9-1/2	8	<b>22466</b>
27/32	.8438	.6240	2-1/2	9-1/2	8	<b>22469</b>
7/8	.8750	.7490	2-5/8	10	8	<b>22472</b>
29/32	.9062	.7490	2-5/8	10	8	<b>22475</b>
15/16	.9375	.7490	2-5/8	10	8	<b>22478</b>
31/32	.9688	.7490	2-5/8	10	8	<b>22481</b>
1	1.000	.8740	2-3/4	10-1/2	8	<b>22484</b>

## List 2655M — Cobalt Metric Sizes

MM SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1.0	.0394	.0394	1/2	2-1/2	4	<b>22515</b>
1.5	.0591	.0510	1/2	2-1/2	4	<b>22516</b>
2.0	.0787	.0720	3/4	3	4	<b>22517</b>
2.5	.0984	.0928	7/8	3-1/2	4	<b>22518</b>
3.0	.1181	.1120	7/8	3-1/2	4	<b>22519</b>
3.5	.1378	.1350	1	4	4	<b>22520</b>
4.0	.1575	.1510	1	4	6	<b>22521</b>
4.5	.1772	.1704	1-1/8	4-1/2	6	<b>22522</b>
5.0	.1969	.1895	1-1/4	5	6	<b>22523</b>
5.5	.2165	.2075	1-1/4	5	6	<b>22524</b>
6.0	.2362	.2265	1-1/2	6	6	<b>22525</b>
6.5	.2559	.2405	1-1/2	6	6	<b>22526</b>
7.0	.2756	.2485	1-1/2	6	6	<b>22527</b>

MM SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
7.5	.2953	.2792	1-1/2	6	6	<b>22528</b>
8.0	.3150	.2792	1-1/2	6	6	<b>22529</b>
8.5	.3346	.2792	1-1/2	6	6	<b>22530</b>
9.0	.3543	.3105	1-3/4	7	6	<b>22531</b>
9.5	.3740	.3105	1-3/4	7	6	<b>22532</b>
10.0	.3937	.3105	1-3/4	7	6	<b>22533</b>
10.5	.4134	.3730	1-3/4	7	6	<b>22534</b>
11.0	.4331	.3730	1-3/4	7	6	<b>22535</b>
11.5	.4528	.3730	1-3/4	7	6	<b>22536</b>
12.0	.4724	.4355	2	8	6	<b>22537</b>
12.5	.4921	.4355	2	8	6	<b>22538</b>

## TOOL COATING SERVICE

Tool Coatings enhance cutting tool performance for increased productivity and lower overall tooling cost.

**TiN** — Titanium Nitride  
**TiAlN** — Titanium Aluminum Nitride  
**CrN** — Chromium Nitride

**TiCN** — Titanium Carbonitride  
**AlTiN** — Aluminum Titanium Nitride  
**CrC** — Chromium Carbide

# Decimal Size Straight Shank Chucking Reamers

High Speed Steel

Straight Flute — Right Hand Cut

.0005" Increments

45° Chamfer for reaming of most materials.

List No. 1655H

Diameter Tolerances

up to .5000 — +.0002/-0

.5005 to .6250 — +.0003/-0

.6255 to 1.0030 — +.0001/+0.0004

**STANDARD PACKAGE** All sizes - 1 each

Over / Under Sizes:  
Pages 111-113

Dowel Pin Sizes:  
Page 120



DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.
.0140	28978	.0470	29031	.0770	29082	.1085	29133
.0150	28979	.0475	29032	.0775	29083	.1090	29134
.0155	28980	.0480	29033	.0780	29084	.1095	29135
.0165	28981	.0485	29034	.0790	29085	.1105	29136
.0170	28982	.0490	29035	.0795	29086	.1115	29137
.0175	28983	.0495	29036	.0800	29087	.1120	29138
.0185	28984	.0500	29037	.0805	29088	.1125	29139
.0190	28985	.0505	29038	.0815	29089	.1135	29140
.0195	28986	.0510	29039	.0825	29090	.1140	29141
.0205	28987	.0515	29040	.0830	29091	.1145	29142
.0215	28988	.0525	29041	.0835	29092	.1150	29143
.0220	28989	.0530	29042	.0840	29093	.1155	29144
.0230	28990	.0535	29043	.0845	29094	.1165	29146
.0235	28991	.0540	29044	.0850	29095	.1170	29147
.0245	28992	.0545	29045	.0855	29096	.1175	29148
.0255	28993	.0555	29046	.0865	29097	.1180	29149
.0265	28994	.0560	29047	.0870	29098	.1185	29150
.0270	28995	.0565	29048	.0875	29099	.1190	29151
.0275	28996	.0570	29049	.0880	29100	.1195	29152
.0285	28997	.0575	29050	.0885	29101	.1205	29153
.0290	28998	.0580	29051	.0895	29102	.1210	29154
.0295	28999	.0585	29052	.0900	29103	.1215	29155
.0300	29000	.0590	29053	.0905	29104	.1220	29156
.0305	29001	.0600	29054	.0910	29105	.1225	29157
.0310	29002	.0605	29055	.0915	29106	.1235	29158
.0315	29004	.0610	29056	.0920	29107	.1240	22136
.0320	29005	.0615	29057	.0925	29108	.1245	29159
.0325	29006	.0620	29058	.0930	29109	.1255	29160
.0330	29007	.0630	29059	.0940	29110	.1260	22138
.0335	29008	.0640	29060	.0945	29111	.1265	29161
.0340	29009	.0645	29061	.0950	29112	.1270	29162
.0345	29010	.0650	29062	.0955	29113	.1275	29163
.0350	29011	.0655	29063	.0965	29114	.1280	29164
.0355	29012	.0660	29064	.0970	29115	.1290	29165
.0360	29013	.0665	29065	.0975	29116	.1295	29166
.0365	29014	.0675	29066	.0985	29117	.1300	29167
.0370	29015	.0680	29067	.0990	29118	.1305	29168
.0375	29016	.0685	29068	.1000	29119	.1310	29169
.0380	29017	.0690	29069	.1005	29120	.1315	29170
.0385	29018	.0695	29070	.1010	29121	.1320	29171
.0390	29019	.0705	29071	.1020	29122	.1325	29172
.0395	29021	.0710	29072	.1025	29123	.1330	29173
.0405	29022	.0715	29073	.1030	29124	.1335	29174
.0415	29023	.0720	29074	.1035	29125	.1340	29175
.0425	29024	.0725	29075	.1045	29126	.1345	29176
.0435	29025	.0735	29076	.1050	29127	.1350	29177
.0440	29026	.0740	29077	.1055	29128	.1355	29178
.0445	29027	.0745	29078	.1060	29129	.1365	29179
.0450	29028	.0750	29079	.1070	29130	.1370	29180
.0455	29029	.0755	29080	.1075	29131	.1375	29181
.0460	29030	.0765	29081	.1080	29132		

(continued)

DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.
.1380	29182	.1690	29234	.2020	29283	.2310	29334	.2605	29383
.1385	29183	.1700	29235	.2025	29284	.2315	29335	.2615	29384
.1390	29184	.1705	29236	.2030	29285	.2320	29336	.2620	29385
.1395	29185	.1710	29237	.2035	29286	.2325	29337	.2625	29386
.1400	29186	.1715	29238	.2045	29287	.2330	29338	.2630	29387
.1410	29187	.1720	29239	.2050	29288	.2335	29339	.2635	29388
.1415	29188	.1725	29240	.2060	29289	.2345	29340	.2640	29389
.1420	29189	.1735	29241	.2065	29290	.2350	29341	.2645	29390
.1425	29190	.1740	29242	.2070	29291	.2355	29342	.2650	29391
.1430	29191	.1745	29243	.2075	29292	.2360	29343	.2655	29392
.1435	29192	.1750	29244	.2080	29293	.2365	29344	.2665	29393
.1445	29193	.1755	29245	.2085	29294	.2370	29345	.2670	29394
.1450	29194	.1760	29246	.2095	29295	.2375	29346	.2675	29395
.1455	29195	.1765	29247	.2100	29296	.2385	29347	.2680	29396
.1460	29196	.1775	29248	.2105	29297	.2390	29348	.2685	29397
.1465	29197	.1780	29249	.2110	29298	.2395	29349	.2690	29398
.1475	29198	.1785	29250	.2115	29299	.2400	29350	.2695	29399
.1480	29199	.1790	29251	.2120	29300	.2405	29351	.2700	29400
.1485	29200	.1795	29252	.2125	29301	.2410	29352	.2705	29401
.1490	29201	.1805	29253	.2135	29302	.2415	29353	.2710	29402
.1500	29202	.1810	29254	.2140	29303	.2425	29354	.2715	29403
.1505	29203	.1815	29255	.2145	29304	.2430	29355	.2725	29404
.1510	29204	.1825	29256	.2150	29305	.2435	29356	.2730	29405
.1515	29205	.1830	29257	.2155	29306	.2440	29357	.2735	29406
.1525	29206	.1835	29258	.2160	29307	.2445	29358	.2740	29407
.1530	29207	.1840	29259	.2170	29308	.2450	29359	.2745	29408
.1535	29208	.1845	29260	.2175	29309	.2455	29360	.2750	29409
.1545	29209	.1860	29261	.2180	29310	.2465	29361	.2755	29410
.1550	29210	.1865	22160	.2185	29311	.2470	29362	.2760	29411
.1555	29211	.1880	29262	.2190	29312	.2475	29363	.2765	29412
.1560	29212	.1885	22162	.2195	29313	.2485	29364	.2775	29413
.1565	29213	.1895	29263	.2200	29314	.2490	22182	.2780	29414
.1580	29214	.1900	29264	.2205	29315	.2505	29365	.2785	29415
.1585	29215	.1905	29265	.2215	29316	.2510	22185	.2790	29416
.1595	29216	.1915	29266	.2220	29317	.2515	29366	.2795	29417
.1600	29217	.1920	29267	.2225	29318	.2520	29367	.2800	29418
.1605	29218	.1925	29268	.2230	29319	.2525	29368	.2805	29419
.1615	29220	.1930	29269	.2235	29320	.2530	29369	.2815	29420
.1620	29221	.1940	29270	.2240	29321	.2535	29370	.2820	29421
.1625	29222	.1945	29271	.2245	29322	.2540	29371	.2825	29422
.1630	29223	.1950	29272	.2250	29323	.2545	29372	.2830	29423
.1635	29224	.1955	29273	.2255	29324	.2550	29373	.2835	29424
.1640	29225	.1965	29274	.2260	29325	.2555	29374	.2840	29425
.1645	29226	.1970	29275	.2265	29326	.2560	29375	.2845	29426
.1650	29227	.1975	29276	.2270	29327	.2565	29376	.2850	29427
.1655	29228	.1980	29277	.2275	29328	.2575	29377	.2855	29428
.1665	29229	.1985	29278	.2285	29329	.2580	29378	.2860	29429
.1670	29230	.1995	29279	.2290	29330	.2585	29379	.2865	29430
.1675	29231	.2000	29280	.2295	29331	.2590	29380	.2870	29431
.1680	29232	.2005	29281	.2300	29332	.2595	29381	.2875	29432
.1685	29233	.2015	29282	.2305	29333	.2600	29382	.2880	29433

(continued)



# Decimal Size Chucking Reamers

List No. 1655H

(continued)

Over / Under Sizes:  
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Dowel Pin Sizes:  
Page 120

DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.
.2885	29434	.3180	29484	.3450	29535	.3720	29586	.4005	29635
.2890	29435	.3185	29485	.3455	29536	.3725	29587	.4010	29636
.2895	29436	.3190	29486	.3460	29537	.3735	29588	.4015	29637
.2905	29437	.3195	29487	.3465	29538	.3740	22211	.4020	29638
.2910	29438	.3200	29488	.3470	29539	.3755	29589	.4025	29639
.2915	29439	.3205	29489	.3475	29540	.3760	22213	.4030	29640
.2920	29440	.3210	29490	.3485	29541	.3765	29590	.4035	29641
.2925	29441	.3215	29491	.3490	29542	.3775	29591	.4045	29642
.2930	29442	.3220	29492	.3495	29543	.3780	29592	.4050	29643
.2935	29443	.3225	29493	.3500	29544	.3785	29593	.4055	29644
.2940	29444	.3235	29494	.3505	29545	.3790	29594	.4060	29645
.2945	29445	.3240	29495	.3510	29546	.3795	29595	.4065	29646
.2955	29446	.3245	29496	.3515	29547	.3800	29596	.4070	29647
.2960	29447	.3250	29497	.3520	29548	.3805	29597	.4075	29648
.2965	29448	.3255	29498	.3525	29549	.3810	29598	.4080	29649
.2970	29449	.3260	29499	.3530	29550	.3815	29599	.4085	29650
.2975	29450	.3265	29500	.3535	29551	.3820	29600	.4090	29651
.2980	29451	.3270	29501	.3540	29552	.3825	29601	.4095	29652
.2985	29452	.3275	29502	.3545	29553	.3830	29602	.4100	29653
.2990	29453	.3280	29503	.3550	29554	.3835	29603	.4105	29654
.2995	29454	.3285	29504	.3555	29555	.3840	29604	.4110	29655
.3000	29455	.3290	29505	.3560	29556	.3845	29605	.4115	29656
.3005	29456	.3295	29506	.3565	29557	.3850	29606	.4120	29657
.3010	29457	.3300	29507	.3570	29558	.3855	29607	.4125	29658
.3015	29458	.3305	29508	.3575	29559	.3865	29608	.4135	29659
.3025	29459	.3310	29509	.3585	29560	.3870	29609	.4140	29660
.3030	29460	.3315	29510	.3590	29561	.3875	29610	.4145	29661
.3035	29461	.3325	29511	.3595	29562	.3880	29611	.4150	29662
.3040	29462	.3330	29512	.3600	29563	.3885	29612	.4155	29663
.3045	29463	.3335	29513	.3605	29564	.3890	29613	.4160	29664
.3050	29464	.3340	29514	.3610	29565	.3895	29614	.4165	29665
.3055	29465	.3345	29515	.3615	29566	.3900	29615	.4170	29666
.3060	29466	.3350	29516	.3620	29567	.3905	29616	.4175	29667
.3065	29467	.3355	29517	.3625	29568	.3910	29617	.4180	29668
.3070	29468	.3360	29518	.3630	29569	.3915	29618	.4185	29669
.3075	29469	.3365	29519	.3635	29570	.3920	29619	.4190	29670
.3080	29470	.3370	29520	.3640	29571	.3925	29620	.4195	29671
.3085	29471	.3375	29521	.3645	29572	.3930	29621	.4200	29672
.3090	29472	.3380	29522	.3650	29573	.3935	29622	.4205	29673
.3095	29473	.3385	29523	.3655	29574	.3940	29623	.4210	29674
.3100	29474	.3395	29524	.3660	29575	.3945	29624	.4215	29675
.3110	29475	.3400	29525	.3665	29576	.3950	29625	.4220	29676
.3115	22198	.3405	29526	.3670	29577	.3955	29626	.4225	29677
.3130	29476	.3410	29527	.3675	29578	.3960	29627	.4230	29678
.3135	22200	.3415	29528	.3685	29579	.3965	29628	.4235	29679
.3140	29478	.3420	29529	.3690	29580	.3975	29629	.4240	29680
.3145	29479	.3425	29530	.3695	29581	.3980	29630	.4245	29681
.3155	29480	.3430	29531	.3700	29582	.3985	29631	.4250	29682
.3165	29481	.3435	29532	.3705	29583	.3990	29632	.4255	29683
.3170	29482	.3440	29533	.3710	29584	.3995	29633	.4260	29684
.3175	29483	.3445	29534	.3715	29585	.4000	29634	.4265	29685
								.4270	29686

(continued)





# Decimal Size Chucking Reamers (continued)

List No. 1655H

**REAMERS**

DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.
.4275	29687	.4555	29738	.4820	29791	.5605	29838	.8095	29883
.4280	29688	.4560	29739	.4825	29792	.5610	29839	.8100	29884
.4285	29689	.4565	29740	.4830	29793	.5615	29932	.8105	29885
.4290	29690	.4570	29741	.4835	29794	.5620	29840	.8110	29886
.4295	29691	.4575	29742	.4840	29795	.5630	29841	.8115	29887
.4300	29692	.4580	29743	.4845	29796	.5635	29933	.8120	29888
.4305	29693	.4585	29744	.4850	29797	.5640	29842	.8130	29889
.4310	29694	.4590	29745	.4855	29798	.5645	29843	.8135	29890
.4315	29695	.4595	29746	.4860	29799	.5650	29844	.8140	29891
.4320	29696	.4600	29747	.4865	29800	.5655	29845	.8145	29892
.4325	29697	.4605	29748	.4870	29801	.5790	29938	.8150	29893
.4330	29698	.4610	29749	.4875	29802	.6200	29939	.8155	29894
.4335	29699	.4615	29750	.4880	29803	.6220	29846	.8720	29895
.4340	29700	.4620	29751	.4885	29804	.6225	29847	.8725	29896
.4345	29701	.4625	29752	.4890	29805	.6230	29848	.8730	29897
.4350	29702	.4630	29753	.4895	29806	.6235	29849	.8735	29898
.4360	29703	.4635	29754	.4900	29807	.6240	29850	.8740	29899
.4365	22222	.4640	29755	.4905	29808	.6245	29851	.8745	29900
.4380	29704	.4645	29756	.4910	29809	.6255	29852	.8755	29901
.4385	22224	.4650	29757	.4915	29810	.6260	29853	.8760	29902
.4390	29705	.4655	29758	.4920	29811	.6265	29854	.8765	29903
.4395	29706	.4660	29759	.4925	29812	.6270	29855	.8770	29904
.4400	29707	.4665	29760	.4930	29813	.6275	29856	.8775	29905
.4405	29708	.4670	29761	.4935	29814	.6280	29857	.8780	29906
.4410	29709	.4675	29762	.4940	29815	.6300	29940	.9340	29907
.4415	29710	.4680	29763	.4945	29816	.6330	29941	.9345	29908
.4420	29711	.4685	29764	.4950	29817	.6350	29942	.9350	29909
.4425	29712	.4690	29765	.4955	29818	.6845	29858	.9355	29910
.4430	29713	.4695	29766	.4960	29819	.6850	29859	.9360	29911
.4435	29714	.4700	29767	.4965	29820	.6855	29860	.9365	29912
.4440	29715	.4705	29768	.4970	29821	.6860	29861	.9370	29913
.4445	29716	.4710	29769	.4975	29822	.6865	29862	.9380	29914
.4450	29717	.4715	29770	.4985	29823	.6870	29863	.9385	29915
.4455	29718	.4720	29771	.4990	22228	.6880	29864	.9390	29916
.4460	29719	.4725	29772	.5005	29824	.6885	29865	.9395	29917
.4465	29720	.4730	29773	.5010	22230	.6895	29867	.9400	29918
.4470	29721	.4735	29774	.5015	29825	.6900	29868	.9405	29919
.4475	29722	.4740	29775	.5020	29826	.6905	29869	.9970	29920
.4480	29723	.4745	29776	.5025	29827	.7470	29870	.9975	29921
.4485	29724	.4750	29777	.5030	29828	.7475	29871	.9980	29922
.4490	29725	.4755	29778	.5035	29829	.7485	29872	.9985	29923
.4495	29726	.4760	29779	.5040	29830	.7490	29873	.9990	29924
.4500	29727	.4765	29780	.5045	29831	.7495	29874	.9995	29925
.4505	29728	.4770	29781	.5050	29832	.7505	29875	1.0005	29926
.4510	29729	.4775	29782	.5060	29833	.7510	29876	1.0010	29927
.4515	29730	.4780	29783	.5070	29834	.7515	29877	1.0015	29928
.4520	29731	.4785	29784	.5080	29934	.7520	29878	1.0020	29929
.4525	29732	.4790	29785	.5090	29835	.7525	29879	1.0025	29930
.4530	29733	.4795	29786	.5100	29836	.7530	29880	1.0030	29931
.4535	29734	.4800	29787	.5150	29935	.7540	29881		
.4540	29735	.4805	29788	.5160	29936	.7550	29882		
.4545	29736	.4810	29789	.5200	29937	.7570	29943		
.4550	29737	.4815	29790	.5600	29837	.7600	29944		

# Intermediate Size Straight Shank Chucking Reamers

High Speed Steel  
Straight Flute – Right Hand Cut



List No. 1655I

Size Range .0100" - 1.9999"



## Price on Application

# Dowel Pin Size Straight Shank Chucking Reamers

High Speed Steel — Right Hand Cut  
Straight Flute



List No. 1655D

STANDARD All sizes – 1 each  
PACKAGE

Diameter Tolerances +.0000, -.0002

Over / Under Sizes:  
Pages 111-113  
Decimal Sizes:  
Pages 116-119

45° Chamfer for reaming of most materials.  
Dowel Pin Reamers are produced with increased back taper and a minus diameter tolerance.  
Chucking Reamers are produced with minimal back taper and a plus diameter tolerance.

DECIMAL SIZE	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
.1230	7/8	3-1/2	4	21561
.1247	7/8	3-1/2	4	21562
.1855	1-1/8	4-1/2	6	21563
.1870	1-1/8	4-1/2	6	21564
.2480	1-1/2	6	6	21565
.2495	1-1/2	6	6	21566
.3105	1-1/2	6	6	21567

DECIMAL SIZE	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
.3120	1-1/2	6	6	21568
.3730	1-3/4	7	6	21569
.3745	1-3/4	7	6	21570
.4355	1-3/4	7	6	21571
.4370	1-3/4	7	6	21572
.4980	2	8	6	21573
.4995	2	8	6	21574

# Carbide Tipped Straight Shank Chucking Reamers

Straight Flute — Right Hand Cut



List No. 5655

STANDARD All sizes — 1 each  
PACKAGE

Diameter Tolerances +.0003, -.0000

Carbide Tipped offers excellent wear resistance for general reaming of steel, cast iron, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
3/16	.1875	11/64	1-1/8	4-1/2	4	55212
7/32	.2187	13/64	1-1/4	5	4	55214
1/4	.2500	15/64	1-1/2	6	4	55216
9/32	.2812	15/64	1-1/2	6	4	55218
19/64	.2969	9/32	1-1/2	6	4	55219
5/16	.3125	9/32	1-1/2	6	4	55220
21/64	.3281	9/32	1-1/2	6	4	55221
11/32	.3437	9/32	1-1/2	6	4	55222
3/8	.3750	5/16	1-3/4	7	4	55224
13/32	.4062	5/16	1-3/4	7	4	55226
27/64	.4219	3/8	1-3/4	7	4	55227*
7/16	.4375	3/8	1-3/4	7	4	55228

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
29/64	.4531	3/8	1-3/4	7	4	55229*
15/32	.4688	3/8	1-3/4	7	4	55230
1/2	.5000	7/16	2	8	6	55232
17/32	.5312	7/16	2	8	6	55234
9/16	.5625	7/16	2	8	6	55236
5/8	.6250	9/16	2-1/4	9	6	55240
11/16	.6875	9/16	2-1/4	9	6	55244
3/4	.7500	5/8	2-1/2	9-1/2	6	55248
7/8	.8750	3/4	2-5/8	10	6	55256
1	1.0000	7/8	2-3/4	10-1/2	8	55264
1-1/2	1.5000	1-1/4	3-1/2	12-1/2	8	55332*

\* Available While Supplies Last

# Right Hand Helix Straight Shank Chucking Reamers



List No. 1653

Diameter Tolerances

up to 1/2" — +.0002/-0  
over 1/2" to 5/8" — +.0003/-0  
over 5/8" to 1-1/2" — +.0001/+0.0004



High Speed Steel — Right Hand Cut

Right Hand Helix pulls chips out of the hole in blind hole and through hole applications, bridges interruptions and provides better finish and sizing than straight flute reamers. Recommended for reaming a wide range of materials.

STANDARD All sizes - 1 each  
PACKAGE

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1/16	.0625	1/2	2-1/2	4	21701
5/64	.0781	3/4	3	4	21702
3/32	.0938	3/4	3	4	21703
7/64	.1094	7/8	3-1/2	4	21704
1/8	.1250	7/8	3-1/2	4	21705
9/64	.1406	1	4	4	21706
5/32	.1562	1	4	6	21707
11/64	.1719	1-1/8	4-1/2	6	21708
3/16	.1875	1-1/8	4-1/2	6	21709
13/64	.2031	1-1/4	5	6	21710
7/32	.2188	1-1/4	5	6	21711
15/64	.2344	1-1/2	6	6	21712
1/4	.2500	1-1/2	6	6	21713
17/64	.2656	1-1/2	6	6	21714
9/32	.2812	1-1/2	6	6	21715
19/64	.2969	1-1/2	6	6	21716
5/16	.3125	1-1/2	6	6	21717
21/64	.3281	1-1/2	6	6	21718
11/32	.3438	1-1/2	6	6	21719
23/64	.3594	1-3/4	7	6	21720
3/8	.3750	1-3/4	7	6	21721
25/64	.3906	1-3/4	7	6	21722
13/32	.4062	1-3/4	7	6	21723
27/64	.4219	1-3/4	7	6	21724
7/16	.4375	1-3/4	7	6	21725
29/64	.4531	1-3/4	7	6	21726
15/32	.4688	1-3/4	7	6	21727

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
31/64	.4844	2	8	6	21728
1/2	.5000	2	8	6	21729
17/32	.5313	2	8	6	21730
9/16	.5625	2	8	8	21731
19/32	.5938	2	8	8	21732
5/8	.6250	2-1/4	9	8	21733
21/32	.6562	2-1/4	9	8	21734
11/16	.6875	2-1/4	9	8	21735
23/32	.7188	2-1/4	9	8	21736
3/4	.7500	2-1/2	9-1/2	8	21737
25/32	.7812	2-1/2	9-1/2	8	21738
13/16	.8125	2-1/2	9-1/2	8	21739
27/32	.8438	2-1/2	9-1/2	8	21740
7/8	.8750	2-5/8	10	8	21741
29/32	.9062	2-5/8	10	8	21742
15/16	.9375	2-5/8	10	8	21743
31/32	.9688	2-5/8	10	8	21744
1	1.0000	2-3/4	10-1/2	8	21745
1-1/16	1.0625	2-3/4	10-1/2	8	21746
1-1/8	1.1250	2-7/8	11	10	21747
1-3/16	1.1875	2-7/8	11	10	21748
1-1/4	1.2500	3	11-1/2	10	21749
1-5/16	1.3125	3	11-1/2	10	21750
1-3/8	1.3750	3-1/4	12	10	21751
1-7/16	1.4375	3-1/4	12	10	21752
1-1/2	1.5000	3-1/2	12-1/2	10	21753

# Taper Shank Chucking Reamers



List No. 1656

Diameter Tolerances

up to 1/2" — +.0002/-0  
over 1/2" to 5/8" — +.0003/-0  
over 5/8" to 1-1/2" — +.0001/+0.0004

High Speed Steel — Morse Taper Shank  
Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials

STANDARD All sizes - 1 each  
PACKAGE

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1/4	1	.2500	1-1/2	6	6	22311
5/16	1	.3125	1-1/2	6	6	22313
11/32	1	.3438	1-1/2	6	6	22314
3/8	1	.3750	1-3/4	7	6	22315
13/32	1	.4062	1-3/4	7	6	22316
7/16	1	.4375	1-3/4	7	6	22317
15/32	1	.4688	1-3/4	7	6	22318
1/2	1	.5000	2	8	6	22319
17/32	1	.5313	2	8	6	22320
9/16	1	.5625	2	8	8	22321
19/32	1	.5938	2	8	8	22322
5/8	2	.6250	2-1/4	9	8	22323
21/32	2	.6562	2-1/4	9	8	22324
11/16	2	.6875	2-1/4	9	8	22325
23/32	2	.7188	2-1/4	9	8	22326
3/4	2	.7500	2-1/2	9-1/2	8	22327

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
25/32	2	.7812	2-1/2	9-1/2	8	22328
13/16	2	.8125	2-1/2	9-1/2	8	22329
27/32	2	.8438	2-1/2	9-1/2	8	22330
7/8	2	.8750	2-5/8	10	8	22331
29/32	2	.9062	2-5/8	10	8	22332
15/16	3	.9375	2-5/8	10	8	22333
31/32	3	.9688	2-5/8	10	8	22334
1	3	1.0000	2-3/4	10-1/2	8	22335
1-1/16	3	1.0625	2-3/4	10-1/2	8	22336
1-1/8	3	1.1250	2-7/8	11	10	22337
1-3/16	3	1.1875	2-7/8	11	10	22338
1-1/4	4	1.2500	3	11-1/2	10	22339
1-5/16	4	1.3125	3	11-1/2	10	22340
1-3/8	4	1.3750	3-1/4	12	10	22341
1-7/16	4	1.4375	3-1/4	12	10	22342
1-1/2	4	1.5000	3-1/2	12-1/2	10	22343

# Expansion Taper Shank Chucking Reamers

**High Speed Steel — Morse Taper Shank  
Straight Flute — Right Hand Cut**

Expansion Reamers are expandable to permit many regrinds to the original reamer size. Recommended for reaming a wide range of materials.



List No. 1734

**NOTE:** Expansion feature is for expansion and regrind to the original reamer size only. Not to be used as an adjustable reamer for producing different hole sizes. Expansion screw should never be loosened to achieve a smaller reamer size.

**STANDARD PACKAGE** All sizes — 1 each



SIZE	DEC. EQUIV.	MORSE TAPER NO.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
3/8	.3750	1	3/4	7	6	22951*
7/16	.4375	1	7/8	7	6	22952*
1/2	.5000	1	1	8	6	22953*
9/16	.5625	1	1-1/8	8	6	22955*
5/8	.6250	2	1-1/4	9	6	22957*
21/32	.6562	2	1-1/4	9	6	22958*
11/16	.6875	2	1-1/4	9	6	22959*
23/32	.7188	2	1-1/4	9	6	22960*
13/16	.8125	2	1-3/8	9-1/2	6	22962*
7/8	.8750	2	1-1/2	10	6	22963*
15/16	.9375	3	1-1/2	10	6	22964*
1	1.0000	3	1-5/8	10-1/2	8	22965*
1-1/16	1.0625	3	1-5/8	10-1/2	8	22966*
1-1/8	1.1250	3	1-3/4	11	8	22967*
1-3/16	1.1875	3	1-3/4	11	8	22968*
1-3/8	1.3750	4	2	12	8	22971*
1-7/16	1.4375	4	2	12	10	22972*
1-1/2	1.5000	4	2-1/8	12-1/2	10	22973*

\* Available While Supplies Last

# Right Hand Helix Taper Shank Chucking Reamers

**High Speed Steel — Morse Taper Shank  
Right Hand Cut**

Right Hand Helix pulls chips out of the hole in blind hole and through hole applications, bridges interruptions and provides better finish and sizing than straight flute reamers. Recommended for reaming a wide range of materials.



List No. 1654

45° Chamfer for reaming of most materials

**Diameter Tolerances**

up to 1/2" — +.0002/-0

over 1/2" to 5/8" — +.0003/-0

over 5/8" to 1 1/2" — +.0001/+0.0004

**STANDARD PACKAGE** All sizes — 1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1/4	1	.2500	1-1/2	6	6	21851
5/16	1	.3125	1-1/2	6	6	21853
11/32	1	.3438	1-1/2	6	6	21854
3/8	1	.3750	1-3/4	7	6	21855
13/32	1	.4062	1-3/4	7	6	21856
7/16	1	.4375	1-3/4	7	6	21857
15/32	1	.4687	1-3/4	7	6	21858
1/2	1	.5000	2	8	6	21859
17/32	1	.5313	2	8	6	21860
9/16	1	.5625	2	8	8	21861
5/8	2	.6250	2-1/4	9	8	21863
21/32	2	.6562	2-1/4	9	8	21864
11/16	2	.6875	2-1/4	9	8	21865
23/32	2	.7188	2-1/4	9	8	21866
3/4	2	.7500	2-1/2	9-1/2	8	21867
25/32	2	.7812	2-1/2	9-1/2	8	21868

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
13/16	2	.8125	2-1/2	9-1/2	8	21869
27/32	2	.8438	2-1/2	9-1/2	8	21870
7/8	2	.8750	2-5/8	10	8	21871
29/32	2	.9062	2-5/8	10	8	21872
15/16	3	.9375	2-5/8	10	8	21873
31/32	3	.9688	2-5/8	10	8	21874
1	3	1.0000	2-3/4	10-1/2	8	21875
1-1/16	3	1.0625	2-3/4	10-1/2	8	21876
1-1/8	3	1.1250	2-7/8	11	10	21877
1-3/16	3	1.1875	2-7/8	11	10	21878
1-1/4	4	1.2500	3	11-1/2	10	21879
1-5/16	4	1.3125	3	11-1/2	10	21880
1-3/8	4	1.3750	3-1/4	12	10	21881
1-7/16	4	1.4375	3-1/4	12	10	21882
1-1/2	4	1.5000	3-1/2	12-1/2	10	21883

# Expansion Straight Shank Chucking Reamers



List No. 1733



**STANDARD PACKAGE** All sizes — 1 each

**NOTE:** Expansion feature is for expansion and regrind to the original reamer size only. Not to be used as an adjustable reamer for producing different hole sizes. Expansion screw should never be loosened to achieve a smaller reamer size.

High Speed Steel

Straight Flute — Right Hand Cut

**Expansion Reamers** are expandable to permit many regrinds to the original reamer size. Recommended for reaming a wide range of materials.

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
13/32	.4062	5/16	3/4	7	6	22902*
7/16	.4375	3/8	7/8	7	6	22903*
15/32	.4688	3/8	7/8	7	6	22904*
17/32	.5313	7/16	1	8	6	22906*
9/16	.5625	7/16	1-1/8	8	6	22907*
19/32	.5938	7/16	1-1/8	8	6	22908*
5/8	.6250	9/16	1-1/4	9	6	22909*
21/32	.6562	9/16	1-1/4	9	6	22910*
11/16	.6875	9/16	1-1/4	9	6	22911*
23/32	.7188	9/16	1-1/4	9	6	22912*
25/32	.7812	5/8	1-3/8	9-1/2	6	22914*
13/16	.8125	5/8	1-3/8	9-1/2	6	22915*
27/32	.8438	5/8	1-3/8	9-1/2	6	22916*
7/8	.8750	3/4	1-1/2	10	6	22917*
29/32	.9062	3/4	1-1/2	10	6	22918*
15/16	.9375	3/4	1-1/2	10	6	22919*
31/32	.9688	3/4	1-1/2	10	6	22920*
1-1/8	1.1250	7/8	1-3/4	11	8	22923*
1-3/16	1.1875	1	1-3/4	11	8	22924*
1-1/4	1.2500	1	1-7/8	11-1/2	8	22925*

\* Available While Supplies Last

# Carbide Tipped Expansion Straight Shank Chucking Reamers



List No. 5733

**NOTE:** Expansion feature is for expansion and regrind to the original reamer size only. Not to be used as an adjustable reamer for producing different hole sizes. Expansion screw should never be loosened to achieve a smaller reamer size.

**STANDARD PACKAGE** All sizes — 1 each

**Expansion Reamers** are expandable to permit many regrinds to the original reamer size. **Carbide Tipped** offers excellent wear resistance for general reaming of steel, cast iron, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
3/8	.3750	5/16	1	7	4	56003
7/16	.4375	3/8	1	7	4	56004
1/2	.5000	7/16	1	8	6	56005
9/16	.5625	7/16	1-1/8	8	6	56007
5/8	.6250	9/16	1-1/4	9	6	56009
11/16	.6875	9/16	1-1/4	9	6	56011
3/4	.7500	5/8	1-3/8	9-1/2	6	56013
13/16	.8125	5/8	1-3/8	9-1/2	6	56015
7/8	.8750	3/4	1-1/2	10	6	56017
15/16	.9375	3/4	1-1/2	10	8	56019
1	1.000	7/8	1-5/8	10-1/2	8	56021
1-1/8	1.1250	7/8	1-3/4	11	8	56025
1-1/4	1.2500	1	1-7/8	11-1/2	8	56027
1-3/8	1.3750	1	2	12	8	56029
1-1/2	1.5000	1-1/4	2-1/8	12-1/2	8	56031
1-15/16	1.9375	1-1/4	2-1/8	12-1/2	8	56042*

\* Available While Supplies Last

# Taper Pin Reamers

High Speed Steel – Straight Shank

Right Hand Cut

1/4" Taper Per Foot

For reaming holes for standard taper pins. **Straight Flute** for hand reaming of most materials. **Helical Flute** for machine reaming of most materials. **Spiral Flute** for hand reaming of difficult-to-ream materials.

**STANDARD PACKAGE** All sizes —1 each



List No. 1680 Straight Flute Hand Reamers



List No. 1683 Helical Flute Machine Reamers Left Hand Helix



List No. 1684 Spiral Flute Hand Reamers Left Hand Helix

SIZE	SHANK DIA.	DIA. SMALL END	DIA. LARGE END	FLUTE LENGTH	OAL	1680		1683		1684	
						EDP NO.	NO. OF FLUTES	EDP NO.	NO. OF FLUTES	EDP NO.	NO. OF FLUTES
7/0	5/64	.0497	.0666	13/16	1-13/16	22581	4	22611	2	22641	4
6/0	3/32	.0611	.0806	15/16	1-15/16	22582	4	22612	2	22642	4
5/0	7/64	.0719	.0966	1-3/16	2-3/16	22583	4	22613	2	22643	4
4/0	1/8	.0869	.1142	1-5/16	2-5/16	22584	4	22614	3	22644	4
3/0	9/64	.1029	.1302	1-5/16	2-5/16	22585	4	22615	3	22645	4
2/0	5/32	.1137	.1462	1-9/16	2-9/16	22586	4	22616	3	22646	4
0	11/64	.1287	.1638	1-11/16	2-15/16	22587	4	22617	3	22647	4
1	3/16	.1447	.1798	1-11/16	2-15/16	22588	6	22618	3	22648	6
2	13/64	.1605	.2008	1-15/16	3-3/16	22589	6	22619	3	22649	6
3	15/64	.1813	.2294	2-5/16	3-11/16	22590	6	22620	3	22650	6
4	17/64	.2071	.2604	2-9/16	4-1/16	22591	6	22621	3	22651	6
5	5/16	.2409	.2994	2-13/16	4-5/16	22592	6	22622	3	22652	6
6	23/64	.2773	.3540	3-11/16	5-7/16	22593	6	22623	3	22653	6
7	13/32	.3297	.4220	4-7/16	6-5/16	22594	6	22624	3	22654	6
8	7/16	.3971	.5050	5-3/16	7-3/16	22595	6	22625	3	22655	6
9	9/16	.4805	.6066	6-1/16	8-5/16	22596	8	22626	4	22656	8
10	5/8	.5799	.7219	6-13/16	9-5/16	22597	8	22627	4	22657	8
11	3/4	.7060	.8780	8-1/4	11-1/4	22598	8	22628	4	22658	8
12	3/4	.8420	1.0500	10	13-7/8	22599	8	22629	4	22659	8
13	1-1/16	1.0090	1.2590	12	16	22600	10	22630	6	22660	10
14	1-13/32	1.2500	1.5420	14	18-1/4	22601	10	22631	6	22661	10

# Taper Pipe Reamers

High Speed Steel — Right Hand Cut

Left Hand Helical Flute

3/4" Taper per foot. For reaming holes to be tapped with American Standard taper pipe taps.



List No. 2116

**STANDARD PACKAGE** All sizes —1 each

SIZE	DIA. LARGE END	DIA. SMALL END	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
1/16	.275	.232	.3125	11/16	2-1/8	36080
1/8	.362	.316	.4375	3/4	2-1/8	36081
1/4	.472	.406	.5625	1-1/16	2-7/16	36082
3/8	.606	.540	.7000	1-1/16	2-9/16	36083
1/2	.751	.665	.875	1-3/8	3-1/8	36084
3/4	.962	.876	.9063	1-3/8	3-1/4	36085
1	1.212	1.103	1.1250	1-3/4	3-3/4	36086
1-1/4	1.553	1.444	1.3125	1-3/4	4	36087
1-1/2	1.793	1.684	1.5000	1-3/4	4-1/4	36088
2	2.268	2.159	1.8750	1-3/4	4-1/2	36089

# Hand Reamers

High Speed Steel  
Right Hand Cut

Used for hand reaming for final sizing and finishing of holes. Ground with a starting taper for easy entry into the hole. Shanks are the same size as the reamer size and are supplied with a square end for holding in a tap wrench or vise.

### Diameter Tolerances

up to 1/2" — +.0002/-0  
over 1/2" to 3/8" — +.0003/-0  
over 3/8" to 1 1/2" — +.0001/+0.0004

### List No. 1601 Straight Flute

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1/8	.1250	1 1/2	3	4	21231
5/32	.1562	1 5/8	3 1/4	6	21232
3/16	.1875	1 3/4	3 1/2	6	21233
7/32	.2188	1 7/8	3 3/4	6	21234
1/4	.2500	2	4	6	21235
9/32	.2812	2 1/8	4 1/4	6	21236
5/16	.3125	2 1/4	4 1/2	6	21237
11/32	.3438	2 3/8	4 3/4	6	21238
3/8	.3750	2 1/2	5	6	21239
13/32	.4062	2 5/8	5 1/4	6	21240
7/16	.4375	2 3/4	5 1/2	6	21241
15/32	.4688	2 7/8	5 3/4	6	21242
1/2	.5000	3	6	6	21243
17/32	.5312	3 1/8	6 1/4	6	21244
9/16	.5625	3 1/4	6 1/2	8	21245
19/32	.5938	3 3/8	6 3/4	8	21246
5/8	.6250	3 1/2	7	8	21247
21/32	.6562	3 11/16	7 3/8	8	21248
11/16	.6875	3 3/8	7 3/4	8	21249
23/32	.7188	4 1/16	8 1/8	8	21250
3/4	.7500	4 3/16	8 3/8	8	21251
7/8	.8750	4 7/8	9 3/4	8	21252
1	1.0000	5 7/16	10 7/8	8	21253
1 1/8	1.1250	5 13/16	11 5/8	10	21254
1 1/4	1.2500	6 1/8	12 1/4	10	21255
1 3/8	1.3750	6 5/16	12 5/8	10	21256
1 1/2	1.5000	6 1/2	13	10	21257



### List No. 1601 Straight Flute

Straight Flute for most applications



### List No. 1602 Left Hand Helical Flute

Left Hand Helical Flute pushes chips out ahead of the reamer in through holes and bridges interruptions in the hole being reamed.

STANDARD PACKAGE All sizes —1 each



### List No. 1602 Helical Flute

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1/4	.2500	2	4	6	21291
5/16	.3125	2 1/4	4 1/2	6	21293
3/8	.3750	2 1/2	5	6	21295
13/32	.4062	2 5/8	5 1/4	6	21296*
7/16	.4375	2 3/4	5 1/2	6	21297
1/2	.5000	3	6	6	21299
9/16	.5625	3 1/4	6 1/2	8	21300
5/8	.6250	3 1/2	7	8	21301
11/16	.6875	3 3/8	7 3/4	8	21302
3/4	.7500	4 3/16	8 3/8	8	21303
13/16	.8125	4 9/16	9 1/8	8	21304
7/8	.8750	4 7/8	9 3/4	8	21305
15/16	.9375	5 1/16	10 1/4	8	21306
1	1.0000	5 7/16	10 7/8	8	21307
1 1/8	1.1250	5 13/16	11 5/8	10	21308
1 1/4	1.2500	6 1/8	12 1/4	10	21309
1 3/8	1.3750	6 5/16	12 5/8	10	21310
1 1/2	1.5000	6 1/2	13	10	21311

\* Available While Supplies Last

# Bridge Reamers

High Speed Steel — Morse Taper Shank  
Right Hand Cut

Commonly used on bridgework, ship construction and structural steel fabrication where extreme accuracy of diameter is not important. May be used in portable electric or pneumatic equipment.



### List No. 1697 Straight Flute



### List No. 1701 Left Hand Helical Flute

Left Hand Helical Flute cuts with a shearing action for smoother cutting and improved hole quality, eliminates grabbing and binding of the reamer in the hole and pushes chips ahead of the reamer.

STANDARD PACKAGE All sizes —1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	APPROX. POINT DIA.	NO. 1697 EDP NO.	NO. 1701 EDP NO.
7/16	2	.4375	4 3/8	8 1/4	1/4	—	22721
1/2	2	.5000	5 1/8	9	9/32	—	22722
9/16	2	.5625	5 1/8	9	11/32	22672	22723
5/8	2	.6250	6 1/8	10	3/8	—	22724
11/16	3	.6875	7 1/8	11 1/4	25/64	22673	22725
3/4	3	.7500	7 3/8	12	7/16	—	22726
13/16	3	.8125	7 3/8	12	1/2	22674	22727
7/8	3	.8750	7 3/8	12	9/16	—	22728
15/16	3	.9375	7 3/8	12	5/8	22675	22729
1	3	1.0000	7 3/8	12	11/16	—	22730
1 1/16	3	1.0625	7 3/8	12	3/4	22676	22731
1 1/8	3	1.1250	7 3/8	12	13/16	—	22732
1 3/16	3	1.1875	7 3/8	12	7/8	—	22733
1 1/4	4	1.2500	7 3/8	13	15/16	—	22734
1 5/16	4	1.3125	7 3/8	13	1	—	22735

# Morse Taper Finishing Reamers

High Speed Steel — Straight Shank  
Straight Flute — Right Hand Cut

For accurate hand reaming of Morse Taper holes in sockets, sleeves and spindles.



List No. 1636 - Straight Shank

STANDARD PACKAGE All sizes — 1 each



DIA. OF REAMER		MORSE TAPER NO.	FLUTE LENGTH	OAL	SHANK DIA.	EDP NO.
LARGE END	SMALL END					
.3674	.2503	0	2¼	3¾	5/16	21491
.5170	.3674	1	3	5	7/16	21492
.7444	.5696	2	3½	6	5/8	21493
.9881	.7748	3	4¼	7¼	7/8	21494
1.2893	1.0167	4	5¼	8½	1½	21495
1.8005	1.4717	5	6¼	9¾	1½	21496

# Construction Taper Reamers

High Speed Steel - Straight Shank  
Left Hand Helical Flute - Right Hand Cut

Construction reamers are especially adapted for heavy duty reaming in structural steel assemblies. They are tapered at the point to enter holes which are out of alignment.

Straight shank with stop collar to prevent the reamer from running through the hole.



List No. 1650 — 3-Flat Shank

Round shank with 3 flats to prevent slipping in the drill chuck



List No. 1650R — Round Shank

STANDARD PACKAGE All sizes — 1 each

## List No. 1650 — 3-Flat Shank

SIZE	DEC. EQUIV.	SHANK DIA.	POINT DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
3/8	.3750	3/8	.1645	3%	5¼	5	21000
7/16	.4375	7/16	.1645	3%	5¼	5	21001
1/2	.5000	1/2	.2340	4%	6	5	21002
9/16	.5625	1/2	.2920	5	6½	5	21003
5/8	.6250	1/2	.3520	5	6½	5	21004
1¼	.6875	1/2	.4140	5%	7	5	21005
¾	.7500	1/2	.4770	5%	7	5	21006
13/16	.8125	1/2	.5400	5%	7¼	5	21009
7/8	.8750	1/2	.6020	5%	7¼	5	21007
15/16	.9375	1/2	.6450	5%	7¼	5	21010
1	1.0000	1/2	.7270	5%	7¼	5	21008

## List No. 1650R — Round Shank

SIZE	DEC. EQUIV.	SHANK DIA.	POINT DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
3/8	.3750	3/8	.1645	3%	5¼	5	21100
7/16	.4375	7/16	.1645	3%	5¼	5	21101
1/2	.5000	1/2	.2340	4%	6	5	21102
9/16	.5625	1/2	.2920	5	6½	5	21103
5/8	.6250	1/2	.3520	5	6½	5	21104
1¼	.6875	1/2	.4140	5%	7	5	21105
¾	.7500	1/2	.4770	5%	7	5	21106
13/16	.8125	1/2	.5400	5%	7¼	5	21109
7/8	.8750	1/2	.6020	5%	7¼	5	21107
15/16	.9375	1/2	.6450	5%	7¼	5	21110
1	1.0000	1/2	.7270	5%	7¼	5	21108



# Hex Shank Construction Reamers Car Length Magnetic Safety Shank

High Speed Steel

Left Hand Spiral Flute — Right Hand Cut

Black Oxide Treated



List No. 1651

- Enlarge and align existing holes in bridgework, ship construction and structural steel fabrication where extreme accuracy of diameter is not important
- **Hex Shank** for use in impact sockets with portable electric and pneumatic power tools. Hex shank size is the same size as the required nut size.
- **Left Hand Spiral Flutes** eject chips forward and away from the tool operator and also minimize tendency of the reamer to pull itself into the hole and bind.
- **Tapered Point** for easy entry into misaligned holes

**Magnetic Safety Shank** has two magnets in the hex shank to hold the reamer in the socket. Aids in compliance to **OSHA Standard 29CFR Part 1926.759 (Falling Objects Protection)**.

Shorter length  
for tight areas.

SIZE	POINT DIA.	FLUTE LENGTH	OAL	HEX SHANK SIZE	NO. OF FLUTES	EDP NO.
9/16	5/16	4	6	1-1/16	5	20963
11/16	7/16	5	6-1/2	1-1/16	5	20964
13/16	9/16	5-1/2	7	1-1/4	5	20965
15/16	11/16	5-1/2	7	1-7/16	5	20966
1-1/16	13/16	5-1/2	7	1-5/8	5	20967
1-3/16	7/8	5-3/8	7	1-13/16	5	20968
1-5/16	1	5-3/8	7-7/8	2	5	20969

## High Speed Steel Chucking Reamers Speed and Feed Recommendations

### REAMER CUTTING SPEED – SFM

For machine reaming, the recommended starting point is **2/3 the speed used for drilling** in the same material.

### REAMER FEED RATE – IPR

For machine reaming, the recommended starting point is **2 to 3 times the feed rate used for drilling** in the same material. It is important that the feed rate be high enough so that the reamer actually cuts rather than just rubbing or burnishing.

**DRILLING SPEEDS & FEEDS** are located on **Page 102** for reference.

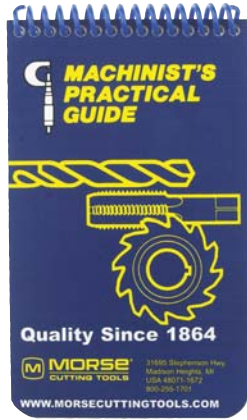
### NOTE

The speeds and feeds shown are suggested starting points only and may be increased or decreased depending on the actual material and machining conditions. Start conservatively and adjust speed and feed until the reaming cycle is optimized while producing the required surface finish and hole accuracy.

# Technical Publications

## Machinist's Practical Guide

The original concept of a pocket size manual covering a wide range of practical information for the machinist, tool maker, engineer and student. End mills, cutters, drills, reamers, taps and tool bits are some of the cutting tool areas covered. Tool steels, tapers, speeds, feeds, cutting fluids, and a wealth of additional useful information is found in this complete 108-page handbook. Fits handily into shop coats, tool boxes, desk drawers, etc.



## Machinist's Guide for Taps

Taps and screw threads play a very important part in "holding the world together by a thread." This booklet contains all the needed information for correct tapping work. Included are thread forms and dimensions, fits and limits, hole preparation and size, type of taps, speeds and lubricants, tap sharpening and troubleshooting hints.



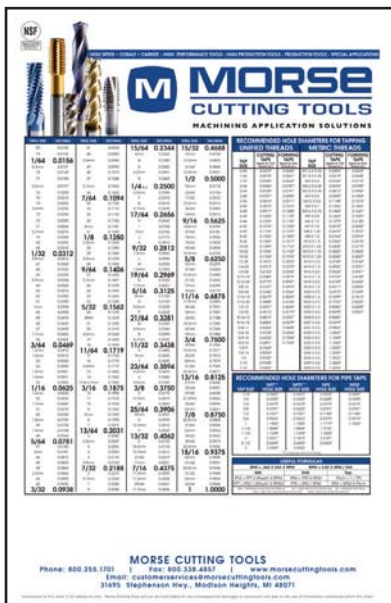
## Machinist's Guide for Carbide Tooling

Carbide and its many applications is fully explained in this handy booklet. Complete coverage is given from the introduction and manufacture of carbide to its present major position in the cutting tools field. Included are design, application, geometrics, troubleshooting, speeds and feeds.



GUIDES	LIST NO.	DISPLAY BOX OF 50 (1 BOX) EDP. NO.	INDIVIDUAL COPIES EDP. NO.
Machinist's Practical Guide	1001	20401	20402
Machinist's Guide for Taps	1002	20403	20404
Machinist's Guide for Carbide Tooling	1004	20407	20408

## Morse® Plastic Wall Chart



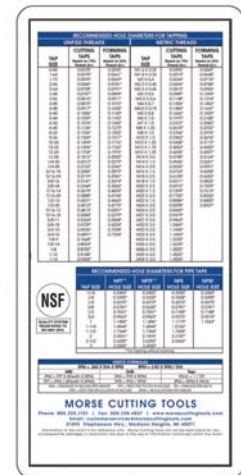
NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24" x 36" printed on heavy duty .023" gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 EDP No. 01650

## Decimal Equivalent Pocket Chart List No. 1005



Front



Back

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads.  
Size: 3 3/8" x 7", Printed on plastic

Pack of 50  
EDP No. 20412

Pack of 100  
EDP No. 20413

COUNTERBORES  
COUNTERSINKS  
CENTER DRILLS  
SPOTTING DRILLS

<b>CARBIDE COUNTERSINKS</b>	<b>PAGE NO.</b>	<b>CENTER DRILLS</b>	<b>PAGE NO.</b>
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 		<b>COMBINED DRILLS</b>	
<b>CARBIDE COUNTERSINKS</b>		<b>&amp; COUNTERSINKS</b>	
<b>- DOUBLE END</b>		Carbide .....	131
Single Flute .....	137	High Speed Steel .....	130
4-Flute .....	137		
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**CUTTING FLUIDS**

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Combined Drills and Countersinks

High Speed Steel — Bright Finish  
60° Included Angle

Often called “center drills”, Designed for drilling center holes in the ends of work pieces to be held between standard 60° centers. **Bell Type** features an additional 120° chamfer at the body diameter to form a protected 60° center hole.

STANDARD PACKAGE	Plain Type & Bell Type	Long Plain Type
	All Sizes — 6 each	1 thru 3 — 6 each 4 thru 8 — 1 each

## List No. 1495 Plain Type

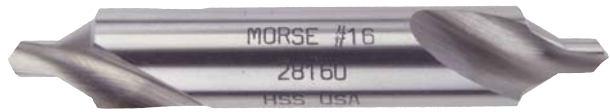
SIZE	DRILL DIA.	BODY DIA.	OAL	EDP NO.
000	.020	1/8	1 1/4	25049
00	.025	1/8	1 1/4	25050
0	1/32	1/8	1 1/4	25051
1	3/64	1/8	1 1/4	25041
2	5/64	3/16	1 7/8	25042
3	7/64	1/4	2	25043
4	1/8	5/16	2 1/8	25044
4 1/2	9/64	3/8	2 1/2	25052
5	3/16	7/16	2 3/4	25045
6	7/32	1/2	3	25046
7	1/4	5/8	3 1/4	25047
8	5/16	3/4	3 1/2	25048

## List No. 1499 Long Plain Type

SIZE	DRILL DIA.	BODY DIA.	OAL	EDP NO.
1	3/64	1/8	3	25010
1	3/64	1/8	4	25011
1	3/64	1/8	5	25036
1	3/64	1/8	6	25037
2	5/64	3/16	3	25027
2	5/64	3/16	4	25012
2	5/64	3/16	5	25013
2	5/64	3/16	6	25028
3	7/64	1/4	3	25029
3	7/64	1/4	4	25014
3	7/64	1/4	5	25015
3	7/64	1/4	6	25030
4	1/8	5/16	4	25016
4	1/8	5/16	5	25017
4	1/8	5/16	6	25018
4 1/2	9/64	3/8	4	25032
4 1/2	9/64	3/8	5	25033
4 1/2	9/64	3/8	6	25034
5	3/16	7/16	4	25035
5	3/16	7/16	5	25019
5	3/16	7/16	6	25020
6	7/32	1/2	5	25021
6	7/32	1/2	6	25022
7	1/4	5/8	6	25023
8	5/16	3/4	6	25024



List No. 1495 Plain Type



List No. 1498 Bell Type



List No. 1499 Long Plain Type



## List No. 1498 Bell Type

SIZE	DRILL DIA.	BODY DIA.	OAL	EDP NO.
11	3/64	1/8	1 1/4	25081
12	1/16	3/16	1 7/8	25082
13	3/32	1/4	2	25083
14	7/64	5/16	2 1/8	25084
15	5/32	7/16	2 3/4	25085
16	3/16	1/2	3	25086
17	7/32	5/8	3 1/4	25087
18	1/4	3/4	3 1/2	25088

Tool Coatings Also Available

# Combined Drill and Countersink Set

High Speed Steel

Includes Nos. 1, 2, 3, 4, and 5, Style 1495, Plain Type



List No. 8500

SIZE RANGE	SET NO.	EDP NO.
1-5	51H	25059

# Solid Carbide Combined Drills and Countersinks

## Plain Type

### 60°, 82° & 90° Included Angle

**Solid Carbide** offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.

**Aluminum Titanium Nitride (ALTiN) Coating** is an excellent all-around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.



Standard Length



Long Length

List No. 5495 Uncoated

List No. 5495T ALTiN Coated

STANDARD  
PACKAGE

All sizes — 1 each



### Standard Length

SIZE	DRILL DIA.	BODY DIA.	OAL	60° INCL. ANGLE		82° INCL. ANGLE		90° INCL. ANGLE	
				UNCOATED	ALTiN	UNCOATED	ALTiN	UNCOATED	ALTiN
				EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.
00	.025	1/8	1-1/2	53899	93056	53909	93066	53919	93076
0	1/32	1/8	1-1/2	53900	93057	53910	93067	53920	93077
1	3/64	1/8	1-1/2	53901	93058	53911	93068	53921	93078
2	5/64	3/16	1-7/8	53902	93059	53912	93069	53922	93079
3	7/64	1/4	2	53903	93060	53913	93070	53923	93080
4	1/8	5/16	2-1/8	53904	93061	53914	93071	53924	93081
5	3/16	7/16	2-3/4	53905	93062	53915	93072	53925	93082
6	7/32	1/2	3	53906	93063	53916	93073	53926	93083
7	1/4	5/8	3-1/4	53907	93064	53917	93074	53927	93084
8	5/16	3/4	3-1/2	53908	93065	53918	93075	53928	93085

### Long Length

SIZE	DRILL DIA.	BODY DIA.	OAL	60° INCL. ANGLE		82° INCL. ANGLE		90° INCL. ANGLE	
				UNCOATED	ALTiN	UNCOATED	ALTiN	UNCOATED	ALTiN
				EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.
1	3/64	1/8	4	53929	93086	53883	93094	53891	93102
2	5/64	3/16	4	53930	93087	53884	93095	53892	93103
3	7/64	1/4	4	53931	93088	53885	93096	53893	93104
4	1/8	5/16	4	53932	93089	53886	93097	53894	93105
5	3/16	7/16	6	53933	93090	53887	93098	53895	93106
6	7/32	1/2	6	53934	93091	53888	93099	53896	93107
7	1/4	5/8	6	53935	93092	53889	93100	53897	93108
8	5/16	3/4	6	53936	93093	53890	93101	53898	93109

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

## Center Drills

High Speed Steel — Bright Finish  
118° Point

Feature short flute length, short overall length and no body clearance. Can be chucked close to the point for maximum rigidity in centering and spotting applications



List No. 1443

STANDARD PACKAGE 1/16" thru 3/8" — 6 each  
1/2" — 1" — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
9/64	.1406	13/16	1-1/4	10280*
11/64	.1719	1	1-1/2	10282*
13/64	.2031	1	1-1/2	10284*

\*Available While Supplies Last

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
3/8	.3750	1	2	16001
1/2	.5000	1	2	16002
5/8	.6250	1-1/8	2-1/4	16003
3/4	.7500	1-1/8	2-1/4	16004
1	1.0000	1-1/4	2-1/2	16005



## NC Spotting Drills

High Speed Steel — Bright Finish  
90° and 120° Points

Ideal for close tolerance NC spotting operations. Provides a more accurate and faster spotting location for follow-up drilling. Eliminates wandering.



List No. 1441

STANDARD PACKAGE 1/4" & 3/8" — 6 each  
1/2" — 1" — 1 each

### Short Length

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	90° EDP NO.	120° EDP NO.
1/4	.2500	1	2-1/2	11900	11906
3/8	.3750	1-1/8	3-1/8	11901	11907
1/2	.5000	1-1/2	3-3/4	11902	11908
5/8	.6250	1-5/8	4-1/4	11903	11909
3/4	.7500	1-3/4	5	11904	11910
1	1.0000	1-3/4	6	11905	11911

### Regular Length

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	90° EDP NO.	120° EDP NO.
1/4	.2500	1	4	11912	11918
3/8	.3750	1-1/8	5	11913	11919
1/2	.5000	1-1/2	6	11914	11920
5/8	.6250	1-5/8	7-1/8	11915	11921
3/4	.7500	1-3/4	8	11916	11922
1	1.0000	1-3/4	8	11917	11923

## M42 Cobalt NC Spotting Drills

82°, 90° and 120° Points

Ideal for close tolerance NC spotting operations. Provides a more accurate and faster spotting location for follow-up drilling. Eliminates wandering.

Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials and materials that generate higher cutting temperatures.

Tool Coatings Also Available



List No. 1441C

STANDARD PACKAGE All sizes — 1 each



SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	82° EDP NO.	90° EDP NO.	120° EDP NO.
1/4	.2500	7/8	2-5/8	11936	11941	11946
3/8	.3750	1	3-1/2	11937	11942	11947
1/2	.5000	1-3/8	4	11938	11943	11948
5/8	.6250	1-3/8	4-1/2	11939	11944	11949
3/4	.7500	1-1/2	5-3/16	11940	11945	11950

# Solid Carbide NC Spotting Drills

Micrograin Carbide  
90°, 120° & 140° Points

Ideal for close tolerance NC spotting operations. Provides a more accurate and faster spotting location for follow-up drilling. Eliminates wandering.

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life.

**Aluminum Titanium Nitride (ALTiN) Coating** is an excellent all-around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.



List No. 1440 Uncoated



List No. 1440T ALTiN Coated

**TOLERANCES**

Dia. +.0000 - .0005  
Shank Dia. +.0000 - .0005



SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED LIST NO. 1440			ALTiN COATED LIST NO. 1440T		
				90° EDP NO.	120° EDP NO.	140° EDP NO.	90° EDP NO.	120° EDP NO.	140° EDP NO.
1/8	.1250	5/8	2	54767	54773	54779	92947	92953	92959
3/16	.1875	3/4	2	54768	54774	54780	92948	92954	92960
1/4	.2500	3/4	2-1/2	54769	54775	54781	92949	92955	92961
5/16	.3125	1	2-1/2	54770	54776	54782	92950	92956	92962
3/8	.3750	1	2-1/2	54771	54777	54783	92951	92957	92963
1/2	.5000	1-1/4	3	54772	54778	54784	92952	92958	92964

## TOOL COATINGS

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish.

### TiN – Titanium Nitride

A good general purpose coating for a wide range of ferrous materials. Not recommended for non-ferrous materials. Has higher heat resistance than TiCN coating.

### TiCN – Titanium Carbonitride

Enhanced toughness, hardness & wear resistance for aggressive speeds & feeds. Recommended for difficult-to-machine, gummy & abrasive materials where moderate cutting temperatures are generated.

### TiALN – Titanium Aluminum Nitride

### ALTiN – Aluminum Titanium Nitride

Excellent all around coatings featuring high heat resistance. Recommended for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. ALTiN has higher AL content for increased hardness & heat resistance.

### CrN – Chromium Nitride

### CrC – Chromium Carbide

Especially recommended for titanium and non-ferrous materials including aluminum, copper & brass. CrC has slightly higher hardness than CrN. These coatings resist adhesion of the material being machined and resist chipping and cracking.

### DLC – Amorphous Diamond-Like Carbon

A thin carbon based amorphous (non-crystalline) coating featuring very high hardness & low coefficient of friction. Recommended for graphite and some non-ferrous materials. Typically used on solid carbide tools.

# M42 Cobalt Zero Flute Countersinks



List No. 1753

For countersinking and deburring in a wide range of ferrous and non-ferrous materials. Radially relieved single cutting edge for fast stock removal without chatter in portable and machine applications.

**Cobalt** offers increased wear and heat resistance in alloy steels, stainless steels and other abrasive and difficult materials. Longer tool life in all production applications.

Tools can be re-sharpened using an axial relief sharpening fixture or with a mounted grinding wheel inserted into the hole.

SIZE	DIA. OF CUT		BODY DIA.	SHANK DIA.	OAL	EDP NO.		
	MIN.	MAX.				60°	82°	90°
#0*	.09	.23	1/4	1/4	1-1/2	25600	25610	25620
#1	.15	.40	7/16	1/4	2-1/32	25601	25611	25621
#2	.19	.52	9/16	1/4	2	25602	25612	25622
#3	.28	.75	13/16	1/2	2-5/8	25603	25613	25623
#4	.46	1.08	1-1/8	1/2	2-7/8	25604	25614	25624
5-Piece Set, Sizes #0 - #4 In Plastic Case						25609	25619	25629

\*Size #0 is double end.

# Single Flute Countersinks High Speed Steel Treated (Black Oxide)



STANDARD PACKAGE All sizes — 1 each



List No. 1752

For chamfering, deburring, and countersinking. Also to enlarge existing holes in thin sheet metal.

Designed for light portable work as well as machine use. Single flute construction provides smoother surface finish. Can be used when multi-flute countersinks chatter.

STANDARD PACKAGE All sizes — 1 each

SIZE	SHANK		OAL	EDP NO.				
	DIA.	DIA.		60°	82°	90°	100°	120°
1/8	1/8	1/8	1-1/2	25567	25568	25569	25570	25639
1/4	1/4	1/4	2	25571	25572	25573	25574	25640
3/8	1/4	1/4	2	25575	25576	25577	25578	25641
1/2	1/4	1/4	2	25579	25580	25581	25582	25642
5/8	1/2	1/2	2-1/4	25583	25584	25585	25586	25643
3/4	1/2	1/2	2-3/4	25587	25588	25589	25590	25644
1	1/2	1/2	2-3/4	25591	25592	25593	25594	25645
1-1/4	1/2	1/2	3	25630	25631	25632	—	—
1-1/2	3/4	3/4	3-1/2	25633	25634	25635	—	—
2	3/4	3/4	3-3/4	25636	25637	25638	—	—

# M42 Cobalt Titanium Nitride (TiN) Coated Single Flute Countersinks



List No. 1754

For chamfering, deburring, and countersinking. Also to enlarge existing holes in thin sheet metal.

Designed for light portable work as well as machine use. Single flute construction provides smoother surface finish. Can be used when multi-flute countersinks chatter.

**Cobalt** offers increased wear and heat resistance in alloy steels, stainless steels and other abrasive and difficult materials. Longer tool life in all production applications.

**Titanium Nitride (TiN) Coating** increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding.

STANDARD PACKAGE All sizes — 1 each

SIZE	SHANK		OAL	EDP NO.		
	DIA.	DIA.		60°	82°	90°
1/8	1/8	1/8	1-1/2	25650	25658	25666
1/4	1/4	1/4	2	25651	25659	25667
3/8	1/4	1/4	2	25652	25660	25668
1/2	3/8	3/8	2	25653	25661	25669
5/8	3/8	3/8	2-1/4	25654	25662	25670
3/4	1/2	1/2	2-3/4	25655	25663	25671
1	1/2	1/2	2-3/4	25656	25664	25672
1-1/4	1/2	1/2	3	25657	25665	25673





## Carbide Single Flute Countersinks

For countersinking, chamfering, and deburring holes. Produces a smoother finish. Can be used when multi-flute countersinks chatter.

The 1/8 and 1/4 diameters are solid carbide. The larger diameters are brazed construction.

**Carbide** offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.



List No. 5752

STANDARD PACKAGE All sizes — 1 each

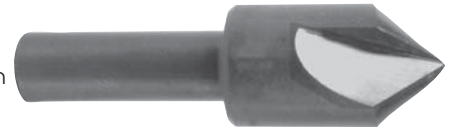
SHANK			EDP NO.				
SIZE	DIA.	OAL	60°	82°	90°	100°	120°
1/8	1/8	1-1/2	56101	56102	56103	56119	56120
3/16	3/16	2	50628	50629	50630	50631	50632
1/4	1/4	2	56104	56105	56106	56121	56122
3/8	1/4	2-1/2	56107	56108	56109	56123	56124
1/2	1/4	2-1/2	56110	56111	56112	56125	56126
5/8	1/4	2-1/2	50633	50634	50635	50636	50637
3/4	3/8	3	56113	56114	56115	56127	56128
1	1/2	3	56116	56117	56118	56129	56130
1-1/4	3/4	3-1/2	56386	56387	56388	56389	56390
1-1/2	3/4	3-1/2	56391	56392	56393	56394	56395
4-Piece Set in Wood Case Sizes 1/4", 1/2", 3/4" & 1"			50638	50639	50640	50641	50642



## Three Flute Center Reamers

High Speed Steel  
Treated (Black Oxide)

Designed for countersinking holes for rivets, flat head screws and centers.



List No. 1750

STANDARD PACKAGE All sizes — 1 each

SHANK			EDP NO.			
SIZE	DIA.	OAL	60°	82°	90°	100°
1/4	1/4	2	23501	23502	23503	23504
3/8	1/4	2	23505	23506	23507	23508
1/2	3/8	2	23509	23510	23511	23512
5/8	3/8	2-1/4	23513	23514	23515	23516
3/4	1/2	2-3/4	23517	23518	23519	23520
1	1/2	2-3/4	23521	23522	23523	—



## Carbide Three Flute Countersinks

For countersinking, chamfering, and deburring holes.

Three flutes allow higher feed rates than single flute countersinks and greater chip clearance than six flute countersinks.

The 1/8 and 1/4 diameters are solid carbide. The larger diameters are brazed construction.

**Carbide** offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.



List No. 5753

STANDARD PACKAGE All sizes — 1 each

SHANK			EDP NO.				
SIZE	DIA.	OAL	60°	82°	90°	100°	120°
1/8	1/8	1-1/2	56163	56171	56179	56187	56193
3/16	3/16	2	50643	50644	50645	50646	50647
1/4	1/4	2	56164	56172	56180	56188	56194
3/8	1/4	2-1/2	56165	56173	56181	56189	56195
1/2	1/4	2-1/2	56166	56174	56182	56190	56196
5/8	3/8	2-3/4	50648	50649	50650	50651	50652
3/4	3/8	3	56167	56175	56183	56191	56197
1	1/2	3	56168	56176	56184	56192	56198
1-1/4	3/4	3-1/2	56169	56177	56185	—	—
1-1/2	3/4	3-1/2	56170	56178	56186	—	—
4-Piece Set in Wood Case Sizes 1/4", 1/2", 3/4" & 1"			50653	50654	50655	50656	50657



## Machine Countersinks

High Speed Steel - 4-Flute  
Treated (Black Oxide)

Designed primarily for countersinking holes. The longer shank length is ideal for use in turret lathes for screw machine work.

STANDARD PACKAGE All sizes — 1 each



List No. 1751

SHANK				EDP NO.		
SIZE	DIA.	SHANK LENGTH	OAL	60°	82°	90°
1/2	1/2	2-1/4	3-7/8	25551	25552	25561
5/8	1/2	2-1/4	4	25553	25554	—
3/4	1/2	2-1/4	4-1/4	25555	25556	25563
7/8	1/2	2-1/4	4-1/4	25557	25558	—
1	1/2	2-1/4	4-3/8	25559	25560	25565

# Carbide Four Flute Countersinks



List No. 5755

STANDARD PACKAGE

All sizes — 1 each

For countersinking, chamfering, and deburring holes.

Four flutes allow higher feed rates than single flute countersinks and greater chip clearance than six flute countersinks.

The 1/8 and 1/4 diameters are solid carbide. The larger diameters are brazed construction.

Carbide offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.

SIZE	SHANK			EDP NO.				
	DIA.	OAL		60°	82°	90°	100°	120°
1/8	1/8	1-1/2		56628	56635	56642	56649	56656
1/4	1/4	2		56629	56636	56643	56650	56657
3/8	1/4	2-1/2		56630	56637	56644	56651	56658
1/2	3/8	2-1/2		56631	56638	56645	56652	56659
5/8	3/8	2-1/2		56632	56639	56646	56653	56660
3/4	1/2	3		56633	56640	56647	56654	56661
1	1/2	3		56634	56641	56648	56655	56662

# M42 Cobalt Titanium Nitride (TiN) Coated Six Flute Chatterless Countersinks



List No. 1755

STANDARD PACKAGE

All sizes — 1 each



Cutting edge geometry designed to reduce chatter and harmonics. Six flutes allow higher feed rates and provide longer tool life due to distributing the cutting load over a greater number of teeth.

Cobalt offers increased wear and heat resistance in alloy steels, stainless steels and other abrasive and difficult materials. Longer tool life in all production applications.

Titanium Nitride (TiN) Coating increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding.

SIZE	SHANK			EDP NO.		
	DIA.	OAL		60°	82°	90°
1/4	1/4	2		25680	25687	25694
3/8	1/4	2		25681	25688	25695
1/2	3/8	2		25682	25689	25696
5/8	3/8	2-1/4		25683	25690	25697
3/4	1/2	2-3/4		25684	25691	25698
1	1/2	2-3/4		25685	25692	25699
1-1/4	1/2	3		25686	25693	25700

# Carbide Six Flute Chatterless Countersinks



List No. 5754

STANDARD PACKAGE

All sizes — 1 each

Cutting edge geometry designed to reduce chatter and harmonics. Six flutes allow higher feed rates and provide longer tool life due to distributing the cutting load over a greater number of teeth.

The 1/4 diameter is solid carbide. The larger diameters are brazed construction.

Carbide offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.

SIZE	SHANK			EDP NO.				
	DIA.	OAL		60°	82°	90°	100°	120°
1/8	1/8	1-1/2		56096	56097	56098	56099	56100
3/16	3/16	2		56058	56059	56060	56061	56062
1/4	1/4	2		56132	56139	56146	56153	56158
3/8	1/4	2-1/2		56133	56140	56147	56154	56159
1/2	1/4	2-1/2		56134	56141	56148	56155	56160
5/8	3/8	2-3/4		56063	56064	56065	56066	56067
3/4	3/8	3		56135	56142	56149	56156	56161
1	1/2	3		56136	56143	56150	56157	56162
1-1/4	3/4	3-1/2		56137	56144	56151	—	—
1-1/2	3/4	3-1/2		56138	56145	56152	—	—
4-Piece Set in Wood Case Sizes 1/4", 1/2", 3/4" & 1"				56068	56069	56070	56071	56072

# Solid Carbide Double End Countersinks

## Micrograin Carbide

For countersinking, chamfering, and deburring holes.

**Carbide** offers excellent wear resistance, heat resistance, and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.

**Drill Point** countersink saves setup and production time by allowing you to spot drill and countersink with the same tool.



List No. 5751 1-Flute



List No. 5751 4-Flute



List No. 5751 4-Flute with Drill Point



List No. 5751 6-Flute

COUNTERBORES, COUNTERSINKS

### 1-Flute

SIZE	SHANK DIA.	OAL	EDP NO.					
			60°	82°	90°	100°	110°	120°
1/8	1/8	1-1/2	50460	50461	50462	50463	50464	50465
3/16	3/16	2	50466	50467	50468	50469	50470	50471
1/4	1/4	2	50472	50473	50474	50475	50476	50477
5/16	5/16	2-1/8	50478	50479	50480	50481	50482	50483
3/8	3/8	2-1/2	50484	50485	50486	50487	50488	50489
1/2	1/2	3	50490	50491	50492	50493	50494	50495
5/8	5/8	3-1/4	50496	50497	50498	50499	50500	50501
3/4	3/4	3-1/2	50502	50503	50504	50505	50506	50507

### 4-Flute

SIZE	SHANK DIA.	OAL	EDP NO.					
			60°	82°	90°	100°	110°	120°
1/8	1/8	1-1/2	50508	50509	50510	50511	50512	50513
3/16	3/16	2	50514	50515	50516	50517	50518	50519
1/4	1/4	2	50520	50521	50522	50523	50524	50525
5/16	5/16	2-1/8	50526	50527	50528	50529	50530	50531
3/8	3/8	2-1/2	50532	50533	50534	50535	50536	50537
1/2	1/2	3	50538	50539	50540	50541	50542	50543
5/8	5/8	3-1/4	50544	50545	50546	50547	50548	50549
3/4	3/4	3-1/2	50550	50551	50552	50553	50554	50555

### 4-Flute - Drill Point

SIZE	SHANK DIA.	OAL	EDP NO.					
			60°	82°	90°	100°	110°	120°
1/8	1/8	1-1/2	50556	50557	50558	50559	50560	50561
3/16	3/16	2	50562	50563	50564	50565	50566	50567
1/4	1/4	2	50568	50569	50570	50571	50572	50573
5/16	5/16	2-1/8	50574	50575	50576	50577	50578	50579
3/8	3/8	2-1/2	50580	50581	50582	50583	50584	50585
1/2	1/2	3	50586	50587	50588	50589	50590	50591
5/8	5/8	3-1/4	50592	50593	50594	50595	50596	50597
3/4	3/4	3-1/2	50598	50599	50600	50601	50602	50603

### 6-Flute

SIZE	SHANK DIA.	OAL	EDP NO.		
			60°	82°	90°
1/8	1/8	1-1/2	50604	50605	50606
3/16	3/16	2	50607	50608	50609
1/4	1/4	2	50610	50611	50612
5/16	5/16	2-1/8	50613	50614	50615
3/8	3/8	2-1/2	50616	50617	50618
1/2	1/2	3	50619	50620	50621
5/8	5/8	3-1/4	50622	50623	50624
3/4	3/4	3-1/2	50625	50626	50627

Chamfer  
Mills:  
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# Cap Screw Counterbores

High Speed Steel — Straight Shank — 4-Flute

On Size, 1/64" Oversize & 1/32" Oversize

For producing counterbored clearance holes for the heads of socket head cap screws. Recommended for a wide range of material types.



List No. 1766

STANDARD PACKAGE All sizes — 1 each



CUTTER DIA.	FOR CAP SCREW		PILOT DIA.	PILOT LENGTH	CUTTER DIA. FLUTE LENGTH	SHANK DIA.	OAL	EDP NO.
	SIZE	TOLERANCE						
.183	4	On Size	.1120	1/8	9/16	.1562	3-7/8	25718
.199	4	1/64 Over	.1270	1/8	9/16	.1562	3-7/8	25701
.215	4	1/32 Over	.1430	1/8	9/16	.1562	3-7/8	25719
.205	5	On Size	.1250	5/32	5/8	.1875	4-1/8	25720
.221	5	1/64 Over	.1400	5/32	5/8	.1875	4-1/8	25702
.237	5	1/32 Over	.1560	5/32	5/8	.1875	4-1/8	25721
.227	6	On Size	.1380	3/16	3/4	.2188	4-5/8	25722
.243	6	1/64 Over	.1530	3/16	3/4	.2188	4-5/8	25703
.259	6	1/32 Over	.1690	3/16	3/4	.2188	4-5/8	25723
.270	8	On Size	.1640	7/32	3/4	.2500	5	25724
.286	8	1/64 Over	.1790	7/32	3/4	.2500	5	25704
.302	8	1/32 Over	.1950	7/32	3/4	.2500	5	25725
.312	10	On Size	.1900	1/4	7/8	.2812	5-1/4	25726
.328	10	1/64 Over	.2050	1/4	7/8	.2812	5-1/4	25705
.344	10	1/32 Over	.2180	1/4	7/8	.2812	5-1/4	25727
.380	1/4	On Size	.2500	9/32	1	.3125	5-5/8	25741
.396	1/4	1/64 Over	.2650	9/32	1	.3125	5-5/8	25706
.412	1/4	1/32 Over	.2810	9/32	1	.3125	5-5/8	25728
.474	5/16	On Size	.3125	5/16	1	.3750	6-1/8	25742
.489	5/16	1/64 Over	.3280	5/16	1	.3750	6-1/8	25707
.504	5/16	1/32 Over	.3430	5/16	1	.3750	6-1/8	25729
.569	3/8	On Size	.3750	3/8	1-1/4	.5000	6-1/2	25743
.585	3/8	1/64 Over	.3900	3/8	1-1/4	.5000	6-1/2	25708
.601	3/8	1/32 Over	.4060	3/8	1-1/4	.5000	6-1/2	25730
.661	7/16	On Size	.4370	7/16	1-1/4	.5000	7	25744
.676	7/16	1/64 Over	.4520	7/16	1-1/4	.5000	7	25709
.691	7/16	1/32 Over	.4680	7/16	1-1/4	.5000	7	25731
.755	1/2	On Size	.5000	1/2	1-1/2	.5000	7-1/2	25745
.771	1/2	1/64 Over	.5150	1/2	1-1/2	.5000	7-1/2	25710
.787	1/2	1/32 Over	.5310	1/2	1-1/2	.5000	7-1/2	25732
.943	5/8	On Size	.6250	5/8	1-1/2	.6250	7-5/8	25733
.959	5/8	1/64 Over	.6400	5/8	1-1/2	.6250	7-5/8	25711
.975	5/8	1/32 Over	.6560	5/8	1-1/2	.6250	7-5/8	25734
1.131	3/4	On Size	.7500	3/4	1-5/8	.7500	7-3/4	25735
1.147	3/4	1/64 Over	.7650	3/4	1-5/8	.7500	7-3/4	25712
1.163	3/4	1/32 Over	.7810	3/4	1-5/8	.7500	7-3/4	25736
1.320	7/8	On Size	.8750	7/8	1-7/8	.8750	8	25737
1.336	7/8	1/64 Over	.8910	7/8	1-7/8	.8750	8	25713
1.352	7/8	1/32 Over	.9060	7/8	1-7/8	.8750	8	25738
1.508	1	On Size	1.0000	1	2	1.0000	8-1/2	25739
1.524	1	1/64 Over	1.0150	1	2	1.0000	8-1/2	25714
1.540	1	1/32 Over	1.0310	1	2	1.0000	8-1/2	25740

## List No. 1766 — Metric

CUTTER DIA.	FOR CAP SCREW		PILOT DIA.	PILOT LENGTH	CUTTER DIA. FLUTE LENGTH	SHANK DIA.	OAL	EDP NO.
	SIZE	TOLERANCE						
.2362	3mm	On Size	.1377	5/32	5/8	.1875	4-1/8	25746
.2953	4mm	1/64 Over	.1772	7/32	3/4	.2500	5	25747
.3543	5mm	1/32 Over	.2165	9/32	1	.3125	5-5/8	25748
.4134	6mm	On Size	.2559	5/16	1	.3750	6-1/8	25749
.5315	8mm	1/32 Over	.3346	3/8	1-1/4	.5000	6-1/2	25750
.6496	10mm	On Size	.4134	7/16	1-1/4	.5000	7	25751
.7283	12mm	1/64 Over	.4921	1/2	1-1/2	.5000	7-1/2	25752
.8465	14mm	1/32 Over	.5709	5/8	1-1/2	.6250	7-5/8	25753
.9645	16mm	On Size	.6500	5/8	1-1/2	.6250	7-5/8	25754
1.2010	20mm	1/64 Over	.8070	7/8	1-7/8	.8750	8	25756
1.4370	24mm	1/32 Over	.9650	1	2	1.0000	8-1/2	25758

# Interchangeable Pilot Counterbores

Short Series — High Speed Steel

For general purpose counterboring and spot facing.



List No. 1772 Straight Shank

STANDARD PACKAGE All sizes — 1 each



CUTTER DIA.	NO. OF FLUTES	OAL	ACCEPTS PILOT SHANK DIA.	RANGE OF PILOTS DIA.	SHANK DIA.	EDP NO.
3/16	3	3	3/32	1/8 - 3/16	15/64	25811
7/32	3	3	3/32	1/8 - 7/32	15/64	25812
1/4	3	3-13/16	3/32	1/8 - 3/16	15/64	25813
9/32	3	3-13/16	3/32	1/8 - 7/32	17/64	25814
5/16	3	3-13/16	3/32	1/8 - 1/4	19/64	25815
11/32	3	3-13/16	3/32	1/8 - 9/32	5/16	25816
3/8	3	4-1/16	5/32	3/16 - 5/16	5/16	25817
13/32	3	4-1/16	5/32	3/16 - 11/32	3/8	25818
7/16	3	4-1/16	5/32	3/16 - 3/8	3/8	25819
15/32	3	4-5/16	3/16	1/4 - 13/32	7/16	25820
1/2	3	4-5/16	3/16	1/4 - 7/16	7/16	25821
17/32	3	4-5/16	3/16	1/4 - 15/32	1/2	25822
9/16	3	4-5/16	3/16	1/4 - 1/2	1/2	25823
19/32	3	5-1/8	3/16	1/4 - 17/32	1/2	25824
5/8	3	5-1/8	3/16	1/4 - 9/16	1/2	25825
21/32	3	5-1/8	3/16	1/4 - 5/8	1/2	25826
11/16	3	5-1/8	3/16	1/4 - 5/8	1/2	25827
23/32	3	5-3/8	1/4	5/16 - 21/32	1/2	25828
3/4	3	5-3/8	1/4	5/16 - 11/16	1/2	25829
25/32	3	5-3/8	1/4	5/16 - 23/32	5/8	25830
13/16	3	5-3/8	1/4	5/16 - 3/4	5/8	25831
7/8	3	5-3/8	1/4	5/16 - 13/16	3/4	25833
15/16	3	6-1/8	1/4	5/16 - 7/8	3/4	25835
1	3	6-3/8	5/16	3/8 - 15/16	3/4	25837
1-1/16	3	6-3/8	5/16	3/8 - 1	3/4	25838
1-1/8	3	6-3/8	5/16	3/8 - 1-1/16	1	25839
1-3/16	3	6-3/8	5/16	3/8 - 1-1/8	1	25840
1-1/4	5	6-5/8	3/8	7/16 - 1-3/16	1	25841
1-3/8	5	6-5/8	3/8	7/16 - 1-5/16	1	25842
1-1/2	5	7-7/8	3/8	7/16 - 1-7/16	1-1/4	25843
1-5/8	5	8-1/8	7/16	1/2 - 1-9/16	1-1/4	25844
1-3/4	5	8-1/8	7/16	1/2 - 1-11/16	1-1/4	25845
1-7/8	5	8-1/8	7/16	1/2 - 1-13/16	1-1/2	25846
2	5	8-3/8	1/2	9/16 - 1-15/16	1-1/2	25847

# Interchangeable Pilots For Counterbores

Carbon Steel

List No. 0776

Carbon Steel



PILOT DIA.	SHANK DIA.	EDP NO.	PILOT DIA.	SHANK DIA.	EDP NO.	PILOT DIA.	SHANK DIA.	EDP NO.	PILOT DIA.	SHANK DIA.	EDP NO.	PILOT DIA.	SHANK DIA.	EDP NO.
1/8	3/32	26002	1/4	3/16	26018	5/16	1/4	26032	13/16	1/4	26047	13/16	5/16	26063
5/32	3/32	26003	9/32	3/16	26019	11/32	1/4	26033	7/8	1/4	26048	7/8	5/16	26064
3/16	3/32	26004	5/16	3/16	26020	3/8	1/4	26034	3/8	5/16	26050	15/16	5/16	26065
7/32	3/32	26005	11/32	3/16	26021	13/32	1/4	26035	7/16	5/16	26052	1	5/16	26066
1/4	3/32	26006	3/8	3/16	26022	7/16	1/4	26036	15/32	5/16	26053	1/2	3/8	26072
9/32	3/32	26007	13/32	3/16	26023	15/32	1/4	26037	1/2	5/16	26054	17/32	3/8	26073*
3/16	5/32	26009	7/16	3/16	26024	1/2	1/4	26038	17/32	5/16	26055	11/16	3/8	26078
7/32	5/32	26010	15/32	3/16	26025	17/32	1/4	26039	9/16	5/16	26056	3/4	3/8	26080
1/4	5/32	26011	1/2	3/16	26026	9/16	1/4	26040	5/8	5/16	26058	13/16	3/8	26081
9/32	5/32	26012	17/32	3/16	26027	5/8	1/4	26042	21/32	5/16	26059	7/8	3/8	26082
5/16	5/32	26013	9/16	3/16	26028	21/32	1/4	26043	11/16	5/16	26060	15/16	3/8	26083
11/32	5/32	26014	19/32	3/16	26029*	11/16	1/4	26044	23/32	5/16	26061	1-1.16	7/16	26085
3/8	5/32	26015	5/8	3/16	26030	3/4	1/4	26046	3/4	5/16	26062	13/16	7/16	26102
												7/8	7/16	26103

\* Available while supplies last

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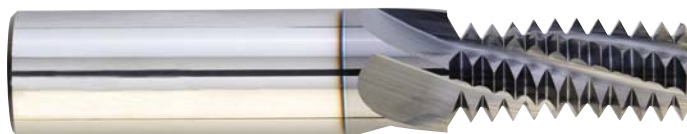
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# Solid Carbide Thread Mills

ALTiN Coated  
10% Micrograin Carbide  
20° Helix Angle



List No. 5900  
Fractional & Machine Screw



**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life.

**ALTiN - Aluminum Titanium Nitride** is an excellent all-around coating that is especially recommended for high thermal stress applications including dry machining, abrasive materials and difficult-to-machine materials. Benefits include higher cutting speeds and longer tool life.

Shank Diameter Tolerance: h6 for Shrink Fit Holders

## THREAD MILLING FEATURES & BENEFITS

- **Reduced Tool Inventory. One Thread Mill Can Produce** internal & external threads, left hand & right hand threads, different thread diameters of the same pitch and through hole & blind hole threads.
- **Requires Less Power.** Produce coarse pitches and large diameters on lower H.P. machines.
- **Tough Threading Applications.** Thread harder, difficult-to-machine & gummy materials that cause problems for taps.
- **Helical Flutes** for reduced cutting forces, improved thread quality & increased tool life.
- **Precision Threading.** Control pitch diameter precisely via programming. Precise thread depth control & positional accuracy. Produce 100% thread heights. Produce full threads to within one pitch of a shoulder or blind hole bottom.
- **Easily Removed if Broken.** No need for EDM burn-out.

**We recommend reducing the ramp-in feed rate by 50% of the interpolation feed rate.**

## Fractional & Machine Screw

SIZE	SHANK DIA.	CUTTING DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
6-32	1/8	.100	.218	2	3	98600
8-36	1/8	.115	.250	2	3	98601
8-32	1/8	.115	.250	2	3	98602
10-24	3/16	.120	.312	2	3	98603
10-32	3/16	.120	.312	2	3	98604
1/4-20	3/16	.180	.500	2-1/2	3	98605
1/4-28	3/16	.180	.500	2-1/2	3	98606
5/16-18	1/4	.240	.625	2-1/2	3	98607
5/16-24	1/4	.240	.625	2-1/2	3	98608
3/8-16	5/16	.290	.750	3	4	98609
3/8-24	5/16	.290	.750	3	4	98610
7/16-14	3/8	.340	.875	3	4	98611
7/16-20	3/8	.340	.875	3	4	98612
1/2-13	3/8	.350	.875	3-1/2	4	98613
1/2-20	3/8	.350	.875	3-1/2	4	98614
9/16-12	1/2	.370	.875	3-1/2	4	98615
9/16-18	1/2	.370	.875	3-1/2	4	98616
5/8-11	1/2	.470	1.250	3-1/2	5	98617
5/8-18	1/2	.470	1.250	3-1/2	5	98618
3/4-10	1/2	.495	1.250	3-1/2	5	98619
3/4-16	1/2	.495	1.250	3-1/2	5	98620
7/8-9	5/8	.620	1.250	3-1/2	5	98621
7/8-14	5/8	.620	1.250	3-1/2	5	98622
1-8	3/4	.620	1.375	4	5	98623
1-12	3/4	.620	1.375	4	5	98624

Speeds & Feeds: Page 144



# Solid Carbide Thread Mills

ALTiN Coated  
10% Micrograin Carbide  
20° Helix Angle



List No. 5902 Pipe Thread



## Pipe Thread

Shank Diameter Tolerance: h6 for Shrink Fit Holders

SIZE	SHANK DIA.	CUTTING DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
<b>NPT</b>						
1/16-27	1/4	.245	.437	2-1/2	3	98641
1/8-27	5/16	.310	.437	2-1/2	4	98642
1/4-18	3/8	.370	.625	3	4	98656
3/8-18	3/8	.370	.625	3	4	98657
1/2-14	1/2	.495	.875	3-1/2	4	98645
3/4-14	1/2	.495	.875	3-1/2	4	98646
1-11½	3/4	.620	1.125	4	5	98647
<b>NPTF</b>						
1/16-27	1/4	.245	.437	2-1/2	3	98648
1/8-27	5/16	.310	.437	2-1/2	4	98649
1/4-18	3/8	.370	.625	3	4	98658
3/8-18	3/8	.370	.625	3	4	98659
1/2-14	1/2	.495	.875	3-1/2	4	98652
3/4-14	1/2	.495	.875	3-1/2	4	98653
1-11½	3/4	.620	1.125	4	5	98654

# Solid Carbide Thread Mills

ALTiN Coated  
10% Micrograin Carbide

Speeds & Feeds: Page 144

We recommend reducing the ramp-in feed rate by 50% of the interpolation feed rate.

## 6 PIECE SET Fractional & Machine Screw

With just 6 thread mills you can produce 13 different thread sizes:  
6-32, 8-32, 10-32, 10-24, 5/16"-24, 3/8"-24, 1/4"-20, 1/2"-20, 5/16"-18,  
9/16"-18, 3/8"-16, 3/4"-16, 1/2"-13

With the same thread mill you can produce:

- both left hand & right hand threads
- both internal & external threads

List No. 5900

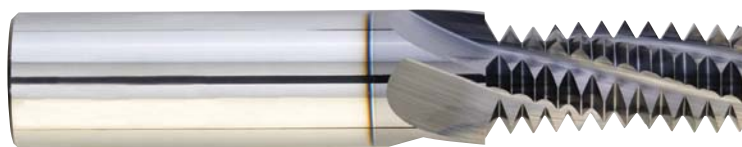
Sizes: 6-32, 10-24, 1/4"-20, 5/16"-18, 3/8"-16, 1/2"-13  
in Plastic Case

EDP No. 98655



# Solid Carbide Thread Mills

ALTiN Coated  
10% Micrograin Carbide  
20° Helix Angle



List No. 5901 Metric



## Metric

SIZE	SHANK DIA.	CUTTING DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
M4 x 0.7	1/8	.120	.250	2	3	98625
M4.5 x 0.75	1/8	.120	.250	2	3	98626
M5 x 0.8	3/16	.120	.312	2	3	98627
M6 x 1	3/16	.170	.500	2-1/2	3	98628
M8 x 0.75	1/4	.235	.625	2-1/2	3	98629
M8 x 1	1/4	.235	.625	2-1/2	3	98630
M8 x 1.25	1/4	.235	.625	2-1/2	3	98631
M10 x 1.25	5/16	.300	.750	3	4	98632
M10 x 1.5	5/16	.300	.750	3	4	98633
M12 x 1	3/8	.360	.875	3-1/2	4	98634
M12 x 1.25	3/8	.360	.875	3-1/2	4	98635
M12 x 1.75	3/8	.360	.875	3-1/2	4	98636
M14 x 1.5	3/8	.360	.875	3-1/2	4	98637
M16 x 2	1/2	.470	1.250	3-1/2	5	98638
M18 x 2.5	1/2	.470	1.250	3-1/2	5	98639
M20 x 3	5/8	.470	1.250	3-1/2	5	98640

Shank Diameter Tolerance: h6 for Shrink Fit Holders

We recommend reducing the ramp-in feed rate by 50% of the interpolation feed rate.

## Thread Milling Feed & Speeds

Material	Speed SFM	Feed Rate (inches/tooth)						
		Tool Diameter						
		1/8	3/16	1/4	5/16	3/8	1/2	5/8
Aluminum	800-1400	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007
Magnesium	800-1400	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007
Brass	600-800	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0045	.005-.006
Bronze	500-600	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0045	.005-.006
Hard Bronze	200-300	.0004-.0008	.0007-.0012	.001-.002	.001-.002	.0015-.0025	.002-.003	.003-.004
Low Alloy Steels < 25 Rc	350-500	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.0025-.0035	.003-.004	.004-.005
High Alloy Steels > 25 Rc	250-400	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004
Stainless Steel	150-250	.0004-.0008	.0006-.001	.001-.0015	.0015-.002	.0015-.003	.002-.0035	.003-.004
Cast Iron - Soft	250-350	.0004-.0008	.0007-.0013	.0007-.0013	.0015-.002	.002-.003	.002-.004	.003-.005
Cast Iron - Hard	200-300	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004
Titanium	80-150	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.0015-.0025	.0025-.0035
Inconel	60-100	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.0015-.0025	.002-.003

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use in information contained within this chart.

# HPT HIGH PERFORMANCE TAPS



CNC Reduced Neck Design

## MATERIAL SPECIFIC GEOMETRY

Application specific geometries engineered for high performance, high productivity tapping in a variety of materials. Morse Cutting Tools offers a complete selection of styles, sizes and "H" limits including metric sizes enabling you to choose the right tap to optimize your tapping application.

Powder metallurgy high speed steel, unique geometry, surface finish and tool coating ensure consistent, predictable performance, superior thread quality and excellent tool life for lower cost per tapped hole.

## P/M POWDER METALLURGY HIGH SPEED STEEL

Premium Steel Engineered For

Hardness / Wear Resistance / Tool Life  
Heat Resistance / Toughness and Strength  
Performance Under Difficult Cutting Conditions  
Higher Cutting Speeds / Increased Productivity

Morse FAST TAP SERVICE  
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## SURFACE FINISHES / TOOL COATINGS

**Steam Oxide Finish** increases wear resistance, reduces friction, loading and galling, helps retain cutting fluids, improves thread quality and extends tool life.

**Steam Oxide Over Nitride Finish** features a hard abrasion resistant **Nitrided Base** for enhanced tool life in abrasive materials including cast iron. **Steam Oxide** surface treatment helps toughen the nitrided base, reduces friction, loading and galling, helps retain cutting fluids, improves thread quality and extends tool life.

**TiCN - Titanium Carbonitride Coating** increases wear resistance, reduces friction and galling, reduces tapping torque, improves thread quality and allows increased cutting speeds for greatly increased productivity and tool life.

**TiALN - Titanium Aluminum Nitride Coating** is an excellent all-around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

**CrN - Chromium Nitride Coating** increases wear resistance, reduces friction and galling, reduces tapping torque, improves thread quality and allows increased cutting speeds for greatly increased productivity and tool life.

**Recommended for softer materials including aluminum.**

# APPLICATIONS



## FOR ALUMINUM

Spiral Point / Spiral Flute / Bright Finish / CrN (Chromium Nitride) Coated

**Recommended for all types of aluminum alloys. CrN coating especially recommended for high-silicon aluminum alloys.**

## FOR CAST IRON

Straight Flute / Steam Oxide Over Nitride Finish

**Recommended for all types of gray, ductile and malleable cast iron**

## FOR CAST IRON and CAST ALUMINUM

Straight Flute / **AXIAL COOLANT-THROUGH** / TiAlN Coated

**Recommended for Gray Cast Iron and Aluminum Alloy Castings.**

## FOR EXOTIC ALLOYS

Spiral Point / Spiral Flute / Steam Oxide Finish / TiCN Coated

**Recommended for steels, steel alloys, stainless steels, titanium alloys, nickel and nickel base alloys, other exotic alloys and a wide variety of materials up to 32Rc hardness.**

## FOR HARD MATERIALS

Spiral Point / Spiral Flute / Steam Oxide Finish / TiCN Coated

**Recommended for harder (32Rc- 45Rc) materials including steel alloys, titanium alloys, nickel base high temperature alloys, tool and mold steels and stainless steels**

# GEOMETRY

**Spiral Point Taps** are designed for efficient tapping of through holes and blind holes with adequate depth for chip accumulation at the bottom of the hole. The shearing action of the point provides freer cutting action and ejects the chips ahead of the tap, eliminating chip evacuation problems and chip damage to the threads. Shallower flutes also result in greater tap strength, allowing for higher cutting speeds.

**Spiral Flute Taps** are designed to lift the chips out of the hole in blind hole tapping, eliminating chip evacuation problems which can result in damaged threads and broken taps. They will also bridge openings, keyways and other interruptions in the tapped hole.

**Plug Style** (3-5 thread chamfer) is the most common chamfer used for tapping applications in through holes and blind holes with sufficient bottom clearance.

**Semi-Bottoming Style** (2-3 thread chamfer) allows threading close to the bottom of blind holes but cuts more efficiently than standard bottoming taps due to a slightly longer chamfer which distributes the cutting load over a greater number of teeth.

**Semi-Interrupted Threads** help to break the chips and enhance coolant flow to the cutting teeth for reduced chance of torn threads and improved thread quality.

**CNC Reduced Neck Design** enhances chip evacuation and cutting fluid flow to the cutting teeth for reduced friction, heat and galling. Also reduces contact between the tap and the workpiece.

# Spiral Flute HPT High Performance Taper Pipe Taps



Recommended for low to medium carbon steels, alloy steels, tool steels, stainless steels, titanium alloys and many other materials up to 35Rc hardness.

**Premium Powder Metallurgy** high speed steel for increased toughness, wear resistance and heat resistance in a wide range of materials up to 35Rc hardness. **Enhanced Geometry** especially recommended for tapping **Stainless Steel**.

**EXTRA  
Length**

**Steam Oxide Finish** increases wear resistance, reduces friction, acts as a lubricant, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**

## List No. 2099

Premium Powder Metallurgy High Speed Steel  
Bright Finish and Steam Oxide Finish  
15° Helix Angle  
2-3/4" Thread Chamfer

**Extra Length** – longer than standard ANSI length – provides extra reach in tapping applications

**ANSI Shank** – made to standard American dimensions – fits standard tap holders

**STANDARD PACKAGE** All Sizes — 1 each

**Morse FAST TAP SERVICE**  
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Cutting Speeds: Page 161

Tool Coatings Also Available

## NPT/ANPT Taper Pipe Thread

NPT taper pipe taps are commonly used for tapping pipe fittings and couplings. Assembly requires the use of a thread sealant to ensure a tight seal.

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	BRIGHT EDP NO.	SURFACE TREATED EDP NO.
1/16-27	11/16	2-9/16	4	36220	36230
1/8-27* (Sm. Sk.)	3/4	2-3/4	4	36221	36231
1/8-27* (Lg. Sk.)	3/4	2-3/4	4	36222	36232
1/4-18	1-1/16	3	4	36223	36233
3/8-18	1-1/16	3-1/8	4	36224	36234
1/2-14	1-3/8	3-15/16	4	36225	36235
3/4-14	1-3/8	4-1/8	5	36226	36236
1-11-1/2	1-3/4	4-1/2	5	36227	36237

\*Large shank furnished unless otherwise specified.

## NPTF Dryseal Taper Pipe Thread

**NPTF Dryseal** taper pipe taps produce threads where a tight seal is achieved during assembly by metal-to-metal contact. Used for applications requiring a tight seal without the use of thread sealants.

For 1/8" Taps:  
Small Shank = .3125" dia.  
Large Shank = .4375" dia.

## List No. 2099

**STANDARD PACKAGE** All Sizes — 1 each

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	BRIGHT EDP NO.	SURFACE TREATED EDP NO.
1/16-27	11/16	2-9/16	4	36240	36250
1/8-27* (Sm. Sk.)	3/4	2-3/4	4	36241	36251
1/8-27* (Lg. Sk.)	3/4	2-3/4	4	36242	36252
1/4-18	1-1/16	3	4	36243	36253
3/8-18	1-1/16	3-1/8	4	36244	36254
1/2-14	1-3/8	3-15/16	4	36245	36255
3/4-14	1-3/8	4-1/8	5	36246	36256
1-11-1/2	1-3/4	4-1/2	5	36247	36257

\*Large shank furnished unless otherwise specified.

# Coolant-Through Straight Flute HPT High Performance Taps For Cast Iron, Ductile Iron and Cast Aluminum



List No. 2087 TIALN Coated

**AXIAL COOLANT-THROUGH**

Semi-Bottoming Style



Powder Metallurgy High Speed Steel  
TiALN - Titanium Aluminum Nitride Coating

SIZE	THREAD TYPE	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	EDP NO.
10-24	NC	H3	4	.50	.38	2.38	61290
10-24	NC	H5	4	.50	.38	2.38	61291
10-32	NF	H3	4	.50	.38	2.38	61292
1/4-20	NC	H3	4	.63	.38	2.50	61293
1/4-20	NC	H5	4	.63	.38	2.50	61294
1/4-28	NF	H3	4	.63	.38	2.50	61295
5/16-18	NC	H3	4	.69	.44	2.72	61296
5/16-18	NC	H5	4	.69	.44	2.72	61297
5/16-24	NF	H3	4	.69	.44	2.72	61298
3/8-16	NC	H3	4	.75	.50	2.94	61299
3/8-16	NC	H5	4	.75	.50	2.94	61300
3/8-24	NF	H3	4	.75	.50	2.94	61301
7/16-14	NC	H3	4	.88	*	3.16	61302
7/16-14	NC	H5	4	.88	*	3.16	61303
7/16-20	NF	H3	4	.88	*	3.16	61304
7/16-20	NF	H5	4	.88	*	3.16	61305
1/2-13	NC	H3	4	.94	*	3.38	61306
1/2-13	NC	H5	4	.94	*	3.38	61307
1/2-20	NF	H3	4	.94	*	3.38	61308
1/2-20	NF	H5	4	.94	*	3.38	61309
9/16-12	NC	H3	4	1.00	*	3.59	61310
9/16-12	NC	H5	4	1.00	*	3.59	61311
9/16-18	NF	H3	4	1.00	*	3.59	61312
9/16-18	NF	H5	4	1.00	*	3.59	61313
5/8-11	NC	H3	4	1.09	*	3.81	61314
5/8-11	NC	H5	4	1.09	*	3.81	61315
5/8-18	NF	H3	4	1.09	*	3.81	61316
5/8-18	NF	H5	4	1.09	*	3.81	61317
3/4-10	NC	H3	4	1.22	*	4.25	61318
3/4-10	NC	H5	4	1.22	*	4.25	61319
3/4-16	NF	H3	4	1.22	*	4.25	61320
3/4-16	NF	H5	4	1.22	*	4.25	61321

## Metric

SIZE	THREAD TYPE	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	EDP NO.
M5	0.8	D4	4	.50	.38	2.38	61325
M6	1.0	D5	4	.63	.38	2.50	61326
M8	1.25	D5	4	.69	.44	2.72	61327
M10	1.5	D6	4	.75	.50	2.94	61328
M12	1.25	D6	4	.94	*	3.38	61329
M12	1.75	D6	4	.94	*	3.38	61330
M14	1.25	D6	4	1.00	*	3.59	61331
M14	1.5	D6	4	1.00	*	3.59	61332
M16	1.5	D6	4	1.09	*	3.81	61333
M18	1.5	D6	4	1.09	*	4.03	61334

\*Reduced Shank (shank diameter is smaller than minor diameter)

Cutting Speeds	Workpiece Material	Brinell Hardness (BHN)	Surface Speed (SFM)
	Aluminum Alloy Castings	—	40-95
	Gray Cast Iron	≤ 230	45-70
	???	≤ 230	22-55

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use in information contained within this chart.

# Straight Flute HPT High Performance Taps For Cast Iron

Semi-Bottoming Style



Recommended for all types of gray, ductile and malleable cast iron.

Premium Powder Metallurgy High Speed Steel  
Steam Oxide over Nitride Finish

List No. 2094 Steam Oxide Over Nitride

CNC Reduced Neck Design

SIZE	TPI		NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE OVER NITRIDE LIST NO. 2094			
	UNC	UNF					H2	H3	H4	H5
10	24	—	3	1/2	3/8	2 3/8	—	30140	—	—
10	—	32	3	1/2	3/8	2 3/8	30141	30142	—	—
1/4	20	—	4	5/8	3/8	2 1/2	—	30143	—	30144
1/4	—	28	4	5/8	3/8	2 1/2	—	30145	30146	—
5/16	18	—	4	1 1/16	7/16	2 23/32	—	30147	—	30148
5/16	—	24	4	1 1/16	7/16	2 23/32	—	30149	30150	—
3/8	16	—	4	3/4	1/2	2 15/16	—	30151	—	30152
3/8	—	24	4	3/4	1/2	2 15/16	—	30153	30154	—
7/16	14	—	4	7/8	9/16	3 5/32	—	30155	—	30156
7/16	—	20	4	7/8	9/16	3 5/32	—	30157	—	30158
1/2	13	—	4	1 5/16	2 3/32	3 3/8	—	30159	—	30160
1/2	—	20	4	1 5/16	2 3/32	3 3/8	—	30161	—	30162

## Metric

List No. 2094M Steam Oxide Over Nitride

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE OVER NITRIDE LIST NO. 2094M
							EDP NO.
M6	1.0	D5	4	5/8	3/8	2 1/2	30180
M8	1.0	D5	4	1 1/16	7/16	2 23/32	30181
M8	1.25	D5	4	1 1/16	7/16	2 23/32	30182
M10	1.5	D6	4	3/4	1/2	2 15/16	30183
M12	1.5	D5	4	1 5/16	2 3/32	3 3/8	30184
M12	1.75	D6	4	1 5/16	2 3/32	3 3/8	30185

Cutting Speeds: Page 161

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Spiral Point HPT High Performance Taps For Aluminum Plug Style



Recommended for all types of aluminum alloys.

Premium Powder Metallurgy High Speed Steel  
Bright Finish and CrN (Chromium Nitride) Coated  
Semi-Interrupted Thread (3-Flute taps only)

List No. 2092 Bright Finish

List No. 2092S

CrN - Chromium Nitride Coated

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

**CNC Reduced Neck Design**

SIZE	TPI		NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	BRIGHT FINISH LIST NO. 2092					CRN COATED LIST NO. 2092S						
	UNC	UNF					H1	H2	H3	H4	H5	H1	H2	H3	H4	H5		
4	40	—	2	5/16	1/4	17/8	—	30000	—	—	—	—	—	—	60700	—	—	—
4	—	48	2	5/16	1/4	17/8	30001	30002	—	—	—	—	60701	60702	—	—	—	
5	40	—	2	5/16	5/16	1 15/16	—	30003	—	—	—	—	—	60703	—	—	—	
6	32	—	2	3/8	5/16	2	—	30004	30005	—	—	—	—	60704	60705	—	—	
6	—	40	2	3/8	5/16	2	—	30006	—	—	—	—	—	60706	—	—	—	
8	32	—	3	3/8	3/8	2 1/8	—	30007	30008	—	—	—	—	60707	60708	—	—	
8	—	36	3	3/8	3/8	2 1/8	—	30009	—	—	—	—	—	60709	—	—	—	
10	24	—	3	1/2	3/8	2 3/8	—	—	30010	—	—	—	—	—	60710	—	—	
10	—	32	3	1/2	3/8	2 3/8	—	30011	30012	—	—	—	—	60711	60712	—	—	
1/4	20	—	3	5/8	3/8	2 1/2	—	—	30013	—	—	30014	—	—	60713	—	60714	
1/4	—	28	3	5/8	3/8	2 1/2	—	—	30015	30016	—	—	—	—	60715	60716	—	
5/16	18	—	3	1 1/16	7/16	2 23/32	—	—	30017	—	—	30018	—	—	60717	—	60718	
5/16	—	24	3	1 1/16	7/16	2 23/32	—	—	30019	30020	—	—	—	—	60719	60720	—	
3/8	16	—	3	3/4	1/2	2 15/16	—	—	30021	—	—	30022	—	—	60721	—	60722	
3/8	—	24	3	3/4	1/2	2 15/16	—	—	30023	30024	—	—	—	—	60723	60724	—	
7/16	14	—	3	7/8	9/16	3 5/32	—	—	30025	—	—	30026	—	—	60725	—	60726	
7/16	—	20	3	7/8	9/16	3 5/32	—	—	30027	—	—	30028	—	—	60727	—	60728	
1/2	13	—	3	1 5/16	23/32	3 3/8	—	—	30029	—	—	30030	—	—	60729	—	60730	
1/2	—	20	3	1 5/16	23/32	3 3/8	—	—	30031	—	—	30032	—	—	60731	—	60732	

Semi-Interrupted Thread on 3-Flute Taps Only

## Metric

List No. 2092M Bright Finish

List No. 2092MS CrN - Chromium Nitride Coated

**Morse FAST TAP SERVICE**  
Pages 206-240

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	BRIGHT FINISH LIST NO. 2092M		CRN COATED LIST NO. 2092MS	
							EDP NO.	EDP NO.		
M3	0.5	D3	2	5/16	5/16	1 15/16	30050	—	60750	—
M4	0.7	D4	3	3/8	3/8	2 1/8	30051	—	60751	—
M5	0.8	D4	3	1/2	3/8	2 3/8	30052	—	60752	—
M6	1.0	D5	3	5/8	3/8	2 1/2	30053	—	60753	—
M8	1.0	D5	3	1 1/16	7/16	2 23/32	30054	—	60754	—
M8	1.25	D5	3	1 1/16	7/16	2 23/32	30055	—	60755	—
M10	1.5	D6	3	3/4	1/2	2 5/16	30056	—	60756	—
M12	1.5	D5	3	1 5/16	23/32	3 3/8	30057	—	60757	—
M12	1.75	D6	3	1 5/16	23/32	3 3/8	30058	—	60758	—

Semi-Interrupted Thread on 3-Flute Taps Only



# Spiral Flute HPT High Performance Taps For Aluminum

## Semi-Bottoming Style

Recommended for all types of aluminum alloys.

Premium Powder Metallurgy High Speed Steel  
Bright Finish and CrN (Chromium Nitride) Coated  
Semi-Interrupted Thread (3-Flute taps only).



List No. 2093 Bright Finish

List No. 2093S

CrN - Chromium Nitride Coated

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

CNC Reduced Neck Design

SIZE	TPI		NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	BRIGHT FINISH LIST NO. 2093					CRN COATED LIST NO. 2093S					
	UNC	UNF					H1	H2	H3	H4	H5	H1	H2	H3	H4	H5	
4	40	—	2	1 <sup>5</sup> / <sub>64</sub>	2 <sup>1</sup> / <sub>64</sub>	1 <sup>7</sup> / <sub>8</sub>	—	30070	—	—	—	—	—	60770	—	—	—
4	—	48	2	1 <sup>5</sup> / <sub>64</sub>	2 <sup>1</sup> / <sub>64</sub>	1 <sup>7</sup> / <sub>8</sub>	30071	30072	—	—	—	—	60771	60772	—	—	—
5	40	—	2	1 <sup>5</sup> / <sub>64</sub>	2 <sup>5</sup> / <sub>64</sub>	1 <sup>15</sup> / <sub>16</sub>	—	30073	—	—	—	—	—	60773	—	—	—
6	32	—	2	1 <sup>5</sup> / <sub>64</sub>	2 <sup>9</sup> / <sub>64</sub>	2	—	30074	30075	—	—	—	—	60774	60775	—	—
6	—	40	2	1 <sup>5</sup> / <sub>64</sub>	2 <sup>9</sup> / <sub>64</sub>	2	—	30076	—	—	—	—	—	60776	—	—	—
8	32	—	2	1 <sup>5</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>64</sub>	2 <sup>1</sup> / <sub>8</sub>	—	30077	30078	—	—	—	—	60777	60778	—	—
8	—	36	2	1 <sup>5</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>64</sub>	2 <sup>1</sup> / <sub>8</sub>	—	30079	—	—	—	—	—	60779	—	—	—
10	24	—	2	1 <sup>1</sup> / <sub>32</sub>	1 <sup>7</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>8</sub>	—	—	30080	—	—	—	—	—	60780	—	—
10	—	32	2	1 <sup>1</sup> / <sub>32</sub>	1 <sup>7</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>8</sub>	—	30081	30082	—	—	—	—	60781	60782	—	—
1/4	20	—	2	7/16	9/16	2 <sup>1</sup> / <sub>2</sub>	—	—	30083	—	—	30084	—	—	60783	—	60784
1/4	—	28	2	7/16	9/16	2 <sup>1</sup> / <sub>2</sub>	—	—	30085	30086	—	—	—	—	60785	60786	—
5/16	18	—	2	1 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>32</sub>	2 <sup>23</sup> / <sub>32</sub>	—	—	30087	—	—	30088	—	—	60787	—	60788
5/16	—	24	2	1 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>32</sub>	2 <sup>23</sup> / <sub>32</sub>	—	—	30089	30090	—	—	—	—	60789	60790	—
3/8	16	—	2	3 <sup>5</sup> / <sub>64</sub>	4 <sup>5</sup> / <sub>64</sub>	2 <sup>15</sup> / <sub>16</sub>	—	—	30091	—	—	30092	—	—	60791	—	60792
3/8	—	24	2	3 <sup>5</sup> / <sub>64</sub>	4 <sup>5</sup> / <sub>64</sub>	2 <sup>15</sup> / <sub>16</sub>	—	—	30093	30094	—	—	—	—	60793	60794	—
7/16	14	—	3	1 <sup>9</sup> / <sub>32</sub>	2 <sup>7</sup> / <sub>32</sub>	3 <sup>5</sup> / <sub>32</sub>	—	—	30095	—	—	30096	—	—	60795	—	60796
7/16	—	20	3	1 <sup>9</sup> / <sub>32</sub>	2 <sup>7</sup> / <sub>32</sub>	3 <sup>5</sup> / <sub>32</sub>	—	—	30097	—	—	30098	—	—	60797	—	60798
1/2	13	—	3	5/8	1 <sup>1</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	—	—	30099	—	—	30100	—	—	60799	—	60800
1/2	—	20	3	5/8	1 <sup>1</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	—	—	30101	—	—	30102	—	—	60801	—	60802

Semi-Interrupted Thread on 3-Flute Taps Only

Cutting Speeds: Page 161

## Metric

List No. 2093M Bright Finish

List No. 2093MS CrN - Chromium Nitride Coated

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	BRIGHT FINISH LIST NO. 2093M		CRN COATED LIST NO. 2093MS	
							EDP NO.	EDP NO.	EDP NO.	EDP NO.
M3	0.5	D3	2	1 <sup>5</sup> / <sub>64</sub>	2 <sup>5</sup> / <sub>64</sub>	1 <sup>15</sup> / <sub>16</sub>	30120	—	60820	—
M4	0.7	D4	2	1 <sup>5</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>64</sub>	2 <sup>1</sup> / <sub>8</sub>	30121	—	60821	—
M5	0.8	D4	2	2 <sup>3</sup> / <sub>64</sub>	1 <sup>7</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>8</sub>	30122	—	60822	—
M6	1.0	D5	2	7/16	9/16	2 <sup>1</sup> / <sub>2</sub>	30123	—	60823	—
M8	1.0	D5	2	1 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>32</sub>	2 <sup>23</sup> / <sub>32</sub>	30124	—	60824	—
M8	1.25	D5	2	1 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>32</sub>	2 <sup>23</sup> / <sub>32</sub>	30125	—	60825	—
M10	1.5	D6	2	3 <sup>5</sup> / <sub>64</sub>	1 <sup>1</sup> / <sub>16</sub>	2 <sup>15</sup> / <sub>16</sub>	30126	—	60826	—
M12	1.5	D5	3	5/8	1 <sup>1</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>8</sub>	30127	—	60827	—
M12	1.75	D6	3	5/8	1 <sup>1</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>8</sub>	30128	—	60828	—

Semi-Interrupted Thread on 3-Flute Taps Only

# Spiral Point HPT High Performance Taps For Exotic Alloys

Plug Style

Recommended for steels, steel alloys, stainless steels, titanium alloys, nickel and nickel base alloys, other exotic alloys and a wide variety of materials up to 32Rc hardness.

Premium Powder Metallurgy High Speed Steel Steam Oxide Finish and TiCN Coated



List No. 2095 Steam Oxide Finish

List No. 2095C

TiCN - Titanium Carbonitride Coated

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

**CNC Reduced Neck Design**

SIZE	TPI		NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2095				TiCN COATED LIST NO. 2095C				
	UNC	UNF					H2	H3	H4	H5	H2	H3	H4	H5	
4	40	—	2	5/16	1/4	1 7/8	30200	—	—	—	—	60840	—	—	—
5	40	—	2	5/16	5/16	1 15/16	30201	—	—	—	—	60841	—	—	—
6	32	—	2	3/8	5/16	2	30202	30203	—	—	—	60842	60843	—	—
8	32	—	3	3/8	3/8	2 1/8	30204	30205	—	—	—	60844	60845	—	—
10	24	—	3	1/2	3/8	2 3/8	—	30206	—	—	—	—	60846	—	—
10	—	32	3	1/2	3/8	2 3/8	30208	30209	—	—	—	60848	60849	—	—
1/4	20	—	3	5/8	3/8	2 1/2	—	30210	—	30211	—	—	60850	—	60851
1/4	—	28	3	5/8	3/8	2 1/2	—	30212	30213	—	—	—	60852	60853	—
5/16	18	—	3	1 1/16	7/16	2 23/32	—	30214	—	30215	—	—	60854	—	60855
5/16	—	24	3	1 1/16	7/16	2 23/32	—	30216	30217	—	—	—	60856	60857	—
3/8	16	—	3	3/4	1/2	2 15/16	—	30218	—	30219	—	—	60858	—	60859
3/8	—	24	3	3/4	1/2	2 15/16	—	30220	30221	—	—	—	60860	60861	—
7/16	14	—	3	7/8	9/16	3 5/32	—	30222	—	30223	—	—	60862	—	60863
7/16	—	20	3	7/8	9/16	3 5/32	—	30224	—	30225	—	—	60864	—	60865
1/2	13	—	3	1 5/16	23/32	3 3/8	—	30226	—	30227	—	—	60866	—	60867
1/2	—	20	3	1 5/16	23/32	3 3/8	—	30228	—	30229	—	—	60868	—	60869
9/16	12	—	4	1	43/64	3 19/32	—	30230	—	30231	—	—	60870	—	60871
9/16	—	18	4	1	43/64	3 19/32	—	30232	—	30233	—	—	60872	—	60873
5/8	11	—	4	1 1/8	43/64	3 13/16	—	30234	—	30235	—	—	60874	—	60875
5/8	—	18	4	1 1/8	43/64	3 13/16	—	30236	—	30237	—	—	60876	—	60877
3/4	10	—	4	1 7/32	49/64	4 1/4	—	30238	—	30239	—	—	60878	—	60879
3/4	—	16	4	1 7/32	49/64	4 1/4	—	30240	—	30241	—	—	60880	—	60881

## Metric

List No. 2095M Steam Oxide Finish

List No. 2095MC TiCN - Titanium Carbonitride Coated

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2095M		TiCN COATED LIST NO. 2095MC	
							EDP NO.	EDP NO.	EDP NO.	EDP NO.
M3	0.5	D3	2	5/16	5/16	1 15/16	30260	—	60900	—
M4	0.7	D4	3	3/8	3/8	2 1/8	30261	—	60901	—
M5	0.8	D4	3	1/2	3/8	2 3/8	30262	—	60902	—
M6	1.0	D5	3	5/8	3/8	2 1/2	30263	—	60903	—
M8	1.0	D5	3	1 1/16	7/16	2 23/32	30264	—	60904	—
M8	1.25	D5	3	1 1/16	7/16	2 23/32	30265	—	60905	—
M10	1.5	D6	3	3/4	1/2	2 15/16	30266	—	60906	—
M12	1.5	D5	3	1 5/16	23/32	3 3/8	30267	—	60907	—
M12	1.75	D6	3	1 5/16	23/32	3 3/8	30268	—	60908	—

# Spiral Flute HPT High Performance Taps For Exotic Alloys

Semi-Bottoming Style



Recommended for steels, steel alloys, stainless steels, titanium alloys, nickel and nickel base alloys, other exotic alloys and a wide variety of materials up to 32Rc hardness.

Premium Powder Metallurgy High Speed Steel Steam Oxide Finish and TiCN Coated

List No. 2096 Steam Oxide Finish

List No. 2096C

TiCN - Titanium Carbonitride Coated

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

CNC Reduced Neck Design

SIZE	TPI		NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2096				TiCN COATED LIST NO. 2096C			
	UNC	UNF					H2	H3	H4	H5	H2	H3	H4	H5
4	40	—	3	1 <sup>5</sup> / <sub>64</sub>	2 <sup>1</sup> / <sub>64</sub>	1 <sup>7</sup> / <sub>8</sub>	30280	—	—	—	60920	—	—	—
5	40	—	3	1 <sup>5</sup> / <sub>64</sub>	2 <sup>5</sup> / <sub>64</sub>	1 <sup>15</sup> / <sub>16</sub>	30281	—	—	—	60921	—	—	—
6	32	—	3	1 <sup>5</sup> / <sub>64</sub>	2 <sup>9</sup> / <sub>64</sub>	2	30282	30283	—	—	60922	60923	—	—
8	32	—	3	1 <sup>5</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>64</sub>	2 <sup>1</sup> / <sub>8</sub>	30284	30285	—	—	60924	60925	—	—
10	24	—	3	2 <sup>3</sup> / <sub>64</sub>	1 <sup>7</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>8</sub>	—	30286	—	—	—	60926	—	—
10	—	32	3	2 <sup>3</sup> / <sub>64</sub>	1 <sup>7</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>8</sub>	30288	30289	—	—	60928	60929	—	—
1/4	20	—	3	7/16	9/16	2 1/2	—	30290	—	30291	—	60930	—	60931
1/4	—	28	3	7/16	9/16	2 1/2	—	30292	30293	—	—	60932	60933	—
5/16	18	—	3	1 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>32</sub>	2 <sup>23</sup> / <sub>32</sub>	—	30294	—	30295	—	60934	—	60935
5/16	—	24	3	1 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>32</sub>	2 <sup>23</sup> / <sub>32</sub>	—	30296	30297	—	—	60936	60937	—
3/8	16	—	3	3 <sup>5</sup> / <sub>64</sub>	1 <sup>1</sup> / <sub>16</sub>	2 <sup>15</sup> / <sub>16</sub>	—	30298	—	30299	—	60938	—	60939
3/8	—	24	3	3 <sup>5</sup> / <sub>64</sub>	1 <sup>1</sup> / <sub>16</sub>	2 <sup>15</sup> / <sub>16</sub>	—	30300	30301	—	—	60940	60941	—
7/16	14	—	3	1 <sup>9</sup> / <sub>32</sub>	2 <sup>7</sup> / <sub>32</sub>	3 <sup>5</sup> / <sub>32</sub>	—	30302	—	30303	—	60942	—	60943
7/16	—	20	3	1 <sup>9</sup> / <sub>32</sub>	2 <sup>7</sup> / <sub>32</sub>	3 <sup>5</sup> / <sub>32</sub>	—	30304	—	30305	—	60944	—	60945
1/2	13	—	3	5/8	1 <sup>1</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>8</sub>	—	30306	—	30307	—	60946	—	60947
1/2	—	20	3	5/8	1 <sup>1</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>8</sub>	—	30308	—	30309	—	60948	—	60949
9/16	12	—	3	1 <sup>1</sup> / <sub>16</sub>	3 <sup>9</sup> / <sub>64</sub>	3 <sup>19</sup> / <sub>32</sub>	—	30310	—	30311	—	60950	—	60951
9/16	—	18	3	1 <sup>1</sup> / <sub>16</sub>	3 <sup>9</sup> / <sub>64</sub>	3 <sup>19</sup> / <sub>32</sub>	—	30312	—	30313	—	60952	—	60953
5/8	11	—	3	3/4	1 <sup>3</sup> / <sub>64</sub>	3 <sup>13</sup> / <sub>16</sub>	—	30314	—	30315	—	60954	—	60955
5/8	—	18	3	3/4	1 <sup>3</sup> / <sub>64</sub>	3 <sup>13</sup> / <sub>16</sub>	—	30316	—	30317	—	60956	—	60957
3/4	10	—	3	1 <sup>3</sup> / <sub>16</sub>	1 <sup>5</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>4</sub>	—	30318	—	30319	—	60958	—	60959
3/4	—	16	3	1 <sup>3</sup> / <sub>16</sub>	1 <sup>5</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>4</sub>	—	30320	—	30321	—	60960	—	60961

## Metric

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List No. 2096M Steam Oxide Finish

List No. 2096MC TiCN - Titanium Carbonitride Coated

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2096M		TiCN COATED LIST NO. 2096MC	
							EDP NO.	EDP NO.	EDP NO.	EDP NO.
M3	0.5	D3	3	1 <sup>5</sup> / <sub>64</sub>	2 <sup>5</sup> / <sub>64</sub>	1 <sup>15</sup> / <sub>16</sub>	30340	—	60980	—
M4	0.7	D4	3	1 <sup>5</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>64</sub>	2 <sup>1</sup> / <sub>8</sub>	30341	—	60981	—
M5	0.8	D4	3	2 <sup>3</sup> / <sub>64</sub>	1 <sup>7</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>8</sub>	30342	—	60982	—
M6	1.0	D5	3	7/16	9/16	2 1/2	30343	—	60983	—
M8	1.0	D5	3	1 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>32</sub>	2 <sup>23</sup> / <sub>32</sub>	30344	—	60984	—
M8	1.25	D5	3	1 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>32</sub>	2 <sup>23</sup> / <sub>32</sub>	30345	—	60985	—
M10	1.5	D6	3	3 <sup>5</sup> / <sub>64</sub>	1 <sup>1</sup> / <sub>16</sub>	2 <sup>15</sup> / <sub>16</sub>	30346	—	60986	—
M12	1.5	D5	3	5/8	1 <sup>1</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>8</sub>	30347	—	60987	—
M12	1.75	D6	3	5/8	1 <sup>1</sup> / <sub>64</sub>	3 <sup>3</sup> / <sub>8</sub>	30348	—	60988	—

# Spiral Point - DIN Length HPT High Performance Taps

**Plug Style**  
**DIN Length — ANSI Shank**

Recommended for steels, steel alloys, stainless steels, titanium alloys and a wide variety of materials up to 36Rc hardness.

Premium Powder Metallurgy High Speed Steel  
Steam Oxide Finish and TiCN Coated

**DIN Length** - longer than standard ANSI length - provides extra reach in tapping applications

**ANSI Shank** - made to standard American dimensions - fits standard tap holders



List No. 2088 Steam Oxide Finish

List No. 2088C

TiCN - Titanium Carbonitride Coated

**DIN Length**

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.



**STANDARD PACKAGE** All Sizes — 1 each

**CNC Reduced Neck Design**

SIZE	TPI		NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	Steam Oxide Finish LIST NO. 2088				TiCN Coated LIST NO. 2088C			
	UNC	UNF					H2	H3	H4	H5	H2	H3	H4	H5
4	40	—	2	.433	.276	2.205	30530	—	—	—	61160	—	—	—
6	32	—	2	.472	.315	2.205	30532	30533	—	—	61162	61163	—	—
8	32	—	3	.512	.315	2.480	30534	30535	—	—	61164	61165	—	—
10	24	—	3	.591	.393	2.756	—	30536	—	—	—	61166	—	—
10	—	32	3	.512	.472	2.756	30537	30538	—	—	61167	61168	—	—
1/4	20	—	3	.669	.512	3.150	—	30539	—	30540	—	61169	—	61170
1/4	—	28	3	.669	.512	3.150	—	30541	30542	—	—	61171	61172	—
5/16	18	—	3	.787	.591	3.543	—	30543	—	30544	—	61173	—	61174
5/16	—	24	3	.669	.709	3.543	—	30545	30546	—	—	61175	61176	—
3/8	16	—	3	.866	.669	3.937	—	30547	—	30548	—	61177	—	61178
3/8	—	24	3	.709	.826	3.937	—	30549	30550	—	—	61179	61180	—
7/16	14	—	3	.866	*	3.937	—	30551	—	30552	—	61181	—	61182
7/16	—	20	3	.866	*	3.937	—	30553	—	30554	—	61183	—	61184
1/2	13	—	3	.984	*	4.331	—	30555	—	30556	—	61185	—	61186
1/2	—	20	3	.866	*	3.937	—	30557	—	30558	—	61187	—	61188
9/16	12	—	4	1.024	*	4.331	—	30559	—	30560	—	61189	—	61190
9/16	—	18	4	.866	*	3.937	—	30561	—	30562	—	61191	—	61192
5/8	11	—	4	1.063	*	4.331	—	30563	—	30564	—	61193	—	61194
5/8	—	18	4	.866	*	3.937	—	30565	—	30566	—	61195	—	61196
3/4	10	—	4	1.181	*	4.921	—	30567	—	30568	—	61197	—	61198
3/4	—	16	4	.984	*	4.331	—	30569	—	30570	—	61199	—	61200
7/8	9	—	4	1.126	*	5.512	—	—	30571	—	—	—	61201	—
7/8	—	14	4	1.024	*	4.921	—	—	30572	—	—	—	61202	—
1	8	—	4	1.417	*	6.299	—	—	30573	—	—	—	61203	—
1	—	12	4	1.102	*	5.512	—	—	30574	—	—	—	61204	—

## Metric

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH MM	NECK LENGTH MM	OAL MM	Steam Oxide Finish	
							List No. 2088M EDP NO.	TiCN Coated List No. 2088MC EDP NO.
M4	0.7	D4	3	13	8	63	30576	61206
M5	0.8	D4	3	15	10	70	30577	61207
M6	1.0	D5	3	17	13	80	30578	61208
M8	1.25	D5	3	20	15	90	30579	61209
M10	1.5	D6	3	22	17	100	30580	61210
M12	1.25	D5	3	22	*	100	30581	61211
M12	1.5	D5	3	22	*	100	30582	61212
M12	1.75	D6	3	24	*	110	30583	61213
M14	1.5	D6	4	22	*	100	30584	61214
M14	2	D7	4	26	*	110	30585	61215
M16	2	D7	4	27	*	110	30586	61216
M18	1.5	D6	4	25	*	110	30587	61217
M20	2.5	D7	4	32	*	140	30588	61218
M24	3	D8	4	34	*	160	30589	61219

\*Reduced Shank (shank diameter is smaller than minor diameter)

# Spiral Flute - DIN Length HPT High Performance Taps

**Semi-Bottoming Style**  
**DIN Length — ANSI Shank**

Recommended for steels, steel alloys, stainless steels, titanium alloys and a wide variety of materials up to 36Rc hardness.

Premium Powder Metallurgy High Speed Steel  
Steam Oxide Finish and TiCN Coated

**DIN Length** - longer than standard ANSI length - provides extra reach in tapping applications

**ANSI Shank** - made to standard American dimensions - fits standard tap holders



List No. 2089 Steam Oxide Finish

List No. 2089C

TiCN - Titanium Carbonitride Coated

**DIN Length**

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.



**STANDARD PACKAGE** All Sizes — 1 each

**CNC Reduced Neck Design**

SIZE	TPI		NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	Steam Oxide Finish				TiCN Coated			
	UNC	UNF					H2	H3	H4	H5	H2	H3	H4	H5
4	40	—	3	.236	.473	2.205	30600	—	—	—	61230	—	—	—
6	32	—	3	.236	.551	2.205	30602	30603	—	—	61232	61233	—	—
8	32	—	3	.236	.591	2.480	30604	30605	—	—	61234	61235	—	—
10	24	—	3	.354	.630	2.756	—	30606	—	—	—	61236	—	—
10	—	32	3	.354	.630	2.756	30607	30608	—	—	61237	61238	—	—
1/4	20	—	3	.433	.748	3.150	—	30609	—	30610	—	61239	—	61240
1/4	—	28	3	.433	.748	3.150	—	30611	30612	—	—	61241	61242	—
5/16	18	—	3	.472	.906	3.543	—	30613	—	30614	—	61243	—	61244
5/16	—	24	3	.472	.906	3.543	—	30615	30616	—	—	61245	61246	—
3/8	16	—	3	.551	.984	3.937	—	30617	—	30618	—	61247	—	61248
3/8	—	24	3	.551	.984	3.937	—	30619	30620	—	—	61249	61250	—
7/16	14	—	3	.591	*	3.937	—	30621	—	30622	—	61251	—	61252
7/16	—	20	3	.591	*	3.937	—	30623	—	30624	—	61253	—	61254
1/2	13	—	3	.630	*	4.331	—	30625	—	30626	—	61255	—	61256
1/2	—	20	3	.630	*	3.937	—	30627	—	30628	—	61257	—	61258
9/16	12	—	3	.690	*	4.331	—	30629	—	30630	—	61259	—	61260
9/16	—	18	3	.690	*	3.937	—	30631	—	30632	—	61261	—	61262
5/8	11	—	3	.745	*	4.331	—	30633	—	30634	—	61263	—	61264
5/8	—	18	3	.745	*	3.937	—	30635	—	30636	—	61265	—	61266
3/4	10	—	3	.820	*	4.921	—	30637	—	30638	—	61267	—	61268
3/4	—	16	3	.820	*	4.331	—	30639	—	30640	—	61269	—	61270
7/8	9	—	4	.911	*	5.512	—	—	30641	—	—	—	61271	—
7/8	—	14	4	.911	*	4.921	—	—	30642	—	—	—	61272	—
1	8	—	4	1.025	*	6.299	—	—	30643	—	—	—	61273	—
1	—	12	4	1.025	*	5.512	—	—	30644	—	—	—	61274	—

## Metric

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH MM	NECK LENGTH MM	OAL MM	Steam Oxide Finish	
							List No. 2089M EDP NO.	TiCN Coated List No. 2089MC EDP NO.
M4	0.7	D4	3	6	15	63	30646	61276
M5	0.8	D4	3	9	16	70	30647	61277
M6	1.0	D5	3	11	19	80	30648	61278
M8	1.25	D5	3	12	23	90	30649	61279
M10	1.5	D6	3	14	25	100	30650	61280
M12	1.25	D5	3	16	*	100	30651	61281
M12	1.5	D5	3	16	*	100	30652	61282
M12	1.75	D6	3	16	*	110	30653	61283
M14	1.5	D6	3	18	*	100	30654	61284
M14	2	D7	3	18	*	110	30655	61285
M16	2	D7	3	19	*	110	30656	61286
M18	1.5	D6	3	21	*	110	30657	61287
M20	2.5	D7	3	21	*	140	30658	61288
M24	3	D8	4	26	*	160	30659	61289

\*Reduced Shank (shank diameter is smaller than minor diameter)

# Spiral Point HPT High Performance Taps For Hard Materials Plug Style



Recommended for harder 32Rc-45Rc materials including steel alloys, titanium alloys, nickel base high temp alloys, tool and mold steels and stainless steels.

Premium Powder Metallurgy High Speed Steel  
Steam Oxide Finish and TiCN Coated

List No. 2097 Steam Oxide Finish

List No. 2097C

TiCN - Titanium Carbonitride Coated

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

SIZE	TPI		NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2097				TiCN COATED LIST NO. 2097C			
	UNC	UNF					H2	H3	H4	H5	H2	H3	H4	H5
4	40	—	2	5/16	1/4	1 7/8	30360	—	—	—	61000	—	—	—
5	40	—	3	5/16	5/16	1 15/16	30361	—	—	—	61001	—	—	—
6	32	—	3	3/8	5/16	2	30362	30363	—	—	61002	61003	—	—
8	32	—	3	3/8	3/8	2 1/8	30364	30365	—	—	61004	61005	—	—
10	24	—	3	1/2	3/8	2 3/8	—	30366	—	—	—	61006	—	—
10	—	32	3	1/2	3/8	2 3/8	30368	30369	—	—	61008	61009	—	—
1/4	20	—	3	5/8	3/8	2 1/2	—	30370	—	30371	—	61010	—	61011
1/4	—	28	3	5/8	3/8	2 1/2	—	30372	30373	—	—	61012	61013	—
5/16	18	—	3	1 1/16	7/16	2 23/32	—	30374	—	30375	—	61014	—	61015
5/16	—	24	3	1 1/16	7/16	2 23/32	—	30376	30377	—	—	61016	61017	—
3/8	16	—	3	3/4	1/2	2 15/16	—	30378	—	30379	—	61018	—	61019
3/8	—	24	3	3/4	1/2	2 15/16	—	30380	30381	—	—	61020	61021	—
7/16	14	—	3	7/8	9/16	3 5/32	—	30382	—	30383	—	61022	—	61023
7/16	—	20	3	7/8	9/16	3 5/32	—	30384	—	30385	—	61024	—	61025
1/2	13	—	3	1 5/16	23/32	3 3/8	—	30386	—	30387	—	61026	—	61027
1/2	—	20	3	1 5/16	23/32	3 3/8	—	30388	—	30389	—	61028	—	61029
9/16	12	—	4	1	43/64	3 19/32	—	30390	—	30391	—	61030	—	61031
9/16	—	18	4	1	43/64	3 19/32	—	30392	—	30393	—	61032	—	61033
5/8	11	—	4	1 1/8	43/64	3 13/16	—	30394	—	30395	—	61034	—	61035
5/8	—	18	4	1 1/8	43/64	3 13/16	—	30396	—	30397	—	61036	—	61037
3/4	10	—	4	1 7/32	49/64	4 1/4	—	30398	—	30399	—	61038	—	61039
3/4	—	16	4	1 7/32	49/64	4 1/4	—	30400	—	30401	—	61040	—	61041

## Metric

Morse FAST TAP SERVICE  
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CNC Reduced Neck Design

List No. 2097M Steam Oxide Finish

List No. 2097MC TiCN - Titanium Carbonitride Coated

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2097M		TiCN COATED LIST NO. 2097MC	
							EDP NO.	EDP NO.	EDP NO.	EDP NO.
M3	0.5	D3	3	5/16	5/16	1 15/16	30420	—	61060	—
M4	0.7	D4	3	3/8	3/8	2 1/8	30421	—	61061	—
M5	0.8	D4	3	1/2	3/8	2 3/8	30422	—	61062	—
M6	1.0	D5	3	5/8	3/8	2 1/2	30423	—	61063	—
M8	1.0	D5	3	1 1/16	7/16	2 23/32	30424	—	61064	—
M8	1.25	D5	3	1 1/16	7/16	2 23/32	30425	—	61065	—
M10	1.5	D6	3	3/4	1/2	2 15/16	30426	—	61066	—
M12	1.5	D5	3	1 5/16	23/32	3 3/8	30427	—	61067	—
M12	1.75	D6	3	1 5/16	23/32	3 3/8	30428	—	61068	—

# Spiral Flute HPT High Performance Taps For Hard Materials Semi-Bottoming Style



Recommended for harder 32Rc-45Rc materials including steel alloys, titanium alloys, nickel base high temp alloys, tool and mold steels and stainless steels.

Premium Powder Metallurgy High Speed Steel  
Steam Oxide Finish and TiCN Coated

List No. 2098 Steam Oxide Finish

List No. 2098C

TiCN - Titanium Carbonitride Coated

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

CNC Reduced Neck Design

SIZE	TPI		NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH				TiCN COATED		LIST NO. 2098C	
	UNC	UNF					H2	H3	H4	H5	H2	H3	H4	H5
4	40	—	2	5/16	1/4	17/8	30440	—	—	—	61080	—	—	—
5	40	—	2	5/16	5/16	1 15/16	30441	—	—	—	61081	—	—	—
6	32	—	2	3/8	5/16	2	30442	30443	—	—	61082	61083	—	—
8	32	—	2	3/8	3/8	2 1/8	30444	30445	—	—	61084	61085	—	—
10	24	—	3	1/2	3/8	2 3/8	—	30446	—	—	—	61086	—	—
10	—	32	3	1/2	3/8	2 3/8	30448	30449	—	—	61088	61089	—	—
1/4	20	—	3	5/8	3/8	2 1/2	—	30450	—	30451	—	61090	—	61091
1/4	—	28	3	5/8	3/8	2 1/2	—	30452	30453	—	—	61092	61093	—
5/16	18	—	3	1 1/16	7/16	2 23/32	—	30454	—	30455	—	61094	—	61095
5/16	—	24	3	1 1/16	7/16	2 23/32	—	30456	30457	—	—	61096	61097	—
3/8	16	—	3	3/4	1/2	2 15/16	—	30458	—	30459	—	61098	—	61099
3/8	—	24	3	3/4	1/2	2 15/16	—	30460	30461	—	—	61100	61101	—
7/16	14	—	3	7/8	9/16	3 5/32	—	30462	—	30463	—	61102	—	61103
7/16	—	20	3	7/8	9/16	3 5/32	—	30464	—	30465	—	61104	—	61105
1/2	13	—	3	1 5/16	2 3/32	3 3/8	—	30466	—	30467	—	61106	—	61107
1/2	—	20	3	1 5/16	2 3/32	3 3/8	—	30468	—	30469	—	61108	—	61109
9/16	12	—	4	1	4 3/64	3 19/32	—	30470	—	30471	—	61110	—	61111
9/16	—	18	4	1	4 3/64	3 19/32	—	30472	—	30473	—	61112	—	61113
5/8	11	—	4	1 1/8	4 3/64	3 13/16	—	30474	—	30475	—	61114	—	61115
5/8	—	18	4	1 1/8	4 3/64	3 13/16	—	30476	—	30477	—	61116	—	61117
3/4	10	—	4	1 7/32	4 9/64	4 1/4	—	30478	—	30479	—	61118	—	61119
3/4	—	16	4	1 7/32	4 9/64	4 1/4	—	30480	—	30481	—	61120	—	61121

Cutting Speeds: Page 161

## Metric

List No. 2098M Steam Oxide Finish

List No. 2098MC TiCN - Titanium Carbonitride Coated

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH		TiCN COATED	
							LIST NO. 2098M	EDP NO.	LIST NO. 2098MC	EDP NO.
M3	0.5	D3	2	5/16	5/16	1 15/16	30490	61140	30490	61140
M4	0.7	D4	2	3/8	3/8	2 1/8	30491	61141	30491	61141
M5	0.8	D4	3	1/2	3/8	2 3/8	30492	61142	30492	61142
M6	1.0	D5	3	5/8	3/8	2 1/2	30493	61143	30493	61143
M8	1.0	D5	3	1 1/16	7/16	2 23/32	30494	61144	30494	61144
M8	1.25	D5	3	1 1/16	7/16	2 23/32	30495	61145	30495	61145
M10	1.5	D6	3	3/4	1/2	2 15/16	30496	61146	30496	61146
M12	1.5	D5	3	1 5/16	2 3/32	3 3/8	30497	61147	30497	61147
M12	1.75	D6	3	1 5/16	2 3/32	3 3/8	30498	61148	30498	61148

# Thread Forming — DIN Length HPT High Performance Taps

**Premium Powder Metallurgy High Speed Steel  
DIN Length, ANSI Shank**

**Thread Forming** taps cold form rather than cut the threads. Advantages include no chips to dispose of, stronger higher quality threads, increased tapping speeds, longer tap life and reduced tap breakage.

**DIN Length** — longer than standard ANSI length — provides extra reach in tapping applications

**ANSI Shank** — made to standard American dimensions — fits standard tap holders

**Lube Grooves** provides a path for lubrication and act as vents to relieve pressure in blind hole tapping.

**Plug Style** (4 threads tapered) for through holes and blind holes with adequate depth. The longer taper lead is easier starting, requires less torque, produces less burr above the mouth of the tapped hole and increases tool life.

**Bottoming Style** (2 threads tapered) for blind holes.



- List No. 2106 Bright Finish
- List No. 2106G TiN Coated
- List No. 2106C TiCN Coated
- List No. 2106T TiAlN Coated

**DIN Length**

**Powder Metallurgy High Speed Steel** for enhanced performance and increased tool life under difficult tapping conditions. Recommended for a wide variety of ductile materials up to 28Rc hardness.

**NOTE:** Thread forming taps require a larger **tap drill size** than cutting taps because the material flows during the thread forming process. It may be necessary to experiment to determine the required hole size to produce a specific percent of thread. **Countersinking** before tapping is recommended because the forming process usually displaces material above the mouth of the tapped hole.

**STANDARD PACKAGE** All Sizes — 1 each

Cutting Speeds: Page 161

CNC Reduced Neck Design

TAP DRILL SIZES:  
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CLASS OF FIT  
RECOMMENDATIONS:  
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## Machine Screw — Plug Style

SIZE	TPI		PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT	TiN	TiCN	TiAlN
	UNC	UNF						EDP NO.	COATED EDP NO.	COATED EDP NO.	COATED EDP NO.
4	40	—	H3	.433	.276	2.205	3	30670	94680	61460	61620
	40	—	H5	.433	.276	2.205	3	30671	94681	61461	61621
6	32	—	H3	.472	.315	2.205	3	30672	94682	61462	61622
	32	—	H5	.472	.315	2.205	3	30673	94683	61463	61623
8	32	—	H3	.512	.315	2.480	3	30674	94684	61464	61624
	32	—	H5	.512	.315	2.480	3	30675	94685	61465	61625
10	24	—	H4	.591	.393	2.756	4	30676	94686	61466	61626
	24	—	H6	.591	.393	2.756	4	30677	94687	61467	61627
	—	32	H4	.512	.472	2.756	4	30678	94688	61468	61628
	—	32	H6	.512	.472	2.756	4	30679	94689	61469	61629

**Titanium Nitride (TiN) Coating** results in an extremely hard surface with high lubricity for increased tool life. Improved thread quality, reduced torque and increased tapping speeds for greater productivity.

**Titanium Carbonitride (TiCN) Coating** is harder than TiN coating for more abrasive materials but has a lower temperature resistance.

**Titanium Aluminum Nitride (TiAlN) Coating** is especially recommended for applications generating higher temperatures.



# Thread Forming HPT High Performance Taps

Machine Screw — Bottoming Style



DIN Length

HPT HIGH PERFORMANCE TAPS

SIZE	TPI		PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT	TIN COATED	TICN COATED	TIALN COATED
	UNC	UNF						EDP NO.	EDP NO.	EDP NO.	EDP NO.
4	40	—	H3	.433	.276	2.205	3	30750	94760	61540	61700
	40	—	H5	.433	.276	2.205	3	30751	94761	61541	61701
6	32	—	H3	.472	.315	2.205	3	30752	94762	61542	61702
	32	—	H5	.472	.315	2.205	3	30753	94763	61543	61703
8	32	—	H3	.512	.315	2.480	3	30754	94764	61544	61704
	32	—	H5	.512	.315	2.480	3	30755	94765	61545	61705
10	24	—	H4	.591	.393	2.756	4	30756	94766	61546	61706
	24	—	H6	.591	.393	2.756	4	30757	94767	61547	61707
	—	32	H4	.512	.472	2.756	4	30758	94768	61548	61708
	—	32	H6	.512	.472	2.756	4	30759	94769	61549	61709

CNC Reduced Neck Design

Morse FAST TAP SERVICE  
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## Fractional — Plug Style

SIZE	TPI		PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT	TIN COATED	TICN COATED	TIALN COATED
	UNC	UNF						EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/4	20	—	H4	.669	.512	3.150	4	30690	94700	61480	61640
	20	—	H6	.669	.512	3.150	4	30691	94701	61481	61641
	—	28	H4	.669	.512	3.150	4	30692	94702	61482	61642
	—	28	H6	.669	.512	3.150	4	30693	94703	61483	61643
5/16	18	—	H5	.787	.591	3.543	4	30694	94704	61484	61644
	18	—	H7	.787	.591	3.543	4	30695	94705	61485	61645
	—	24	H5	.669	.591	3.543	4	30696	94706	61486	61646
	—	24	H7	.669	.591	3.543	4	30697	94707	61487	61647
3/8	16	—	H5	.866	.669	3.937	4	30698	94708	61488	61648
	16	—	H7	.866	.669	3.937	4	30699	94709	61489	61649
	—	24	H5	.709	.826	3.937	4	30700	94710	61490	61650
	—	24	H7	.709	.826	3.937	4	30701	94711	61491	61651
7/16	14	—	H5	.866	*	3.937	4	30702	94712	61492	61652
	14	—	H8	.866	*	3.937	4	30703	94713	61493	61653
	—	20	H5	.866	*	3.937	4	30704	94714	61494	61654
	—	20	H8	.866	*	3.937	4	30705	94715	61495	61655
1/2	13	—	H5	.984	*	4.331	4	30706	94716	61496	61656
	13	—	H8	.984	*	4.331	4	30707	94717	61497	61657
	—	20	H5	.866	*	3.937	4	30708	94718	61498	61658
	—	20	H8	.866	*	3.937	4	30709	94719	61499	61659
5/8	11	—	H7	1.063	*	4.331	6	30710	94720	61500	61660
	11	—	H10	1.063	*	4.331	6	30711	94721	61501	61661
	—	18	H7	.866	*	3.937	6	30712	94722	61502	61662
	—	18	H10	.866	*	3.937	6	30713	94723	61503	61663
3/4	10	—	H7	1.181	*	4.921	6	30714	94724	61504	61664
	10	—	H10	1.181	*	4.921	6	30715	94725	61505	61665
	—	16	H7	.984	*	4.331	6	30716	94726	61506	61666
	—	16	H10	.984	*	4.331	6	30717	94727	61507	61667

\* Reduced Shank (shank diameter is smaller than minor diameter)

# Thread Forming HPT High Performance Taps

## Fractional — Bottoming Style

**DIN Length**

**CNC Reduced Neck Design**



SIZE	TPI		PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT	TIN COATED	TICN COATED	TIALN COATED
	UNC	UNF						EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/4	20	—	H4	.669	.512	3.150	4	30770	94780	61560	61720
	20	—	H6	.669	.512	3.150	4	30771	94781	61561	61721
	—	28	H4	.669	.512	3.150	4	30772	94782	61562	61722
	—	28	H6	.669	.512	3.150	4	30773	94783	61563	61723
5/16	18	—	H5	.787	.591	3.543	4	30774	94784	61564	61724
	18	—	H7	.787	.591	3.543	4	30775	94785	61565	61725
	—	24	H5	.669	.591	3.543	4	30776	94786	61566	61726
	—	24	H7	.669	.591	3.543	4	30777	94787	61567	61727
3/8	16	—	H5	.866	.669	3.937	4	30778	94788	61568	61728
	16	—	H7	.866	.669	3.937	4	30779	94789	61569	61729
	—	24	H5	.709	.826	3.937	4	30780	94790	61570	61730
	—	24	H7	.709	.826	3.937	4	30781	94791	61571	61731
7/16	14	—	H5	.866	*	3.937	4	30782	94792	61572	61732
	14	—	H8	.866	*	3.937	4	30783	94793	61573	61733
	—	20	H5	.866	*	3.937	4	30784	94794	61574	61734
	—	20	H8	.866	*	3.937	4	30785	94795	61575	61735
1/2	13	—	H5	.984	*	4.331	4	30786	94796	61576	61736
	13	—	H8	.984	*	4.331	4	30787	94797	61577	61737
	—	20	H5	.866	*	3.937	4	30788	94798	61578	61738
	—	20	H8	.866	*	3.937	4	30789	94799	61579	61739
5/8	11	—	H7	1.063	*	4.331	6	30790	94800	61580	61740
	11	—	H10	1.063	*	4.331	6	30791	94801	61581	61741
	—	18	H7	.866	*	3.937	6	30792	94802	61582	61742
	—	18	H10	.866	*	3.937	6	30793	94803	61583	61743
3/4	10	—	H7	1.181	*	4.921	6	30794	94804	61584	61744
	10	—	H10	1.181	*	4.921	6	30795	94805	61585	61745
	—	16	H7	.984	*	4.331	6	30796	94806	61586	61746
	—	16	H10	.984	*	4.331	6	30797	94807	61587	61747

### Metric — Plug Style

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH MM	NECK LENGTH MM	OAL MM	NO. OF LUBE GROOVES	BRIGHT	TIN COATED	TICN COATED	TIALN COATED
							EDP NO.	EDP NO.	EDP NO.	EDP NO.
M4	0.7	D6	13	8	63	3	30730	94740	61520	61680
M5	0.8	D7	15	10	70	4	30731	94741	61521	61681
M6	1	D8	17	13	80	4	30732	94742	61522	61682
M8	1.25	D9	20	15	90	4	30733	94743	61523	61683
M10	1.5	D10	22	17	100	4	30734	94744	61524	61684
M12	1.75	D11	24	*	110	4	30735	94745	61525	61685
M14	2	D11	26	*	110	6	30736	94746	61526	61686
M16	2	D12	27	*	110	6	30737	94747	61527	61687
M20	2.5	D12	32	*	140	6	30738	94748	61528	61688

### Metric — Bottoming Style

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH MM	NECK LENGTH MM	OAL MM	NO. OF LUBE GROOVES	BRIGHT	TIN COATED	TICN COATED	TIALN COATED
							EDP NO.	EDP NO.	EDP NO.	EDP NO.
M4	0.7	D6	13	8	63	3	30810	94820	61600	61760
M5	0.8	D7	15	10	70	4	30811	94821	61601	61761
M6	1	D8	17	13	80	4	30812	94822	61602	61762
M8	1.25	D9	20	15	90	4	30813	94823	61603	61763
M10	1.5	D10	22	17	100	4	30814	94824	61604	61764
M12	1.75	D11	24	*	110	4	30815	94825	61605	61765
M14	2	D11	26	*	110	6	30816	94826	61606	61766
M16	2	D12	27	*	110	6	30817	94827	61607	61767
M20	2.5	D12	32	*	140	6	30818	94828	61608	61768

\* Reduced Shank (shank diameter is smaller than minor diameter)

## Application Chart for HPT High Performance Taps

	WORKPIECE MATERIAL	EXAMPLES	HARDNESS		RECOMMENDED TAP			
			BRN	HRC	CUTTING TAP		FORMING TAP SPEED (SFM)	
					SPEED (SFM)	THROUGH HOLE (Use Spiral Point Where Available)		BLIND HOLE (Use Spiral Flute Where Available)
Steel	Low Carbon (Less Than 0.3% C)	1008, 1118, 12L14, 1213, 1513, A36	< 200	<15	25 - 50	-	-	50 - 100
	Medium Carbon (0.3% - 0.6% C)	1030, 1040, 1045, 1050,	< 275	< 28	15 - 40	DIN Length or Exotic	Din Length or Exotic	30 - 80
	High Carbon, Alloyed (More than 0.6% C)	1070, 1080, 1561, 1572	< 300	< 32	15 - 30	DIN Length or Exotic	Din Length or Exotic	-
	Hardened	4140, Hard 1340, 50100	275 - 320	28 - 34	12 - 25	Exotic	Exotic	-
320 - 420			34 - 45	5 - 15	Hard Material	Hard Material	-	
Stainless Steel	Free Machining	303,410, 416, 440F	<275	< 28	25 - 40	DIN Length or Exotic	DIN Length or Exotic	50 - 80
	Austenitic	200 Series, 300 Series	< 275	< 28	15 - 35	DIN Length or Exotic	Exotic or DIN Length	30 - 70
		Nitronic 32, 40, 50, 60	350-425	38 - 45	5 - 10	Hard Material	Hard Material	-
	Martensitic & Ferritic	400 Series: 416 Se, 420F, 420FSe; 440F, 440FSe	< 275	< 28	20 - 35	DIN Length or Exotics	DIN Length or Exotics	40 - 70
Hardened	15-5 PH, 17-4 PH, A-236, AM-350	275 - 320	28 - 34	5 - 15	Exotic	Exotic	-	
		320 - 425	34 - 45	5 - 15	Hard Material	Hard Material	-	
Tool Steel	Hot Work, Cold Work, Mold	A2, D2, H11, P2, P4	275 - 320	28 - 34	7 - 20	DIN Length or Exotic	DIN Length or Exotic	-
			320 - 420	34 - 45	3 - 10	Hard Material	Hard Material	-
Cast Iron	Grey, Pearlitic, Ferritic	ASTM A48 Class 20; 25; 30; 40; 50; SAJ 431C Grade G1800; 3000; 4000	<260	<26	35 - 60	Cast Iron or Hard Material	Cast Iron or Hard Material	-
	Ductile, Pearlitic, Ferritic	ASTM A536 GRADES 60-40-18; 65-45-12; 80-55-06	<260	<26	20 - 40	Cast Iron or Hard Material	Cast Iron or Hard Material	-
	Malleable	ASTM A47 Grades 32510; 35018, ASTM A 220; Grades 40010; 45006; 60004; 70003; 80002	<260	<26	10 - 30	Cast Iron or Hard Material	Cast Iron or Hard Material	-
Titanium Alloys	Commercially Pure	99.5, 99.2, 98.9, Ti-0.2 Pd, Ti code - 12	< 275	< 28	25 - 45	Exotic	Exotic	50 - 90
	Alpha and Beta Alloys Annealed	Ti-5Al-2.55 Sn, Ti-6Al-4V	275 - 320	28 - 34	10 - 25	Exotic or DIN Length	Exotic or DIN Length	-
	Alpha and Beta Alloys Solution Treated and Aged	Ti-6Al-4V ELI, Ti-6Al-6V-2 Sn	320 - 420	34 - 45	2 - 8	Hard Material	Hard Material	-
Nickel Alloys	Nickel and Nickel Base Alloys Wrought and Cast	Nickel 200, Monel Alloy 400, Duranickel Alloy 301	170 - 250	< 25	10 - 25	Exotic	Exotic	-
	Nickel Base High Temperature Alloys Wrought and Cast	Inconel 718, Nimonic 90, Rene 41, Hastelloy B and C, Inconel 600	250 - 320	28 - 34	6 - 12	Exotic	Exotic	-
Aluminum Alloys	Unalloyed	1000 Series	-	-	40 - 80	Aluminum	Aluminum	80 - 160
	Wrought	2000, 3000, 5000, 6000, 7000 Series	-	-	70 - 100	Aluminum	Aluminum	140 - 200
	Cast	360, A380	-	-	60 - 90	Aluminum	Aluminum	120 - 180

**SPEEDS in Surface Feet per Minute (SFM)** are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

**SPEEDS** may be increased for coated taps, reduced percentage of full threads, fine pitch taps, and spiral point taps.

**SPEEDS** may need to be decreased for coarse pitch taps, higher percentages of full thread, and spiral flute taps.

**PIPE TAPS** should be run at one half to three quarters of the speed for taps of comparable pitch and diameter.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# Spiral Point SHEARTAP™

Premium High Speed Steel  
Plug Style

“SHEARTAP” offers exceptional value for high volume production tapping in long-chipping steels and stainless steels up to 35 Rc Hardness.

**Steam Oxide Over Nitride** resists chip welding, increases lubricity and helps to retain cutting fluid. **TiN Coating** increases hardness and lubricity for improved thread quality, higher speeds and longer tool life.

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.



List No. 2090 — Steam Oxide Over Nitride

List No. 2090G — TiN Coated

**STANDARD PACKAGE** Machine Screw Sizes — 12 each  
Fractional Sizes 1/4" thru 1/2" — 12 each  
9/16" thru 3/4" — 3 each  
7/8" thru 2" — 1 each



CNC Reduced Neck Design

Cutting Speeds: Page 167

SIZE	THREAD TYPE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	SURFACE TREATED				TIN COATED			
						H2	H3	H4	H5	H2	H3	H4	H5
#4-40	NC	2	.313	.250	1 7/8	34400	34401	—	34402	94400	94401	—	94402
#6-32	NC	2	.375	.313	2	34404	34405	—	34406	94404	94405	—	94406
#8-32	NC	3	.375	.375	2 1/8	34407	34408	—	34409	94407	94408	—	94409
#10-24	NC	3	.500	.375	2 3/8	—	34410	—	—	—	94410	—	—
#10-32	NF	3	.500	.375	2 3/8	34411	34412	—	34413	94411	94412	—	94413
1/4-20	NC	3	.625	.375	2 1/2	34416	34417	—	34418	94416	94417	—	94418
1/4-28	NF	3	.625	.375	2 1/2	34419	34420	34421	—	94419	94420	94421	—
5/16-18	NC	3	.688	.438	2 23/32	—	34422	—	34423	—	94422	—	94423
5/16-24	NF	3	.688	.438	2 23/32	—	34424	34425	—	—	94424	94425	—
3/8-16	NC	3	.750	.500	2 15/16	—	34426	—	34427	—	94426	—	94427
3/8-24	NF	3	.750	.500	2 15/16	—	34428	34429	—	—	94428	94429	—
7/16-14	NC	3	.875	.563	3 5/32	—	34430	—	34431	—	94430	—	94431
7/16-20	NF	3	.875	.563	3 5/32	—	34432	—	34433	—	94432	—	94433
1/2-13	NC	3	.938	.719	3 3/8	—	34434	—	34435	—	94434	—	94435
1/2-20	NF	3	.938	.719	3 3/8	—	34436	—	34437	—	94436	—	94437
9/16-12	NC	4	1.000	.673	3 19/32	—	34438	—	—	—	94438	—	—
9/16-18	NF	4	1.000	.673	3 19/32	—	34439	—	—	—	94439	—	—
5/8-11	NC	4	1.125	.673	3 13/16	—	34440	—	—	—	94440	—	—
5/8-18	NF	4	1.125	.673	3 13/16	—	34441	—	—	—	94441	—	—
3/4-10	NC	4	1.219	.766	4 1/4	—	34444	—	—	—	94444	—	—
3/4-16	NF	4	1.219	.766	4 1/4	—	34445	—	—	—	94445	—	—
7/8-9	NC	4	1.344	.875	4 11/16	—	—	34500	—	—	—	94500	—
7/8-14	NF	4	1.344	.875	4 11/16	—	—	34501	—	—	—	94501	—
1-8	NC	4	1.500	1.000	5 1/8	—	—	34502	—	—	—	94502	—
1-12	NF	4	1.500	1.000	5 1/8	—	—	34503	—	—	—	94503	—
1 1/8-7	NC	4	1.719	.843	5 7/16	—	—	34504	—	—	—	94504	—
1 1/8-12	NF	4	1.719	.843	5 7/16	—	—	34505	—	—	—	94505	—
1 1/4-7	NC	4	1.719	.843	5 3/4	—	—	34506	—	—	—	94506	—
1 1/4-12	NF	4	1.719	.843	5 3/4	—	—	34507	—	—	—	94507	—
1 3/8-6	NC	4	2.000	1.000	6 1/16	—	—	34508	—	—	—	94508	—
1 3/8-12	NF	4	2.000	1.000	6 1/16	—	—	34509	—	—	—	94509	—
1 1/2-6	NC	6	2.000	1.000	6 3/8	—	—	34510	—	—	—	94510	—
1 1/2-12	NF	6	2.000	1.000	6 3/8	—	—	34511	—	—	—	94511	—
1 3/4-5*	NC	6	2.406	.782	7	—	—	—	34512*	—	—	—	94512*
2-4 1/2*	NC	6	2.688	.874	7 5/8	—	—	—	34514*	—	—	—	94514*

\*H7 Pitch Dia. Limit (Sizes 1 3/4-5 and 2-4 1/2)

# Spiral Flute SHEARTAP™

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

Premium High Speed Steel – 48° Helix Angle  
Semi-Bottoming Style

“SHEARTAP” offers exceptional value for high volume production tapping in long-chipping steels and stainless steels up to 35 Rc Hardness.

**Steam Oxide Over Nitride** resists chip welding, increases lubricity and helps to retain cutting fluid. **TiN Coating** increases hardness and lubricity for improved thread quality, higher speeds and longer tool life.

CNC Reduced Neck Design



TAPS & DIES

List No. 2091 — Steam Oxide Over Nitride

List No. 2091G — TiN Coated

STANDARD Machine Screw Sizes — 12 each  
PACKAGE Fractional Sizes 1/4" thru 1/2" — 12 each  
9/16" thru 3/4" — 3 each  
7/8" thru 2" — 1 each

SIZE	THREAD TYPE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	SURFACE TREATED				TIN COATED			
						H2	H3	H4	H5	H2	H3	H4	H5
#4-40	NC	3	.236	.327	1 7/8	34450	34451	—	—	94450	94451	—	—
#6-32	NC	3	.236	.452	2	34453	34454	—	34455	94453	94454	—	94455
#8-32	NC	3	.236	.514	2 1/8	34456	34457	—	34458	94456	94457	—	94458
#10-24	NC	3	.354	.521	2 3/8	34459	34460	—	—	94459	94460	—	—
#10-32	NF	3	.354	.521	2 3/8	34461	34462	—	34463	94461	94462	—	94463
1/4-20	NC	3	.433	.567	2 1/2	—	34466	—	34467	—	94466	—	94467
1/4-28	NF	3	.433	.567	2 1/2	—	34468	34469	—	—	94468	94469	—
5/16-18	NC	3	.472	.653	2 23/32	—	34470	—	34471	—	94470	—	94471
5/16-24	NF	3	.472	.653	2 23/32	—	34472	34473	—	—	94472	94473	—
3/8-16	NC	3	.551	.699	2 19/16	—	34474	—	34475	—	94474	—	94475
3/8-24	NF	3	.551	.699	2 19/16	—	34476	34477	—	—	94476	94477	—
7/16-14	NC	3	.591	.847	3 5/32	—	34478	—	34479	—	94478	—	94479
7/16-20	NF	3	.591	.847	3 5/32	—	34480	—	34481	—	94480	—	94481
1/2-13	NC	3	.630	1.026	3 3/8	—	34482	—	34483	—	94482	—	94483
1/2-20	NF	3	.630	1.026	3 3/8	—	34484	—	34485	—	94484	—	94485
9/16-12	NC	3	.690	.983	3 19/32	—	34486	—	—	—	94486	—	—
9/16-18	NF	3	.690	.983	3 19/32	—	34487	—	—	—	94487	—	—
5/8-11	NC	3	.745	1.052	3 19/16	—	34488	—	—	—	94488	—	—
5/8-18	NF	3	.745	1.052	3 19/16	—	34489	—	—	—	94489	—	—
3/4-10	NC	4	.820	1.165	4 1/4	—	34492	—	—	—	94492	—	—
3/4-16	NF	4	.820	1.165	4 1/4	—	34493	—	—	—	94493	—	—
7/8-9	NC	4	.911	1.308	4 11/16	—	—	34520	—	—	—	94520	—
7/8-14	NF	4	.911	1.308	4 11/16	—	—	34521	—	—	—	94521	—
1-8	NC	4	1.025	1.475	5 1/8	—	—	34522	—	—	—	94522	—
1-12	NF	4	1.025	1.475	5 1/8	—	—	34523	—	—	—	94523	—
1 1/8-7	NC	4	1.143	1.419	5 7/16	—	—	34524	—	—	—	94524	—
1 1/8-12	NF	4	1.143	1.419	5 7/16	—	—	34525	—	—	—	94525	—
1 1/4-7	NC	4	1.143	1.419	5 3/4	—	—	34526	—	—	—	94526	—
1 1/4-12	NF	4	1.143	1.419	5 3/4	—	—	34527	—	—	—	94527	—
1 3/8-6	NC	4	1.333	1.667	6 1/16	—	—	34528	—	—	—	94528	—
1 3/8-12	NF	4	1.333	1.667	6 1/16	—	—	34529	—	—	—	94529	—
1 1/2-6	NC	4	1.333	1.667	6 3/8	—	—	34530	—	—	—	94530	—
1 1/2-12	NF	4	1.333	1.667	6 3/8	—	—	34531	—	—	—	94531	—
1 3/4-5*	NC	6	1.600	1.588	7	—	—	—	34532*	—	—	—	94532*
2-4 1/2*	NC	6	1.777	1.588	7 5/8	—	—	—	34533*	—	—	—	94533*

\*H7 Pitch Dia. Limit (Sizes 1 3/4-5 and 2-4 1/2)



## Metric Spiral Point SHEARTAP™

CNC Reduced Neck Design

List No. 2090M — Steam Oxide Over Nitride

List No. 2090G — TiN Coated

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	SURFACE TREATED	
							EDP NO.	TIN COATED EDP NO.
M3	0.5	D3	2	.313	.313	1 <sup>15</sup> / <sub>16</sub>	35240	95240
M3.5	0.6	D4	2	.375	.313	2	35241	95241
M4	0.7	D4	3	.375	.375	2 <sup>1</sup> / <sub>8</sub>	35242	95242
M5	0.8	D4	3	.500	.375	2 <sup>3</sup> / <sub>8</sub>	35243	95243
M6	1	D5	3	.625	.375	2 <sup>1</sup> / <sub>2</sub>	35244	95244
M7	1	D5	3	.688	.438	2 <sup>23</sup> / <sub>32</sub>	35245	95245
M8	1	D5	3	.688	.438	2 <sup>23</sup> / <sub>32</sub>	35246	95246
M8	1.25	D5	3	.688	.438	2 <sup>23</sup> / <sub>32</sub>	35247	95247
M10	1.25	D5	3	.750	.500	2 <sup>15</sup> / <sub>16</sub>	35248	95248
M10	1.5	D6	3	.750	.500	2 <sup>15</sup> / <sub>16</sub>	35249	95249
M12	1.25	D5	3	.938	.719	3 <sup>3</sup> / <sub>8</sub>	35250	95250
M12	1.75	D6	3	.938	.719	3 <sup>3</sup> / <sub>8</sub>	35251	95251
M14	1.5	D6	4	1.000	.673	3 <sup>19</sup> / <sub>32</sub>	35252	95252
M14	2	D7	4	1.000	.673	3 <sup>19</sup> / <sub>32</sub>	35253	95253
M16	1.5	D6	4	1.125	.673	3 <sup>13</sup> / <sub>16</sub>	35254	95254
M16	2	D7	4	1.125	.673	3 <sup>13</sup> / <sub>16</sub>	35255	95255
M18	1.5	D6	4	1.125	.719	4 <sup>1</sup> / <sub>32</sub>	35256	95256
M18	2.5	D7	4	1.125	.719	4 <sup>1</sup> / <sub>32</sub>	35257	95257
M20	1.5	D6	4	1.188	.812	4 <sup>15</sup> / <sub>32</sub>	35280	95280
M20	2.5	D7	4	1.188	.812	4 <sup>15</sup> / <sub>32</sub>	35281	95281
M22	1.5	D6	4	1.188	1.031	4 <sup>11</sup> / <sub>16</sub>	35282	95282
M22	2.5	D7	4	1.188	1.031	4 <sup>11</sup> / <sub>16</sub>	35283	95283
M24	2	D7	4	1.422	.797	4 <sup>29</sup> / <sub>32</sub>	35284	95284
M24	3	D8	4	1.422	.797	4 <sup>29</sup> / <sub>32</sub>	35285	95285



### STANDARD PACKAGE

M3-M12 - 12 each

M14-M18 - 3 each

M20-M24 - 1 each

**Cutting Speeds:**  
Page 167

## Metric Spiral Flute SHEARTAP™

List No. 2091M — Steam Oxide Over Nitride

List No. 2091G — TiN Coated

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	SURFACE TREATED	
							EDP NO.	TIN COATED EDP NO.
M3	0.5	D3	3	.236	.389	1 <sup>15</sup> / <sub>16</sub>	35258	95258
M3.5	0.6	D4	3	.236	.452	2	35259	95259
M4	0.7	D4	3	.236	.514	2 <sup>1</sup> / <sub>8</sub>	35260	95260
M5	0.8	D4	3	.354	.521	2 <sup>3</sup> / <sub>8</sub>	35261	95261
M6	1	D5	3	.433	.567	2 <sup>1</sup> / <sub>2</sub>	35262	95262
M7	1	D5	3	.472	.653	2 <sup>23</sup> / <sub>32</sub>	35263	95263
M8	1	D5	3	.472	.653	2 <sup>23</sup> / <sub>32</sub>	35264	95264
M8	1.25	D5	3	.472	.653	2 <sup>23</sup> / <sub>32</sub>	35265	95265
M10	1.25	D5	3	.551	.699	2 <sup>15</sup> / <sub>16</sub>	35266	95266
M10	1.5	D6	3	.551	.699	2 <sup>15</sup> / <sub>16</sub>	35267	95267
M12	1.25	D5	3	.630	1.026	3 <sup>3</sup> / <sub>8</sub>	35268	95268
M12	1.75	D6	3	.630	1.026	3 <sup>3</sup> / <sub>8</sub>	35269	95269
M14	1.5	D6	3	.690	.983	3 <sup>19</sup> / <sub>32</sub>	35270	95270
M14	2	D7	3	.690	.983	3 <sup>19</sup> / <sub>32</sub>	35271	95271
M16	1.5	D6	3	.745	1.052	3 <sup>13</sup> / <sub>16</sub>	35272	95272
M16	2	D7	3	.745	1.052	3 <sup>13</sup> / <sub>16</sub>	35273	95273
M18	1.5	D6	4	.813	.983	4 <sup>1</sup> / <sub>32</sub>	35274	95274
M18	2.5	D7	4	.813	.983	4 <sup>1</sup> / <sub>32</sub>	35275	95275
M20	1.5	D6	4	.790	1.210	4 <sup>15</sup> / <sub>32</sub>	35290	95290
M20	2.5	D7	4	.790	1.210	4 <sup>15</sup> / <sub>32</sub>	35291	95291
M22	1.5	D6	4	.790	1.428	4 <sup>11</sup> / <sub>16</sub>	35292	95292
M22	2.5	D7	4	.790	1.428	4 <sup>11</sup> / <sub>16</sub>	35293	95293
M24	2	D7	4	.940	1.279	4 <sup>29</sup> / <sub>32</sub>	35294	95294
M24	3	D8	4	.940	1.279	4 <sup>29</sup> / <sub>32</sub>	35295	95295



### STANDARD PACKAGE

M3-M12 - 12 each

M14-M18 - 3 each

M20-M24 - 1 each

Pitch diameter limits are  
those recommended  
for 6H class of thread.

“SHEARTAP” offers exceptional value for high volume production tapping in long-chipping steels and stainless steels up to 35 Rc Hardness.

**Steam Oxide Over Nitride** resists chip welding, increases lubricity and helps to retain cutting fluid. **TiN Coating** increases hardness and lubricity for improved thread quality, higher speeds and longer tool life.

Oversize taps are mainly used for parts that will be plated or heat treated after tapping. Also used in materials that tend to shrink after tapping.

PITCH DIA. LIMIT	AMOUNT LARGER THAN BASIC PITCH DIA.
H7	.0030”-.0035”
H11	.0050”-.0055”

### CNC Reduced Neck Design

SIZE	THREAD TYPE	PITCH DIA. LIMIT	Spiral Point		Spiral Flute	
			SURFACE TREATED EDP NO.	TIN COATED EDP NO.	SURFACE TREATED EDP NO.	TIN COATED EDP NO.
6-32	NC	H7	34542	94542	34592	94592
8-32	NC	H7	34544	94544	34594	94594
10-24	NC	H7	34546	94546	34596	94596
10-32	NF	H7	34548	94548	34598	94598
1/4-20	NC	H7	34550	94550	34600	94600
1/4-20	NC	H11	34551	94551	34601	94601
1/4-28	NF	H7	34552	94552	34602	94602
1/4-28	NF	H11	34553	94553	34603	94603
5/16-18	NC	H7	34554	94554	34604	94604
5/16-18	NC	H11	34555	94555	34605	94605
5/16-24	NF	H7	34556	94556	34606	94606
5/16-24	NF	H11	34557	94557	34607	94607
3/8-16	NC	H7	34558	94558	34608	94608
3/8-16	NC	H11	34559	94559	34609	94609
3/8-24	NF	H7	34560	94560	34610	94610
3/8-24	NF	H11	34561	94561	34611	94611
7/16-14	NC	H11	34563	94563	34613	94613
7/16-20	NF	H11	34565	94565	34615	94615
1/2-13	NC	H11	34567	94567	34617	94617
1/2-20	NF	H11	34569	94569	34619	94619
9/16-12	NC	H11	34571	94571	34621	94621
9/16-18	NF	H11	34573	94573	34623	94623
5/8-11	NC	H11	34575	94575	34625	94625
5/8-18	NF	H11	34577	94577	34627	94627
3/4-10	NC	H11	34579	94579	34629	94629
3/4-16	NF	H11	34581	94581	34631	94631
7/8-9	NC	H11	34583	94583	34633	94633
7/8-14	NF	H11	34585	94585	34635	94635
1-8	NC	H11	34587	94587	34637	94637
1-12	NF	H11	34589	94589	34639	94639
<b>METRIC</b>						
M3 x 0.5		H7	34670	94670	34680	94690
M4 x 0.7		H7	34671	94671	34681	94691
M5 x 0.8		H7	34672	94672	34682	94692
M6 x 1		H11	34673	94673	34683	94693
M8 x 1.25		H11	34674	94674	34684	94694
M10 x 1.5		H11	34675	94675	34685	94695
M12 x 1.75		H11	34676	94676	34686	94696

## Spiral Point Plug Style

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.



### Inch

List No. 2090 — Steam Oxide Over Nitride

List No. 2090G — TiN Coated

### Metric

List No. 2090M — Steam Oxide Over Nitride

List No. 2090G — TiN Coated

## Spiral Flute Semi-Bottoming Style 48° Helix Angle

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.



### Inch

List No. 2091 — Steam Oxide Over Nitride

List No. 2091G — TiN Coated

### Metric

List No. 2091M — Steam Oxide Over Nitride

List No. 2091G — TiN Coated

Morse FAST TAP SERVICE  
Pages 206-240

# Eight Pitch SHEARTAP™



**Eight Pitch** taps are often required for applications in the power generation industry and general construction.

“**SHEARTAP**” offers exceptional value for high volume production tapping in long-chipping steels and stainless steels up to 35 Rc Hardness.

**Steam Oxide Over Nitride** resists chip welding, increases lubricity and helps to retain cutting fluid. **TiN Coating** increases hardness and lubricity for improved thread quality, higher speeds and longer tool life.



List No. 2090 — Steam Oxide Over Nitride

List No. 2090G — TiN Coated

## Spiral Point Eight Pitch SHEARTAP™

Cutting Speeds: Page 167

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

Plug Style

SIZE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	PITCH DIA. LIMIT	SURFACE TREATED	TIN COATED
						EDP NO.	EDP NO.
1-1/8-8	4	1.719	.843	5 <sup>7</sup> / <sub>16</sub>	H5	34650	94650
1-1/4-8	4	1.719	.843	5 <sup>3</sup> / <sub>4</sub>	H5	34651	94651
1-3/8-8	4	2.000	1.000	6 <sup>1</sup> / <sub>16</sub>	H5	34652	94652
1-1/2-8	6	2.000	1.000	6 <sup>3</sup> / <sub>8</sub>	H5	34653	94653
1-5/8-8	6	2.000	1.187	6 <sup>1</sup> / <sub>16</sub>	H6	34654	94654
1-3/4-8	6	2.406	.782	7	H6	34655	94655
1-7/8-8	6	2.406	1.156	7 <sup>5</sup> / <sub>16</sub>	H6	34656	94656
2-8	6	2.688	.874	7 <sup>5</sup> / <sub>8</sub>	H6	34657	94657

## Spiral Flute Eight Pitch SHEARTAP™

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

48° Helix Angle  
Semi-Bottoming Style

**Eight Pitch** taps are often required for applications in the power generation industry and general construction.



List No. 2091 — Steam Oxide Over Nitride

List No. 2091G — TiN Coated

SIZE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	PITCH DIA. LIMIT	SURFACE TREATED	TIN COATED
						EDP NO.	EDP NO.
1-1/8-8	4	1.143	1.419	5 <sup>7</sup> / <sub>16</sub>	H5	34660	94660
1-1/4-8	4	1.143	1.419	5 <sup>3</sup> / <sub>4</sub>	H5	34661	94661
1-3/8-8	4	1.333	1.667	6 <sup>1</sup> / <sub>16</sub>	H5	34662	94662
1-1/2-8	4	1.333	1.667	6 <sup>3</sup> / <sub>8</sub>	H5	34663	94663
1-5/8-8	6	1.333	1.854	6 <sup>1</sup> / <sub>16</sub>	H6	34664	94664
1-3/4-8	6	1.600	1.588	7	H6	34665	94665
1-7/8-8	6	1.600	1.962	7 <sup>5</sup> / <sub>16</sub>	H6	34666	94666
2-8	6	1.777	1.588	7 <sup>5</sup> / <sub>8</sub>	H6	34667	94667



# Cutting Speeds



WORKPIECE MATERIAL	BRINELL HARDNESS (BHN)	SURFACE SPEED (SFM)
Low Carbon Steel - 1118, 12L12, 1108, 1213	≤120	65
Low & Medium Carbon Steel - 1018, 1551, 11L44	120 - 250	40
Medium Carbon and Alloyed Steel - 1040, 1140, 4340, 8640	≤250	40
Free Machining Stainless Steels - 303, 410, 416, 440F	≤260	35
Moderate Machining Stainless Steels - 304, 316	≤300	20

# Standard Taps Cutting Speeds



Workpiece Material	Brinell Hardness (BHN)	Surface Speed (SFM)
Low Carbon Steel - 1018, 12L12, 1108, 1213	≤ 120	65
Low & Medium Carbon Steel - 1018, 1551, 11L44	120 - 250	40
Medium Carbon and Alloyed Steel - 1040, 1140, 4340, 8640	≤ 250	40
Tool and Die Steels - P20, A2, D2, H12	≤ 250	20
Tool and Die Steels - P20, A2, D2, H12	250 - 350	15
Free Machining Stainless Steels - 303, 410, 416, 440F	≤ 260	35
Moderate Machining Stainless Steels - 304, 316	≤ 300	25
Difficult Machining Stainless Steels - 17-4PH, 316L, AM350	≤ 300	10
Cast Iron - Soft Gray	≤ 160	70
Cast Iron - Gray	160 - 260	60
Cast Iron - Ductile	250	50
Cast Iron - Malleable	250 - 330	35
Titanium Alloys - Commercially Pure 99.0	110 - 170	20
Titanium Alloys - Ti-6Al-4V, ASTM B367 Grades C-3, C-4	≤ 250	15
High Temperature Alloys - Inconel, Hastelloy, Waspaloy	≤ 150	25
High Temperature Alloys - Inconel, Hastelloy, Waspaloy	150 - 250	10
Aluminum Alloys - 2025, 6061, A140, 514.0	≤ 150	100
Copper Alloys - Brass and Bronze	≤ 200	50
Magnesium Alloys - AZ80A, HM12A, AM60A, ZE41A	50 - 90	70

**SPEEDS** shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase until the machining cycle is optimized.

**TAP SPEEDS** may be **increased** for coated taps, spiral point taps, fine pitch taps and when the percentage of thread is decreased.

**TAP SPEEDS** may need to be **decreased** for uncoated taps, spiral flute taps, coarse pitch taps, bottoming taps, difficult materials, longer thread lengths, and when the percentage of thread is increased.

**THREAD FORMING TAPS** generally form threads more efficiently at higher speeds. Suggested speeds are 50% to 100% higher than the suggested speeds for cutting taps in similar applications.

**PIPE TAP SPEEDS** should be between one-half and three-quarters of the speeds of taps of comparable diameter and pitch.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# ONYX TAP

## CNC Style — Spiral Point Plug Taps

Bright Finish & Steam Oxide Over Nitride

High Speed Steel

For tapping a wide range of materials up to 28Rc hardness.

Tool Coatings Also Available

For tapping through holes. The spiral point forces the chips ahead of the tap.



List No. 2101 - Fractional & Machine Screw

**Reduce Neck Design and Shorter Thread Length** for increased coolant flow to the cutting edge, enhanced chip evacuation and reduced contact between tap and workpiece.

**Bright Finish** for tapping a wide range of materials including Non-Ferrous Materials.

**Steam Oxide over Nitride** increases wear resistance, reduces friction, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **Not recommended for non-ferrous materials.**

### CNC Reduced Neck Design

Size	Thread Type	No. of Flutes	Thread Length	Neck Length	OAL	BRIGHT			OXIDE OVER NITRIDE		
						H2	H3	H4	H2	H3	H4
#4-40	NC	2	.313	.250	1-7/8	30820	—	—	34700	—	—
#6-32	NC	2	.375	.313	2	30821	30822	—	34697	34701	—
#8-32	NC	2	.375	.375	2-1/8	30823	30824	—	34698	34702	—
#8-32	NC	3	.375	.375	2-1/8	30825	30826	—	34699	34703	—
#10-24	NC	2	.500	.375	2-3/8	—	30827	—	—	34704	—
#10-24	NC	3	.500	.375	2-3/8	—	30828	—	—	34705	—
#10-32	NF	2	.500	.375	2-3/8	—	30829	—	—	34706	—
#10-32	NF	3	.500	.375	2-3/8	—	30830	—	—	34707	—
#12-24	NC	3	.500	.375	2-3/8	—	30831	—	—	34708	—
#12-28	NF	3	.500	.375	2-3/8	—	30832	—	—	34709	—
1/4-20	NC	2	.625	.375	2-1/2	—	30833	—	—	34710	—
1/4-20	NC	3	.625	.375	2-1/2	—	30834	—	—	34711	—
1/4-28	NF	2	.625	.375	2-1/2	—	30835	—	—	34712	—
1/4-28	NF	3	.625	.375	2-1/2	—	30836	—	—	34713	—
5/16-18	NC	2	.688	.438	2-23/32	—	30837	—	—	34740	—
5/16-18	NC	3	.688	.438	2-23/32	—	30838	—	—	34714	—
5/16-24	NF	2	.688	.438	2-23/32	—	30839	—	—	34741	—
5/16-24	NF	3	.688	.438	2-23/32	—	30840	—	—	34715	—
3/8-16	NC	3	.750	.500	2-15/16	—	30841	—	—	34716	—
3/8-24	NF	3	.750	.500	2-15/16	—	30842	—	—	34717	—
7/16-14	NC	3	.875	.563	3-5/32	—	30843	—	—	34718	—
7/16-20	NF	3	.875	.563	3-5/32	—	30844	—	—	34719	—
1/2-13	NC	3	.938	.719	3-3/8	—	30845	—	—	34720	—
1/2-20	NF	3	.938	.719	3-3/8	—	30846	—	—	34721	—
9/16-12	NC	4	1.000	.673	3-19/32	—	30847	—	—	34722	—
9/16-18	NF	4	1.000	.673	3-19/32	—	30848	—	—	34723	—
5/8-11	NC	4	1.125	.673	3-13/16	—	30849	—	—	34724	—
5/8-18	NF	4	1.125	.673	3-13/16	—	30850	—	—	34725	—
3/4-10	NC	4	1.219	.766	4-1/4	—	30851	—	—	34726	—
3/4-16	NF	4	1.219	.766	4-1/4	—	30852	—	—	34727	—
7/8-9	NC	4	1.344	.875	4-11/16	—	—	30853	—	—	34728
7/8-14	NF	4	1.344	.875	4-11/16	—	—	30854	—	—	34729
1-8	NC	4	1.500	1.000	5-1/8	—	—	30855	—	—	34730
1-12	NF	4	1.500	1.000	5-1/8	—	—	30856	—	—	34731
1-14	NS	4	1.500	1.000	5-1/8	—	—	30857	—	—	34742
1-1/8-7	NC	4	1.719	.843	5-7/16	—	—	30858	—	—	34732
1-1/8-12	NF	4	1.719	.843	5-7/16	—	—	30859	—	—	34733
1-1/4-7	NC	4	1.719	.843	5-3/4	—	—	30860	—	—	34734
1-1/4-12	NF	4	1.719	.843	5-3/4	—	—	30861	—	—	34735
1-3/8-6	NC	4	2.000	1.000	6-1/16	—	—	30862	—	—	34736
1-3/8-12	NF	4	2.000	1.000	6-1/16	—	—	30863	—	—	34737
1-1/2-6	NC	6	2.000	1.000	6-3/8	—	—	30864	—	—	34738
1-1/2-12	NF	6	2.000	1.000	6-3/8	—	—	30865	—	—	34739

# ONYX TAP

## CNC Style — Spiral Flute

### Semi-Bottoming Taps

Bright Finish & Steam Oxide Over Nitride

High Speed Steel

For tapping a wide range of materials up to 28Rc hardness.

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

Tool Coatings Also Available



List No. 2102 - Fractional & Machine Screw

Reduce Neck Design and Shorter Thread Length for increased coolant flow to the cutting edge, enhanced chip evacuation and reduced contact between tap and workpiece.

Bright Finish for tapping a wide range of materials including Non-Ferrous Materials.

Steam Oxide over Nitride increases wear resistance, reduces friction, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **Not recommended for non-ferrous materials.**

#### CNC Reduced Neck Design

Size	Thread Type	No. of Flutes	Thread Length	Neck Length	OAL	BRIGHT			OXIDE OVER NITRIDE		
						H2	H3	H4	H2	H3	H4
#4-40	NC	3	.236	.327	1-7/8	30870	—	—	34750	—	—
#6-32	NC	3	.236	.452	2	30871	30872	—	34748	34751	—
#8-32	NC	3	.236	.514	2-1/8	30873	30874	—	34749	34752	—
#10-24	NC	3	.354	.521	2-3/8	—	30875	—	—	34753	—
#10-32	NF	3	.354	.521	2-3/8	—	30876	—	—	34754	—
#12-24	NC	3	.354	.521	2-3/8	—	30877	—	—	34755	—
#12-28	NF	3	.354	.521	2-3/8	—	30878	—	—	34756	—
1/4-20	NC	3	.433	.567	2-1/2	—	30879	—	—	34757	—
1/4-28	NF	3	.433	.567	2-1/2	—	30880	—	—	34758	—
5/16-18	NC	3	.472	.653	2-23/32	—	30881	—	—	34759	—
5/16-24	NF	3	.472	.653	2-23/32	—	30882	—	—	34760	—
3/8-16	NC	3	.551	.699	2-15/16	—	30883	—	—	34761	—
3/8-24	NF	3	.551	.699	2-15/16	—	30884	—	—	34762	—
7/16-14	NC	3	.591	.847	3-5/32	—	30885	—	—	34763	—
7/16-20	NF	3	.591	.847	3-5/32	—	30886	—	—	34764	—
1/2-13	NC	3	.630	1.026	3-3/8	—	30887	—	—	34765	—
1/2-20	NF	3	.630	1.026	3-3/8	—	30888	—	—	34766	—
9/16-12	NC	3	.690	.983	3-19/32	—	30889	—	—	34767	—
9/16-18	NF	3	.690	.983	3-19/32	—	30890	—	—	34768	—
5/8-11	NC	3	.745	1.052	3-13/16	—	30891	—	—	34769	—
5/8-18	NF	3	.745	1.052	3-13/16	—	30892	—	—	34770	—
3/4-10	NC	4	.820	1.165	4-1/4	—	30893	—	—	34771	—
3/4-16	NF	4	.820	1.165	4-1/4	—	30894	—	—	34772	—
7/8-9	NC	4	.911	1.308	4-11/16	—	—	30895	—	—	34773
7/8-14	NF	4	.911	1.308	4-11/16	—	—	30896	—	—	34774
1-8	NC	4	1.025	1.475	5-1/8	—	—	30897	—	—	34775
1-12	NF	4	1.025	1.475	5-1/8	—	—	30898	—	—	34776
1-14	NS	4	1.025	1.475	5-1/8	—	—	30899	—	—	34785
1-1/8-7	NC	4	1.143	1.419	5-7/16	—	—	30900	—	—	34777
1-1/8-12	NF	4	1.143	1.419	5-7/16	—	—	30901	—	—	34778
1-1/4-7	NC	4	1.143	1.419	5-3/4	—	—	30902	—	—	34779
1-1/4-12	NF	4	1.143	1.419	5-3/4	—	—	30903	—	—	34780
1-3/8-6	NC	4	1.333	1.667	6-1/16	—	—	30904	—	—	34781
1-3/8-12	NF	4	1.333	1.667	6-1/16	—	—	30905	—	—	34782
1-1/2-6	NC	4	1.333	1.667	6-3/8	—	—	30906	—	—	34783
1-1/2-12	NF	4	1.333	1.667	6-3/8	—	—	30907	—	—	34784

# Metric Spiral Point ONYX TAP

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	BRIGHT	OXIDE OVER
							EDP NO.	NITRIDE
							EDP NO.	EDP NO.
M2	0.4	D3	2	.313	.313	1-15/16	30910	34800
M2.5	0.45	D3	2	.313	.313	1-15/16	30911	34801
M3	0.5	D3	2	.313	.313	1-15/16	30912	34802
M3.5	0.6	D4	2	.375	.313	2	30913	34803
M4	0.7	D4	3	.375	.375	2-1/8	30914	34804
M5	0.8	D4	3	.500	.375	2-3/8	30915	34805
M6	1	D5	3	.625	.375	2-1/2	30916	34806
M7	1	D5	3	.688	.438	2-23/32	30917	34807
M8	1	D5	3	.688	.438	2-23/32	30918	34808
M8	1.25	D5	3	.688	.438	2-23/32	30919	34809
M10	1.25	D5	3	.750	.500	2-15/16	30920	34810
M10	1.5	D6	3	.750	.500	2-15/16	30921	34811
M12	1.25	D5	3	.938	.719	3-3/8	30922	34812
M12	1.5	D5	3	.938	.719	3-3/8	30923	34826
M12	1.75	D6	3	.938	.719	3-3/8	30924	34813
M14	1.5	D6	4	1.000	.673	3-19/32	30925	34814
M14	2	D7	4	1.000	.673	3-19/32	30926	34815
M16	1.5	D6	4	1.125	.673	3-13/16	30927	34816
M16	2	D7	4	1.125	.673	3-13/16	30928	34817
M18	1.5	D6	4	1.125	.719	4-1/32	30929	34818
M18	2.5	D7	4	1.125	.719	4-1/32	30930	34819
M20	1.5	D6	4	1.188	.812	4-15/32	30931	34820
M20	2.5	D7	4	1.188	.812	4-15/32	30932	34821
M22	1.5	D6	4	1.188	1.031	4-11/16	30933	34822
M22	2.5	D7	4	1.188	1.031	4-11/16	30934	34823
M24	1.5	D7	4	1.422	.797	4-29/32	30935	34824
M24	2	D7	4	1.422	.797	4-29/32	30936	34827
M24	3	D8	4	1.422	.797	4-29/32	30937	34825

Tool Coatings Also Available

Bright Finish & Steam Oxide Over Nitride  
CNC Reduced Neck Design



List No. 2101M -  
Metric Spiral Point

Pitch diameter limits are those recommended for 6H class thread.



# Metric Spiral Flute ONYX TAP

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	BRIGHT	OXIDE OVER
							EDP NO.	NITRIDE
							EDP NO.	EDP NO.
M3	0.5	D3	3	.236	.389	1-15/16	30940	34840
M3.5	0.6	D4	3	.236	.452	2	30941	34841
M4	0.7	D4	3	.236	.514	2-1/8	30942	34842
M5	0.8	D4	3	.354	.521	2-3/8	30943	34843
M6	1	D5	3	.433	.567	2-1/2	30944	34844
M7	1	D5	3	.472	.653	2-23/32	30945	34845
M8	1	D5	3	.472	.653	2-23/32	30946	34846
M8	1.25	D5	3	.472	.653	2-23/32	30947	34847
M10	1.25	D5	3	.551	.699	2-15/16	30948	34848
M10	1.5	D6	3	.551	.699	2-15/16	30949	34849
M12	1.25	D5	3	.630	1.026	3-3/8	30950	34850
M12	1.5	D5	3	.630	1.026	3-3/8	30951	34864
M12	1.75	D6	3	.630	1.026	3-3/8	30952	34851
M14	1.5	D6	3	.690	.983	3-19/32	30953	34852
M14	2	D7	3	.690	.983	3-19/32	30954	34853
M16	1.5	D6	3	.745	1.052	3-13/16	30955	34854
M16	2	D7	3	.745	1.052	3-13/16	30956	34855
M18	1.5	D6	4	.813	.983	4-1/32	30957	34856
M18	2.5	D7	4	.813	.983	4-1/32	30958	34857
M20	1.5	D6	4	.790	1.210	4-15/32	30959	34858
M20	2.5	D7	4	.790	1.210	4-15/32	30960	34859
M22	1.5	D6	4	.790	1.428	4-11/16	30961	34860
M22	2.5	D7	4	.790	1.428	4-11/16	30962	34861
M24	1.5	D7	4	.940	1.279	4-29/32	30963	34862
M24	2	D7	4	.940	1.279	4-29/32	30964	34865
M24	3	D8	4	.940	1.279	4-29/32	30965	34863

Bright Finish & Steam Oxide Over Nitride  
CNC Reduced Neck Design



List No. 2102M -  
Metric Spiral Flute

# Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Available in sets, taper (8-10 thread chamfer), plug (3-5 thread chamfer) or bottoming (1-2 thread chamfer).

Tool Coating Also Available



List No. 2068 — Machine Screw

**STANDARD** All sizes — 12 each  
**PACKAGE** Sets (Taper Plug Bottom)

Bold type indicates standard H limit.



SIZE	UNC	TPI	UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO.			
								SETS	TAPER	PLUG	BOTTOM
0	—	80	80	2	H1	5/16	1 5/8	<b>33901</b>	<b>33601</b>	<b>33701</b>	<b>33801</b>
	—	80	80	2	<b>H2</b>	5/16	1 5/8	—	—	<b>33702</b>	<b>33802</b>
1	64	—	64	2	H1	3/8	1 11/16	<b>33902</b>	<b>33602</b>	<b>33703</b>	<b>33803</b>
	64	—	64	2	<b>H2</b>	3/8	1 11/16	—	—	<b>33704</b>	—
	—	72	72	2	H1	3/8	1 11/16	<b>33903</b>	<b>33603</b>	<b>33705</b>	<b>33804</b>
	—	72	72	2	<b>H2</b>	3/8	1 11/16	—	—	<b>33706</b>	<b>33805</b>
2	56	—	56	3	H1	7/16	1 3/4	<b>33904</b>	<b>33604</b>	<b>33707</b>	<b>33806</b>
	56	—	56	3	<b>H2</b>	7/16	1 3/4	—	<b>33605</b>	<b>33708</b>	<b>33807</b>
	—	64	64	3	<b>H2</b>	7/16	1 3/4	<b>33905</b>	<b>33606</b>	<b>33710</b>	<b>33809</b>
3	48	—	48	3	H1	1/2	1 13/16	—	—	<b>33711</b>	—
	48	—	48	3	<b>H2</b>	1/2	1 13/16	<b>33906</b>	<b>33607</b>	<b>33712</b>	<b>33810</b>
	—	56	56	3	<b>H2</b>	1/2	1 13/16	<b>33907</b>	<b>33608</b>	<b>33714</b>	<b>33812</b>
4	40	—	40	3	<b>H2</b>	9/16	1 7/8	<b>33909</b>	<b>33610</b>	<b>33716</b>	<b>33814</b>
	—	48	48	3	<b>H2</b>	9/16	1 7/8	<b>33910</b>	<b>33611</b>	<b>33719</b>	<b>33816</b>
	—	*36	36	3	<b>H2</b>	9/16	1 7/8	<b>33911</b>	<b>33612</b>	<b>33720</b>	<b>33817</b>
5	40	—	40	3	H1	5/8	1 15/16	—	—	<b>33721</b>	—
	40	—	40	3	<b>H2</b>	5/8	1 15/16	<b>33912</b>	<b>33613</b>	<b>33722</b>	<b>33818</b>
	—	44	44	3	<b>H2</b>	5/8	1 15/16	<b>33913</b>	<b>33614</b>	<b>33724</b>	<b>33820</b>
6	32	—	32	3	H1	1 1/16	2	<b>33914</b>	<b>33615</b>	<b>33726</b>	<b>33821</b>
	32	—	32	3	H2	1 1/16	2	<b>33915</b>	<b>33616</b>	<b>33727</b>	<b>33822</b>
	32	—	32	3	<b>H3</b>	1 1/16	2	<b>33916</b>	<b>33617</b>	<b>33728</b>	<b>33823</b>
	—	40	40	3	H1	1 1/16	2	—	—	<b>33731</b>	—
	—	40	40	3	<b>H2</b>	1 1/16	2	<b>33917</b>	<b>33618</b>	<b>33732</b>	<b>33826</b>
8	32	—	32	4	H1	3/4	2 1/8	<b>33918</b>	<b>33619</b>	<b>33734</b>	<b>33827</b>
	32	—	32	4	H2	3/4	2 1/8	<b>33919</b>	<b>33620</b>	<b>33735</b>	<b>33828</b>
	32	—	32	4	<b>H3</b>	3/4	2 1/8	<b>33920</b>	<b>33621</b>	<b>33736</b>	<b>33829</b>
	—	36	36	4	<b>H2</b>	3/4	2 1/8	<b>33921</b>	<b>33622</b>	<b>33742</b>	<b>33835</b>
10	24	—	24	4	H1	7/8	2 3/8	<b>33922</b>	<b>33623</b>	<b>33743</b>	<b>33836</b>
	24	—	24	4	H2	7/8	2 3/8	<b>33923</b>	<b>33624</b>	<b>33744</b>	<b>33837</b>
	24	—	24	4	<b>H3</b>	7/8	2 3/8	<b>33924</b>	<b>33625</b>	<b>33745</b>	<b>33838</b>
	—	32	32	4	H1	7/8	2 3/8	<b>33925</b>	<b>33626</b>	<b>33751</b>	<b>33842</b>
	—	32	32	4	H2	7/8	2 3/8	<b>33926</b>	<b>33627</b>	<b>33752</b>	<b>33843</b>
	—	32	32	4	<b>H3</b>	7/8	2 3/8	<b>33927</b>	<b>33628</b>	<b>33753</b>	<b>33844</b>
12	24	—	24	4	<b>H3</b>	15/16	2 3/8	<b>33928</b>	<b>33629</b>	<b>33758</b>	<b>33849</b>
	—	28	28	4	<b>H3</b>	15/16	2 3/8	<b>33929</b>	<b>33630</b>	<b>33759</b>	<b>33850</b>

\*UNS

# Optional Flutes Straight Flute Hand Taps

**Ground Thread — High Speed Steel  
Bright Finish**

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

**Optional Flutes** taps feature fewer flutes than standard taps for added chip capacity in deeper hole tapping.



List No. 2068 — Machine Screw

**STANDARD PACKAGE** All sizes — 12 each

Available in plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer).

Bold type indicates standard H limit.



SIZE	TPI		NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER	
	UNC	UNF					PLUG	BOTTOM
2	56	—	2	<b>H2</b>	7/16	1 3/4	<b>33709</b>	<b>33808</b>
4	40	—	2	<b>H2</b>	9/16	1 7/8	<b>33717</b>	<b>33815</b>
5	40	—	2	<b>H2</b>	5/8	1 15/16	<b>33723</b>	<b>33819</b>
6	32	—	2	H2	1 1/16	2	<b>33729</b>	<b>33824</b>
	32	—	2	<b>H3</b>	1 1/16	2	<b>33730</b>	<b>33825</b>
	—	40	2	<b>H2</b>	1 1/16	2	<b>33733</b>	—
8	32	—	2	H2	3/4	2 1/8	<b>33740</b>	<b>33833</b>
	32	—	2	<b>H3</b>	3/4	2 1/8	<b>33741</b>	<b>33834</b>
	32	—	3	H2	3/4	2 1/8	<b>33738</b>	—
	32	—	3	<b>H3</b>	3/4	2 1/8	<b>33739</b>	<b>33832</b>
10	24	—	2	H2	7/8	2 3/8	<b>33749</b>	<b>33840</b>
	24	—	2	<b>H3</b>	7/8	2 3/8	<b>33750</b>	<b>33841</b>
	24	—	3	H2	7/8	2 3/8	<b>33747</b>	—
	24	—	3	<b>H3</b>	7/8	2 3/8	<b>33748</b>	<b>33839</b>
	—	32	2	H2	7/8	2 3/8	<b>33756</b>	<b>33847</b>
	—	32	2	<b>H3</b>	7/8	2 3/8	<b>33757</b>	<b>33848</b>
	—	32	3	H2	7/8	2 3/8	<b>33754</b>	<b>33845</b>
	—	32	3	<b>H3</b>	7/8	2 3/8	<b>33755</b>	<b>33846</b>

# Surface Treated Straight Flute Hand Taps

**Ground Thread — High Speed Steel**

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

**Steam Oxide Finish** increases wear resistance, reduces friction, acts as a lubricant, reduces galling and chip welding, improves chip flow and increases tap lubricant retention.

**NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**



List No. 2068X Machine Screw  
Steam Oxide Finish

**STANDARD PACKAGE** All sizes — 12 each

Available in plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer)

SIZE	TPI		NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER	
	UNC	UNF					PLUG	BOTTOM
6	32	—	3	H3	1 1/16	2	<b>32558</b>	<b>32573</b>
	—	40	3	H2	1 1/16	2	<b>32559</b>	<b>32574</b>
8	32	—	4	H3	3/4	2 1/8	<b>32560</b>	<b>32575</b>
	—	36	4	H2	3/4	2 1/8	<b>32561</b>	<b>32576</b>
10	24	—	4	H3	7/8	2 3/8	<b>32562</b>	<b>32577</b>
	—	32	4	H3	7/8	2 3/8	<b>32563</b>	<b>32578</b>

# Titanium Nitride (TiN) Coated Straight Flute Hand Taps



## Ground Thread — High Speed Steel

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

**Titanium Nitride (TiN) Coating** results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.

## List No. 2068G — Machine Screw

**STANDARD PACKAGE** All sizes — 12 each

Available in plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer).



SIZE	TPI		NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER	
	UNC	UNF					PLUG	BOTTOM.
0	—	80	2	H1	5/16	1 5/8	92460	92480
1	64	—	2	H1	3/8	1 11/16	92461	92481
	—	72	2	H1	3/8	1 11/16	92462	92482
2	56	—	3	H2	7/16	1 3/4	92463	92483
	—	64	3	H2	7/16	1 3/4	92464	92484
3	48	—	3	H2	1/2	1 13/16	92465	92485
	—	56	3	H2	1/2	1 13/16	92466	92486
4	40	—	3	H2	9/16	1 7/8	92467	92487
	—	48	3	H2	9/16	1 7/8	92468	92488
	—	36*	3	H2	9/16	1 7/8	92469	92489
5	40	—	3	H2	5/8	1 15/16	92470	92490
	—	44	3	H2	5/8	1 15/16	92471	92491
6	32	—	3	H3	11/16	2	92472	92492
	—	40	3	H2	11/16	2	92473	92493
8	32	—	4	H3	3/4	2 1/8	92474	92494
	—	36	4	H2	3/4	2 1/8	92475	92495
10	24	—	4	H3	7/8	2 3/8	92476	92496
	—	32	4	H3	7/8	2 3/8	92477	92497
12	24	—	4	H3	15/16	2 3/8	92478	92498
	—	28	4	H3	15/16	2 3/8	92479	92499

\*UNS

Morse FAST TAP SERVICE  
Pages 206-240

## SPECIAL TAPS FAST QUOTE SERVICE

Call Morse Cutting Tools for all of your special tap needs.  
To expedite your quote please provide the following information:

TAP SIZE \_\_\_\_\_ CLASS of FIT or H LIMIT \_\_\_\_\_ # of FLUTES \_\_\_\_\_  
 TYPE of TAP \_\_\_\_\_ SURFACE TREATMENT \_\_\_\_\_  
 MATERIAL to be THREADED \_\_\_\_\_ HARDNESS \_\_\_\_\_  
 BLIND or THROUGH HOLE \_\_\_\_\_ LENGTH of THREAD \_\_\_\_\_  
 # of HOLES to TAP \_\_\_\_\_ TAPPING EQUIPMENT USED \_\_\_\_\_  
 CURRENT TAP USED \_\_\_\_\_ TAPPING PROBLEM \_\_\_\_\_

# Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Available in sets or taper (8-10 thread chamfer), plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer)

Tool Coatings Also Available



## List No. 2046 Fractional

**STANDARD PACKAGE** 1/4" thru 1/2" — 12 each  
9/16" thru 3/4" — 3 each  
7/8" thru 1 1/2" — 1 each  
Sets (Taper Plug Bottom)

Bold type indicates standard H limit.



SIZE	TPI		NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER			
	UNC	UNF					SETS EDP NO.	TAPER	PLUG	BOTTOM
1/4	20	—	4	H1	1	2 1/2	—	<b>32301</b>	<b>32402</b>	<b>32601</b>
	20	—	4	H2	1	2 1/2	—	<b>32302</b>	<b>32404</b>	<b>32602</b>
	20	—	4	<b>H3</b>	1	2 1/2	<b>32701</b>	<b>32303</b>	<b>32407</b>	<b>32605</b>
	20	—	4	H5	1	2 1/2	—	—	<b>32409</b>	—
	—	28	4	H1	1	2 1/2	—	—	<b>32410</b>	<b>32607</b>
	—	28	4	H2	1	2 1/2	—	—	<b>32411</b>	<b>32608</b>
	—	28	4	<b>H3</b>	1	2 1/2	<b>32702</b>	<b>32304</b>	<b>32414</b>	<b>32611</b>
	—	28	4	H4	1	2 1/2	—	—	<b>32415</b>	<b>32612</b>
5/16	18	—	4	H2	1 1/8	2 23/32	—	—	<b>32418</b>	<b>32614</b>
	18	—	4	<b>H3</b>	1 1/8	2 23/32	<b>32703</b>	<b>32305</b>	<b>32421</b>	<b>32617</b>
	18	—	4	H5	1 1/8	2 23/32	—	—	<b>32422</b>	<b>32618</b>
	—	24	4	H2	1 1/8	2 23/32	—	—	<b>32424</b>	—
	—	24	4	<b>H3</b>	1 1/8	2 23/32	<b>32704</b>	<b>32306</b>	<b>32426</b>	<b>32621</b>
	—	24	4	H4	1 1/8	2 23/32	—	—	<b>32427</b>	—
3/8	16	—	4	H1	1 1/4	2 15/16	—	—	<b>32429</b>	—
	16	—	4	H2	1 1/4	2 15/16	—	—	<b>32430</b>	<b>32624</b>
	16	—	4	<b>H3</b>	1 1/4	2 15/16	<b>32705</b>	<b>32307</b>	<b>32432</b>	<b>32626</b>
	16	—	4	H5	1 1/4	2 15/16	—	—	<b>32434</b>	<b>32627</b>
	—	24	4	H1	1 1/4	2 15/16	—	—	<b>32435</b>	—
	—	24	4	H2	1 1/4	2 15/16	—	—	<b>32436</b>	<b>32629</b>
	—	24	4	<b>H3</b>	1 1/4	2 15/16	<b>32706</b>	<b>32308</b>	<b>32438</b>	<b>32631</b>
	—	24	4	H4	1 1/4	2 15/16	—	—	<b>32439</b>	—
7/16	14	—	4	<b>H3</b>	1 7/16	3 5/32	<b>32707</b>	<b>32309</b>	<b>32441</b>	<b>32633</b>
	14	—	4	H5	1 7/16	3 5/32	—	—	<b>32442</b>	<b>32634</b>
	—	20	4	<b>H3</b>	1 7/16	3 5/32	<b>32708</b>	<b>32310</b>	<b>32444</b>	<b>32635</b>
	—	20	4	H5	1 7/16	3 5/32	—	—	<b>32445</b>	<b>32636</b>
1/2	13	—	4	H1	1 21/32	3 3/8	—	—	<b>32446</b>	—
	13	—	4	<b>H3</b>	1 21/32	3 3/8	<b>32709</b>	<b>32311</b>	<b>32449</b>	<b>32640</b>
	13	—	4	H5	1 21/32	3 3/8	—	—	<b>32450</b>	<b>32641</b>
	—	20	4	H1	1 21/32	3 3/8	—	—	<b>32451</b>	<b>32642</b>
	—	20	4	<b>H3</b>	1 21/32	3 3/8	<b>32710</b>	<b>32312</b>	<b>32453</b>	<b>32643</b>
	—	20	4	H5	1 21/32	3 3/8	—	—	<b>32454</b>	—
9/16	12	—	4	<b>H3</b>	1 21/32	3 19/32	<b>32711</b>	<b>32313</b>	<b>32455</b>	<b>32644</b>
	12	—	4	H5	1 21/32	3 19/32	—	—	<b>32456</b>	—
	—	18	4	H2	1 21/32	3 19/32	—	—	<b>32457</b>	—
	—	18	4	<b>H3</b>	1 21/32	3 19/32	<b>32712</b>	<b>32314</b>	<b>32458</b>	<b>32645</b>
	—	18	4	H5	1 21/32	3 19/32	—	—	<b>32459</b>	—
5/8	11	—	4	H2	1 13/16	3 13/16	—	—	<b>32460</b>	—
	11	—	4	<b>H3</b>	1 13/16	3 13/16	<b>32713</b>	<b>32315</b>	<b>32461</b>	<b>32647</b>
	11	—	4	H5	1 13/16	3 13/16	—	—	<b>32462</b>	<b>32648</b>
	—	18	4	H2	1 13/16	3 13/16	—	—	<b>32463</b>	—
	—	18	4	<b>H3</b>	1 13/16	3 13/16	<b>32714</b>	<b>32316</b>	<b>32464</b>	<b>32649</b>
	—	18	4	H5	1 13/16	3 13/16	—	—	<b>32465</b>	<b>32650</b>

(continued)



SIZE	UNC	TPI		NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER			
		UNF	UNS					SETS EDP NO.	TAPER	PLUG	BOTTOM
1 <sup>1</sup> / <sub>16</sub>	—	—	11	4	H3	1 <sup>13</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>32</sub>	32715	32317	32466	32651
	—	—	16	4	H3	1 <sup>13</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>32</sub>	32716	32318	32467	32652
3/4	10	—	—	4	H3	2	4 <sup>1</sup> / <sub>4</sub>	32717	32319	32469	32653
	10	—	—	4	H5	2	4 <sup>1</sup> / <sub>4</sub>	—	—	32470	32654
	—	16	—	4	H1	2	4 <sup>1</sup> / <sub>4</sub>	—	—	32471	—
	—	16	—	4	H2	2	4 <sup>1</sup> / <sub>4</sub>	—	—	32472	—
	—	16	—	4	H3	2	4 <sup>1</sup> / <sub>4</sub>	32718	32320	32473	32655
	—	16	—	4	H5	2	4 <sup>1</sup> / <sub>4</sub>	—	—	32474	32656
7/8	9	—	—	4	H4	2 <sup>7</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>16</sub>	32719	32321	32475	32657
	9	—	—	4	H6	2 <sup>7</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>16</sub>	—	—	32476	—
	—	14	—	4	H2	2 <sup>7</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>16</sub>	—	—	32477	—
	—	14	—	4	H4	2 <sup>7</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>16</sub>	32720	32322	32478	32658
1	8	—	—	4	H4	2 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>8</sub>	32721	32323	32480	32659
	8	—	—	4	H6	2 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>8</sub>	—	—	32481	—
	—	12	—	4	H4	2 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>8</sub>	32722	32324	32482	32660
	—	—	14	4	H4	2 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>8</sub>	32723	32325	32484	32661
1 <sup>1</sup> / <sub>8</sub>	7	—	—	4	H4	2 <sup>9</sup> / <sub>16</sub>	5 <sup>7</sup> / <sub>16</sub>	32724	32326	32485	32662
	—	12	—	4	H4	2 <sup>9</sup> / <sub>16</sub>	5 <sup>7</sup> / <sub>16</sub>	32725	32327	32486	32663
1 <sup>1</sup> / <sub>4</sub>	7	—	—	4	H4	2 <sup>9</sup> / <sub>16</sub>	5 <sup>3</sup> / <sub>4</sub>	32726	32328	32487	32664
	—	12	—	6	H4	2 <sup>9</sup> / <sub>16</sub>	5 <sup>3</sup> / <sub>4</sub>	32727	32329	32488	32665
1 <sup>3</sup> / <sub>8</sub>	6	—	—	4	H4	3	6 <sup>1</sup> / <sub>16</sub>	32728	32330	32489	32666
	—	12	—	6	H4	3	6 <sup>1</sup> / <sub>16</sub>	32729	32331	32490	32667
1 <sup>1</sup> / <sub>2</sub>	6	—	—	4	H4	3	6 <sup>3</sup> / <sub>8</sub>	32730	32332	32491	32668
	—	12	—	6	H4	3	6 <sup>3</sup> / <sub>8</sub>	32731	32333	32492	32669

## Optional Flutes Straight Flute Hand Taps

Ground Thread—High Speed Steel  
Bright Finish

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

**Optional Flutes** taps feature fewer flutes than standard taps for added chip capacity in deeper hole tapping.



List No. 2046 — Fractional

**STANDARD PACKAGE** All sizes — 12 each

SIZE	UNC	TPI		NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER	
		UNF	UNS					PLUG	BOTTOM
1/4	20	—	—	2	H3	1	2 <sup>1</sup> / <sub>2</sub>	32405	32603
	20	—	—	3	H3	1	2 <sup>1</sup> / <sub>2</sub>	32406	32604
	20	—	—	3	H5	1	2 <sup>1</sup> / <sub>2</sub>	32408	32606
	—	28	—	2	H3	1	2 <sup>1</sup> / <sub>2</sub>	32412	32609
	—	28	—	3	H3	1	2 <sup>1</sup> / <sub>2</sub>	32413	32610
5/16	18	—	—	2	H3	1 <sup>1</sup> / <sub>8</sub>	2 <sup>23</sup> / <sub>32</sub>	—	32615
	18	—	—	3	H3	1 <sup>1</sup> / <sub>8</sub>	2 <sup>23</sup> / <sub>32</sub>	32420	32616
	—	24	—	3	H3	1 <sup>1</sup> / <sub>8</sub>	2 <sup>23</sup> / <sub>32</sub>	32425	32620
3/8	16	—	—	3	H3	1 <sup>1</sup> / <sub>4</sub>	2 <sup>15</sup> / <sub>16</sub>	32431	32625
	—	24	—	3	H3	1 <sup>1</sup> / <sub>4</sub>	2 <sup>15</sup> / <sub>16</sub>	32437	32630
7/16	14	—	—	3	H3	1 <sup>7</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>32</sub>	32440	—
	—	20	—	3	H3	1 <sup>7</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>32</sub>	32443	—
1/2	13	—	—	3	H3	1 <sup>21</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	32448	32639
	—	20	—	3	H3	1 <sup>21</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	32452	—

# Titanium Nitride (TiN) Coated Straight Flute Hand Taps

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

**Titanium Nitride (TiN) Coating** results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.



## List No. 2046G Fractional

**STANDARD** 1/4 - 1/2 — 12 each  
**PACKAGE** 9/16 - 3/4 — 3 each  
 7/8 - 1 — 1 each



**Ground Thread - High Speed Steel**

SIZE	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. PLUG	EDP NO. BOTTOM
1/4 - 20	H3	1	2-1/2	4	92400	92430
1/4 - 28	H3	1	2-1/2	4	92401	92431
5/16 - 18	H3	1-1/8	2-23/32	4	92402	92432
5/16 - 24	H3	1-1/8	2-23/32	4	92403	92433
3/8 - 16	H3	1-1/4	2-15/16	4	92404	92434
3/8 - 24	H3	1-1/4	2-15/16	4	92405	92435
7/16 - 14	H3	1-7/16	3-5/32	4	92406	92436
7/16 - 20	H3	1-7/16	3-5/32	4	92407	92437
1/2 - 13	H3	1-21/32	3-3/8	4	92408	92438
1/2 - 20	H3	1-21/32	3-3/8	4	92409	92439
9/16 - 12	H3	1-21/32	3-19/32	4	92410	92440
9/16 - 18	H3	1-21/32	3-19/32	4	92411	92441
5/8 - 11	H3	1-13/16	3-13/16	4	92412	92442
5/8 - 18	H3	1-13/16	3-13/16	4	92413	92443
11/16 - 11	H3	2	4-1/4	4	92414	92444
11/16 - 16	H3	2	4-1/4	4	92415	92445
3/4 - 10	H3	2	4-1/4	4	92416	92446
3/4 - 16	H3	2	4-1/4	4	92417	92447
7/8 - 9	H4	2-7/32	4-11/16	4	92418	92448
7/8 - 14	H4	2-7/32	4-11/16	4	92419	92449
1 - 8	H4	2-1/2	5-1/8	4	92420	92450
1 - 14	H4	2-1/2	5-1/8	4	92421	92451

# +.005" Oversize Straight Flute Hand Taps

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

**+.005" Oversize (H11)** taps are mainly used for parts that will be plated or heat treated after tapping. Also used in materials that tend to shrink after tapping.

Tool Coatings Also Available



## List No. 2014 Machine Screw & Fractional

**STANDARD** Machine screw sizes: 12 each  
**PACKAGE** Fractional sizes: 1/4" thru 1/2" — 12 each  
 5/8" — 3 each

**Ground Thread — High Speed Steel — Plug Style Bright Finish**

PITCH DIA. LIMIT	AMOUNT LARGER THAN BASIC PITCH DIA.
H11	.0050"-.0055"

## List No. 2014 Machine Screw

SIZE	UNC	TPI	UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. PLUG
6	32	—	—	H11	11/16	2	3	34222
8	32	—	—	H11	3/4	2-1/8	4	34223
10	24	—	—	H11	7/8	2-3/8	4	34225
10	—	—	32	H11	7/8	2-3/8	4	34226

## List No. 2014 Fractional

SIZE	UNC	TPI	UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. PLUG
1/4	20	—	—	H11	1	2-1/2	4	34301
5/16	18	—	—	H11	1-1/8	2-23/32	4	34303
3/8	16	—	—	H11	1-1/4	2-15/16	4	34305
1/2	13	—	—	H11	1-21/32	3-3/8	4	34309
5/8	11	—	—	H11	1-13/16	3-13/16	4	34313

# Eight Pitch Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

**Eight Pitch** taps are often required for applications in the power generation industry and general construction.



List No. 2046 Fractional

STANDARD PACKAGE All sizes — 1 each



Available in taper (8-10 thread chamfer), plug (3-5 chamfer), or bottoming (1-2 thread chamfer)

SIZE	TPI	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO.		
						TAPER	PLUG	BOTTOM
1	8	4	H4	2½	5⅞	32323	32480	32659
1⅛	8	4	H5	2⅞	57/16	32334	32508	32501
1¼	8	4	H5	2⅞	5¾	32336	32509	32502
1⅝	8	4	H5	3	6¼	32338	32510	32503
1½	8	6	H5	3	6⅜	32340	32511	32504
1⅞	8	6	H6	3⅜	611/16	—	32512	32505
1¾	8	6	H6	3⅜	7	32344	32513	32506
17/8	8	6	H6	3⅜	75/16	—	32514	32507
2	8	6	H6	3⅜	75/8	32348	32515	32516
2⅛	8	6	H6	3⅜	8	34919	34925	34933
2¼	8	6	H6	3⅜	8¼	34920	34926	34934
2⅝	8	6	H6	4	8½	34921	34927	34935
2½	8	6	H6	4	8¾	34922	34928	34936
25/8	8	6	H8	4	8¾	—	34929	34937
2¾	8	6	H8	4	9¼	34923	34930	34938
27/8	8	6	H8	4	9¼	—	34931	34939
3	8	6	H8	4⅞	9¾	34924	34932	34940

# Surface Treated Straight Flute Hand Taps

Ground Thread — High Speed Steel

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

**Steam Oxide Finish** increases wear resistance, reduces friction, acts as a lubricant, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**



List No. 2046X — Fractional

Steam Oxide Finish

STANDARD PACKAGE 1/4" thru 1/2" — 12 each  
5/8" thru 3/4" — 3 each

Available in plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer)

SIZE	TPI		NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO.	
	UNC	UNF					PLUG	BOTTOMING
¼	20	—	4	H3	1	2½	32520	32535
	—	28	4	H3	1	2½	32521	32536
5/16	18	—	4	H3	1⅞	223/32	32522	32537
	—	24	4	H3	1⅞	223/32	32523	32538
3/8	16	—	4	H3	1¼	215/16	32524	32539
	—	24	4	H3	1¼	215/16	32525	32540
½	13	—	4	H3	121/32	33/8	32526	32541
	—	20	4	H3	121/32	33/8	32527	32542
9/16	12	—	4	H3	121/32	319/32	32532	32547
	—	18	4	H3	121/32	319/32	32533	32548
5/8	11	—	4	H3	113/16	313/16	32528	32543
	—	18	4	H3	113/16	313/16	32529	32544
¾	10	—	4	H3	2	4¼	32530	32545
	—	16	4	H3	2	4¼	32531	32546

# Straight Flute Hand Taps For Cast Iron



**Ground Thread — High Speed Steel  
Steam Oxide Over Nitride**

**Taps for Cast Iron** feature specific geometry and a wear resistant surface finish for tapping materials that produce small or powdery chips. Recommended for cast iron, cast brass and other brass materials and non-metals that produce small or powdery chips.

**List No. 2021 — Machine Screw & Fractional  
List No. 2021M — Metric**

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes.

Available in plug (3-5 chamfer) and bottoming (1-2 thread chamfer)



## List No. 2021 Machine Screw & Fractional

SIZE	THREAD TYPE	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO. PLUG	EDP NO. BOTTOM
10-24	NC	H3	4	7/8	2-3/8	34870	34890
10-32	NF	H3	4	7/8	2-3/8	34871	34891
1/4-20	NC	H3	4	1	2-1/2	34872	34892
1/4-28	NF	H3	4	1	2-1/2	34873	34893
5/16-18	NC	H3	4	1-1/8	2-23/32	34874	34894
5/16-24	NF	H3	4	1-1/8	2-23/32	34875	34895
3/8-16	NC	H3	4	1-1/4	2-15/16	34876	34896
3/8-24	NF	H3	4	1-1/4	2-15/16	34877	34897
7/16-14	NC	H3	4	1-7/16	3-5/32	34878	34898
7/16-20	NF	H3	4	1-7/16	3-5/32	34879	34899
1/2-13	NC	H3	4	1-21/32	3-3/8	34880	34900
1/2-20	NF	H3	4	1-21/32	3-3/8	34881	34901
9/16-12	NC	H3	4	1-21/32	3-19/32	34882	34902
9/16-18	NF	H3	4	1-21/32	3-19/32	34883	34903
5/8-11	NC	H3	4	1-13/16	3-13/16	34884	34904
5/8-18	NF	H3	4	1-13/16	3-13/16	34885	34905
3/4-10	NC	H3	4	2	4-1/4	34886	34906
3/4-16	NF	H3	4	2	4-1/4	34887	34907

## List No. 2021M Metric

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO. PLUG	EDP NO. BOTTOM
M6	1	D5	4	1	2-1/2	34910	34915
M8	1.25	D5	4	1-1/8	2-23/32	34911	34916
M10	1.5	D6	4	1-1/4	2-15/16	34912	34917
M12	1.75	D6	4	1-21/32	3-3/8	34913	34918

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Left Hand Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish

Left Hand taps are left hand cutting for producing left hand threads in a wide variety of materials.



List No. 2020

**STANDARD PACKAGE** #6 thru 1/2" — 12 each  
5/8" thru 3/4" — 3 each  
7/8" thru 1" — 1 each

Available in plug (3-5 thread chamfer),  
or bottoming (1-2 thread chamfer)



SIZE	TPI		NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
	UNC	UNF						
10	24	—	4	H3	7/8	2 3/8	33440	33470
	—	32	4	H3	7/8	2 3/8	33441	33471
1/4	20	—	4	H3	1	2 1/2	33442	33472
	—	28	4	H3	1	2 1/2	33443	33473
5/16	18	—	4	H3	1 1/8	2 23/32	33444	33474
	—	24	4	H3	1 1/8	2 23/32	33445	33475
3/8	16	—	4	H3	1 1/4	2 19/16	33446	33476
	—	24	4	H3	1 1/4	2 19/16	33447	33477
7/16	14	—	4	H3	1 7/16	3 3/32	33448	33478
	—	20	4	H3	1 7/16	3 3/32	33449	33479
1/2	13	—	4	H3	1 21/32	3 3/8	33450	33480
	—	20	4	H3	1 21/32	3 3/8	33451	33481
5/8	11	—	4	H3	1 13/16	3 13/16	33452	33482
	—	18	4	H3	1 13/16	3 13/16	33453	33483
3/4	10	—	4	H3	2	4 1/4	33454	33484
	—	16	4	H3	2	4 1/4	33455	33485
7/8	9	—	4	H4	2 7/32	4 11/16	33456	33486
	—	14	4	H4	2 7/32	4 11/16	33457	33487
1	8	—	4	H4	2 1/2	5 1/8	33458	33488
	—	12	4	H4	2 1/2	5 1/8	33459	33489
	—	14**	4	H4	2 1/2	5 1/8	33460	33490

\*\* UNS

**Morse FAST TAP SERVICE**  
Pages 206-240

## SPECIAL TAPS FAST QUOTE SERVICE

Call Morse Cutting Tools for all of your special tap needs.  
To expedite your quote please provide the following information:

TAP SIZE \_\_\_\_\_ CLASS of FIT or H LIMIT \_\_\_\_\_ # of FLUTES \_\_\_\_\_

TYPE of TAP \_\_\_\_\_ SURFACE TREATMENT \_\_\_\_\_

MATERIAL to be THREADED \_\_\_\_\_ HARDNESS \_\_\_\_\_

BLIND or THROUGH HOLE \_\_\_\_\_ LENGTH of THREAD \_\_\_\_\_

# of HOLES to TAP \_\_\_\_\_ TAPPING EQUIPMENT USED \_\_\_\_\_

CURRENT TAP USED \_\_\_\_\_ TAPPING PROBLEM \_\_\_\_\_

# Cleanout Taps

## Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Steam Oxide Finish

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

**Steam Oxide Finish** increases wear resistance, reduces friction, acts as a lubricant, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**



### List No. 2146 – Cleanout Taps

**Cleanout Taps** are used to restore existing internal threads by the safe removal of old finishes, burrs, debris and other obstructions.

**Special Geometry and Pitch Diameter Tolerance** are designed to help prevent cross threading or re-cutting of the existing threads.

**Flattened Point** allows getting closer to the bottom of blind holes.



### Machine Screw and Fractional

Size	TPI	Pitch Dia. Limit	No. of Flutes	Overall Length	Thread Length	Chamfer	EDP No.
10	24	H0	4	2-3/8	7/8	Plug	<a href="#">31850</a>
10	32	H0	4	2-3/8	7/8	Plug	<a href="#">31851</a>
1/4	20	H0	4	2-1/2	1	Plug	<a href="#">31852</a>
1/4	28	H0	4	2-1/2	1	Plug	<a href="#">31853</a>
5/16	18	H0	4	2-23/32	1-1/8	Plug	<a href="#">31854</a>
5/16	24	H0	4	2-23/32	1-1/8	Plug	<a href="#">31855</a>
3/8	16	H0	4	2-15/16	1-1/4	Plug	<a href="#">31856</a>
3/8	24	H0	4	2-15/16	1-1/4	Plug	<a href="#">31857</a>
7/16	14	H0	4	3-5/32	1-7/16	Plug	<a href="#">31858</a>
7/16	20	H0	4	3-5/32	1-7/16	Plug	<a href="#">31859</a>
1/2	13	H0	4	3-3/8	1-21/32	Plug	<a href="#">31860</a>
1/2	20	H0	4	3-3/8	1-21/32	Plug	<a href="#">31861</a>
5/8	11	H0	4	3-13/16	1-13/16	Plug	<a href="#">31862</a>
5/8	18	H0	4	3-13/16	1-13/16	Plug	<a href="#">31863</a>
3/4	10	H0	4	4-1/4	2	Plug	<a href="#">31864</a>
3/4	16	H0	4	4-1/4	2	Plug	<a href="#">31865</a>

### Metric

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Overall Length	Thread Length	Chamfer	EDP No.
M6	1.0	D0	4	2-1/2	1	Plug	<a href="#">31866</a>
M8	1.25	D0	4	2-23/32	1-1/8	Plug	<a href="#">31867</a>
M10	1.5	D0	4	2-15/16	1-1/4	Plug	<a href="#">31868</a>
M12	1.75	D0	4	3-3/8	1-21/32	Plug	<a href="#">31869</a>
M14	2.0	D0	4	3-19/32	1-21/32	Plug	<a href="#">31870</a>
M16	2.0	D0	4	3-13/16	1-13/16	Plug	<a href="#">31871</a>

Cleanout taps are used by hand, hand held driver, drill press, or machine to restore threaded holes. When used by machine, a holder with axial float should be used, allowing the tap to time itself to existing threads.

# Metric Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish

**Straight Flute** hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Available in sets or taper (8-10 thread chamfer), plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer).



List No. 7500

**STANDARD PACKAGE**

M1.6 thru M12 — 12 each  
M14 thru M16 — 3 each  
M18 thru M39 — 1 each  
Sets (Taper, Plug, Bottom)

Tool Coatings Also Available



**TAPS & DIES**

SIZE	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	SETS		EDP NO.	
					EDP NO.	TAPER	PLUG	BOTTOM
M1.6 x 0.35	D3	2	5/16	1-5/8	38200	38141	38016	38116
M1.8 x 0.35	D3	2	3/8	1-11/16	38201	38142	38017	38117
M2 x 0.4	D3	3	7/16	1-3/4	38203	38143	38018	38118
M2.2 x 0.45	D3	3	7/16	1-3/4	38204	38144	38019	38119
M2.5 x 0.45	D3	3	1/2	1-13/16	38205	38145	38001	38101
M3 x 0.5	D3	3	5/8	1-15/16	38206	38146	38002	38102
M3.5 x 0.6	D4	3	11/16	2	38207	38147	38003	38103
M4 x 0.7	D4	4	3/4	2-1/8	38208	38148	38004	38104
M4.5 x 0.75	D4	4	7/8	2-3/8	38209	38149	38005	38105
M5 x 0.8	D4	4	7/8	2-3/8	38210	38150	38006	38106
M6 x 1	D5	4	1	2-1/2	38211	38151	38007	38107
M7 x 1	D5	4	1-1/8	2-23/32	38212	38152	38008	38108
M8 x 1	D5	4	1-1/8	2-23/32	38213	38153	38020	38120
*M8 x 1.25	D5	4	1-1/8	2-23/32	38214	38154	38009	38109
M10 x 1.25	D5	4	1-1/4	2-15/16	38215	38155	38021	38121
*M10 x 1.5	D6	4	1-1/4	2-15/16	38216	38156	38010	38110
M12 x 1.25	D5	4	1-21/32	3-3/8	38217	38157	38022	38122
*M12 x 1.75	D6	4	1-21/32	3-3/8	38218	38158	38011	38111
M14 x 1.5	D6	4	1-21/32	3-19/32	38219	38159	38023	38123
*M14 x 2	D7	4	1-21/32	3-19/32	38220	38160	38012	38112
M16 x 1.5	D6	4	1-13/16	3-13/16	38221	38161	38024	38124
*M16 x 2	D7	4	1-13/16	3-13/16	38222	38162	38013	38113
M18 x 1.5	D6	4	1-13/16	4-1/32	38223	38163	38025	38125
*M18 x 2.5	D7	4	1-13/16	4-1/32	38224	38164	38014	38114
M20 x 1.5	D6	4	2	4-15/32	38225	38165	38026	38126
*M20 x 2.5	D7	4	2	4-15/32	38226	38166	38015	38115
M22 x 1.5	D6	4	2-7/32	4-11/16	38227	38167	38027	38127
*M22 x 2.5	D7	4	2-7/32	4-11/16	38228	38168	38028	38128
M24 x 2	D7	4	2-7/32	4-29/32	38229	38169	38029	38129
*M24 x 3	D8	4	2-7/32	4-29/32	38230	38170	38030	38130
M27 x 2	D7	4	2-1/2	5-1/8	38231	38171	38031	38131
*M27 x 3	D8	4	2-1/2	5-1/8	38232	38172	38032	38132
M30 x 2	D7	4	2-9/16	5-7/16	38233	38173	38033	38133
*M30 x 3.5	D9	4	2-9/16	5-7/16	38234	38174	38034	38134
M33 x 2	D7	6	2-9/16	5-3/4	38238	38178	38038	38138
*M33 x 3.5	D9	4	2-9/16	5-3/4	—	—	38035	—
M36 x 3	D8	4	3	6-1/16	38236	38176	38036	38136
*M36 x 4	D9	4	3	6-1/16	38237	38177	38037	38137

Pitch diameters are those recommended for 6H class of thread.

\*Designates course pitch

**Morse FAST TAP SERVICE**  
Pages 206-240

# Spiral Point Plug Taps

## Ground Thread — High Speed Steel

**Spiral Point** taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

**Steam Oxide Finish** increases wear resistance, reduces friction, acts as a lubricant, reduces galling and chip welding. Improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**



List No. 2070 Machine Screw  
Bright Finish



List No. 2070X Machine Screw  
Steam Oxide Finish

### STANDARD PACKAGE

All sizes — 12 each

Bold type indicates standard H limit.



SIZE	TPI		PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	2070	2070X
	UNC	UNF					EDP NO.	EDP NO.
0	—	80	H1	5/16	1 5/8	2	34001	—
	—	80	<b>H2</b>	5/16	1 5/8	2	34002	34122
1	64	—	H1	3/8	1 1/16	2	34003	—
	64	—	<b>H2</b>	3/8	1 1/16	2	34004	—
	—	72	H1	3/8	1 1/16	2	34005	—
	—	72	<b>H2</b>	3/8	1 1/16	2	34006	34126
2	56	—	<b>H2</b>	7/16	1 3/4	2	34008	34127
	—	64	<b>H2</b>	7/16	1 3/4	2	34010	—
3	48	—	<b>H2</b>	1/2	1 3/16	2	34012	34129
	—	56	H1	1/2	1 3/16	2	34013	—
	—	56	<b>H2</b>	1/2	1 3/16	2	34014	34131
4	40	—	H1	9/16	1 7/8	2	34015	34132
	40	—	<b>H2</b>	9/16	1 7/8	2	34016	34133
	—	48	H1	9/16	1 7/8	2	34017	—
	—	48	<b>H2</b>	9/16	1 7/8	2	34018	—
	—	*36	<b>H2</b>	9/16	1 7/8	2	34019	34134
5	40	—	H1	5/8	1 5/16	2	34020	—
	40	—	<b>H2</b>	5/8	1 5/16	2	34021	34136
	—	44	<b>H2</b>	5/8	1 5/16	2	34022	—
6	32	—	H1	11/16	2	2	34023	—
	32	—	H2	11/16	2	2	34024	34137
	32	—	<b>H3</b>	11/16	2	2	34025	34138
	—	40	<b>H2</b>	11/16	2	2	34026	34139
8	32	—	H1	3/4	2 1/8	2	34027	—
	32	—	H2	3/4	2 1/8	2	34028	34140
	32	—	<b>H3</b>	3/4	2 1/8	2	34029	34141
	—	36	<b>H2</b>	3/4	2 1/8	2	34030	34142
10	24	—	H1	7/8	2 3/8	2	34031	—
	24	—	H2	7/8	2 3/8	2	34032	34143
	24	—	<b>H3</b>	7/8	2 3/8	2	34033	34144
	—	32	H1	7/8	2 3/8	2	34034	—
	—	32	H2	7/8	2 3/8	2	34035	34145
	—	32	<b>H3</b>	7/8	2 3/8	2	34036	34146
12	24	—	<b>H3</b>	15/16	2 3/8	2	34038	34147
	—	28	<b>H3</b>	15/16	2 3/8	2	34039	34148

\*UNS

Tool Coatings Also Available



# Titanium Nitride (TiN) Coated Spiral Point Plug Taps

**Spiral Point** taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

**Titanium Nitride (TiN) Coating** results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.



List No. 2070G Machine Screw

Ground Thread - High Speed Steel

STANDARD PACKAGE. All sizes — 12 each



SIZE	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.
0-80	H2	5/16	1 5/8	2	92520
1-64	H2	3/8	1 11/16	2	92521
2-56	H2	7/16	1 3/4	2	92522
2-64	H2	7/16	1 3/4	2	92523
3-48	H2	1/2	1 13/16	2	92524
3-56	H2	1/2	1 13/16	2	92525
4-40	H2	9/16	1 7/8	2	92526
4-48	H2	9/16	1 7/8	2	92527
5-40	H2	5/8	1 15/16	2	92528
5-44	H2	5/8	1 15/16	2	92529
6-32	H3	1 1/16	2	2	92530
6-40	H2	1 1/16	2	2	92531
8-32	H3	3/4	2 1/8	2	92532
8-36	H2	3/4	2 1/8	2	92533
10-24	H3	7/8	2 3/8	2	92534
10-32	H3	7/8	2 3/8	2	92535
12-24	H3	1 5/16	2 3/8	2	92536
12-28	H3	1 5/16	2 3/8	2	92537

# + .005" Oversize Spiral Point Plug Taps

**Spiral Point** taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

**+ .005" Oversize (H11)** taps are mainly used for parts that will be plated or heat treated after tapping. Also used in materials that tend to shrink after tapping



List No. 2015 Machine Screw & Fractional

Ground Thread — High Speed Steel

Bright Finish

STANDARD PACKAGE. Machine screw sizes: All sizes — 12 each  
Fractional sizes:

1/4" thru 1/2" — 12 each  
5/8" — 3 each

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PITCH DIA. LIMIT	AMOUNT LARGER THAN BASIC PITCH DIA.
H11	.0050"-.0055"

SIZE	UNC	TPI	UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.
6	32	—	—	H11	1 1/16	2	2	34241
8	32	—	—	H11	3/4	2 1/8	2	34243
10	24	—	—	H11	7/8	2 3/8	2	34244
10	—	—	32	H11	7/8	2 3/8	2	34245
1/4	20	—	—	H11	1	2 1/2	2	34251
5/16	18	—	—	H11	1 1/8	2 23/32	2	34253
3/8	16	—	—	H11	1 1/4	2 15/16	3	34255
1/2	13	—	—	H11	1 21/32	3 3/8	3	34259
5/8	11	—	—	H11	1 13/16	3 13/16	3	34263

# Spiral Point Plug Taps

Ground Thread — High Speed Steel

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

Steam Oxide Finish increases wear resistance reduces friction, acts as a lubricant, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**



List No. 2047 Fractional  
Bright Finish



List No. 2047X Fractional  
Steam Oxide Finish

STANDARD PACKAGE 1/4" thru 1/2" — 12 each  
9/16" thru 3/4" — 3 each

Tool Coatings Also Available

Bold type indicates standard H limit.

SIZE	TPI		NO. OF FLUTES		PITCH DIA. LIMIT	THREAD LENGTH	OAL	2047	2047X	
	UNC	UNF	STD.	OPTL.				EDP NO.	EDP NO.	
1/4	20	—	2	—	H1	1	2-1/2	<b>33001</b>	—	
	20	—	2	—	H2	1	2-1/2	<b>33002</b>	<b>33055</b>	
	20	—	2	—	<b>H3</b>	1	2-1/2	<b>33003</b>	<b>33056</b>	
	20	—	2	—	H5	1	2-1/2	<b>33004</b>	<b>33057</b>	
	20	—	—	3	—	<b>H3</b>	1	2-1/2	<b>33005</b>	—
	20	—	—	3	—	H5	1	2-1/2	<b>33006</b>	—
1/4	—	28	2	—	H1	1	2-1/2	<b>33007</b>	—	
	—	28	2	—	H2	1	2-1/2	<b>33008</b>	<b>33058</b>	
	—	28	2	—	<b>H3</b>	1	2-1/2	<b>33009</b>	<b>33059</b>	
	—	28	2	—	H4	1	2-1/2	<b>33010</b>	<b>33060</b>	
	—	28	—	3	H2	1	2-1/2	<b>33011</b>	—	
	—	28	—	3	H4	1	2-1/2	<b>33012</b>	—	
5/16	18	—	2	—	H1	1-1/8	2-23/32	<b>33013</b>	—	
	18	—	2	—	H2	1-1/8	2-23/32	<b>33014</b>	—	
	18	—	2	—	<b>H3</b>	1-1/8	2-23/32	<b>33015</b>	<b>33061</b>	
	18	—	2	—	H5	1-1/8	2-23/32	<b>33016</b>	<b>33062</b>	
	18	—	—	3	<b>H3</b>	1-1/8	2-23/32	<b>33017</b>	<b>33063</b>	
	18	—	—	3	H5	1-1/8	2-23/32	<b>33018</b>	<b>33064</b>	
5/16	—	24	2	—	H1	1-1/8	2-23/32	<b>33019</b>	—	
	—	24	2	—	H2	1-1/8	2-23/32	<b>33020</b>	<b>33065</b>	
	—	24	2	—	<b>H3</b>	1-1/8	2-23/32	<b>33021</b>	<b>33066</b>	
	—	24	2	—	H4	1-1/8	2-23/32	<b>33022</b>	—	
	—	24	—	3	H2	1-1/8	2-23/32	<b>33023</b>	—	
	—	24	—	3	H4	1-1/8	2-23/32	<b>33024</b>	<b>33067</b>	
3/8	16	—	3	—	H1	1-1/4	2-15/16	<b>33025</b>	—	
	16	—	3	—	H2	1-1/4	2-15/16	<b>33026</b>	—	
	16	—	3	—	<b>H3</b>	1-1/4	2-15/16	<b>33027</b>	<b>33068</b>	
	16	—	3	—	H5	1-1/4	2-15/16	<b>33028</b>	<b>33069</b>	
3/8	—	24	3	—	H1	1-1/4	2-15/16	<b>33029</b>	—	
	—	24	3	—	H2	1-1/4	2-15/16	<b>33030</b>	—	
	—	24	3	—	<b>H3</b>	1-1/4	2-15/16	<b>33031</b>	<b>33070</b>	
	—	24	3	—	H4	1-1/4	2-15/16	<b>33032</b>	—	
7/16	14	—	3	—	H2	1-7/16	3-5/32	<b>33033</b>	—	
	14	—	3	—	<b>H3</b>	1-7/16	3-5/32	<b>33034</b>	<b>33071</b>	
	14	—	3	—	H5	1-7/16	3-5/32	<b>33035</b>	<b>33072</b>	
7/16	—	20	3	—	<b>H3</b>	1-7/16	3-5/32	<b>33036</b>	<b>33073</b>	
	—	20	3	—	H5	1-7/16	3-5/32	<b>33037</b>	<b>33074</b>	
1/2	13	—	3	—	H2	1-21/32	3-3/8	<b>33039</b>	—	
	13	—	3	—	<b>H3</b>	1-21/32	3-3/8	<b>33040</b>	<b>33075</b>	
	13	—	3	—	H5	1-21/32	3-3/8	<b>33041</b>	<b>33076</b>	
1/2	—	20	3	—	H1	1-21/32	3-3/8	<b>33042</b>	—	
	—	20	3	—	H2	1-21/32	3-3/8	<b>33043</b>	—	
	—	20	3	—	<b>H3</b>	1-21/32	3-3/8	<b>33044</b>	<b>33077</b>	
	—	20	3	—	H5	1-21/32	3-3/8	<b>33045</b>	<b>33078</b>	
5/8	11	—	3	—	<b>H3</b>	1-13/16	3-13/16	<b>33046</b>	<b>33079</b>	
	11	—	3	—	H5	1-13/16	3-13/16	<b>33047</b>	<b>33080</b>	
	—	18	3	—	<b>H3</b>	1-13/16	3-13/16	<b>33050</b>	<b>33081</b>	
3/4	10	—	3	—	<b>H3</b>	2	4-1/4	<b>33048</b>	<b>33082</b>	
	10	—	3	—	H5	2	4-1/4	<b>33049</b>	<b>33083</b>	
	—	16	3	—	<b>H3</b>	2	4-1/4	<b>33052</b>	<b>33084</b>	

# Titanium Nitride (TiN) Coated Spiral Point Plug Taps

**Spiral Point** taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

**Titanium Nitride (TiN) Coating** results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.



List No. 2047G Fractional

Ground Thread - High Speed Steel

STANDARD PACKAGE 1/4 - 1/2 — 12 each  
5/8 - 3/4 — 3 each



SIZE	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.
1/4-20	H3	1	2 1/2	2	92500
1/4-28	H3	1	2 1/2	2	92501
5/16-18	H3	1 1/8	2 23/32	2	92502
5/16-24	H3	1 1/8	2 23/32	2	92503
3/8-16	H3	1 1/4	2 15/16	3	92504
3/8-24	H3	1 1/4	2 15/16	3	92505
7/16-14	H3	1 7/16	3 5/32	3	92506
7/16-20	H3	1 7/16	3 5/32	3	92507
1/2-13	H3	1 21/32	3 3/8	3	92508
1/2-20	H3	1 21/32	3 3/8	3	92509
5/8-11	H3	1 13/16	3 13/16	3	92510
5/8-18	H3	1 13/16	3 13/16	3	92511
3/4-10	H3	2	4 1/4	3	92512
3/4-16	H3	2	4 1/4	3	92513

# Spiral Point Bottoming Taps

**Spiral Point Bottoming** taps are designed for machine tapping in blind holes with adequate chip space at the bottom of the hole. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds. Recommended for a wide range of materials.



List No. 2047 Fractional

List No. 2070 Machine Screw

STANDARD PACKAGE All sizes — 12 each

Ground Thread — High Speed Steel  
Bright Finish

SIZE	TPI		NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO.
	UNC	UNF					
0	—	80	2	H2	5/16	1 5/8	34101
2	56	—	2	H2	7/16	1 3/4	34102
3	48	—	2	H2	1/2	1 13/16	34103
4	40	—	2	H2	9/16	1 7/8	34104
5	40	48	2	H2	9/16	1 7/8	34105
		—	2	H2	5/8	1 15/16	34106
6	32	—	2	H2	1 1/16	2	34107
		—	2	H3	1 1/16	2	34108
		40	2	H2	1 1/16	2	34109
8	32	—	2	H2	3/4	2 1/8	34110
8	32	—	2	H3	3/4	2 1/8	34111
10	24	—	2	H2	7/8	2 3/8	34112
		—	2	H3	7/8	2 3/8	34113
	—	32	2	H2	7/8	2 3/8	34114
	—	32	2	H3	7/8	2 3/8	34115
12	24	—	2	H3	15/16	2 3/8	34116
1/4	20	—	2	H3	1	2 1/2	33101
		28	2	H3	1	2 1/2	33102
5/16	18	—	2	H3	1 1/8	2 23/32	33103
		24	2	H3	1 1/8	2 23/32	33104

# Metric Spiral Point Plug Taps

Ground Thread — High Speed Steel

**Spiral Point** taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

**STANDARD** M1.6 thru M12 — 12 each  
**PACKAGE** M14 thru M16 — 3 each  
 M18 thru M20 — 1 each



List No. 7501 Bright Finish



List No. 7501G TiN Coated

**Titanium Nitride (TiN) Coating** results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.

SIZE	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	7501 EDP NO.	7501G EDP NO.
M1.6 × 0.35	D3	5/16	1-5/8	2	38516	98516
M1.8 × 0.35	D3	3/8	1-11/16	2	38517	98517
M2 × 0.4	D3	7/16	1-3/4	2	38518	98518
M2.2 × 0.45	D3	7/16	1-3/4	2	38519	98519
M2.5 × 0.45	D3	1/2	1-13/16	2	38501	98501
M3 × 0.5	D3	5/8	1-15/16	2	38502	98502
M3.5 × 0.6	D4	11/16	2	2	38503	98503
M4 × 0.7	D4	3/4	2-1/8	2	38504	98504
M4.5 × 0.75	D4	7/8	2-3/8	2	38505	98505
M5 × 0.8	D4	7/8	2-3/8	2	38506	98506
M6 × 1	D5	1	2-1/2	2	38507	98507
M7 × 1	D5	1-1/8	2-23/32	2	38508	98508
M8 × 1	D5	1-1/8	2-23/32	2	38520	98520
M8 × 1.25*	D5	1-1/8	2-23/32	2	38509	98509
M10 × 1.25	D5	1-1/4	2-15/16	3	38521	98521
M10 × 1.5*	D6	1-1/4	2-15/16	3	38510	98510
M12 × 1.25	D5	1-21/32	3-3/8	3	38522	98522
M12 × 1.75*	D6	1-21/32	3-3/8	3	38511	98511
M14 × 1.5	D6	1-21/32	3-19/32	3	38523	98523
M14 × 2*	D7	1-21/32	3-19/32	3	38512	98512
M16 × 1.5	D6	1-13/16	3-13/16	3	38524	98524
M16 × 2*	D7	1-13/16	3-13/16	3	38513	98513
M18 × 2.5	D7	1-13/16	4-1/32	3	38514	98514
M20 × 2.5	D7	2	4-15/32	3	38515	98515

Pitch diameters are those recommended for 6H class of thread

\* Designates Course Pitch

## TOOL COATING SERVICE

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish. **PLEASE INQUIRE.**

**TiN** — Titanium Nitride

**TiCN** — Titanium Carbonitride

**TiAlN** — Titanium Aluminum Nitride

**AlTiN** — Aluminum Titanium Nitride

**CrN** — Chromium Nitride

**CrC** — Chromium Carbide

**DLC** — Amorphous Diamond-Like Carbon

# Slow Spiral Spiral Flute Taps

Ground Thread — High Speed Steel  
30° Helix Angle — Bright Finish



List No. 2063 Machine Screw  
List No. 2039 Fractional

STANDARD PACKAGE All sizes — 12 each



**Spiral Flute** taps lift the chips out of the hole in blind hole tapping, eliminating chip disposal problems, damaged threads and broken taps. They will also bridge interruptions in the tapped hole. **Slow Spiral** taps have a stronger cutting edge (less susceptible to chipping) than Fast Spiral taps and are recommended for general purpose applications.

SIZE	TPI		NO. OF FLUTES		PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
	UNC	UNF	STD.	OPTL.					
4	40	—	2	—	H2	9/16	1 7/8	33401	33426
5	40	—	2	—	H2	5/8	1 15/16	33402	33427
6	32	—	2	—	H3	1 1/16	2	33403	33428
8	32	—	2	—	H3	3/4	2 1/8	33404	33429
10	24	—	2	—	H3	7/8	2 3/8	33405	33430
10	—	32	2	—	H3	7/8	2 3/8	33406	33431
1/4	20	—	2	—	H3	1	2 1/2	32121	—
	—	28	2	—	H3	1	2 1/2	32123	32152
	—	28	—	3	H3	1	2 1/2	—	32153*
5/16	18	—	3	—	H3	1 1/8	2 23/32	32125	32154
	—	24	3	—	H3	1 1/8	2 23/32	32126	32155
3/8	16	—	3	—	H3	1 1/4	2 15/16	32127	32156
	—	24	3	—	H3	1 1/4	2 15/16	32128	32157
1/2	13	—	3	—	H3	1 21/32	3 3/8	32130	32159
	—	20	3	—	H3	1 21/32	3 3/8	32131	—

\*Available While Supplies Last

# Fast Spiral Spiral Flute Taps

Ground Thread — High Speed Steel  
52° Helix Angle — Bright Finish



List No. 2059 Machine Screw & Fractional

STANDARD PACKAGE All sizes — 12 each

**Spiral Flute** taps lift the chips out of the hole in blind hole tapping, eliminating chip disposal problems, damaged threads and broken taps. They will also bridge interruptions in the tapped hole. **Fast Spiral** taps provide enhanced chip lifting action, will bridge wider interruptions and have a freer-cutting geometry. Recommended for softer materials that produce stringy chips.

SIZE	TPI		PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	PLUG EDP NO.	BOTTOM EDP NO.
	UNC	UNF						
3	48	—	H2	1/2	1 13/16	2	33201*	33251*
4	40	—	H2	9/16	1 7/8	2	33203	33253
5	40	—	H2	5/8	1 15/16	2	33205	33255
6	32	—	H3	1 1/16	2	2	33208	33258
8	32	—	H2	3/4	2 1/8	3	33210	—
8	32	—	H3	3/4	2 1/8	3	33211	33261
10	24	—	H3	7/8	2 3/8	3	33214	33264
10	—	32	H3	7/8	2 3/8	3	33216	33266
12	24	—	H3	15/16	2 3/8	3	33217	33267
1/4	20	—	H3	1	2 1/2	3	33302	33352
	—	28	H3	1	2 1/2	3	33305	33355
5/16	18	—	H3	1 1/8	2 23/32	3	33307	33357
	—	24	H3	1 1/8	2 23/32	3	33309	33359
3/8	16	—	H3	1 1/4	2 15/16	3	33311	33361
	—	24	H3	1 1/4	2 15/16	3	33313	33363
7/16	14	—	H3	1 7/16	3 3/32	3	33314	33364
	—	20	H3	1 7/16	3 3/32	3	33315	33365
1/2	13	—	H3	1 21/32	3 3/8	3	33316	33366
	—	20	H3	1 21/32	3 3/8	3	33317	33367

\*Available While Supplies Last

# Thread Forming Taps

## Ground Thread — High Speed Steel

**Thread Forming** taps cold form rather than cut the threads. Advantages include no chips to dispose of, stronger higher quality threads, increased tapping speeds, longer tap life and reduced tap breakage. Recommended for a wide variety of ductile materials.

**Lube Grooves** provide a path for lubrication and act as vents to relieve pressure in blind hole tapping.

**Plug Style** (4 threads tapered) for through holes and blind holes with adequate depth. The longer taper lead is easier starting, requires less torque, produces less burr above the mouth of the tapped hole and increases tool life.

**Bottoming Style** (2 threads tapered) for blind holes.

**Titanium Nitride (TiN) Coating** results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.



List No. 2105 Bright Finish  
List No. 2105G TiN Coated

Tool Coatings  
Also Available

**NOTE:** Thread forming taps require a larger **tap drill size** than cutting taps because the material flows during the thread forming process. It may be necessary to experiment to determine the required hole size to produce a specific percent of thread. **Countersinking** before tapping is recommended because the forming process usually displaces material above the mouth of the tapped hole.

**STANDARD PACKAGE** No. 0 thru 1/2" — 12 each  
1/16" thru 3/4" — 3 each  
M3 thru M12 — 12 each  
M14 thru M16 — 3 each  
M18 thru M24 — 1 each

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## Machine Screw

SIZE	TPI		PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG		BOTTOM	
	UNC	UNF					BRIGHT EDP NO.	TIN COATED EDP NO.	BRIGHT EDP NO.	TIN COATED EDP NO.
0	80	—	H2	5/16	15/8	1	—	—	36370	96370
1	64	—	H2	3/8	1 11/16	1	—	—	36371	96371
	—	72	H2	3/8	1 11/16	1	—	—	36372	96372
2	56	—	H2	7/16	1 3/4	1	—	—	36373	96373
	56	—	H3	7/16	1 3/4	1	—	—	36374	96374
	—	64	H2	7/16	1 3/4	1	—	—	36375	96375
	—	64	H3	7/16	1 3/4	1	—	—	36376	96376
3	48	—	H2	1/2	1 13/16	1	—	—	36377	96377
	48	—	H3	1/2	1 13/16	1	—	—	36378	96378
	—	56	H2	1/2	1 13/16	1	—	—	36379	96379
	—	56	H3	1/2	1 13/16	1	—	—	36380	96380
4	40	—	H3	9/16	1 7/8	3	36281	96281	36381	96381
	40	—	H5	9/16	1 7/8	3	36282	96282	36382	96382
	—	48	H3	9/16	1 7/8	3	36283	96283	36383	96383
	—	48	H5	9/16	1 7/8	3	36284	96284	36384	96384
5	40	—	H3	5/8	1 15/16	3	36285	96285	36385	96385
	40	—	H5	5/8	1 15/16	3	36286	96286	36386	96386
	—	44	H3	5/8	1 15/16	3	36287	96287	36387	96387
	—	44	H5	5/8	1 15/16	3	36288	96288	36388	96388
6	32	—	H3	1 1/16	2	3	36289	96289	36389	96389
	32	—	H5	1 1/16	2	3	36290	96290	36390	96390
	—	40	H3	1 1/16	2	3	36291	96291	36391	96391
	—	40	H5	1 1/16	2	3	36292	96292	36392	96392
8	32	—	H3	3/4	2 1/8	3	36293	96293	36393	96393
	32	—	H5	3/4	2 1/8	3	36294	96294	36394	96394
	—	36	H3	3/4	2 1/8	3	36295	96295	36395	96395
	—	36	H5	3/4	2 1/8	3	36296	96296	36396	96396
10	24	—	H4	7/8	2 3/8	4	36297	96297	36397	96397
	24	—	H6	7/8	2 3/8	4	36298	96298	36398	96398
	—	32	H4	7/8	2 3/8	4	36299	96299	36399	96399
	—	32	H6	7/8	2 3/8	4	36300	96300	36400	96400
12	24	—	H4	15/16	2 3/8	4	36301	96301	36401	96401
	24	—	H6	15/16	2 3/8	4	36302	96302	36402	96402
	—	28	H4	15/16	2 3/8	4	36303	96303	36403	96403
	—	28	H6	15/16	2 3/8	4	36304	96304	36404	96404

SIZE	TPI		PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG		BOTTOM	
	UNC	UNF					BRIGHT EDP NO.	TIN COATED EDP NO.	BRIGHT EDP NO.	TIN COATED EDP NO.
1/4	20	—	H4	1	2½	4	36310	96310	36410	96410
	20	—	H6	1	2½	4	36311	96311	36411	96411
	—	28	H4	1	2½	4	36312	96312	36412	96412
	—	28	H6	1	2½	4	36313	96313	36413	96413
5/16	18	—	H5	1½	2 <sup>23</sup> / <sub>32</sub>	4	36314	96314	36414	96414
	18	—	H7	1½	2 <sup>23</sup> / <sub>32</sub>	4	36315	96315	36415	96415
	—	24	H5	1½	2 <sup>23</sup> / <sub>32</sub>	4	36316	96316	36416	96416
	—	24	H7	1½	2 <sup>23</sup> / <sub>32</sub>	4	36317	96317	36417	96417
3/8	16	—	H5	1¼	2 <sup>15</sup> / <sub>16</sub>	4	36318	96318	36418	96418
	16	—	H7	1¼	2 <sup>15</sup> / <sub>16</sub>	4	36319	96319	36419	96419
	—	24	H5	1¼	2 <sup>15</sup> / <sub>16</sub>	4	36320	96320	36420	96420
	—	24	H7	1¼	2 <sup>15</sup> / <sub>16</sub>	4	36321	96321	36421	96421
7/16	14	—	H5	1 <sup>7</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>32</sub>	4	36322	96322	36422	96422
	14	—	H8	1 <sup>7</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>32</sub>	4	36323	96323	36423	96423
	—	20	H5	1 <sup>7</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>32</sub>	4	36324	96324	36424	96424
	—	20	H8	1 <sup>7</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>32</sub>	4	36325	96325	36425	96425
1/2	13	—	H5	1 <sup>21</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	4	36326	96326	36426	96426
	13	—	H8	1 <sup>21</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	4	36327	96327	36427	96427
	—	20	H5	1 <sup>21</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	4	36328	96328	36428	96428
	—	20	H8	1 <sup>21</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	4	36329	96329	36429	96429
9/16	12	—	H7	1 <sup>21</sup> / <sub>32</sub>	3 <sup>19</sup> / <sub>32</sub>	6	36330	96330	36430	96430
	12	—	H10	1 <sup>21</sup> / <sub>32</sub>	3 <sup>19</sup> / <sub>32</sub>	6	36331	96331	36431	96431
	—	18	H7	1 <sup>21</sup> / <sub>32</sub>	3 <sup>19</sup> / <sub>32</sub>	6	36332	96332	36432	96432
	—	18	H10	1 <sup>21</sup> / <sub>32</sub>	3 <sup>19</sup> / <sub>32</sub>	6	36333	96333	36433	96433
5/8	11	—	H7	1 <sup>13</sup> / <sub>16</sub>	3 <sup>19</sup> / <sub>16</sub>	6	36334	96334	36434	96434
	11	—	H10	1 <sup>13</sup> / <sub>16</sub>	3 <sup>19</sup> / <sub>16</sub>	6	36335	96335	36435	96435
	—	18	H7	1 <sup>13</sup> / <sub>16</sub>	3 <sup>19</sup> / <sub>16</sub>	6	36336	96336	36436	96436
	—	18	H10	1 <sup>13</sup> / <sub>16</sub>	3 <sup>19</sup> / <sub>16</sub>	6	36337	96337	36437	96437
3/4	10	—	H7	2	4¼	6	36338	96338	36438	96438
	10	—	H10	2	4¼	6	36339	96339	36439	96439
	—	16	H7	2	4¼	6	36340	96340	36440	96440
	—	16	H10	2	4¼	6	36341	96341	36441	96441

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### Metric

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG		BOTTOM	
						BRIGHT EDP NO.	TIN COATED EDP NO.	BRIGHT EDP NO.	TIN COATED EDP NO.
M3	0.5	D5	5/8	1 <sup>15</sup> / <sub>16</sub>	3	36350	96350	36450	96450
M4	0.7	D6	3/4	2 <sup>1</sup> / <sub>8</sub>	3	36351	96351	36451	96451
M5	0.8	D7	7/8	2 <sup>3</sup> / <sub>8</sub>	4	36352	96352	36452	96452
M6	1	D8	1	2½	4	36353	96353	36453	96453
M8	1.25	D9	1½	2 <sup>23</sup> / <sub>32</sub>	4	36354	96354	36454	96454
M10	1.5	D10	1¼	2 <sup>15</sup> / <sub>16</sub>	4	36355	96355	36455	96455
M12	1.75	D11	1 <sup>21</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	4	36356	96356	36456	96456
M14	2	D11	1 <sup>21</sup> / <sub>32</sub>	3 <sup>19</sup> / <sub>32</sub>	6	36357	96357	36457	96457
M16	2	D12	1 <sup>13</sup> / <sub>16</sub>	3 <sup>13</sup> / <sub>16</sub>	6	36358	96358	36458	96458
M20	2.5	D12	2	4 <sup>15</sup> / <sub>32</sub>	6	36359	96359	36459	96459

# Extension Straight Flute Hand Taps

Straight Flute Extension Hand Taps are used for tapping by hand or machine in blind holes or through holes in a wide variety of materials.



List No. 2040  
Ground Thread — High Speed Steel  
Bright Finish

Small Shank Taps and Standard Shank Taps Size 7/16" and Larger have a shank diameter that is smaller than the minor diameter of the thread.

## 4" Overall Length

Size	TPI UNC	TPI UNF	Pitch Dia. Limit	No. of Flutes	Thread Length	Shank Style	Shank Dia.	EDP No.	
								Plug	Bottom
1/4	20		H3	4	1	Small	.185	31600	—
5/16	18		H3	4	1-1/8	Small	.240	31601	—
3/8	16		H3	4	1-1/4	Small	.275	31602	—
1/2	13		H3	4	1-21/32	Std	.367	31603	—

## 6" Overall Length

6	32		H3	3	11/16	Small	.097	31614	—
6	32		H3	3	11/16	Std	.141	31615	31616
8	32		H3	4	3/4	Small	.123	31617	—
8	32		H3	4	3/4	Std	.168	31618	31619
10	24		H3	4	7/8	Small	.136	31620	—
10	24		H3	4	7/8	Std	.194	31621	31622
10		32	H3	4	7/8	Small	.136	31623	—
10		32	H3	4	7/8	Std	.194	31624	31625
1/4	20		H3	4	1	Small	.185	31626	—
1/4	20		H3	4	1	Std	.255	31627	31628
1/4		28	H3	4	1	Small	.185	31629	—
1/4		28	H3	4	1	Std	.255	31630	31631
5/16	18		H3	4	1-1/8	Small	.240	31632	—
5/16	18		H3	4	1-1/8	Std	.318	31633	31634
5/16		24	H3	4	1-1/8	Small	.240	31635	—
5/16		24	H3	4	1-1/8	Std	.318	31636	31637
3/8	16		H3	4	1-1/4	Small	.275	31638	31639
3/8	16		H3	4	1-1/4	Std	.381	31640	31641
3/8		24	H3	4	1-1/4	Small	.275	31642	—
3/8		24	H3	4	1-1/4	Std	.381	31643	31644
7/16	14		H3	4	1-7/16	Std	.323	31645	31646
7/16		20	H3	4	1-7/16	Std	.323	31647	31648
1/2	13		H3	4	1-21/32	Std	.367	31649	31651
1/2	13		H3	4	1-21/32	Large	.507	31650	—
1/2		20	H3	4	1-21/32	Std	.367	31652	—
9/16	12		H3	4	1-21/32	Std	.429	31653	31654
9/16		18	H3	4	1-21/32	Std	.429	31655	31656
5/8	11		H3	4	1-13/16	Std	.480	31657	—
5/8		18	H3	4	1-13/16	Std	.480	31658	31659
3/4	10		H3	4	2	Std	.590	31660	31661
3/4		16	H3	4	2	Std	.590	31662	—
7/8	9		H4	4	2-7/32	Std	.697	31663	—
1	8		H4	4	2-1/2	Std	.800	31664	—

## 8" Overall Length

1/4	20		H3	4	1	Std	.255	31685	—
5/16	18		H3	4	1-1/8	Std	.318	31686	—
3/8	16		H3	4	1-1/4	Small	.275	31687	—
3/8	16		H3	4	1-1/4	Std	.381	31688	—
7/16	14		H3	4	1-7/16	Std	.323	31689	—
1/2	13		H3	4	1-21/32	Std	.367	31690	—
1/2	13		H3	4	1-21/32	Large	.507	31691	—
5/8	11		H3	4	1-13/16	Std	.480	31692	—
3/4	10		H3	4	2	Std	.590	31693	—
7/8	9		H4	4	2-7/32	Std	.697	31694	—
1	8		H4	4	2-1/2	Std	.800	31695	31696



# Extension Spiral Point Plug Taps

Spiral Point Extension Taps are used for tapping through holes by machine in a wide variety of materials. Chips are ejected ahead of the tap eliminating problems associated with chips remaining in the hole.



List No. 2041  
Ground Thread — High Speed Steel  
Bright Finish

Small Shank Taps and Standard Shank Taps Size 7/16" and Larger have a shank diameter that is smaller than the minor diameter of the thread.

### 4" Overall Length

Size	TPI UNC	TPI UNF	Pitch Dia. Limit	No. of Flutes	Thread Length	Shank Style	Shank Dia.	EDP NO.
6	32		H3	2	11/16	Small	.097	31710
6	32		H3	2	11/16	Std	.141	31711
8	32		H3	2	3/4	Small	.123	31712
8	32		H3	2	3/4	Std	.168	31713
10	24		H3	2	7/8	Small	.136	31714
10	24		H3	2	7/8	Std	.194	31715
10		32	H3	2	7/8	Small	.136	31716
10		32	H3	2	7/8	Std	.194	31717
1/4	20		H3	2	1	Small	.185	31718
1/4		28	H3	2	1	Small	.185	31719
5/16	18		H3	2	1-1/8	Small	.240	31720
5/16		24	H3	2	1-1/8	Small	.240	31721
3/8	16		H3	3	1-1/4	Small	.275	31722
3/8		24	H3	3	1-1/4	Small	.275	31723
1/2	13		H3	3	1-21/32	Std	.367	31724

### 6" Overall Length

6	32		H3	2	11/16	Small	.097	31735
6	32		H3	2	11/16	Std	.141	31736
8	32		H3	2	3/4	Small	.123	31737
8	32		H3	2	3/4	Std	.168	31738
10	24		H3	2	7/8	Small	.136	31739
10	24		H3	2	7/8	Std	.194	31740
10		32	H3	2	7/8	Small	.136	31741
10		32	H3	2	7/8	Std	.194	31742
1/4	20		H3	2	1	Small	.185	31743
1/4	20		H3	2	1	Std	.255	31744
1/4		28	H3	2	1	Small	.185	31745
1/4		28	H3	2	1	Std	.255	31746
5/16	18		H3	2	1-1/8	Small	.240	31747
5/16	18		H3	2	1-1/8	Std	.318	31748
5/16		24	H3	2	1-1/8	Small	.240	31749
5/16		24	H3	2	1-1/8	Std	.318	31750
3/8	16		H3	3	1-1/4	Small	.275	31751
3/8	16		H3	3	1-1/4	Std	.381	31752
3/8		24	H3	3	1-1/4	Small	.275	31753
3/8		24	H3	3	1-1/4	Std	.381	31754
7/16	14		H3	3	1-7/16	Std	.323	31755
7/16		20	H3	3	1-7/16	Std	.323	31756
1/2	13		H3	3	1-21/32	Std	.367	31757
1/2		20	H3	3	1-21/32	Std	.367	31758
5/8	11		H3	3	1-13/16	Std	.480	31759
5/8		18	H3	3	1-13/16	Std	.480	31760
3/4	10		H3	3	2	Std	.590	31761
3/4		16	H3	3	2	Std	.590	31762

### 8" Overall Length

3/8	16		H3	3	1-1/4	Small	.275	31780
1/2	13		H3	3	1-21/32	Std	.367	31781
5/8	11		H3	3	1-13/16	Std	.480	31782
3/4	10		H3	3	2	Std	.590	31783

## Extension Taper Pipe Taps – NPT

Extension Straight Flute Taper Pipe Taps are used for tapping by hand or machine in blind or through holes in a wide variety of materials.



List No. 2042  
Ground Thread — High Speed Steel  
Bright Finish



### 4" Overall Length

Size	TPI	Chamfer	No. of Flutes	Thread Length	Shank Dia.	EDP NO.
1/16	27	Plug	4	11/16	.3125	31790
1/8	27	Plug	4	3/4	.4375	31791
1/4	18	Plug	4	1-1/16	.5625	31792

### 6" Overall Length

1/16	27	Plug	4	11/16	.3125	31800
1/8	27	Plug	4	3/4	.4375	31801
1/4	18	Plug	4	1-1/16	.5625	31802
3/8	18	Plug	4	1-1/16	.7000	31803
1/2	14	Plug	4	1-3/8	.6875	31804
3/4	14	Plug	5	1-3/8	.9063	31805
1	11.5	Plug	5	1-3/4	1.1250	31806

## Extension Metric Straight Flute Hand Taps



List No. 2040M  
Ground Thread — High Speed Steel  
Bright Finish

Small Shank Taps and Standard Shank Taps Size M12 and Larger have a shank diameter that is smaller than the minor diameter of the thread.

### 6" Overall Length

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Shank Style	Shank Dia.	EDP NO.	
							Plug	Bottom
M4.5	0.75	D4	4	7/8	Std	.194	31820	31821
M6	1.00	D5	4	1	Std	.255	31822	31823
M8	1.25	D5	4	1-1/8	Std	.318	31824	31825
M10	1.50	D6	4	1-1/4	Small	.323	31826	31827
M12	1.75	D6	4	1-21/32	Std	.367	31828	31829
M14	2.00	D7	4	1-21/32	Large	.570	31830	—
M16	2.00	D7	4	1-13/16	Large	.633	31831	—
M20	2.50	D7	4	2	Std	.652	31832	—

## Extension Metric Spiral Point Plug Taps



List No. 2041M  
Ground Thread — High Speed Steel  
Bright Finish

Small Shank Taps and Standard Shank Taps Size M12 and Larger have a shank diameter that is smaller than the minor diameter of the thread.

### 6" Overall Length

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Shank Style	Shank Dia.	EDP NO.
M4	0.70	D4	2	3/4	Std	.168	31833
M5	0.80	D4	2	7/8	Std	.194	31834
M6	1.00	D5	2	1	Std	.255	31835
M8	1.25	D5	2	1-1/8	Std	.318	31836
M10	1.50	D6	3	1-1/4	Std	.381	31837
M12	1.75	D6	3	1-21/32	Std	.367	31838

# Taper Pipe Reamers

High Speed Steel – Left Hand Helical Flute  
Right Hand Cut

3/4" Taper per foot. For reaming pipes to be tapped with American Standard taper pipe taps.



List No. 2116

STANDARD PACKAGE All sizes — 1 each

SIZE	DIA. LARGE END	DIA. SMALL END	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
1/16	.275	.232	.3125	11/16	2-1/8	36080
1/8	.362	.316	.4375	3/4	2-1/8	36081
1/4	.472	.406	.5625	1-1/16	2-7/16	36082
3/8	.606	.540	.7000	1-1/16	2-9/16	36083
1/2	.751	.665	.6875	1-3/8	3-1/8	36084
3/4	.962	.876	.9063	1-3/8	3-1/4	36085
1	1.212	1.103	1.1250	1-3/4	3-3/4	36086
1-1/4	1.553	1.444	1.3125	1-3/4	4	36087
1-1/2	1.793	1.684	1.5000	1-3/4	4-1/4	36088
2	2.268	2.159	1.8750	1-3/4	4-1/2	36089

Tool Coatings Also Available

## Taper Pipe Taps

Ground Thread — High Speed Steel  
NPT/ANPT—NPTF  
Bright Finish  
Chamfer – 2 – 3-1/2 threads

Regular Thread NPT taper pipe taps are commonly used for tapping pipe fittings and couplings in a wide variety of materials. Assembly requires the use of a thread sealant to ensure a tight seal.

NPTF Dryseal taper pipe taps produce threads where a tight seal is achieved during assembly by metal-to-metal contact. Used for applications requiring a tight seal without the use of thread sealants.

Interrupted Thread taper pipe taps reduce friction, increase chip capacity and enhance coolant flow to the cutting teeth for reduced chance of torn threads and improved thread quality. Recommended for a wide variety of materials, especially soft ductile materials and materials producing long continuous chips.



List No. 2113 Interrupted Thread



List No. 2119 Regular Thread

STANDARD PACKAGE 1/16" thru 1/4" — 6 each  
3/8" thru 2" — 1 each

For 1/8" Taps:  
Small Shank = .3125" dia.  
Large Shank = .4375" dia.

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES.		INTERRUPTED THREAD LIST NO. 2113 EDP NO.		REGULAR THREAD LIST NO. 2119 EDP NO.	
			LIST NO. 2113	LIST NO. 2119	NPT/ANPT	NPTF	NPT/ANPT	NPTF
1/16-27	11/16	2-1/8	5	4	—	—	36121	36141
1/8-27* (Sm. Sk.)	3/4	2-1/8	5	4	36001	36021	36122	36142
1/8-27* (Lg. Sk.)	3/4	2-1/8	5	4	36002	36022	36123	36143
1/4-18	1-1/16	2-7/16	5	4	36003	36023	36124	36144
3/8-18	1-1/16	2-9/16	5	4	36004	36024	36125	36145
1/2-14	1-3/8	3-1/8	5	4	36005	36025	36126	36146
3/4-14	1-3/8	3-1/4	5	5	36006	36026	36127	36147
1-11-1/2	1-3/4	3-3/4	5	5	36007	36027	36128	36148
1-1/4-11-1/2	1-3/4	4	5	5	36008	—	36129	36149
1-1/2-11-1/2	1-3/4	4-1/4	7	7	36009	—	36130	36150
2-11-1/2	1-3/4	4-1/2	7	7	36010	—	36131	36151

\*Large shank furnished unless otherwise specified.

# Straight Pipe Taps

Ground Thread — High Speed Steel

NPS/NPSF

Bright Finish

**NPS** straight pipe taps produce straight pipe threads for low pressure applications in a wide variety of materials. Can be assembled with taper pipe threads, straight pipe threads or fittings. Assembly requires the use of a thread sealant to ensure a tight seal.

**NPSF Dryseal** straight pipe taps produce threads where a tight seal is achieved during assembly by metal-to-metal contact when assembled with dryseal taper pipe threads. Used for applications requiring a tight seal without the use of thread sealants.



## List No. 2123

**STANDARD** 1/8" thru 1/4" — 6 each

**PACKAGE** 3/8" thru 1" — 1 each

Furnished in Plug style chamfer only. NPS also suitable for NPSC or NPSM work.

SIZE	NUMBER OF FLUTES	THREAD LENGTH	OAL	EDP NO.	
				NPS	NPSF
1/8-27* (Sm. Sk.)	4	3/4	2 1/8	36161	36181
1/8-27* (Lg. Sk.)	4	3/4	2 1/8	36162	36182
1/4-18	4	1 1/16	2 7/16	36163	36183
3/8-18	4	1 1/16	2 9/16	36164	36184
1/2-14	4	1 3/8	3 1/8	36165	36185
3/4-14	5	1 3/8	3 1/4	36166	36186
1-1 1/2	5	1 3/4	3 3/4	36167	—

\*Large shank furnished unless otherwise specified.

For 1/8" Taps:  
Small Shank = .3125" dia.  
Large Shank = .4375" dia.

# Taper Pipe Taps For Cast Iron

Ground Thread — High Speed Steel

NPT

Taper pipe taps for **Cast Iron** feature specific geometry and a wear resistant surface finish for tapping materials that produce small or powdery chips. Recommended for cast iron, cast brass and other brass materials and non-metals that produce small or powdery chips. Assembly requires the use of a thread sealant to ensure a tight seal.

Furnished with 2-3/4" thread chamfer in NPT thread form  
1°-3° Rake.



## List No. 2133 Steam Oxide Over Nitride Finish

**STANDARD** 1/8" thru 1/4" — 6 each

**PACKAGE** 3/8" thru 2" — 1 each

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	NPT EDP NO.
1/8-27 (Lg. Sk.)	3/4	2 1/8	4	36202
1/4-18	1 1/16	2 7/16	4	36203
3/8-18	1 1/16	2 9/16	4	36204
1/2-14	1 3/8	3 1/8	4	36205
3/4-14	1 3/8	3 1/4	5	36206

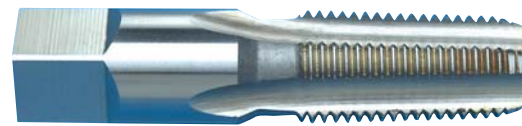
SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	NPT EDP NO.
1-1 1/2	1 3/4	3 3/4	5	36207
1 1/4-1 1/2	1 3/4	4	5	36208
1 1/2-1 1/2	1 3/4	4 1/4	7	36209
2-1 1/2	1 3/4	4 1/2	7	36210

For 1/8" Taps:  
Small Shank = .3125" dia.  
Large Shank = .4375" dia.

# High Hook Taper Pipe Taps

Ground Thread — High Speed Steel  
NPT/NPTF  
Bright Finish

**High Hook** taper pipe taps feature specific geometry for tapping ductile materials and soft gummy materials including aluminum, mild steels, free machining stainless steels, leaded steels and other materials. **NPT** threads require the use of a thread sealant to ensure a tight seal. **NPTF** threads are used for applications requiring a tight seal without the use of thread sealants.



**List No. 2120**

Taper — 3/4" per foot  
Chamfer — 2 - 3-1/2 threads

For 1/8" Taps:  
Small Shank = .3125" dia.  
Large Shank = .4375" dia.

**STANDARD PACKAGE** 1/8" thru 1/4" — 6 each  
3/8" thru 1" — 1 each



SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.	
				NPT	NPTF
1/8-27 (Lg. Sk.)	3/4	2 1/8	4	36188	36194
1/4-18	1 1/16	2 7/16	4	36189	36195
3/8-18	1 1/16	2 9/16	4	36190	36196
1/2-14	1 3/8	3 1/8	4	36191	36197
3/4-14	1 3/8	3 1/4	5	36192	36198
1-11 1/2	1 3/4	3 3/4	5	36193	36199

# Spiral Flute Taper Pipe Taps

Ground Thread — High Speed Steel  
NPT/NPTF — 30° Spiral Flute  
Bright Finish

**Spiral Flute** taper pipe taps are recommended for tapping stringy and ductile materials that produce long stringy chips. The **spiral flute** lifts the chips out of the hole to eliminate chip packing in the flutes. **NPT** threads require the use of a thread sealant to ensure a tight seal. **NPTF** threads are used for applications requiring a tight seal without the use of thread sealants.



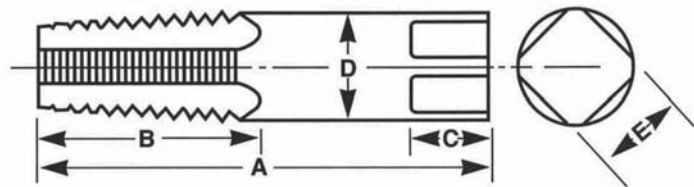
**List No. 2121**

Chamfer — 2 - 3-1/2 threads

**STANDARD PACKAGE** 1/8" thru 1/4" — 6 each  
3/8" thru 3/4" — 1 each

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.	
				NPT	NPTF
1/8-27 (Lg. Sk.)	3/4	2 1/8	4	36168	36173
1/4-18	1 1/16	2 7/16	4	36169	36174
3/8-18	1 1/16	2 9/16	4	36170	36175
1/2-14	1 3/8	3 1/8	4	36171	36176
3/4-14	1 3/8	3 1/4	5	36172	36177

# Table 311 — Pipe Taps



**General Dimensions**

NOMINAL SIZE INCHES	DIMENSIONS - INCHES				
	LENGTH OVERALL A	LENGTH OF THREAD B	LENGTH OF SQUARE C	DIA. OF SHANK D	SIZE OF SQUARE E
1/16	2-1/8	11/16	3/8	.3125	.234
1/8	2-1/8	3/4	3/8	.3125	.234
1/8	2-1/8	3/4	3/8	.4375	.328
1/4	2-7/16	1-1/16	7/16	.5625	.421
3/8	2-9/16	1-1/16	1/2	.7000	.531
1/2	3-1/8	1-3/8	5/8	.6875	.515
3/4	3-1/4	1-3/8	11/16	.9063	.679
1	3-3/4	1-3/4	13/16	1.1250	.843
1-1/4	4	1-3/4	15/16	1.3125	.984
1-1/2	4-1/4	1-3/4	1	1.5000	1.125
2	4-1/2	1-3/4	1-1/8	1.8750	1.406

# STI - Screw Thread Insert Straight Flute Hand Taps

STI -Screw Thread Insert taps are oversize taps that produce a thread that will accept a helical coil wire screw thread insert of the same size and pitch.

Straight Flute hand taps are used for hand tapping and machine tapping in through holes and blind holes in a wide variety of materials.



List No. 2072

Ground Thread • High Speed Steel • Bright Finish

Available in Plug (3-5 thread chamfer)  
or Bottoming (1-2 thread chamfer)

STI -Screw Thread Insert



List No. 2072

Machine Screw Sizes

SIZE	TPI		PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	SHANK DIA.	SIZE OF SQUARE	EDP NO.	
	UNC	UNF							PLUG	BOTTOM
2	56	—	H1	3	9/16	1-7/8	.141	.110	34149	34049
	56	—	H2	3	9/16	1-7/8	.141	.110	34150	34050
4	40	—	H1	3	11/16	2	.141	.110	34151	34051
	40	—	H2	3	11/16	2	.141	.110	34152	34052
5	40	—	H1	3	3/4	2-1/8	.168	.131	34153	34053
	40	—	H2	3	3/4	2-1/8	.168	.131	34154	34054
6	32	—	H2	3	7/8	2-3/8	.194	.152	34155	34055
	32	—	H3	3	7/8	2-3/8	.194	.152	34156	34056
	—	40	H1	3	3/4	2-1/8	.168	.131	34157	34057
	—	40	H2	3	3/4	2-1/8	.168	.131	34158	34058
8	32	—	H2	3	15/16	2-3/8	.220	.165	34159	34059
	32	—	H3	3	15/16	2-3/8	.220	.165	34160	34060
10	24	—	H2	3	1	2-1/2	.255	.191	34161	34061
	24	—	H3	3	1	2-1/2	.255	.191	34162	34062
	—	32	H2	3	1	2-1/2	.255	.191	34163	34063
	—	32	H3	3	1	2-1/2	.255	.191	34164	34064
12	24	—	H2	3	1-1/8	2-23/32	.318	.238	34165	34065
	24	—	H3	3	1-1/8	2-23/32	.318	.238	34166	34066

List No. 2072

Fractional Sizes

SIZE	TPI		PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	SHANK DIA.	SIZE OF SQUARE	EDP NO.	
	UNC	UNF							PLUG	BOTTOM
1/4	20	—	H2	3	1-1/8	2-23/32	.318	.238	34167	34067
	20	—	H3	3	1-1/8	2-23/32	.318	.238	34168	34068
	—	28	H2	3	1-1/8	2-23/32	.318	.238	34169	34069
	—	28	H3	3	1-1/8	2-23/32	.318	.238	34170	34070
5/16	18	—	H3	4	1-1/4	2-15/16	.381	.286	34171	34071
	18	—	H4	4	1-1/4	2-15/16	.381	.286	34172	34072
	—	24	H2	4	1-1/4	2-15/16	.381	.286	34173	34073
	—	24	H3	4	1-1/4	2-15/16	.381	.286	34174	34074
3/8	3/8	—	H3	4	1-21/32	3-3/8	.367	.275	34175	34075
	16	—	H4	4	1-21/32	3-3/8	.367	.275	34176	34076
	—	24	H2	4	1-7/16	3-5/32	.323	.242	34177	34077
	—	24	H3	4	1-7/16	3-5/32	.323	.242	34178	34078
7/16	14	—	H3	4	1-21/32	3-19/32	.429	.322	34179	34079
	14	—	H4	4	1-21/32	3-19/32	.429	.322	34180	34080
	—	20	H3	4	1-21/32	3-3/8	.367	.275	34181	34081
	—	20	H4	4	1-21/32	3-3/8	.367	.275	34182	34082
1/2	13	—	H3	4	1-13/16	3-13/16	.480	.360	34183	34083
	13	—	H4	4	1-13/16	3-13/16	.480	.360	34184	34084
	—	20	H3	4	1-21/32	3-19/32	.429	.322	34185	34085
	—	20	H4	4	1-21/32	3-19/32	.429	.322	34186	34086

# STI - Screw Thread Insert Spiral Point Plug Taps



**STI -Screw Thread Insert taps are oversize taps that produce a thread that will accept a helical coil wire screw thread insert of the same size and pitch.**

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

**List No. 2073**

**Ground Thread • High Speed Steel • Bright Finish Plug (3-5 thread chamfer)**

**STI -Screw Thread Insert**



## List No. 2073 Machine Screw Sizes

SIZE	TPI		PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	SHANK DIA.	SIZE OF SQUARE	EDP NO. PLUG
	UNC	UNF							
2	56	—	H1	2	9/16	1-7/8	.141	.110	33858
	56	—	H2	2	9/16	1-7/8	.141	.110	33859
4	40	—	H1	2	11/16	2	.141	.110	33860
	40	—	H2	2	11/16	2	.141	.110	33861
5	40	—	H1	2	3/4	2-1/8	.168	.131	33862
	40	—	H2	2	3/4	2-1/8	.168	.131	33863
6	32	—	H2	2	7/8	2-3/8	.194	.152	33864
	32	—	H3	2	7/8	2-3/8	.194	.152	33865
	—	40	H1	2	3/4	2-1/8	.168	.131	33866
	—	40	H2	2	3/4	2-1/8	.168	.131	33867
8	32	—	H2	2	15/16	2-3/8	.220	.165	33868
	32	—	H3	2	15/16	2-3/8	.220	.165	33869
10	24	—	H2	2	1	2-1/2	.255	.191	33870
	24	—	H3	2	1	2-1/2	.255	.191	33871
	—	32	H2	2	1	2-1/2	.255	.191	33872
	—	32	H3	2	1	2-1/2	.255	.191	33873
12	24	—	H2	2	1-1/8	2-23/32	.318	.238	33874
	24	—	H3	2	1-1/8	2-23/32	.318	.238	33875

## List No. 2073 Fractional Sizes

SIZE	TPI		PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	SHANK DIA.	SIZE OF SQUARE	EDP NO. PLUG
	UNC	UNF							
1/4	20	—	H2	2	1-1/8	2-23/32	.318	.238	33876
	20	—	H3	2	1-1/8	2-23/32	.318	.238	33877
	—	28	H2	2	1-1/8	2-23/32	.318	.238	33878
	—	28	H3	2	1-1/8	2-23/32	.318	.238	33879
5/16	18	—	H3	3	1-1/4	2-15/16	.381	.286	33880
	18	—	H4	3	1-1/4	2-15/16	.381	.286	33881
	—	24	H2	3	1-1/4	2-15/16	.381	.286	33882
	—	24	H3	3	1-1/4	2-15/16	.381	.286	33883
3/8	16	—	H3	3	1-21/32	3-3/8	.367	.275	33884
	16	—	H4	3	1-21/32	3-3/8	.367	.275	33885
	—	24	H2	3	1-7/16	3-5/32	.323	.242	33886
	—	24	H3	3	1-7/16	3-5/32	.323	.242	33887
7/16	14	—	H3	3	1-21/32	3-19/32	.429	.322	33888
	14	—	H4	3	1-21/32	3-19/32	.429	.322	33889
	—	20	H3	3	1-21/32	3-3/8	.367	.275	33890
	—	20	H4	3	1-21/32	3-3/8	.367	.275	33891
1/2	13	—	H3	3	1-13/16	3-13/16	.480	.360	33892
	13	—	H4	3	1-13/16	3-13/16	.480	.360	33893
	—	20	H3	3	1-21/32	3-19/32	.429	.322	33894
	—	20	H4	3	1-21/32	3-19/32	.429	.322	33895

# STI - Screw Thread Insert

## Fast Spiral • Spiral Flute

### Bottoming Taps



STI -Screw Thread Insert taps are oversize taps that produce a thread that will accept a helical coil wire screw thread insert of the same size and pitch.

**Spiral Flute** taps lift the chips out of the hole in blind hole tapping, eliminating chip disposal problems, damaged threads and broken taps. They will also bridge interruptions in the tapped hole.

**Fast Spiral** taps provide enhanced chip lifting action, will bridge wider interruptions and have a freer-cutting geometry. Recommended for softer materials that produce stringy chips.

List No. 2074

Ground Thread • High Speed Steel • Bright Finish  
Bottoming (1-2 thread chamfer)

STI -Screw Thread Insert



List No. 2074

Machine Screw Sizes

SIZE	TPI		PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	SHANK DIA.	SIZE OF SQUARE	EDP NO. PLUG
	UNC	UNF							
2	56	—	H1	2	9/16	1-7/8	.141	.110	33930
	56	—	H2	2	9/16	1-7/8	.141	.110	33931
4	40	—	H1	2	11/16	2	.141	.110	33932
	40	—	H2	2	11/16	2	.141	.110	33933
5	40	—	H1	3	3/4	2-1/8	.168	.131	33934
	40	—	H2	3	3/4	2-1/8	.168	.131	33935
6	32	—	H2	3	7/8	2-3/8	.194	.152	33936
	32	—	H3	3	7/8	2-3/8	.194	.152	33937
	—	40	H1	3	3/4	2-1/8	.168	.131	33938
	—	40	H2	3	3/4	2-1/8	.168	.131	33939
8	32	—	H2	3	15/16	2-3/8	.220	.165	33940
	32	—	H3	3	15/16	2-3/8	.220	.165	33941
10	24	—	H2	3	1	2-1/2	.255	.191	33942
	24	—	H3	3	1	2-1/2	.255	.191	33943
	—	32	H2	3	1	2-1/2	.255	.191	33944
	—	32	H3	3	1	2-1/2	.255	.191	33945
12	24	—	H2	3	1-1/8	2-23/32	.318	.238	33946
	24	—	H3	3	1-1/8	2-23/32	.318	.238	33947

List No. 2074

Fractional Sizes

SIZE	TPI		PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	SHANK DIA.	SIZE OF SQUARE	EDP NO. PLUG
	UNC	UNF							
1/4	20	—	H2	3	1-1/8	2-23/32	.318	.238	33948
	20	—	H3	3	1-1/8	2-23/32	.318	.238	33949
	—	28	H2	3	1-1/8	2-23/32	.318	.238	33950
	—	28	H3	3	1-1/8	2-23/32	.318	.238	33951
5/16	18	—	H3	3	1-1/4	2-15/16	.381	.286	33952
	18	—	H4	3	1-1/4	2-15/16	.381	.286	33953
	—	24	H2	3	1-1/4	2-15/16	.381	.286	33954
	—	24	H3	3	1-1/4	2-15/16	.381	.286	33955
3/8	16	—	H3	3	1-21/32	3-3/8	.367	.275	33956
	16	—	H4	3	1-21/32	3-3/8	.367	.275	33957
	—	24	H2	3	1-7/16	3-5/32	.323	.242	33958
	—	24	H3	3	1-7/16	3-5/32	.323	.242	33959
7/16	14	—	H3	3	1-21/32	3-19/32	.429	.322	33960
	14	—	H4	3	1-21/32	3-19/32	.429	.322	33961
	—	20	H3	3	1-21/32	3-3/8	.367	.275	33962
	—	20	H4	3	1-21/32	3-3/8	.367	.275	33963
1/2	13	—	H3	3	1-13/16	3-13/16	.480	.360	33964
	13	—	H4	3	1-13/16	3-13/16	.480	.360	33965
	—	20	H3	3	1-21/32	3-19/32	.429	.322	33966
	—	20	H4	3	1-21/32	3-19/32	.429	.322	33967



# Combined Tap and Drill

High Speed Steel  
Bright Finish

Combined Tap and Drills drill and tap in a single pass for increased productivity. Recommended for through hole applications up to 2X the nominal diameter of the tap. The self-centering point eliminates the need for center drilling or center punching. **NOTE: Drill point must penetrate the workpiece prior to start of tapping.**



List No. 2080 — Machine Screw, Fractional & Metric

STANDARD PACKAGE 4-40 — 3/8-24 — 12 ea.  
7/16 — 3 ea.  
1/2 — 1 ea.

Drill Size  
to Produce  
65% of Thread



TAPS & DIES

## List No. 2080 — Machine Screw & Fractional

TAP SIZE	UNC	TPI	UNF	PITCH DIA. LIMIT	THREAD LENGTH	DRILL SIZE	DRILL LENGTH	OAL	EDP NO.
6	32	-	-	H3	7/16	.1115	5/16	2	38604
8	32	-	-	H3	1/2	.1375	3/8	2-1/8	38606
10	24	-	-	H3	5/8	.1545	13/32	2-3/8	38608
		32	-	H3	5/8	.1635	13/32	2-3/8	38609
12	24	-	-	H3	21/32	.1805	15/32	2-3/8	38610
		28	-	H3	21/32	.1860	15/32	2-3/8	38611
1/8	20	-	-	H5	25/32	.2080	17/32	2-1/2	38612
		28	-	H4	25/32	.2220	17/32	2-1/2	38613
5/16	18	-	-	H5	15/16	.2660	11/16	2-27/32	38614
		24	-	H4	15/16	.2770	11/16	2-27/32	38615
3/8	16	-	-	H5	1-1/16	.3225	13/16	3-3/8	38616
		24	-	H4	1-1/16	.3395	13/16	3-3/8	38617
7/16	14	-	-	H5	1-1/4	.3770	1	3-3/4	38618
		20	-	H5	1-1/4	.3955	1	3-3/4	38619
1/2	13	-	-	H5	1-3/8	.4350	1-1/8	4-1/16	38620
		20	-	H5	1-3/8	.4580	1-1/8	4-1/16	38621

## List No. 2080 — Metric

TAP SIZE	PITCH DIA. LIMIT	THREAD LENGTH	DRILL SIZE	DRILL LENGTH	OAL	EDP NO.
M4 x 0.7	D4	1/2	.1340	3/8	2-1/8	38622
M5 x 0.8	D4	5/8	.1700	13/32	2-3/8	38623
M6 x 1	D5	25/32	.2030	17/32	2-1/2	38624
M8 x 1.25	D5	15/16	.2730	11/16	2-27/32	38625
M10 x 1.5	D6	1-1/16	.3440	13/16	3-3/8	38626
M12 x 1.75	D6	1-3/8	.4140	1-1/8	4-1/16	38627

# Nut Taps

Ground Thread – High Speed Steel  
Long Chamfer – H3 Pitch Dia. Limit  
Bright Finish

Nut taps feature a long thread length, a long chamfer and a long reduced shank smaller than the minor diameter of the thread. They were originally designed for threading hex nuts with the finished nuts collecting on the shank until unloaded. The long chamfer spreads the cutting load over a larger area and helps to center the threads. The reduced shank also enhances chip removal and workpiece clearance.



List No. 2052

STANDARD PACKAGE All sizes — 1 each

SIZE	TPI UNC	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO.
1/4	20	4	1-5/8	5	33176
5/16	18	4	1-13/16	5-1/2	33177
3/8	16	4	2	6	33178
1/2	13	4	2-1/2	7	33179

Morse FAST TAP SERVICE  
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# Pulley Taps

Ground Thread — High Speed Steel  
Bright Finish

**Pulley** taps, commonly used wherever extra reach is required, were originally designed for tapping holes in pulleys with hubs. The shank diameter is the same diameter as the major diameter of the thread and the threaded section has the same dimensions as a standard hand tap.



List No. 2082

Plug Style - H3 Pitch Dia. Limit

STANDARD PACKAGE All sizes — 1 each



SIZE	TPI UNC	THREAD LENGTH	NO. OF FLUTES	6"	8"	10"	12"
				LENGTH EDP NO.	LENGTH EDP NO.	LENGTH EDP NO.	LENGTH EDP NO.
1/4	20	1	4	34201	34207	—	—
5/16	18	1-1/8	4	34202	34208	—	—
3/8	16	1-1/4	4	34203	34209	34213	—
7/16	14	1-7/16	4	34204	34210	—	—
1/2	13	1-21/32	4	34205	34211	34214	34217
5/8	11	1-13/16	4	34206	34212	34215	—
3/4	10	2	4	—	—	34216	—

# Solid Round Dies NPT - Taper Pipe Sizes

Carbon Steel

THICKNESS 1 Inch O.D., 3/8 Inch Thick  
1 1/2 Inch O.D., 1/2 Inch Thick  
2 Inch O.D., 5/8 Inch Thick

List No. 1198

STANDARD PACKAGE All sizes — 1 each



NPT SIZE	1" O.D. EDP NO.	1-1/2" O.D. EDP NO.	2" O.D. EDP NO.
1/8-27	31251	31252	—
1/4-18	—	31253	31255
3/8-18	—	31254	31256
1/2-14	—	—	31257



# Adjustable Round Split Dies Machine Screw Sizes

Carbon Steel

Adjustable Round Split dies use a set screw for adjustment of the thread size for precision threading applications.

List No. 1190

STANDARD PACKAGE All sizes — 1 each

THICKNESS 13/16" O.D., 1/4" Thick  
1" O.D., 3/8" Thick



SIZE	TPI		13/16" O.D. EDP NO.
	UNC	UNF	
0	—	80	31101
2	56	—	31104
3	48	—	31106
	—	56	31107
4	40	—	31109
	—	48	31110
5	40	—	31111
	—	44	31112

SIZE	TPI		13/16" O.D. EDP NO.	1" O.D. EDP NO.
	UNC	UNF		
6	32	—	31113	31121
	—	40	31114	—
8	32	—	31115	31122
	—	36	31116	—
10	24	—	31117	31123
	—	32	31118	31124
12	24	—	31119	31125
	—	28	31120	—

# Adjustable Round Split Dies Fractional Sizes

## Carbon Steel

Adjustable Round Split dies use a set screw for adjustment of the thread size for precision threading applications.

### THICKNESS

13/16" O.D., 1/4" Thick

1" O.D., 3/8" Thick

1-1/2" O.D., 1/2" Thick

2" O.D., 5/8" Thick

2-1/2" O.D., 3/4" Thick

3" O.D., 1" Thick



List No. 1195

STANDARD  
PACKAGE

All sizes — 1 each

SIZE	UNC	TPI UNF	UNS	13/16" O.D. EDP NO.	1" O.D. EDP NO.	1-1/2" O.D. EDP NO.	2" O.D. EDP NO.
1/4	20	—	—	31158	31164	31177	31191
	—	28	—	—	31165	31178	31192
5/16	18	—	—	—	31168	31179	31193
	—	24	—	—	31169	31180	31194
3/8	16	—	—	—	31171	31181	31195
	—	24	—	—	31172	31182	31196
7/16	14	—	—	—	31173	31183	31197
	—	20	—	—	31174	31184	31198
1/2	13	—	—	—	31175	31185	31199
	—	20	—	—	31176	31186	31200
9/16	12	—	—	—	—	31187	31201
	—	18	—	—	—	31188	31202

SIZE	UNC	TPI UNF	UNS	1-1/2" O.D. EDP NO.	2" O.D. EDP NO.	2-1/2" O.D. EDP NO.	3" O.D. EDP NO.
5/8	11	—	—	31189	31203	31213	—
	—	18	—	31190	31204	—	—
3/4	10	—	—	—	31207	31214	—
	—	16	—	—	31208	31215	—
7/8	9	—	—	—	31209	31216	—
	—	14	—	—	31210	31217	—
1	8	—	—	—	31211	31218	31221
	—	12	—	—	31212	31219	31222
1-1/8	7	—	—	—	—	—	31224
	—	12	—	—	—	—	31225
1-1/4	7	—	—	—	—	—	31226
	—	12	—	—	—	—	31227
1-3/8	6	—	—	—	—	—	31228
	—	12	—	—	—	—	31229
1-1/2	6	—	—	—	—	—	31230
	—	12	—	—	—	—	31231

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Adjustable Round Split Dies High Speed Steel

Adjustable Round Split dies use a set screw for adjustment of the thread size for precision threading applications.

High Speed Steel dies recommended for longer tool life.

## THICKNESS

13/16" O.D., 1/4" Thick

1" O.D., 3/8" Thick

1 1/2" O.D., 1/2" Thick

2" O.D., 5/8" Thick



List No. 2190 Machine Screw

List No. 2195 Fractional

List No. 2195M Metric

STANDARD PACKAGE All sizes — 1 each

## List No. 2190 Machine Screw

SIZE	TPI		13/16" O.D. EDP NO.	1" O.D. EDP NO.	SIZE	TPI		13/16" O.D. EDP NO.	1" O.D. EDP NO.
	UNC	UNF				UNC	UNF		
5	40	—	31501	—	8	—	36	31506	—
	—	44	31502	—		10	24	—	31507
6	32	—	31503	31511	12		—	32	31508
	—	40	31504	—		8	24	—	31509
8	32	—	31505	31512	12		—	28	31510

## List No. 2195 Fractional

SIZE	TPI		13/16" O.D. EDP NO.	1" O.D. EDP NO.	1-1/2" O.D. EDP NO.	2" O.D. EDP NO.
	UNC	UNF				
1/4	20	—	31526	31530	31538	—
	—	28	31527	31531	31539	—
5/16	18	—	31528	31532	31540	—
	—	24	31529	31533	31541	—
3/8	16	—	—	31534	31542	—
	—	24	—	31535	31543	—
7/16	14	—	—	31536	31544	—
	—	20	—	31537	31545	—
1/2	13	—	—	—	31546	—
	—	20	—	—	31547	—
9/16	12	—	—	—	31548	—
	—	18	—	—	31549	—
5/8	11	—	—	—	31550	31552
	—	18	—	—	31551	31553
3/4	10	—	—	—	—	31554
	—	16	—	—	—	31555
7/8	9	—	—	—	—	31556
	—	14	—	—	—	31557

## List No. 2195M Metric

SIZE	13/16" O.D. EDP NO.	1" O.D. EDP NO.	SIZE	1" O.D. EDP NO.	1-1/2" O.D. EDP NO.
M3 x 0.5	31561	—	M10 x 1.5	31570	—
M3.5 x 0.6	31562	—	M12 x 1.75	31571	—
M4 x 0.7	31563	—	M14 x 2	—	31572
M4.5 x 0.75	31564	—	M16 x 2	—	31573
M5 x 0.8	31565	—	M18 x 2.5	—	31574
M6 x 1	31566	31567	M20 x 2.5	—	31575
M7 x 1	—	31568			

# Hexagon Rethreading Dies

## Carbon Steel

Hexagon Rethreading dies are used in repair and maintenance applications to repair existing bruised or rusty threads. They are not recommended for cutting new threads.

**STANDARD PACKAGE** All sizes — 1 each

### List No. 1266 Fractional

SIZE	UNC	TPI		DIMENSIONS		EDP NO.
		UNF	UNS	ACROSS FLATS	THICKNESS	
1/4	20	—	—	19/32	1/4	31301
	—	28	—	19/32	1/4	31302
5/16	18	—	—	11/16	5/16	31303
	—	24	—	11/16	5/16	31304
3/8	16	—	—	25/32	3/8	31305
	—	24	—	25/32	3/8	31306
7/16	14	—	—	7/8	7/16	31307
	—	20	—	7/8	7/16	31308
1/2	13	—	—	1 1/16	1/2	31309
	—	20	—	1 1/16	1/2	31310
9/16	12	—	—	1 1/16	1/2	31311
	—	18	—	1 1/16	1/2	31312
5/8	11	—	—	1 1/4	5/8	31313
	—	18	—	1 1/4	5/8	31314
1 1/16	—	—	11	1 7/16	3/4	31315
	—	—	16	1 7/16	3/4	31316

### List No. 1266M Metric

SIZE	DIMENSIONS		EDP NO.
	ACROSS FLATS	THICKNESS	
M5 x 0.8	19/32	1/4	31340
M6 x 1	19/32	1/4	31341
M8 x 1.25	1 1/16	5/16	31342
M10 x 1.5	7/8	7/16	31343
M12 x 1.75	1 1/16	1/2	31344
M14 x 2	1 1/16	1/2	31345
M16 x 2	1 1/4	5/8	31346
M20 x 2.5	1 5/8	7/8	31347

# Hexagon Rethreading Die Sets

## Carbon Steel



List No. 7200



List No. 1266 Fractional  
List No. 1266M Metric  
List No. 1267 Taper Pipe — NPT

SIZE	UNC	TPI		DIMENSIONS		EDP NO.
		UNF	UNS	ACROSS FLATS	THICKNESS	
3/4	10	—	—	1 7/16	3/4	31317
	—	16	—	1 7/16	3/4	31318
7/8	9	—	—	1 5/8	7/8	31319
	—	14	—	1 5/8	7/8	31320
1	8	—	—	1 13/16	1	31321
	—	12	—	1 13/16	1	31322
	—	—	14	1 13/16	1	31323
1 1/8	7	—	—	2	1	31324
	—	12	—	2	1	31325
1 1/4	7	—	—	2 3/16	1	31326
	—	12	—	2 3/16	1	31327
1 3/8	6	—	—	2 3/8	1	31328
	—	12	—	2 3/8	1	31329
1 1/2	6	—	—	2 9/16	1	31330
	—	12	—	2 9/16	1	31331

### List No. 1267 Taper Pipe — NPT

SIZE	TPI	DIMENSIONS		EDP NO.
		ACROSS FLATS	THICKNESS	
1/8	27	1 1/16	3/8	31332
1/4	18	1 1/4	5/8	31333
3/8	18	1 7/16	5/8	31334
1/2	14	1 5/8	3/4	31335
3/4	14	2	13/16	31336
1	11 1/2	2 3/8	1	31337

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EDP NO. 37021	EDP NO. 37022	EDP NO. 37023	
SET NO. 194	SET NO. 195	SET NO. 200	
UNC	UNF	UNC	UNF
1/4 - 20	1/4 - 28	1/4 - 20	1/4 - 28
5/16 - 18	5/16 - 24	5/16 - 18	5/16 - 24
3/8 - 16	3/8 - 24	3/8 - 16	3/8 - 24
7/16 - 14	7/16 - 20	7/16 - 14	7/16 - 20
1/2 - 13	1/2 - 20	1/2 - 13	1/2 - 20
9/16 - 12	9/16 - 18	9/16 - 12	9/16 - 18
5/8 - 11	5/8 - 18	5/8 - 11	5/8 - 18
3/4 - 10	3/4 - 16	3/4 - 10	3/4 - 16
7/8 - 9	7/8 - 14	7/8 - 9	7/8 - 14
1 - 8	1 - 12	1 - 8	1 - 12

# Tap and Drill Kits

**3 Series Available • NC, NF, Metric**

**ALL KITS INCLUDE**

- 10 popular sized high speed steel hand taps.
- 10 popular sized high speed steel screw machine length drills.
- 128 Page Machinist's Guide for Taps.
- Packaged in a durable plastic pouch.

**List No. 8001**



EDP NO. 37103		EDP NO. 37104		EDP NO. 37105	
SET NO. 103 NC TAPS		SET NO. 104 NF TAPS		SET NO. 105 METRIC TAPS	
UNC TAPS	DRILLS	UNF TAPS	DRILLS	METRIC TAPS	DRILLS
#4-40	#44	#4-48	#43	M3 x 0.5	#40
#5-40	#39	#5-44	#38	M3.5 x 0.6	#33
#6-32	#36	#6-40	#34	M4 x 0.7	#30
#8-32	#30	#8-36	#29	M4.5 x 0.75	#26
#10-24	#25	#10-32	#21	M5 x 0.8	#19
1/4-20	#7	1/4-28	#3	M6 x 1	#9
5/16-18	F	5/16-24	I	M7 x 1	15/64
3/8-16	5/16	3/8-24	Q	M8 x 1.25	17/64
7/16-14	U	7/16-20	W	M10 x 1.5	Q
1/2-13	27/64	1/2-20	29/64	M12 x 1.75	Y

## “T” Handle Tap Wrenches

Holds tap sizes indicated and also can be used for driving screw extractors. Split jaw construction gives a positive holding grip enhancing its use for hand operations encompassing light drilling and reaming as well.

Sliding handle with spring tension stop. May be extended for more leverage. Has positive grip knurled nut.

**STANDARD PACKAGE** All sizes — 1 each



**List No. 1149**

WRENCH NO.	INCH	TAPS CAPACITY METRIC	EDP NO.
2	0-1/4	M1.5-M6.3	30522
4	1/4 - 1/2	M6.3-M12.5	30524

## Tap Wrenches



**List No. 1148**

**STANDARD PACKAGE** All sizes — 1 each

WRENCH NO.	CAPACITY CUTTING SIZE			EDP NO.
	FRACTIONAL TAPS	PIPE TAPS	REAMERS	
11	1/16 - 1/4		1/8 - 17/64	30501
12	1/16 - 3/8		1/8 - 25/64	30502
13	5/32 - 1/2	1/8	11/64 - 7/16	30503
14	5/32 - 3/4	1/8 - 1/4	11/64 - 41/64	30504
15	1/4 - 11/8	1/8 - 3/4	9/32 - 29/32	30505
16	3/4 - 15/8	3/8 - 11/4	37/64 - 111/32	30506
17	1 - 21/2	3/4 - 2	7/8 - 21/2	30507

## Die Stocks



**List No. 1179**

**STANDARD PACKAGE** All sizes — 1 each

DIE STOCK NO.	CAPACITY		EDP NO.
	DIE O.D.	DIE THICKNESS	
2	13/16	1/4	30512
3	1	3/8	30513
5	1 1/2	1/2	30514
6	2	5/8	30515
7	2 1/2	3/4	30516
8	3	1	30517

## Tap and Die Sets



### 23-Pc. #4 thru #12 NC & NF Tap & Die Set

**Set No. 31**

- #4 to #12 NC & NF HSS Plug Taps
- #4 to #12 NC & NF Carbon Steel 1<sup>3</sup>/<sub>16</sub>" OD Adjustable Dies
- #2 Die Stock
- #2 "T" Handle Tap Wrench
- Screw Driver
- Metal Case

List No. 7130 EDP No. 37011



### 25-Pc. 1/4" thru 1/2" NC & NF Tap & Die Set

**Set No. 100**

- 1/4" to 1/2" NC & NF HSS Plug Taps
- 1/4" to 1/2" NC & NF Carbon Steel 1" OD Adjustable Dies
- 1/16" Pipe Tap
- 1/8-27 Carbon Steel 1" OD Round
- #3 Die Stock
- #4 "T" Handle Tap Wrench
- Screw Driver
- Metal Case

List No. 7120 EDP No. 37001

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### 49-Pc. 1/4" thru 1" NC & NF Tap & Die Set

**Set No. 101**

- 1/4" to 1" NC & NF HSS Plug Taps
- 1/8" NPT HSS Plug Tap
- 1/4" to 3/8" NC & NF & 1/8" NPT Carbon Steel 1" OD Adjustable Dies
- 7/16" to 5/8" NC & NF Carbon Steel 1-1/2" OD Adjustable Dies
- 3/4" to 1" NC & NF Carbon Steel 2" OD Adjustable Dies
- #3, #5 & #6 Die Stocks
- #13 & #15 Straight Tap Wrenches
- 2 Screw Driver
- Metal Case

List No. 7120 EDP No. 37002



# FAST TAP SERVICE

Popular Special Taps for Fast Delivery



*We can quote sizes & styles not listed.*





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# Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Available in taper (8-10 thread chamfer), plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer)



List No. 2046 Machine Screw

## List No. 2046 Machine Screw

SIZE	PITCH	NO. OF FLUTES	PITCH		OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
			DIA. LIMIT	THREAD LENGTH				
#2	56	4	H4	7/16	1-3/4	03025	03547	04052
	32	3	H2	1/2	1-13/16	03028	03549	04054
#4	36	3	H2	1/2	1-13/16	03029	03550	04055
	40	3	H3	9/16	1-7/8	03031	03552	04057
#6	32	3	H5	11/16	2	03035	03556	04061
	32	3	H7	11/16	2	03036	03557	04062
	32	3	H11	11/16	2	03037	—	04063
	48	3	H2	11/16	2	03039	03559	04065
#8	24	4	H3	3/4	2-1/8	03040	03560	04066
	32	4	H5	3/4	2-1/8	03042	03562	04068
	32	4	H7	3/4	2-1/8	03043	03563	04069
	32	7	H11	3/4	2-1/8	03044	—	04070
	40	4	H2	3/4	2-1/8	03046	03565	04072
#10	24*	4	H3	7/8	2-3/8	03006	03529	04033
	24	4	H7	7/8	2-3/8	03004	03528	04031
	24	4	H11	7/8	2-3/8	03005	—	04032
#10	28	4	H3	7/8	2-3/8	03007	03530	04034
	30	4	H3	7/8	2-3/8	03008	03531	04035
#10	32	4	H4	7/8	2-3/8	03010	03532	04036
	32	4	H5	7/8	2-3/8	03011	03533	04037
	32	4	H7	7/8	2-3/8	03012	03534	04038
	32	4	H11	7/8	2-3/8	03013	—	04039
#10	36	4	H2	7/8	2-3/8	03014	03535	04040
	40	4	H2	7/8	2-3/8	03015	03536	04041
	48	4	H2	7/8	2-3/8	03016	03537	04042
	56	4	H2	7/8	2-3/8	03017	03538	04043
	64	4	H2	7/8	2-3/8	03018	03539	04044
#12	32	4	H3	1/2	2-3/8	03021	03542	04047
	36	4	H2	15/16	2-3/8	03022	03543	04048
#14	20	4	H3	1	2-1/2	03023	03544	04049
	24	4	H3	1	2-1/2	03024	03545	04050

\* Double Lead

Special Tap Quoting Form Page 240



# Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 2046 Fractional

**FAST TAP SERVICE**

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
5/32	32	4	H3	3/4	2-1/8	03317	03822	04337
3/16	24	4	H3	7/8	2-3/8	03257	03769	04282
	32	4	H3	7/8	2-3/8	03258	03770	04283
7/32	32	4	H3	15/16	2-3/8	03347	03847	04363
1/4	20	4	H7	1	2-1/2	03175	03690	04201
	20	4	H11	1	2-1/2	03176	—	04202
	20	4	H21	1	2-1/2	03177	03691	04203
	20*	4	H3	1	2-1/2	03178	03692	04204
1/4	24	4	H3	1	2-1/2	03179	03693	04205
	27	4	H3	1	2-1/2	03180	03694	04206
	28	4	H5	1	2-1/2	03182	03695	04207
	28	4	H7	1	2-1/2	03183	03696	04208
	28	4	H11	1	2-1/2	03184	03697	04209
	28*	4	H3	1	2-1/2	03185	03698	04210
	32	4	H3	1	2-1/2	03186	03699	04212
	32	4	H5	1	2-1/2	03187	03701	04214
1/4	36	4	H2	1	2-1/2	03155	03702	04215
	36	4	H3	1	2-1/2	03189	03703	04216
	40	4	H2	1	2-1/2	03190	03704	04217
	40	4	H3	1	2-1/2	03191	03705	04218
	48	4	H2	1	2-1/2	03192	03706	04219
	56	4	H2	1	2-1/2	03193	03707	04220
	80	4	H2	1	2-1/2	03194	03708	04221
9/32	32	4	H3	1-1/8	2-23/32	03372	03871	04387
5/16	18*	4	H3	1-1/8	2-23/32	03306	03812	04327
	18	4	H7	1-1/8	2-23/32	03303	03810	04324
	18	4	H11	1-1/8	2-23/32	03304	—	04325
	18	4	H21	1-1/8	2-23/32	03305	03811	04326
	20	4	H3	1-1/8	2-23/32	03307	03813	04328
5/16	24	4	H5	1-1/8	2-23/32	03310	03814	04329
	24	4	H6	1-1/8	2-23/32	03311	03815	04330
	24	4	H11	1-1/8	2-23/32	03309	03816	04331
5/16	27	4	H3	1-1/8	2-23/32	03312	03817	04332
	28	4	H3	1-1/8	2-23/32	03313	03818	04333
	32	4	H3	1-1/8	2-23/32	03314	03819	04334
	32	4	H5	1-1/8	2-23/32	03315	03820	04335
	40	4	H2	1-1/8	2-23/32	03316	03821	04336
11/32	32	4	H3	1-1/4	2-15/16	03205	03718	04231
3/8	16*	4	H3	1-1/4	2-15/16	03282	03791	04303
	16	4	H7	1-1/4	2-15/16	03279	03788	04300
	16	4	H11	1-1/4	2-15/16	03280	03789	04301
3/8	16	4	H21	1-1/4	2-15/16	03281	03790	04302
	18	4	H3	1-1/4	2-15/16	03283	03792	04304
	20	4	H3	1-1/4	2-15/16	03284	03793	04305
	24	4	H5	1-1/4	2-15/16	03286	03794	04306
3/8	24	4	H7	1-1/4	2-15/16	03287	03796	04308
	24	4	H8	1-1/4	2-15/16	—	03795	04307
	24	4	H11	1-1/4	2-15/16	03288	—	04309
	27	4	H3	1-1/4	2-15/16	03289	03797	04311
3/8	28	4	H3	1-1/4	2-15/16	03290	03798	04312
	32	4	H3	1-1/4	2-15/16	03291	03799	04313
3/8	32	4	H5	1-1/4	2-15/16	03292	03800	04314
	40	4	H2	1-1/4	2-15/16	03294	03801	04315
3/8	40	4	H3	1-1/4	2-15/16	03293	03802	04316
	48	4	H2	1-1/4	2-15/16	03295	03803	04317

\* Double Lead

(continued)

# Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 2046 Fractional

(continued)

SIZE	PITCH	NO. OF FLUTES	PITCH		THREAD LENGTH	OAL	TAPER	PLUG	BOTTOM
			DIA. LIMIT	DIA. LIMIT			EDP NO.	EDP NO.	EDP NO.
13/32	32	4	H3		1-7/16	3-5/32	03214	03726	04239
	14	4	H11		1-7/16	3-5/32	03334	03835	04351
	16	4	H3		1-7/16	3-5/32	03335	03836	04352
7/16	18	4	H3		1-7/16	3-5/32	03336	03837	04353
	20	4	H6		1-7/16	3-5/32	03339	03838	04354
	20	4	H11		1-7/16	3-5/32	03338	03839	04355
7/16	24	4	H3		1-7/16	3-5/32	03340	03840	04356
	24	4	H5		1-7/16	3-5/32	03341	03841	04357
	27	4	H3		1-7/16	3-5/32	03342	03842	04358
7/16	28	4	H3		1-7/16	3-5/32	03343	03843	04359
	28	4	H5		1-7/16	3-5/32	03344	03844	04360
	32	4	H3		1-7/16	3-5/32	03345	03845	04361
	40	4	H2		1-7/16	3-5/32	03346	03846	04362
15/32	32	6	H3		1-21/32	3-3/8	03222	03734	04247
1/2	12	4	H3		1-21/32	3-3/8	03156	03675	04184
	13*	4	H3		1-21/32	3-3/8	03161	03678	04188
	13	4	H7		1-21/32	3-3/8	03158	03676	04185
	13	4	H11		1-21/32	3-3/8	03159	—	04186
	13	4	H21		1-21/32	3-3/8	03160	03677	04187
1/2	14	4	H3		1-21/32	3-3/8	03162	03679	04189
	16	4	H3		1-21/32	3-3/8	03163	03680	04190
	18	4	H3		1-21/32	3-3/8	03164	03681	04191
1/2	20	4	H5		1-21/32	3-3/8	—	—	04192
	20	4	H7		1-21/32	3-3/8	03166	03682	04193
	20	4	H11		1-21/32	3-3/8	03167	03683	04194
1/2	24	4	H3		1-21/32	3-3/8	03168	03684	04195
	27	4	H3		1-21/32	3-3/8	03169	03685	04196
	28	4	H3		1-21/32	3-3/8	03170	03686	04197
	28	4	H5		1-21/32	3-3/8	03171	03687	04198
1/2	32	6	H3		1-21/32	3-3/8	03172	03688	04199
	40	6	H2		1-21/32	3-3/8	03173	03689	04200
33/64	13	4	H3		1-21/32	3-19/32	03296	03804	04318
9/16	16	4	H3		1-21/32	3-19/32	03364	03862	04378
	18	4	H5		1-21/32	3-19/32	—	03864	04380
	18	4	H11		1-21/32	3-19/32	03366	03865	04381
	20	4	H3		1-21/32	3-19/32	03367	03866	04382
9/16	24	4	H3		1-21/32	3-19/32	03368	03867	04383
	24	4	H5		1-21/32	3-19/32	03369	03868	04384
	27	6	H3		1-21/32	3-19/32	03370	03869	04385
	32	6	H3		1-21/32	3-19/32	03371	03870	04386
5/8	11	4	H11		1-13/16	3-13/16	03319	03823	04338
	11	4	H21		1-13/16	3-13/16	03320	03824	04339
	12	4	H3		1-13/16	3-13/16	03321	03825	04340
	16	4	H3		1-13/16	3-13/16	03322	03826	04341
5/8	18	4	H7		1-13/16	3-13/16	03326	03827	04342
	18	4	H8		1-13/16	3-13/16	—	03828	04343
	18	4	H11		1-13/16	3-13/16	03324	—	04344

\* Double Lead

(continued)



# Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 2046 Fractional

**FAST TAP SERVICE**

(continued)

SIZE	PITCH	NO. OF FLUTES	PITCH		THREAD LENGTH	OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
			DIA. LIMIT	H3					
5/8	20	4	H3	H3	1-13/16	3-13/16	03327	03829	04345
	24	6	H3	H3	1-13/16	3-13/16	03328	03830	04346
	24	6	H5	H3	1-13/16	3-13/16	03329	03831	04347
	27	6	H3	H3	1-13/16	3-13/16	03330	03832	04348
	28	6	H3	H3	1-13/16	3-13/16	03331	03833	04349
	32	6	H3	H3	1-13/16	3-13/16	03332	03834	04350
41/64	11	4	H4	H3	1-13/16	4-1/32	03300	03808	04322
11/16	18	4	H3	H3	1-13/16	4-1/32	03197	03712	04225
	20	6	H3	H3	1-13/16	4-1/32	03200	03713	04226
	24	6	H3	H3	1-13/16	4-1/32	03201	03714	04227
	24	6	H5	H3	1-13/16	4-1/32	03202	03715	04228
	28	6	H3	H3	1-13/16	4-1/32	03203	03716	04229
	32	6	H3	H3	1-13/16	4-1/32	03204	03717	04230
3/4	10	4	H11	H3	2	4-1/4	03260	03771	04284
	10	4	H21	H3	2	4-1/4	03261	03772	04285
	11-1/2	6	Hose	H3	2	4-1/4	03262	03773	04286
	12	4	H4	H3	2	4-1/4	03263	03774	04287
3/4	16	4	H7	H3	2	4-1/4	03264	03776	04289
	16	4	H11	H3	2	4-1/4	03266	03778	04291
	16	4	H8	H3	2	4-1/4	03268	03777	04290
	18	4	H3	H3	2	4-1/4	03270	03780	04292
3/4	20	6	H3	H3	2	4-1/4	03271	03782	04294
	20	6	H5	H3	2	4-1/4	03272	03783	04295
	24	6	H3	H3	2	4-1/4	03274	03784	04296
	27	6	H3	H3	2	4-1/4	03275	03785	04297
3/4	32	6	H3	H3	2	4-1/4	03276	03786	04298
	40	6	H3	H3	2	4-1/4	03277	03787	04299
49/64	10	4	H4	H3	2	4-15/32	03301	03809	04323
13/16	10	4	H4	H3	2	4-15/32	03207	03719	04232
	12	4	H4	H3	2	4-15/32	03208	03720	04233
	16	4	H3	H3	2	4-15/32	03209	03721	04234
	18	4	H3	H3	2	4-15/32	03210	03722	04235
	20	6	H3	H3	2	4-15/32	03211	03723	04236
	20	6	H5	H3	2	4-15/32	03212	03724	04237
7/8	24	6	H3	H3	2	4-15/32	03213	03725	04238
	9	4	H11	H3	2-7/32	4-11/16	03362	03860	04376
	10	4	H4	H3	2-7/32	4-11/16	03348	03848	04364
	12	4	H4	H3	2-7/32	4-11/16	03349	03849	04365
	14	4	H5	H3	2-7/32	4-11/16	03353	03850	04366
	14	4	H6	H3	2-7/32	4-11/16	03352	03851	04367
7/8	14	4	H11	H3	2-7/32	4-11/16	03351	03852	04368
	16	4	H3	H3	2-7/32	4-11/16	03354	03853	04369
	18	4	H3	H3	2-7/32	4-11/16	03355	03854	04370
	20	6	H3	H3	2-7/32	4-11/16	03356	03855	04371
	20	6	H5	H3	2-7/32	4-11/16	03357	03856	04372
	24	6	H3	H3	2-7/32	4-11/16	03358	03857	04373
7/8	27	6	H3	H3	2-7/32	4-11/16	03359	03858	04374
	32	6	H3	H3	2-7/32	4-11/16	03360	03859	04375
	15/16	12	4	H4	H3	2-7/32	4-29/32	03215	03727
	14	4	H4	H3	2-7/32	4-29/32	03216	03728	04241

(continued)

Special Tap Quoting Form Page 240

# Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 2046 Fractional

(continued)

SIZE	PITCH	NO. OF FLUTES	PITCH		THREAD LENGTH	OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
			DIA. LIMIT	DIA. LIMIT					
15/16	16	6	H3		2-7/32	4-29/32	03217	03729	04242
	18	6	H3		2-7/32	4-29/32	03218	03730	04243
	20	6	H3		2-7/32	4-29/32	03219	03731	04244
	20	6	H5		2-7/32	4-29/32	03220	03732	04245
	32	6	H3		2-7/32	4-29/32	03221	03733	04246
1	8	4	H6		2-1/2	5-1/8	—	03672	04181
	8	4	H11		2-1/2	5-1/8	03152	03673	04182
	8	4	H21		2-1/2	5-1/8	03154	03674	04183
1	10	4	H4		2-1/2	5-1/8	03135	03658	04167
	12	4	H6		2-1/2	5-1/8	03137	03659	04168
	12	4	H11		2-1/2	5-1/8	03138	03660	04169
1	14	4	H6		2-1/2	5-1/8	03140	03661	04170
	14	4	H11		2-1/2	5-1/8	03141	03662	04171
	16	6	H3		2-1/2	5-1/8	03142	03664	04173
	18	6	H3		2-1/2	5-1/8	03144	03665	04174
1	20	6	H3		2-1/2	5-1/8	03145	03667	04176
	20	6	H5		2-1/2	5-1/8	03146	03668	04177
	24	6	H3		2-1/2	5-1/8	03148	03669	04178
	27	6	H6		2-1/2	5-1/8	03149	03670	04179
	32	6	H3		2-1/2	5-1/8	03150	03671	04180
1-1/16	12	4	H4		2-1/2	5-1/8	03049	03566	04073
	12	4	H5		2-1/2	5-1/8	03047	03567	04074
	12	4	H7		2-1/2	5-1/8	03048	03568	04075
1-1/16	14	6	H5		1-1/2	4	03050	03569	04077
	16	6	H4		1-1/2	4	03051	03570	04078
	16	6	H6		1-1/2	4	03052	03571	04079
1-1/16	18	6	H4		1-1/2	4	03053	03572	04080
	18	6	H6		1-1/2	4	03054	03573	04081
	20	6	H4		1-1/2	4	03055	03574	04082
	24	6	H4		1-1/2	4	03056	03575	04083
1-1/8	8	4	H5		2-9/16	5-7/16	03091	03613	04121
	10	4	H5		2-9/16	5-7/16	03079	03600	04108
	12	4	H6		2-9/16	5-7/16	03081	03602	04110
	12	4	H11		2-9/16	5-7/16	03082	03603	04111
1-1/8	14	6	H5		1-1/2	4	03083	03604	04112
	16	6	H4		1-1/2	4	03084	03605	04113
1-1/8	18	6	H4		1-1/2	4	03085	03606	04114
	18	6	H6		1-1/2	4	03086	03607	04115
	20	6	H4		1-1/2	4	03087	03608	04116
	24	6	H4		1-1/2	4	03088	03609	04117
1-1/8	28	6	H4		1-1/2	4	03206	03610	04118
	32	8	H4		1-1/2	4	03089	03611	04119
1-3/16	12	6	H5		2-9/16	5-7/16	03092	03614	04123
	14	6	H5		1-1/2	4	03093	03615	04124
	16	6	H4		1-1/2	4	03094	03616	04125
	16	6	H6		1-1/2	4	03095	03617	04126
1-3/16	18	6	H4		1-1/2	4	03096	03618	04127
	18	6	H6		1-1/2	4	03097	03619	04128
	20	6	H4		1-1/2	4	03098	03620	04129

(continued)



# Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 2046 Fractional

**FAST TAP SERVICE**

(continued)

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
1-1/4	10	4	H5	2-9/16	5-3/4	03066	03586	04094
	12	6	H6	2-9/16	5-3/4	03068	03588	04096
	14	6	H5	1-1/2	4	03069	03589	04097
1-1/4	16	6	H4	1-1/2	4	03070	03590	04098
	18	6	H4	1-1/2	4	03071	03591	04099
1-1/4	18	6	H6	1-1/2	4	03072	03592	04100
	20	6	H4	1-1/2	4	03073	03593	04101
	24	8	H4	1-1/2	4	03074	03594	04102
1-1/4	32	10	H4	1-1/2	4	03075	03595	04103
	7	4	H8	2-9/16	5-3/4	03076	03597	04105
	7	4	H11	2-9/16	5-3/4	03077	03598	04106
	8	4	H5	2-9/16	5-3/4	03078	03599	04107
1-5/16	12	6	H5	2-9/16	5-3/4	03114	03636	04145
	12	6	H8	2-9/16	5-3/4	03115	03637	04146
	16	6	H4	1-1/2	4	03116	03638	04147
	16	6	H6	1-1/2	4	03117	03639	04148
	18	6	H4	1-1/2	4	03118	03640	04149
	18	6	H6	1-1/2	4	03119	03641	04150
1-3/8	20	6	H4	1-1/2	4	03120	03642	04151
	8	4	H5	3	6-1/16	03113	03635	04144
	16	6	H4	1-1/2	4	03108	03630	04139
	18	6	H4	1-1/2	4	03109	03631	04140
	18	6	H6	1-1/2	4	03110	03632	04141
1-7/16	20	6	H4	1-1/2	4	03111	03633	04142
	18	6	H4	1-1/2	4	03126	03649	04158
1-1/2	18	6	H6	1-1/2	4	03127	03650	04159
	8	6	H5	3	6-3/8	03065	03585	04093
	10	6	H5	3	6-3/8	03057	03576	04084
	12	6	H6	3	6-3/8	03059	03578	04086
1-1/2	16	6	H4	1-1/2	4	03060	03579	04087
	18	6	H4	1-1/2	4	03061	03580	04088
	18	6	H6	1-1/2	4	03062	03581	04089
	20	6	H4	1-1/2	4	03063	03582	04090
1-5/8	24	8	H4	1-1/2	4	03064	03583	04091
	5-1/2	6	H7	3-7/32	6-11/16	03124	03647	04156
1-5/8	8	6	H6	3-7/32	6-11/16	03125	03648	04157
	12	6	H4	2	5	—	03643	04152
	12	6	H6	2	5	03121	03644	04153
	16	6	H5	2	5	03122	03645	04154
	18	6	H5	2	5	03123	03646	04155
1-9/16	16	6	H5	2	5	03133	03656	04165
	18	6	H5	2	5	03134	03657	04166
1-3/4	5	6	H7	3-7/32	7	03105	03627	04136
	8	6	H6	3-7/32	7	03106	03628	04137
	10	6	H6	3-7/32	7	03099	03621	04130
	12	6	H6	2	5	03100	03622	04131
	12	6	H8	2	5	03101	03623	04132
1-3/4	16	6	H5	2	5	03102	03624	04133
	16	6	H7	2	5	03103	03625	04134
	18	6	H5	2	5	03104	03626	04135
1-7/8	5	6	H7	3-9/16	7-5/16	03131	03654	04163
	8	6	H6	3-9/16	7-5/16	03132	03655	04164

(continued)

Special Tap Quoting Form Page 240

# Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 2046 Fractional

(continued)

SIZE	PITCH	NO. OF FLUTES	PITCH		OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
			DIA. LIMIT	THREAD LENGTH				
1-7/8	12	6	H6	2	5	03128	03651	04160
	12	6	H8	2	5	03129	03652	04161
	16	6	H5	2	5	03130	03653	04162
2	4-1/2	6	H7	3-9/16	7-5/8	03242	03754	04267
	8	6	H6	3-9/16	7-5/8	03243	03755	04268
	12	6	H6	2	5	03238	03750	04263
	12	6	H8	2	5	03239	03751	04264
	16	6	H5	2	5	03240	03752	04265
	20	8	H5	2	5	03241	03753	04266
2-1/8	8	6	H6	3-9/16	8	03233	03745	04258
	12	6	H6	2	5-1/4	03231	03743	04256
	16	6	H5	2	5-1/4	03232	03744	04257
2-1/4	4-1/2	6	H7	3-9/16	8-1/4	03229	03741	04254
	8	6	H6	3-9/16	8-1/4	03230	03742	04255
	12	6	H6	2	5-1/4	03227	03739	04252
	16	6	H5	2	5-1/4	03228	03740	04253
2-3/8	8	6	H6	4	8-1/2	03237	03749	04262
	12	6	H6	2	5-1/4	03235	03747	04260
	16	6	H5	2	5-1/4	03236	03748	04261
2-1/2	4	6	H7	4	8-3/4	03225	03737	04250
	8	6	H6	4	8-3/4	03226	03738	04251
	12	6	H6	2	5-1/4	03223	03735	04248
	16	6	H5	2	5-1/4	03224	03736	04249
2-3/4	12	6	H7	2	5-1/2	03234	03746	04259
3	4	6	H9	4-9/16	9-3/4	03255	03767	04280
	8	6	H8	4-9/16	9-3/4	03256	03768	04281
	12	8	H7	2	5-1/2	03253	03765	04278
	16	8	H7	2	5-1/2	03254	03766	04279
3-1/8	12	8	H7	2	5-3/4	03249	03761	04274
3-1/4	12	8	H7	2	5-3/4	03247	03759	04272
	8	6	H8	4-9/16	10	03248	03760	04273
3-1/2	4	6	H9	4-15/16	10-1/4	03245	03757	04270
	8	6	H8	4-15/16	10-1/4	03246	03758	04271
	12	8	H7	2	5-3/4	03244	03756	04269
3-3/4	4	10	H9	5-5/16	10-1/2	03251	03763	04276
	8	10	H8	5-5/16	10-1/2	03252	03764	04277
	12	10	H7	2	6	03250	03762	04275
4	4	10	H9	5-5/16	10-3/4	03298	03806	04320
	8	10	H8	5-5/16	10-3/4	03299	03807	04321
	12	10	H7	2	6	03297	03805	04319





# Metric Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 7500 Metric

**FAST TAP SERVICE**

SIZE	PITCH	NO. OF FLUTES	PITCH		THREAD LENGTH	OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
			DIA. LIMIT	THREAD					
M1.6	0.35	2	D3	5/16	1-5/8	03373	03872	—	
M1.8	0.35	2	D3	3/8	1-11/16	03374	03873	04388	
M2	0.40	3	D3	7/16	1-3/4	03423	03921	04436	
M2.2	0.45	3	D3	7/16	1-3/4	03424	03922	04437	
M2.5	0.45	3	D3	1/2	1-13/16	03426	03924	04438	
	0.45	3	D11	1/2	1-13/16	03425	03923	04439	
M2.6	0.45	3	D3	1/2	1-13/16	03427	03925	04440	
M3	0.50	3	D1	5/8	1-15/16	03460	03961	04474	
	0.60	3	D1	11/16	2	03462	03962	04476	
	0.60	3	D4	11/16	2	03463	03963	04475	
M3.5	0.60	3	D11	11/16	2	03464	03964	04477	
	0.70	4	D2	3/4	2-1/8	03487	03989	04502	
	0.70	4	D4	3/4	2-1/8	03488	03988	04501	
M4	0.70	4	D11	3/4	2-1/8	03490	03991	04504	
	0.75	4	D4	3/4	2-1/8	03491	03992	04505	
M4.5	0.75	4	D2	1/2	2-3/8	03492	03994	04507	
	0.75	4	D4	1/2	2-3/8	03493	03993	04506	
	0.75	4	D11	1/2	2-3/8	03495	03996	04509	
M5	0.50	4	D3	7/8	2-3/8	03498	04000	04513	
	0.80	4	D2	7/8	2-3/8	03499	04002	04515	
	0.80	4	D4	7/8	2-3/8	03500	04001	04514	
	0.80	4	D11	7/8	2-3/8	03502	04004	04517	
	0.90	4	D3	7/8	2-3/8	03503	04005	04518	
M5.5	0.90	4	D3	15/16	2-3/8	03504	04006	04519	
M6	0.50	4	D3	1	2-1/2	03505	04007	04520	
	0.75	4	D3	1	2-1/2	03506	04008	04522	
	1.00	4	D3	1	2-1/2	03507	04010	04524	
	1.00	4	D5	1	2-1/2	03508	04009	04523	
	1.00	4	D11	1	2-1/2	03510	04012	04526	
M7	1.00	4	D5	1-1/8	2-23/32	03511	04013	04527	
	1.00	4	D11	1-1/8	2-23/32	03513	04015	04529	
M8	0.50	4	D4	1-1/8	2-23/32	03514	04016	04530	
	0.75	4	D5	1-1/8	2-23/32	03515	04017	04531	
	1.00	4	D3	1-1/8	2-23/32	03516	04019	04533	
	1.00	4	D5	1-1/8	2-23/32	03517	04018	04532	
	1.00	4	D11	1-1/8	2-23/32	03519	04021	04535	
M8	1.25	4	D3	1-1/8	2-23/32	03520	04023	04537	
	1.25	4	D5	1-1/8	2-23/32	03521	04022	04536	
	1.25	4	D11	1-1/8	2-23/32	03523	04025	04539	
M9	1.00	4	D5	1-1/4	2-15/16	03524	04027	04540	
	1.25	4	D5	1-1/4	2-15/16	03525	04028	04541	
M10	1.00	4	D3	1-1/4	2-15/16	03375	03874	04389	
	1.00	4	D5	1-1/4	2-15/16	03376	03875	04390	
	1.25	4	D3	1-1/4	2-15/16	03378	03877	04392	
	1.25	4	D5	1-1/4	2-15/16	03379	03878	04393	

(continued)

Special Tap Quoting Form Page 240

# Metric Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 7500 Metric

(continued)

SIZE	PITCH	NO. OF FLUTES	PITCH		OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
			DIA. LIMIT	THREAD LENGTH				
M10	1.25	4	D11	1-1/4	2-15/16	03385	03880	04395
	1.50	4	D3	1-1/4	2-15/16	03381	03882	04397
	1.50	4	D6	1-1/4	2-15/16	03382	03881	04396
	1.50	4	D11	1-1/4	2-15/16	03384	03884	04399
M11	1.00	4	D5	1-7/16	3-5/32	03386	03885	04400
	1.50	4	D6	1-7/16	3-5/32	03387	03886	04401
M12	1.00	4	D5	1-21/32	3-3/8	03388	03887	04402
	1.25	4	D11	1-21/32	3-3/8	03389	03891	04406
	1.25	4	D3	1-21/32	3-3/8	03390	03889	04404
	1.25	4	D5	1-21/32	3-3/8	03391	03888	04403
M12	1.50	4	D6	1-21/32	3-3/8	03393	03892	04407
	1.75	4	D11	1-21/32	3-3/8	03394	03896	04411
	1.75	4	D3	1-21/32	3-3/8	03395	03894	04409
	1.75	4	D6	1-21/32	3-3/8	03396	03893	04408
M14	1.00	4	D5	1-21/32	3-19/32	03398	03897	04412
	1.25	4	D4	1-21/32	3-19/32	03399	03898	04413
	1.50	4	D3	1-21/32	3-19/32	03400	03899	04415
	1.50	4	D6	1-21/32	3-19/32	03401	03900	04414
	2.00	4	D3	1-21/32	3-19/32	03403	03902	04418
M15	2.00	4	D7	1-21/32	3-19/32	03404	03903	04417
	1.00	4	D5	1-13/16	3-13/16	03406	03905	04420
M16	1.00	4	D5	1-13/16	3-13/16	03407	03906	04421
	1.50	4	D3	1-13/16	3-13/16	03408	03907	04423
	1.50	4	D6	1-13/16	3-13/16	03409	03908	04422
M16	2.00	4	D4	1-13/16	3-13/16	03411	03911	04426
	2.00	4	D7	1-13/16	3-13/16	03412	03910	04425
	2.00	4	D11	1-13/16	3-13/16	03414	03913	04428
M18	1.00	4	D5	1-13/16	4-1/32	03416	03914	04429
	1.50	4	D3	1-13/16	4-1/32	03417	03917	04432
	1.50	4	D4	1-13/16	4-1/32	03418	03916	04431
	1.50	4	D6	1-13/16	4-1/32	03419	03915	04430
	2.50	4	D7	1-13/16	4-1/32	03421	03919	04434
M20	1.00	4	D6	2	4-15/32	03428	03926	04441
	1.50	4	D3	2	4-15/32	03429	03928	04443
	1.50	4	D6	2	4-15/32	03430	03927	04442
	1.50	4	D11	2	4-15/32	03432	03930	04445
M20	2.50	4	D4	2	4-15/32	03433	03932	04447
	2.50	4	D7	2	4-15/32	03434	03931	04446
	2.50	4	D11	2	4-15/32	03436	03934	04449
M22	1.50	4	D3	2-7/32	4-11/16	03437	03937	04451
	1.50	4	D6	2-7/32	4-11/16	03438	03936	04450
	1.50	4	D11	2-7/32	4-11/16	03440	03939	04453
	2.50	4	D4	2-7/32	4-11/16	03441	03941	04455
	2.50	4	D7	2-7/32	4-11/16	03442	03940	04454

(continued)



# Metric Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 7500 Metric

(continued)

SIZE	PITCH	NO. OF FLUTES	DIA. LIMIT	THREAD LENGTH	OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
M24	1.50	4	D6	2-7/32	4-29/32	03444	03943	04457
	2.00	4	D4	2-7/32	4-29/32	03445	03945	04459
	2.00	4	D7	2-7/32	4-29/32	03446	03944	04458
	3.00	4	D4	2-7/32	4-29/32	03448	03948	04462
	3.00	4	D8	2-7/32	4-29/32	03449	03947	04461
	3.00	4	D11	2-7/32	4-29/32	03451	03950	04464
M25	1.50	4	D6	2-1/2	5-1/8	03452	03952	04465
M26	1.50	6	D6	1-1/2	4	03453	03953	04466
M27	1.50	6	D6	1-1/2	4	03454	03954	04467
	2.00	4	D5	2-1/2	5-1/8	03455	03956	04469
	2.00	4	D7	2-1/2	5-1/8	03456	03955	04468
M27	3.00	4	D5	2-1/2	5-1/8	03457	03958	04471
	3.00	4	D8	2-1/2	5-1/8	03458	03957	04470
M30	1.50	6	D6	1-1/2	4	03465	03965	04478
	2.00	4	D5	2-9/16	5-7/16	03466	03967	04480
	2.00	4	D7	2-9/16	5-7/16	03467	03966	04479
	3.50	4	D5	2-9/16	5-7/16	03468	03969	04482
	3.50	4	D9	2-9/16	5-7/16	03469	03968	04481
M32	1.50	6	D6	1-1/2	4	—	03971	04484
	2.00	6	D7	2-9/16	5-3/4	03471	03972	04485
M33	2.00	4	D5	2-9/16	5-3/4	03472	03974	04487
	2.00	4	D7	2-9/16	5-3/4	03473	03973	04486
	3.50	4	D5	2-9/16	5-3/4	03474	03976	04489
	3.50	4	D9	2-9/16	5-3/4	03475	03975	04488
M35	1.50	6	D6	1-1/2	4	03476	03977	04490
M36	1.50	6	D6	1-1/2	4	03477	03978	04491
	2.00	6	D7	3	6-1/16	03478	03979	04492
	3.00	4	D5	3	6-1/16	03479	03981	04494
	3.00	4	D8	3	6-1/16	03480	03980	04493
	4.00	4	D5	3	6-1/16	03481	03983	04496
	4.00	4	D9	3	6-1/16	03482	03982	04495
M39	3.00	6	D6	3-7/32	6-11/16	03483	03985	04498
	3.00	6	D8	3-7/32	6-11/16	03484	03984	04497
	4.00	6	D6	3-7/32	6-11/16	03485	03987	04500
	4.00	6	D9	3-7/32	6-11/16	03486	03986	04499
M40	1.50	6	D6	2	5	03496	03997	04510
M42	1.50	6	D6	2	5	—	03998	04511
	4.50	6	D10	3-7/32	7	03497	03999	04512

**FAST TAP SERVICE**

Special Tap Quoting Form Page 240

# Titanium Nitride (TiN) Coated Straight Flute Hand Taps

High Speed Steel



List No. 7500 Metric

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
M6	0.50	4	D3	1	2-1/2	—	04521
M8	1.25	4	D5	1-1/8	2-23/32	04026	—
M20	2.50	4	D7	2	4-15/32	03935	—
M24	3.00	4	D8	2-7/32	4-29/32	03951	—

# Titanium Nitride (TiN) Coated Straight Flute Hand Taps

High Speed Steel



List No. 2046 Fractional

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
1/4	28	4	H5	1	2-1/2	—	04211
3/8	24	4	H7	1-1/4	2-15/16	—	04310
3/4	16	4	H8	2	4-1/4	03779	—
1-1/16	12	4	H4	2-1/2	5-1/8	—	04076
1-1/8	8	4	H5	2-9/16	5-7/16	—	04122

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# Left Hand Straight Flute Hand Taps

Ground Thread — High Speed Steel  
Bright Finish



List No. 2020 Machine Screw  
Fractional

Left Hand taps are left hand cutting for producing left hand threads in a wide variety of materials.

## List No. 2020 Machine Screw

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
#0	80	2	H1	5/16	1-5/8	03001	03526	04029
#2	56	2	H2	7/16	1-3/4	03026	03546	04051
#3	48	2	H2	1/2	1-13/16	03027	03548	04053
#4	40	3	H2	9/16	1-7/8	03030	03551	04056
	48	3	H2	9/16	1-7/8	03032	03553	04058
#5	40	3	H2	5/8	1-15/16	03033	03554	04059
#6	32	3	H3	11/16	2	03034	03555	04060
	40	3	H2	11/16	2	03038	03558	04064
#8	32	4	H3	3/4	2-1/8	03041	03561	04067
	36	4	H2	3/4	2-1/8	03045	03564	04071
#10	24	4	H3	7/8	2-3/8	03002	—	—
	32	4	H3	7/8	2-3/8	03009	—	—
#12	24	4	H3	15/16	2-3/8	03019	03540	04045
	28	4	H3	1/2	2-3/8	03020	03541	04046

## List No. 2020 Fractional

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
1/4	20	4	H3	1	2-1/2	03174	—	—
	28	4	H3	1	2-1/2	03181	—	—
	32	4	H3	1	2-1/2	03188	03700	04213
5/16	18	4	H3	1-1/8	2-23/32	03302	—	—
	24	4	H3	1-1/8	2-23/32	03308	—	—
3/8	16	4	H3	1-1/4	2-15/16	03278	—	—
	24	4	H3	1-1/4	2-15/16	03285	—	—
7/16	14	4	H3	1-7/16	3-5/32	03333	—	—
	20	4	H3	1-7/16	3-5/32	03337	—	—
1/2	20	4	H3	1-21/32	3-3/8	03165	—	—
9/16	12	4	H3	1-21/32	3-19/32	03363	03861	04377
	18	4	H3	1-21/32	3-19/32	03365	03863	04379
5/8	11	4	H3	1-13/16	3-13/16	03318	—	—
	18	4	H3	1-13/16	3-13/16	03323	—	—
11/16	11	4	H3	1-13/16	4-1/32	03195	03709	04222
	16	4	H3	1-13/16	4-1/32	03196	03710	04223
	18	4	H3	1-13/16	4-1/32	03198	03711	04224
3/4	10	4	H3	2	4-1/4	03259	—	—
	16	4	H3	2	4-1/4	03265	—	—
	16	4	H5	2	4-1/4	03269	03775	04288
	20	6	H3	2	4-1/4	03273	03781	04293
7/8	14	4	H4	2-7/32	4-11/16	03350	—	—
	9	4	H4	2-7/32	4-11/16	03361	—	—
1	12	4	H4	2-1/2	5-1/8	03136	—	—
	14	4	H4	2-1/2	5-1/8	03139	—	—
	16	6	H3	2-1/2	5-1/8	03143	03663	04172
	20	6	H3	2-1/2	5-1/8	03147	03666	04175
	8	4	H4	2-1/2	5-1/8	03151	—	—
1-1/8	12	4	H4	2-9/16	5-7/16	03080	03601	04109
	7	4	H4	2-9/16	5-7/16	03090	03612	04120
1-1/4	12	6	H4	2-9/16	5-3/4	03067	03587	04095
	7	4	H4	2-9/16	5-3/4	04543	03596	04104
1-3/8	12	6	H4	3	6-1/16	03107	03629	04138
	6	4	H4	3	6-1/16	03112	03634	04143
1-1/2	12	6	H4	3	6-3/8	03058	03577	04085
	6	4	H4	3	6-3/8	04542	03584	04092

Special Tap Quoting Form Page 240

# Left Hand Straight Flute Hand Taps

Ground Thread — High Speed Steel

Bright Finish



List No. 2020 Metric

Left Hand taps are left hand cutting for producing left hand threads in a wide variety of materials.

SIZE	PITCH	NO. OF FLUTES	PITCH		THREAD LENGTH	OAL	TAPER	PLUG	BOTTOM
			DIA. LIMIT	DIA. LIMIT			EDP NO.	EDP NO.	EDP NO.
M4	0.70	4	D4	D4	3/4	2-1/8	03489	03990	04503
M4.5	0.75	4	D4	D4	1/2	2-3/8	03494	03995	04508
M5	0.80	4	D4	D4	7/8	2-3/8	03501	04003	04516
M6	1.00	4	D5	D5	1	2-1/2	03509	04011	04525
M7	1.00	4	D5	D5	1-1/8	2-23/32	03512	04014	04528
M8	1.00	4	D5	D5	1-1/8	2-23/32	03518	04020	04534
	1.25	4	D5	D5	1-1/8	2-23/32	03522	04024	04538
M10	1.00	4	D5	D5	1-1/4	2-15/16	03377	03876	04391
	1.25	4	D5	D5	1-1/4	2-15/16	03380	03879	04394
	1.50	4	D6	D6	1-1/4	2-15/16	03383	03883	04398
M12	1.25	4	D5	D5	1-21/32	3-3/8	03392	03890	04405
	1.75	4	D6	D6	1-21/32	3-3/8	03397	03895	04410
M14	1.50	4	D6	D6	1-21/32	3-19/32	03402	03901	04416
	2.00	4	D7	D7	1-21/32	3-19/32	03405	03904	04419
M16	1.50	4	D6	D6	1-13/16	3-13/16	03410	03909	04424
	2.00	4	D7	D7	1-13/16	3-13/16	03413	03912	04427
M18	1.50	4	D6	D6	1-13/16	4-1/32	03420	03918	04433
	2.50	4	D7	D7	1-13/16	4-1/32	03422	03920	04435
M20	1.50	4	D6	D6	2	4-15/32	03431	03929	04444
	2.50	4	D7	D7	2	4-15/32	03435	03933	04448
M22	1.50	4	D6	D6	2-7/32	4-11/16	03439	03938	04452
	2.50	4	D7	D7	2-7/32	4-11/16	03443	03942	04456
M24	2.00	4	D7	D7	2-7/32	4-29/32	03447	03946	04460
	3.00	4	D8	D8	2-7/32	4-29/32	03450	03949	04463
M27	3.00	4	D8	D8	2-1/2	5-1/8	03459	03959	04472
M30	3.50	4	D9	D9	2-9/16	5-7/16	03470	03970	04483

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**



# Extension Straight Flute Hand Taps

Straight Flute Extension Hand Taps are used for tapping by hand or machine in blind holes or through holes in a wide variety of materials.

**Small Shank Taps and Standard Shank Taps Size 7/16" and Larger** have a shank diameter that is smaller than the minor diameter of the thread.



**List No. 2040 Machine Screw  
Ground Thread — High Speed Steel  
Bright Finish**

## 6" Overall Length

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	SHANK STYLE	THREAD LENGTH	SHANK DIA.	TAPER EDP NO.
#6	32	H3	3	Std	1 1/16	0.141	05132
#8	32	H3	4	Std	3/4	0.168	05133
#10	24	H3	4	Std	7/8	0.194	05130
#10	32	H3	4	Std	7/8	0.194	05131

# Extension Straight Flute Hand Taps

Straight Flute Extension Hand Taps are used for tapping by hand or machine in blind holes or through holes in a wide variety of materials.

**Small Shank Taps and Standard Shank Taps Size 7/16" and Larger** have a shank diameter that is smaller than the minor diameter of the thread.



**List No. 2040 Fractional  
Ground Thread — High Speed Steel  
Bright Finish**

## 6" Overall Length

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	SHANK STYLE	THREAD LENGTH	SHANK DIA.	TAPER EDP NO.	PLUG EDP NO.	BOTTOMING EDP NO.
1/4	20	H3	4	Std	1	0.255	05179	—	—
	8	H3	4	Std	1	0.255	05181	—	—
5/16	18	H3	4	Small	1-1/8	0.240	—	—	05197
	18	H3	4	Std	1-1/8	0.318	05199	—	—
	24	H3	4	Std	1-1/8	0.318	05201	—	—
3/8	16	H3	4	Std	1-1/4	0.381	05191	—	—
	16	H3	4	Small	1-1/4	0.275	05194	—	—
	16	H5	4	Std	1-1/4	0.381	05195	—	—
	24	H3	4	Std	1-1/4	0.381	05196	—	—
1/2	13	H3	4	Std	1-21/32	0.367	05212	05168	—
	13	H3	4	Std	1-21/32	0.367	05173	—	—
	20	H3	4	Std	1-21/32	0.367	05177	—	05172
9/16	18	H3	4	Std	1-21/32	0.429	05217	—	—
5/8	11	H3	4	Std	1-13/16	0.480	05208	—	05204
	18	H3	4	Std	1-13/16	0.480	03225	—	—
3/4	10	H3	4	Std	2	0.590	05185	—	—

## 8" Overall Length

1/4	20	H3	4	Std	1	0.255	05180	—	05178
5/16	18	H3	4	Std	1-1/8	0.318	05200	—	05198
3/8	16	H3	4	Std	1-1/4	0.381	05192	—	05189
7/16	14	H3	4	Std	1-7/16	0.323	05212	—	—
	20	H3	4	Std	1-7/16	0.323	05213	—	—
1/2	13	H3	4	Std	1-21/32	0.367	05174	05169	—
5/8	11	H3	4	Std	1-13/16	0.480	05209	—	05205
3/4	10	H3	4	Std	2	0.590	05186	—	05183
7/8	9	H4	4	Std	2-7/32	0.697	05216	05214	05215
1	8	H4	4	Std	2-1/2	0.800	05158	05162	—

## 10" Overall Length

3/8	16	H3	4	Std	1-1/4	0.381	05193	05188	05190
1/2	13	H3	4	Std	1-21/32	0.367	05175	05166	05170
	13	H3	4	Std	1-21/32	0.367	05176	—	—
5/8	11	H3	4	Std	1-13/16	0.480	05210	05202	05206
3/4	10	H3	4	Std	2	0.590	05187	05182	05184
1	8	H4	4	Std	2-1/2	0.800	05159	05160	05163
1-1/4	7	H4	4	Std	2-9/16	1.021	05154	05146	05148
	8	H5	4	Std	2-9/16	1.021	05156	05150	05152
1-1/2	6	H4	4	Std	3	1.233	05142	05134	05136
	8	H5	4	Std	3	1.233	05144	05138	05140

## 12" Overall Length

1/2	13	H3	4	Std	1-21/32	0.367	—	05167	05171
5/8	11	H3	4	Std	1-13/16	0.480	05211	05203	05207
1	8	H4	4	Std	2-1/2	0.800	05165	05161	05164
1-1/4	7	H4	4	Std	2-9/16	1.021	05155	05147	05149
	8	H5	4	Std	2-9/16	1.021	05157	05151	05153
1-1/2	6	H4	4	Std	3	1.233	05143	05135	05137
	8	H5	4	Std	3	1.233	05145	05139	05141

Special Tap Quoting Form Page 240

# Extension Hand Taps

High Speed Steel

Bright Finish



List No. 2040M Metric

## 6" Overall Length

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	SHANK STYLE	THREAD LENGTH	SHANK DIA.	TAPER EDP NO.	PLUG EDP NO.	BOTTOMING EDP NO.
M3.5	0.60	D4	3	Std	1 1/16	0.141	05229	05227	05228
M4	0.70	D4	4	Std	3/4	0.168	—	05230	05231
M4.5	0.75	D4	4	Std	1/2	0.194	05232	—	—
M5	0.80	D4	4	Std	7/8	0.194	—	05233	05234
M8	1.25	D5	4	Std	1-1/8	0.318	05235	—	—
M10	1.50	D6	4	Std	1-1/4	0.381	05220	05218	05219
M12	1.75	D6	4	Std	1-21/32	0.367	05221	—	—
M16	2.00	D7	4	Std	1-13/16	0.480	—	05222	—
M16	2.00	D7	4	Std	1-13/16	0.480	—	05223	05224
M20	2.50	D7	4	Std	2	0.652	05226	—	05225

## TOOL COATINGS

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish.

### TiN - Titanium Nitride

A good general purpose coating for a wide range of ferrous materials. Not recommended for non-ferrous materials. Has higher heat resistance than TiCN coating.

### TiCN - Titanium Carbonitride

Enhanced toughness, hardness & wear resistance for aggressive speeds & feeds. Recommended for difficult-to-machine, gummy & abrasive materials where moderate cutting temperatures are generated.

### TiALN - Titanium Aluminum Nitride

### ALTiN - Aluminum Titanium Nitride

Excellent all around coatings featuring high heat resistance. Recommended for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. ALTiN has higher AL content for increased hardness & heat resistance.

### CrN - Chromium Nitride

### CrC - Chromium Carbide

Especially recommended for titanium and non-ferrous materials including aluminum, copper & brass. CrC has slightly higher hardness than CrN. These coatings resist adhesion of the material being machined and resist chipping and cracking.

### DLC - Diamond Like Carbon

A thin carbon based amorphous (non-crystalline) coating featuring very high hardness & low coefficient of friction. Highly recommended for non-ferrous materials including plastic, aluminum, copper & brass. Typically used on solid carbide tools.

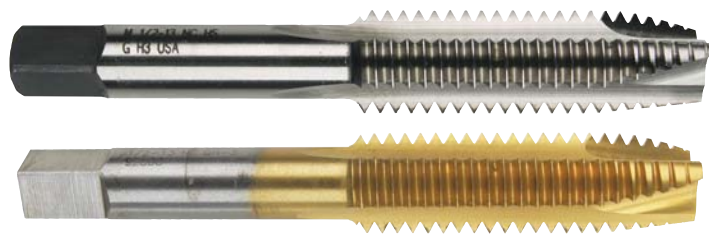




# Spiral Point Plug Taps

High Speed Steel  
Straight Flute

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.



## List No. 2047 Machine Screw

TiN - Titanium Nitride is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. Increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

FAST TAP SERVICE

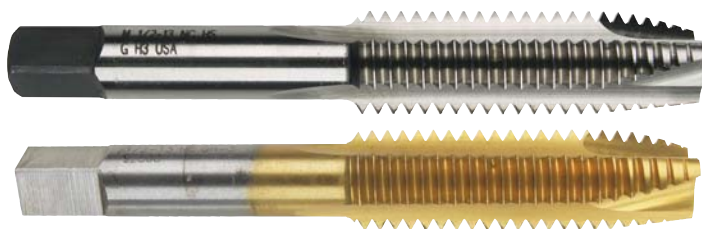
SIZE	PITCH	NO. OF FLUTES	PITCH		OAL	BRIGHT EDP NO.	TiN EDP NO.
			DIA. LIMIT	THREAD LENGTH			
#00	90	0	H1	3/8	1-5/8	04600	—
	96	0	H1	5/16	1-5/8	04601	—
#0	80	0	H3	5/16	1-5/8	04604	—
#1	56	0	H1	13/32	1-11/16	04617	—
	56	2	H3	7/16	1-3/4	04619	—
	56	2	H4	7/16	1-3/4	04620	—
	56	2	H5	7/16	1-3/4	04621	—
#2	56	2	H7	7/16	1-3/4	04622	—
	40	2	H3	9/16	1-7/8	04625	—
	40	2	H4	9/16	1-7/8	04626	04630
	40	2	H5	9/16	1-7/8	04627	—
#4	40	2	H7	9/16	1-7/8	04628	—
	40	2	H11	9/16	1-7/8	04629	—
	40	2	H5	5/8	1-15/16	04633	04636
	40	2	H7	5/8	1-15/16	04634	—
#5	40	2	H11	5/8	1-15/16	04635	—
	32	2	H5	11/16	2	04638	—
	32	2	H7	11/16	2	04639	—
#6	40	2	H3	11/16	2	04640	—
	48	2	H2	11/16	2	04641	—
	32	2	H5	3/4	2-1/8	04643	04645
#8	32	2	H7	3/4	2-1/8	04644	—
	40	2	H2	3/4	2-1/8	04647	—
	24	2	H5	7/8	2-3/8	04606	—
#10	24	2	H7	7/8	2-3/8	04607	—
	32	2	H4	7/8	2-3/8	04609	04612
	32	2	H5	7/8	2-3/8	04610	04613
	32	2	H7	7/8	2-3/8	04611	—
	32	2	H11	7/8	2-3/8	—	04614
	40	2	H2	7/8	2-3/8	04615	—
#12	32	2	H3	15/16	2-3/8	04616	—

Special Tap Quoting Form Page 240

# Spiral Point Plug Taps

High Speed Steel  
Straight Flute

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.



## List No. 2047 Fractional

**TiN - Titanium Nitride** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. Increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

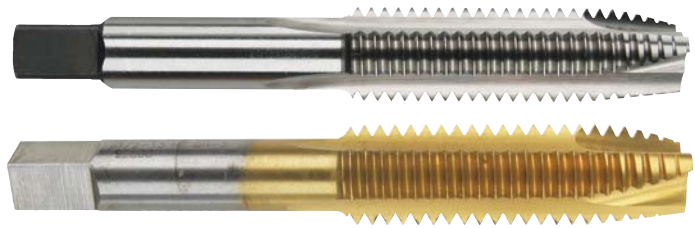
SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	BRIGHT EDP NO.	TiN EDP NO.
1/4	20	2	H7	1	2-1/2	04658	04659
	20	2	H11	1	2-1/2	—	04660
	24	2	H3	1	2-1/2	04661	—
	28	2	H5	1	2-1/2	04663	—
	28	2	H7	1	2-1/2	04664	—
	28	2	H11	1	2-1/2	04665	—
1/4	32	2	H3	1	2-1/2	04666	—
	36	2	H2	1	2-1/2	04667	—
	36	2	H3	1	2-1/2	04668	04669
	40	3	H2	1	2-1/2	04670	—
5/16	18	2	H7	1-1/8	2-23/32	04684	—
	24	2	H5	1-1/8	2-23/32	04686	—
	24	2	H11	1-1/8	2-23/32	04687	—
	32	2	H3	1-1/8	2-23/32	04688	—
3/8	16	2	H3	1-1/4	2-15/16	04676	—
	16	3	H7	1-1/4	2-15/16	04677	—
	24	3	H5	1-1/4	2-15/16	04679	—
	24	3	H7	1-1/4	2-15/16	04680	—
	24	3	H11	1-1/4	2-15/16	04681	—
	32	3	H3	1-1/4	2-15/16	04682	—
7/16	14	3	H11	1-7/16	3-5/32	04694	—
	20	3	H11	1-7/16	3-5/32	04695	—
15/32	32	3	H3	1-21/32	3-3/8	04671	—
1/2	13	3	H11	1-21/32	3-3/8	—	04653
	20	3	H11	1-21/32	3-3/8	04655	—
	28	3	H3	1-21/32	3-3/8	04656	—
9/16	12	3	H3	1-21/32	3-19/32	04698	—
	18	3	H3	1-21/32	3-19/32	04699	—
	18	3	H5	1-21/32	3-19/32	04700	—
	18	3	H11	1-21/32	3-19/32	04701	—
	20	3	H3	1-21/32	3-19/32	04702	—
5/8	18	3	H3	1-13/16	3-13/16	04690	—
	18	3	H5	1-13/16	3-13/16	04691	04692
3/4	10	3	H11	2	4-1/4	04672	—
	16	3	H3	2	4-1/4	04673	—
	16	3	H5	2	4-1/4	04674	—
7/8	9	3	H4	2-7/32	4-11/16	04697	—
	14	3	H4	2-7/32	4-11/16	04696	—
1	8	3	H4	2-1/2	5-1/8	04650	—
	8	3	H11	2-1/2	5-1/8	04651	—
	14	3	H4	2-1/2	5-1/8	04649	—
1-1/4	7	3	H4	2-9/16	5-3/4	04648	—



# Right Hand Metric Spiral Point Plug Taps

High Speed Steel  
Straight Flute

**Spiral Point** taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.



## List No. 7501 Metric

**TiN - Titanium Nitride** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. Increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

**FAST TAP SERVICE**

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	BRIGHT EDP NO.	TiN EDP NO.
M1.6	0.35	0	D3	5/16	1-5/8	04703	—
M1.8	0.35	0	D3	3/8	1-11/16	04704	—
M2	0.40	2	D3	7/16	1-3/4	04733	—
M2.2	0.45	2	D3	7/16	1-3/4	04734	—
M2.5	0.45	2	D1	1/2	1-13/16	04736	—
	0.45	2	D3	1/2	1-13/16	04735	—
	0.50	2	D1	5/8	1-15/16	04743	—
M3	0.50	2	D3	5/8	1-15/16	04740	—
	0.50	2	D5	5/8	1-15/16	04741	—
	0.50	2	D7	5/8	1-15/16	04742	—
	0.60	2	D1	11/16	2	04745	—
M3.5	0.60	2	D4	11/16	2	04744	—
	0.60	2	D11	11/16	2	04746	—
	0.70	2	D2	3/4	2-1/8	04749	—
M4	0.70	2	D4	3/4	2-1/8	04747	—
	0.70	2	D5	3/4	2-1/8	04748	—
	0.70	2	D7	3/4	2-1/8	04750	—
	0.70	2	D11	3/4	2-1/8	04751	—
	0.75	2	D2	7/8	2-3/8	04753	—
M4.5	0.75	2	D4	7/8	2-3/8	04752	—
	0.75	2	D11	7/8	2-3/8	04754	—
	0.80	2	D3	7/8	2-3/8	04755	—
M5	0.80	2	D2	7/8	2-3/8	04757	—
	0.80	2	D4	7/8	2-3/8	04756	—
	0.80	2	D7	7/8	2-3/8	04758	04760
	0.80	2	D11	7/8	2-3/8	04759	—
	0.90	2	D3	7/8	2-3/8	04761	—
M5.5	0.90	2	D3	15/16	2-3/8	04762	—
	0.75	2	D3	1	2-1/2	04763	—
M6	1.00	2	D3	1	2-1/2	04765	—
	1.00	2	D5	1	2-1/2	04764	—
	1.00	2	D11	1	2-1/2	04766	—
M7	1.00	2	D5	1-1/8	2-23/32	04767	—
	1.00	2	D11	1-1/8	2-23/32	04768	—
	1.00	2	D3	1-1/8	2-23/32	04770	—
M8	1.00	2	D5	1-1/8	2-23/32	04769	—
	1.00	2	D11	1-1/8	2-23/32	04771	—
	1.25	2	D3	1-1/8	2-23/32	04773	—
	1.25	2	D5	1-1/8	2-23/32	04772	04775
	1.25	2	D11	1-1/8	2-23/32	04774	—
	1.00	3	D5	1-1/4	2-15/16	04705	—
M10	1.25	3	D3	1-1/4	2-15/16	04706	—
	1.25	3	D5	1-1/4	2-15/16	04707	04709
	1.25	3	D11	1-1/4	2-15/16	04708	—
	1.50	3	D3	1-1/4	2-15/16	04711	—
M10	1.50	3	D6	1-1/4	2-15/16	04710	—
	1.50	3	D11	1-1/4	2-15/16	04713	—
	1.50	3	D7	1-1/4	2-15/16	04712	—
M11	1.50	3	D6	1-7/16	3-5/32	04714	—
	1.00	3	D5	1-21/32	3-3/8	04715	—
M12	1.25	3	D3	1-21/32	3-3/8	04717	—
	1.25	3	D5	1-21/32	3-3/8	04716	—
	1.50	3	D6	1-21/32	3-3/8	04718	04719

(continued)

Special Tap Quoting Form Page 240

List No. 7501 Metric (continued)

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	BRIGHT EDP NO.	TIN EDP NO.
M12	1.75	3	D3	1-21/32	3-3/8	04721	—
	1.75	3	D6	1-21/32	3-3/8	04720	—
	1.75	3	D11	1-21/32	3-3/8	04722	—
M14	1.50	3	D3	1-21/32	3-19/32	04724	—
	1.50	3	D6	1-21/32	3-19/32	04723	—
	2.00	3	D3	1-21/32	3-19/32	04726	—
	2.00	3	D7	1-21/32	3-19/32	04725	—
M16	1.50	3	D3	1-13/16	3-13/16	04728	—
	1.50	3	D6	1-13/16	3-13/16	04727	—
	2.00	3	D4	1-13/16	3-13/16	04730	—
	2.00	3	D7	1-13/16	3-13/16	04729	—
	2.00	3	D11	1-13/16	3-13/16	04731	—
M18	2.50	3	D7	1-13/16	4-1/32	04732	—
M20	2.50	3	D7	2	4-15/32	04737	04738
M24	3.00	3	D8	2-7/32	4-29/32	04739	—

## Left Hand Spiral Point Plug Taps

High Speed Steel  
Straight Flute  
Bright Finish

**Spiral Point** taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.



List No. 2047L Machine Screw Fractional

### List No. 2047L Machine Screw

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO.
#0	80	0	H1	5/16	1-5/8	04602
	80	2	H1	5/16	1-5/8	04603
#2	56	2	H2	7/16	1-3/4	04618
	48	2	H2	1/2	1-13/16	04623
#4	40	2	H2	9/16	1-7/8	04624
	48	2	H2	9/16	1-7/8	04631
#5	40	2	H2	5/8	1-15/16	04632
	32	2	H3	11/16	2	04637
#8	32	2	H3	3/4	2-1/8	04642
	36	2	H2	3/4	2-1/8	04646
#10	24	2	H3	7/8	2-3/8	04605
	32	2	H3	7/8	2-3/8	04608

### List No. 2047L Fractional

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO.
1/4	20	2	H3	1	2-1/2	04657
	28	2	H3	1	2-1/2	04662
5/16	18	2	H3	1-1/8	2-23/32	04683
	24	2	H3	1-1/8	2-23/32	04685
3/8	16	3	H3	1-1/4	2-15/16	04675
	24	3	H3	1-1/4	2-15/16	04678
7/16	14	3	H3	1-7/16	3-5/32	04693
1/2	13	3	H3	1-21/32	3-3/8	04652
	20	3	H3	1-21/32	3-3/8	04654
5/8	11	3	H3	1-13/16	3-13/16	04689



# Slow Spiral Spiral Flute Taps

High Speed Steel  
30° Helix Angle  
Bright Finish

**Spiral Flute** taps lift the chips out of the hole in blind hole tapping, eliminating chip disposal problems, damaged threads and broken taps. They will also bridge interruptions in the tapped hole. **Slow Spiral** taps have a stronger cutting edge (less susceptible to chipping) than Fast Spiral taps and are recommended for general purpose applications. (less susceptible to chipping) than Fast Spiral taps and are recommended for general purpose applications.



List No. 2039 Fractional

List No. 2039 Metric

## List No. 2039 Fractional

SIZE	PITCH	NO. OF FLUTES	PITCH		OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
			DIA. LIMIT	THREAD LENGTH				
3/8	24	3	H5	1-1/4	2-15/16	—	04814	04815
5/8	11	4	H3	1-13/16	3-13/16	04878	04816	04818
	18	4	H3	1-13/16	3-13/16	04879	04820	04822
3/4	10	4	H3	2	4-1/4	04895	04808	04809
	16	4	H3	2	4-1/4	—	04810	04811
7/8	9	4	H4	2-7/32	4-11/16	04880	04825	04826
1	8	4	H4	2-1/2	5-1/8	—	04802	04804

## List No. 2039 Metric

SIZE	PITCH	NO. OF FLUTES	PITCH		OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
			DIA. LIMIT	THREAD LENGTH				
M3	0.50	2	D3	5/8	1-15/16	04885	04846	04848
M3.5	0.60	2	D4	11/16	2	04886	04850	04852
M4	0.70	2	D4	3/4	2-1/8	04888	04854	04856
M4.5	0.75	2	D4	7/8	2-3/8	04889	04858	04860
M5	0.80	2	D4	7/8	2-3/8	04890	04862	04864
M6	1.00	3	D5	1	2-1/2	04891	04866	04868
M8	1.00	3	D5	1-1/8	2-23/32	04892	04870	04872
	1.25	3	D5	1-1/8	2-23/32	04894	04874	04876
M10	1.25	3	D5	1-1/4	2-15/16	04881	04827	04829
	1.50	3	D6	1-1/4	2-15/16	04882	04831	04833
M12	1.25	3	D5	1-21/32	3-3/8	—	04835	—
	1.25	3	D5	1-21/32	3-3/8	04883	04837	04838
	1.75	3	D6	1-21/32	3-3/8	04884	04840	04842

We can quote sizes & styles not listed.

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# Fast Spiral Spiral Flute Taps

High Speed Steel  
52° Helix Angle  
Bright Finish

**Spiral Flute** taps lift the chips out of the hole in blind hole tapping, eliminating chip disposal problems, damaged threads and broken taps. They will also bridge interruptions in the tapped hole. **Fast Spiral** taps provide enhanced chip lifting action, will bridge wider interruptions and have a freer-cutting geometry. Recommended for softer materials that produce stringy chips.



List No. 2063 Machine Screw

List No. 2063 Machine Screw

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
4	40	2	H3	9/16	1-7/8	04800	04801

# Fast Spiral Spiral Flute Taps

High Speed Steel  
52° Helix Angle  
Bright Finish

**Spiral Flute** taps lift the chips out of the hole in blind hole tapping, eliminating chip disposal problems, damaged threads and broken taps. They will also bridge interruptions in the tapped hole. **Fast Spiral** taps provide enhanced chip lifting action, will bridge wider interruptions and have a freer-cutting geometry. Recommended for softer materials that produce stringy chips.



List No. 2059 Fractional

List No. 2059 Metric

List No. 2059 Fractional

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
1/4	20	3	H5	1	2-1/2	04806	04807
3/8	16	3	H5	1-1/4	2-15/16	04812	04813
5/8	11	4	H3	1-13/16	3-13/16	04817	04819
	18	4	H3	1-13/16	3-13/16	04821	04823
	18	4	H3	1-13/16	3-13/16	—	04824
1	8	4	H4	2-1/2	5-1/8	04803	04805

List No. 2059 Metric

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	TAPER EDP NO.	PLUG EDP NO.	BOTTOM EDP NO.
M3	0.50	2	D3	5/8	1-15/16	—	04847	04849
M3.5	0.60	2	D4	11/16	2	04887	04851	04853
M4	0.70	3	D4	3/4	2-1/8	—	04855	04857
M4.5	0.75	3	D4	7/8	2-3/8	—	04859	04861
M5	0.80	3	D4	7/8	2-3/8	—	04863	04865
M6	1.00	3	D5	1	2-1/2	—	04867	04869
M8	1.00	3	D5	1-1/8	2-23/32	04893	04871	04873
	1.25	3	D5	1-1/8	2-23/32	—	04875	04877
M10	1.25	3	D5	1-1/4	2-15/16	—	04828	04830
	1.50	3	D6	1-1/4	2-15/16	—	04832	04834
M12	1.25	3	D5	1-21/32	3-3/8	—	04836	04839
	1.75	3	D6	1-21/32	3-3/8	—	04841	04843
M20	2.50	4	D7	2	4-15/32	—	04844	04845



# Thread Forming Taps

## Ground Thread — High Speed Steel

**Thread Forming** taps cold form rather than cut the threads. Advantages include no chips to dispose of, stronger higher quality threads, increased tapping speeds, longer tap life and reduced tap breakage. Recommended for a wide variety of ductile materials.

**Lube Grooves** provide a path for lubrication and act as vents to relieve pressure in blind hole tapping.

**Plug Style** (4 threads tapered) for through holes and blind holes with adequate depth. The longer taper lead is easier starting, requires less torque, produces less burr above the mouth of the tapped hole and increases tool life.

**Bottoming Style** (2 threads tapered) for blind holes.



## List No. 2105 Machine Screw Fractional Metric

### List No. 2105 Machine Screw

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG EDP NO.	BOTTOM EDP NO.
#0	80	H3	5/16	1-5/8	0	—	04930
#1	64	H3	3/8	1-11/16	0	—	04937
	72	H3	3/8	1-11/16	0	—	04938
#6	32	H10	3/8	2	1	04939	04940
#8	32	H10	3/8	2-1/8	1	04941	04942
#10	24	H10	1/2	2-3/8	1	04931	04932
	32	H10	1/2	2-3/8	1	04933	04934
#12	28	H4	1/2	2-3/8	1	—	04935
	28	H6	1/2	2-3/8	1	—	04936

### List No. 2105 Fractional

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG EDP NO.	BOTTOM EDP NO.
1/4	20	H10	5/8	2-1/2	1	04945	04946
	28	H10	5/8	2-1/2	1	04947	04948
5/16	18	H10	11/16	2-23/32	1	04953	04954
	24	H10	11/16	2-23/32	1	04955	04956
3/8	16	H10	3/4	2-15/16	1	04949	04950
	24	H10	3/4	2-15/16	1	04951	04952
1/2	20	H10	15/16	3-3/8	1	04943	04944

### List No. 2105 Metric

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG EDP NO.	BOTTOM EDP NO.
M3.5	0.60	D6	3/8	2	1	04969	04970
M4.5	0.75	D6	1/2	2-3/8	1	04971	04972
M5	0.80	D7	1/2	2-3/8	1	—	04973
M7	1.00	D8	11/16	2-23/32	1	04974	04975
M8	1.00	D8	11/16	2-23/32	1	04976	04977
M10	1.25	D9	3/4	2-15/16	1	04957	04958
M12	1.25	D10	15/16	3-3/8	1	04959	04960
M14	1.50	D11	1	3-19/32	1	04961	04962
	2.00	D12	1	3-19/32	1	04963	04964
M16	2.00	D14	1-3/32	3-13/16	1	04965	04966
M18	1.50	D12	1-3/32	4-1/32	1	04967	04968

# Extension Spiral Point Plug Taps

Spiral Point Extension Taps are used for tapping through holes by machine in a wide variety of materials. Chips are ejected ahead of the tap eliminating problems associated with chips remaining in the hole.



List No. 2041  
Ground Thread — High Speed Steel  
Bright Finish

Small Shank Taps and Standard Shank Taps Size 7/16" and Larger have a shank diameter that is smaller than the minor diameter of the thread.

### List No. 2041 Machine Screw

#### 4" Overall Length

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	SHANK STYLE	THREAD LENGTH	SHANK DIA.	EDP NO.
#10	32	H3	2	Std	7/8	0.194	05100

### List No. 2041 Fractional

#### 4" Overall Length

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	SHANK STYLE	THREAD LENGTH	SHANK DIA.	EDP NO.
1/4	20	H3	2	Std	1	0.255	05102
5/16	18	H3	2	Std	1-1/8	0.318	05113
	24	H3	2	Small	1-1/8	0.240	05115
3/8	16	H3	3	Std	1-1/4	0.381	05108
	24	H3	3	Small	1-1/4	0.275	05112

#### 6" Overall Length

3/8	16	H5	3	Std	1-1/4	0.381	05109
5/8	11	H3	3	Std	1-13/16	0.430	05116
3/4	10	H3	3	Std	2	0.480	05106

### List No. 2041 Metric

#### 6" Overall Length

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	SHANK STYLE	THREAD LENGTH	SHANK DIA.	EDP NO.
M3.5	0.60	D4	2	Std	11/16	0.141	05122
M4.5	0.75	D4	2	Std	7/8	0.194	05123
M10	1.50	D6	3	Small	1-1/4	0.323	05118
M16	2.00	D7	3	Std	1-13/16	0.480	05121
M10	1.50	D6	3	Std	1-1/4	0.381	05119
M12	1.75	D6	3	Std	1-21/32	0.367	05120

# Extension Spiral Point Plug Taps

Spiral Point Extension Taps are used for tapping through holes by machine in a wide variety of materials. Chips are ejected ahead of the tap eliminating problems associated with chips remaining in the hole.



List No. 2041  
Ground Thread — High Speed Steel  
Titanium Nitride

Small Shank Taps and Standard Shank Taps Size 7/16" and Larger have a shank diameter that is smaller than the minor diameter of the thread.

### List No. 2041 Fractional

#### 4" Overall Length

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	SHANK STYLE	THREAD LENGTH	SHANK DIA.	EDP NO.
1/4	20	H3	2	Std	1	0.255	05105

#### 6" Overall Length

1/4	20	H3	2	Std	1	0.255	05103
	20	H3	2	Small	1	0.185	05104
5/16	18	H3	2	Std	1-1/8	0.318	05114
3/8	16	H3	3	Std	1-1/4	0.381	05110
	16	H3	3	Small	1-1/4	0.275	05111
1/2	13	H3	3	Std	1-21/32	0.367	05101
5/8	11	H3	3	Std	1-13/16	0.480	05117
3/4	10	H3	3	Std	2	0.580	05107



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# Extension Straight Flute Taper Pipe Taps

Ground Thread — High Speed Steel  
 NPT  
 Bright & TiN Finish  
 Right Hand Cut

Regular Thread NPT taper pipe taps are commonly used for tapping pipe fittings and couplings in a wide variety of materials. Assembly requires the use of a thread sealant to ensure a tight seal.



List No. 2042 Fractional

**Interrupted Thread** taper pipe taps reduce friction, increase chip capacity and enhance coolant flow to the cutting teeth for reduced chance of torn threads and improved thread quality. Recommended for a wide variety of materials, especially soft ductile materials and materials producing long continuous chips.

**TiN - Titanium Nitride** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. Increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

## 6" Overall Length

SIZE	PITCH	NO. OF FLUTES	FLUTE TYPE	THREAD LENGTH	BRIGHT EDP NO.	TiN EDP NO.
1/8	27	5	Tapered-Interrupted	3/4	05256	05266
1/4	18	4	Tapered	1-1/16	—	05277
1/4	18	5	Tapered	1-1/16	—	05279
3/8	18	4	Tapered	1-1/16	—	05290
3/8	18	5	Tapered-Interrupted	1-1/16	05284	05292
1/2	14	5	Tapered-Interrupted	1-3/8	05296	—
3/4	14	5	Tapered-Interrupted	1-3/8	05306	—

## 8" Overall Length

1/8	27	4	Tapered	3/4	05259	—
1/4	18	4	Tapered	1-1/16	05272	—
3/8	18	4	Tapered	1-1/16	05286	—
1/2	14	4	Tapered	1-3/8	05299	—
3/4	14	5	Tapered	1-3/8	05308	—

## 10" Overall Length

1/8	27	4	Tapered	3/4	05261	—
1/2	14	4	Tapered	1-3/8	05301	—
3/4	14	5	Tapered	1-3/8	05310	—
1	11-1/2	5	Tapered	1-3/4	05315	—

## 12" Overall Length

1/8	27	4	Tapered	3/4	05263	—
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# Extension Straight Flute Taper Pipe Taps

Ground Thread — High Speed Steel  
 NPTF  
 Bright Finish  
 Right Hand Cut

NPTF Dryseal taper pipe taps produce threads where a tight seal is achieved during assembly by metal-to-metal contact. Used for applications requiring a tight seal without the use of thread sealants.



List No. 2042 Fractional

**TiN - Titanium Nitride** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. Increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

**Interrupted Thread** taper pipe taps reduce friction, increase chip capacity and enhance coolant flow to the cutting teeth for reduced chance of torn threads and improved thread quality. Recommended for a wide variety of materials, especially soft ductile materials and materials producing long continuous chips.

## 6" Overall Length

SIZE	PITCH	NO. OF FLUTES	FLUTE TYPE	THREAD LENGTH	BRIGHT EDP NO.	TiN EDP NO.
1/8	27	5	Tapered-Interrupted	3/4	05257	05267
1/4	18	5	Tapered-Interrupted	1-1/16	05271	05278
1/4	18	5	Tapered	1-1/16	—	05280
3/8	18	5	Tapered-Interrupted	1-1/16	05285	05293
3/8	18	4	Tapered	1-1/16	—	05291
1/2	14	5	Tapered-Interrupted	1-3/8	05297	—
3/4	14	5	Tapered-Interrupted	1-3/8	05307	—

## 8" Overall Length

1/8	27	4	Tapered	3/4	05260	—
1/4	18	4	Tapered	1-1/16	05273	—
3/8	18	4	Tapered	1-1/16	05287	—
1/2	14	4	Tapered	1-3/8	05300	—
3/4	14	5	Tapered	1-3/8	05309	—

## 10" Overall Length

1/8	27	4	Tapered	3/4	05262	—
1/2	14	4	Tapered	1-3/8	05302	—
3/4	14	5	Tapered	1-3/8	05311	—
1	11-1/2	5	Tapered	1-3/4	05316	—

## 12" Overall Length

1/8	27	4	Tapered	3/4	05264	—
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# Extension Straight Flute Straight Pipe Taps

Ground Thread — High Speed Steel  
NPS-NPSF  
Bright Finish  
Right Hand Cut



List No. 2042A Fractional

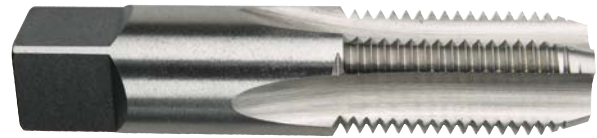
NPS straight pipe taps produce straight pipe threads for low pressure applications in a wide variety of materials. Can be assembled with taper pipe threads, straight pipe threads or fittings. Assembly requires the use of a thread sealant to ensure a tight seal.

NPSF Dryseal straight pipe taps produce threads where a tight seal is achieved during assembly by metal-to-metal contact when assembled with dryseal taper pipe threads. Used for applications requiring a tight seal without the use of thread sealants.

SIZE	PITCH	NUMBER OF FLUTES	THREAD LENGTH	OAL	NPS EDP NO.	NPSF EDP NO.
1/8	27	4	3/4	6	—	05258
1/4	18	4	1-1/16	6	05275	05274
3/8	18	4	1-1/16	6	—	05289
1/2	14	4	1-3/8	6	—	05298

## PTF-SAE – Straight Pipe Taps

Ground Thread — High Speed Steel  
Bright Finish  
Right Hand Cut



List No. 2119P Fractional

SIZE	PITCH	NUMBER OF FLUTES	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
1/4	18	4	1-1/16	2-7/16	05270	05281

## Straight Pipe Taps

Ground Thread — High Speed Steel  
NPS-NPSF  
Bright Finish  
Right Hand Cut



List No. 2123 Fractional

NPS straight pipe taps produce straight pipe threads for low pressure applications in a wide variety of materials. Can be assembled with taper pipe threads, straight pipe threads or fittings. Assembly requires the use of a thread sealant to ensure a tight seal.

SIZE	PITCH	NUMBER OF FLUTES	THREAD LENGTH	OAL	NPS EDP NO.	NPSF EDP NO.
1-1/4	11-1/2	5	1-3/4	4	05319	05320
1-1/2	11-1/2	7	1-3/4	4-1/4	05323	—
2	11-1/2	7	1-3/4	4-1/4	05326	—



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# NPSI – Straight Pipe Taps

Ground Thread — High Speed Steel

Bright Finish

Right Hand Cut

NPS straight pipe taps produce straight pipe threads for low pressure applications in a wide variety of materials. Can be assembled with taper pipe threads, straight pipe threads or fittings. Assembly requires the use of a thread sealant to ensure a tight seal.



List No. 2123 Fractional

SIZE	PITCH	NUMBER OF FLUTES	THREAD LENGTH	OAL	EDP NO.
1/8	27	4	3/4	2-1/8	05265
1/4	18	4	1-1/16	2-7/16	05276
3/8	18	4	1-1/16	2-9/16	05288
1/2	14	4	1-3/8	3-1/8	05303
3/4	14	5	1-3/8	3-1/4	05312

# NPT-NPTF Pipe Taps

Ground Thread — High Speed Steel

NPT-NPTF

Bright Finish

Regular Thread NPT taper pipe taps are commonly used for tapping pipe fittings and couplings in a wide variety of materials. Assembly requires the use of a thread sealant to ensure a tight seal.

NPTF Dryseal taper pipe taps produce threads where a tight seal is achieved during assembly by metal-to-metal contact. Used for applications requiring a tight seal without the use of thread sealants.



List No. 2113 Interrupted Thread Right Hand



List No. 2119 Regular Thread Right Hand & Left Hand

## List No. 2119 — Right Hand — Regular Thread

SIZE	PITCH	NUMBER OF FLUTES	THREAD LENGTH	OAL	NPT EDP NO.	NPTF EDP NO.
2-1/2	8	7	2-9/16	5-1/2	05324	05488
3	8	9	2-5/8	6	05327	05491
3-1/2	8	9	2-11/16	6-1/2	05331	05495
4	8	9	2-3/4	6-3/4	05335	05499

## List No. 2113 — Right Hand — Interrupted Thread

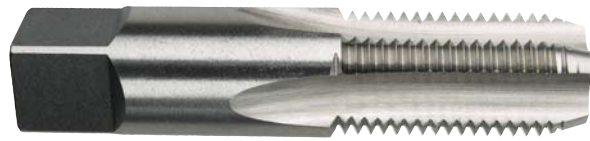
SIZE	PITCH	NUMBER OF FLUTES	THREAD LENGTH	OAL	NPT EDP NO.	NPTF EDP NO.
3	8	9	2-5/8	6	05329	05493
3-1/2	8	9	2-11/16	6-1/2	05333	05497
4	8	9	2-3/4	6-3/4	05337	05501

## List No. 2119 — Left Hand — Regular Thread

SIZE	PITCH	NUMBER OF FLUTES	THREAD LENGTH	OAL	NPT EDP NO.	NPTF EDP NO.
1/16	27	4	11/16	2-1/8	05250	05251
1/8	27	4	3/4	2-1/8	05254	05255
1/4	18	4	1-1/16	2-7/16	05268	05269
3/8	18	4	1-1/16	2-9/16	05282	05283
1/2	14	4	1-3/8	3-1/8	05294	05295
3/4	14	5	1-3/8	3-1/4	05304	05305
1	11-1/2	5	1-3/4	3-3/4	05313	05314
1-1/4	11-1/2	5	1-3/4	4	05317	05318
1-1/2	11-1/2	7	1-3/4	4-1/4	05321	05322

# BSPT Taper Taps

Ground Thread — High Speed Steel  
Bright Finish — General Purpose  
55°



List No. 2119W Fractional

List No. 2119W Fractional

SIZE	NO. OF FLUTES	PITCH	THREAD LENGTH	OAL	FLUTE TYPE	PLUG EDP NO.	BOTTOM EDP NO.
1/8	4	28	3/4	2-1/8	Taper Modified	05039	05043
	4	28	3/4	2-1/8	Taper Full Form	05041	—
1/4	4	19	1-1/16	2-7/16	Taper Modified	05027	05031
	4	19	1-1/16	2-7/16	Taper Full Form	05029	—
3/8	4	19	1-1/16	2-9/16	Taper Modified	05060	05058
	4	19	1-1/16	2-9/16	Taper Modified	05062	—
1/2	4	14	1-3/8	3-1/8	Taper Modified	05020	05024
	4	14	1-3/8	3-1/8	Taper Full Form	05022	—
3/4	5	14	1-3/8	3-1/4	Taper Modified	05051	05055
	5	14	1-3/8	3-1/4	Taper Full Form	05053	—
1	5	11	1-3/4	3-3/4	Taper Modified	05014	05017
	5	11	1-3/4	3-3/4	Taper Modified	—	—
	5	11	1-3/4	3-3/4	Taper Full Form	05015	—
1-1/4	5	11	1-3/4	4	Taper Modified	05006	05010
	5	11	1-3/4	4	Taper Full Form	05008	—
1-1/2	7	11	1-3/4	4-1/4	Taper Modified	05000	05004
	7	11	1-3/4	4-1/4	Taper Full Form	05002	—
2	7	11	1-3/4	4-1/4	Taper Modified	05045	05049
	7	11	1-3/4	4-1/4	Taper Full Form	05047	—

# BSPB Parallel Taps

Ground Thread — High Speed Steel  
Bright Finish — General Purpose  
55°



List No. 2119W Fractional

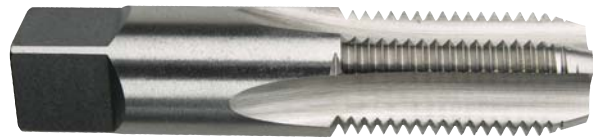
List No. 2119W Fractional

SIZE	NO. OF FLUTES	PITCH	THREAD LENGTH	OAL	FLUTE TYPE	PLUG EDP NO.	BOTTOM EDP NO.
1/8	4	28	3/4	2-1/8	Parallel Modified	05040	05044
	4	28	3/4	2-1/8	Parallel Full Form	05042	—
1/4	4	19	1-1/16	2-7/16	Parallel Modified	05028	05032
	4	19	1-1/16	2-7/16	Parallel Full Form	05030	—
3/8	4	19	1-1/16	2-9/16	Parallel Full Form	05057	05059
	4	19	1-1/16	2-9/16	Parallel Modified	05061	—
1/2	4	14	1-3/8	3-1/8	Parallel Modified	05021	05025
	4	14	1-3/8	3-1/8	Parallel Full Form	05023	—
3/4	5	14	1-3/8	3-1/4	Parallel Modified	05052	05056
	5	14	1-3/8	3-1/4	Parallel Full Form	05054	—
1	5	11	1-3/4	3-3/4	Parallel Modified	05012	05013
	5	11	1-3/4	3-3/4	Parallel Full Form	05016	—
1-1/4	5	11	1-3/4	4	Parallel Modified	05007	05011
	5	11	1-3/4	4	Parallel Full Form	05009	—
1-1/2	7	11	1-3/4	4-1/4	Parallel Modified	05001	05005
	7	11	1-3/4	4-1/4	Parallel Full Form	05003	—
2	7	11	1-3/4	4-1/4	Parallel Modified	05046	05050
	7	11	1-3/4	4-1/4	Parallel Full Form	05048	—



# BSF-Whitworth Fine Taps

Ground Thread — High Speed Steel  
 Bright Finish — General Purpose  
 Straight Flute — 55°



List No. 2119W Fractional

SIZE	PITCH	NO. OF FLUTES	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.	TAPER EDP NO.
1/4	26	4	1	2-1/2	05035	05036	05038
5/16	22	4	1-1/8	2-23/32	05068	05069	05071
3/8	20	4	1-1/4	2-15/16	05063	05064	05065

# BSW-Whitworth Coarse Taps

Ground Thread — High Speed Steel  
 Bright Finish — General Purpose  
 Straight Flute — 55°



List No. 2119W Fractional

SIZE	PITCH	NO. OF FLUTES	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.	TAPER EDP NO.
1/4	20	4	1	2-1/2	05033	05034	05037
5/16	18	4	1-1/8	2-23/32	05066	05067	05070
1/2	12	4	1-21/32	3-3/8	05018	05019	05026
5/8	11	4	1-13/16	3-13/16	05072	05073	05074

# Combined Tap and Drill

High Speed Steel  
 Bright Finish

Combined Tap and Drills drill and tap in a single pass for increased productivity. Recommended for through hole applications up to 2X the nominal diameter of the tap. The self-centering point eliminates the need for center drilling or center punching. **NOTE: Drill point must penetrate the workpiece prior to start of tapping.**



List No. 2080 Machine Screw Fractional Metric

## List No. 2080 Machine Screw

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH	DRILL DIA.	DRILL LENGTH	OAL	EDP NO.
4	40	H2	3/8	0.9100	0.2500	1-7/8	06000

## List No. 2080 Fractional

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH	DRILL DIA.	DRILL LENGTH	OAL	EDP NO.
1/16	27	—	11/16	0.2420	0.6875	2-1/8	06006
1/8	27	—	3/4	0.3320	0.7500	2-1/8	06007
1/4	18	—	1-1/16	0.4830	0.8750	2-7/16	06008
3/8	18	—	1-1/16	0.5620	0.9375	2-9/16	06009
1/2	14	—	1-3/8	0.7030	1.2500	3-1/8	06010
5/8	11	H3	1-3/4	0.5480	1.5000	5-1/16	06001
3/4	14	—	1-3/8	0.9060	1.3125	3-1/4	06011
1	11-1/2	—	1-3/4	1.1410	1.6250	3-3/4	06012

## List No. 2080 Metric

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH	DRILL DIA.	DRILL LENGTH	OAL	EDP NO.
M3	0.50	D3	13/32	0.1020	0.2812	1-15/16	06002
M3.5	0.60	D4	7/16	0.1200	0.3125	2	06003
M4.5	0.75	D4	5/8	0.1520	0.4062	2-3/8	06004
M7	1.00	D5	15/16	0.2420	0.6875	2-23/32	06005

Special Tap Quoting Form Page 240

# Pulley Taps

Ground Thread — High Speed Steel  
Bright Finish

Pulley taps, commonly used wherever extra reach is required, were originally designed for tapping holes in pulleys with hubs. The shank diameter is the same diameter as the major diameter of the thread and the threaded section has the same dimensions as a standard hand tap.



List No. 2082 Fractional

Plug Style – H3 Pitch Dia. Limit

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.	TAPER EDP NO.
7/16	20	4	H3	1-7/16	6	04903	04904	04905
1/2	20	4	H3	1-21/32	6	04900	04901	04902

# Conduit Thread Taps

High Speed Steel  
80° Angle  
Bright Finish



List No. 2086 Metric

SIZE	PITCH	NO. OF FLUTES	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
M12.5	1.27	4	1-21/32	3-3/8	05413	05414
M15.2	1.41	4	1-13/16	3-13/16	05415	05416
M18.6	1.41	4	2	4-1/4	05417	05418
M20.4	1.41	4	2	4-15/32	05419	05420
M22.5	1.41	4	2-7/32	4-11/16	05421	05422
M28.3	1.588	6	1-1/2	4	05423	05424
M37	1.588	6	1-1/2	4	05425	05426
M47	1.588	6	2	5	05427	05428
M54	1.588	6	2	5-1/4	05429	05430
M59.3	1.588	6	2	5-1/4	05431	05432

# Carbide Tipped Taps

Ground Thread  
Bright Finish



List No. 2084 Fractional

Used for materials up to 32Rc.  
Not recommended for hard materials.

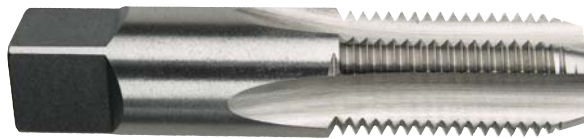
Recommended for abrasive materials including space age alloys, exotic materials, aluminum and non-ferrous materials. Higher speeds and longer tool life in production applications.

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
7/8	9	4	H4	1-11/32	4-11/16	05433	05434
	14	4	H4	1-11/32	4-11/16	05435	05436
1	8	4	H4	1-1/2	5-1/8	05437	05438
	12	4	H4	1-1/2	5-1/8	05439	05440
1-1/4	7	4	H4	2-17/64	5-3/4	05441	05442
1-3/8	12	4	H4	3	6-1/16	05443	05444
1-1/2	6	4	H4	3	6-3/8	05445	05446



# Carbide Pipe Taps Straight Flute

NPS/NPSF  
Ground Thread  
Bright Finish



List No. 2083 Fractional

Recommended for abrasive materials including space age alloys, exotic materials, aluminum and non-ferrous materials. Higher speeds and longer tool life in production applications.

Used for materials up to 32Rc.  
Not recommended for hard materials.

SIZE	PITCH	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	NPS EDP NO.	NPSF EDP NO.
1/8	27	4	3/4	0.5000	2-1/8	05309	05473

# Carbide Pipe Taps Tapered

NPT/NPTF  
Ground Thread  
Bright Finish



List No. 2083 Fractional

Recommended for abrasive materials including space age alloys, exotic materials, aluminum and non-ferrous materials. Higher speeds and longer tool life in production applications.

Used for materials up to 32Rc.  
Not recommended for hard materials.

SIZE	PITCH	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	NPT EDP NO.	NPTF EDP NO.
1/16	27		11/16	0.4400	2-1/8	05474	05475
1/8	27	4	3/4	0.5000	2-1/8	05469	05471
1/4	18	4	5/8	0.3800	2-1/2	05467	05307

# Decimal Equivalent Pocket Chart List No. 1005

Tableau décimal      Tabla de medidas decimales

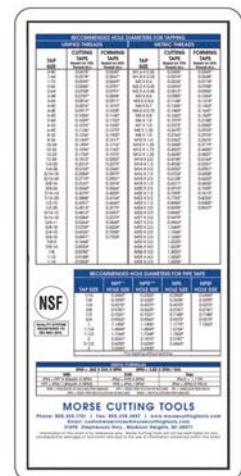
NEW LOOK! LARGER SIZE! Decimal Equivalents.  
Tap Drill Sizes for inch, metric and pipe threads.  
Size: 3 3/8" x 7", Printed on plastic

Pack of 50  
EDP No. 20412

Pack of 100  
EDP No. 20413



Front



Back

Special Tap Quoting Form Page 240

# Carbide Taps Straight Flute

Ground Thread - Carbide  
Bright Finish



**List No. 2083 Machine Screw  
Fractional  
Metric**

Used for materials up to 32Rc.  
Not recommended for hard materials.

Recommended for abrasive materials including space age alloys, exotic materials, aluminum and non-ferrous materials. Higher speeds and longer tool life in production applications.

## List No. 2083 Machine Screw

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
#0	80	2	H2	5/16	—	1-5/8	05343	05344
#2	56	2	H2	7/16	—	1-3/4	05357	05358
#4	40	2	H2	5/16	0.2500	1-7/8	05362	05363
	48	2	H2	5/16	0.2500	1-7/8	05364	05365
#5	40	3	H2	5/16	0.3100	1-15/16	05367	05368
	32	3	H3	3/8	0.3100	2	05370	05371
#6	40	3	H2	3/8	0.3100	2	05372	05373
	32	4	H3	3/8	0.3800	2-1/8	05375	05376
#8	36	4	H2	3/8	0.3800	2-1/8	05377	05378
	24	4	H3	1/2	0.3800	2-3/8	05347	05348
#10	32	4	H3	1/2	0.3800	2-3/8	05349	05350
	24	4	H3	1/2	0.4400	2-3/8	05353	05354
#12	28	4	H3	1/2	0.4400	2-3/8	05355	05356

## List No. 2083 Fractional

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
1/4	20	4	H3	5/8	0.3800	2-1/2	05300	05462
	28	4	H3	5/8	0.3800	2-1/2	05302	05464
5/16	18	4	H3	11/16	0.4400	2-23/32	05490	05328
	24	4	H3	11/16	0.4400	2-23/32	05492	05330
3/8	16	4	H3	3/4	0.5000	2-15/16	05318	05482
	24	4	H3	3/4	0.5000	2-15/16	05320	05321
7/16	14	4	H3	7/8	—	3-5/32	05496	05334
	20	4	H3	7/8	—	3-5/32	05498	05336
1/2	13	4	H3	15/16	0.4400	3-3/8	05455	05295
	20	4	H3	15/16	0.4400	3-3/8	05457	05297
9/16	12	4	H3	1	—	3-19/32	05339	05340
	18	4	H3	1	—	3-19/32	05341	05342
5/8	11	4	H3	1-3/32	—	3-13/16	05486	05487
	18	4	H3	1-3/32	—	3-13/16	05325	05489
3/4	10	4	H3	1-7/32	0.6900	4-1/4	05314	05478
	16	4	H3	1-7/32	0.6900	4-1/4	05316	05480

## List No. 2083 Metric

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
M3	0.50	3	D3	5/16	0.3100	1-15/16	—	05389
M3.5	0.60	3	D4	3/8	0.3100	2	05391	05392
M4	0.70	4	D4	3/8	0.3800	2-1/8	05394	05395
M4.5	0.75	4	D4	1/2	0.3800	2-1/8	05397	05398
M5	0.80	4	D4	1/2	0.3800	2-1/8	05400	05401
M6	1.00	4	D5	5/8	0.3800	2-1/2	05403	05404
M7	1.00	4	D5	11/16	0.4400	2-23/32	05406	05407
	1.25	4	D5	11/16	0.4400	2-23/32	05409	05410
M8	1.00	4	D5	11/16	0.4400	2-23/32	05411	05412
	1.50	4	D6	3/4	0.5000	2-15/16	05379	05380
M10	1.25	4	D5	3/4	0.5000	2-15/16	05381	05382
M12	1.75	4	D6	15/16	—	3-3/8	05385	05386





# Carbide Spiral Point Taps Straight Flute

Ground Thread  
Bright Finish



List No. 2083 Machine Screw  
Fractional  
Metric

**FAST TAP SERVICE**

Used for materials up to 32Rc.  
Not recommended for hard materials.

Recommended for abrasive materials including space age alloys, exotic materials, aluminum and non-ferrous materials. Higher speeds and longer tool life in production applications.

## List No. 2083 Machine Screw

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	EDP NO.
#2	56	2	H2	7/16	—	1-3/4	05359
#4	40	2	H2	5/16	0.2500	1-7/8	05360
	48	2	H2	5/16	0.2500	1-7/8	05361
#5	40	2	H2	5/16	0.3100	1-15/16	05366
#6	32	2	H3	3/8	0.3100	2	05369
#8	32	2	H3	3/8	0.3800	2-1/8	05374
#10	24	2	H3	1/2	0.3800	2-3/8	05345
	32	2	H3	1/2	0.3800	2-3/8	05346
#12	24	2	H3	1/2	0.4400	2-3/8	05351
	28	2	H3	1/2	0.4400	2-3/8	05352

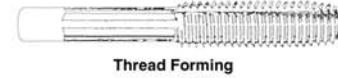
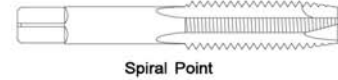
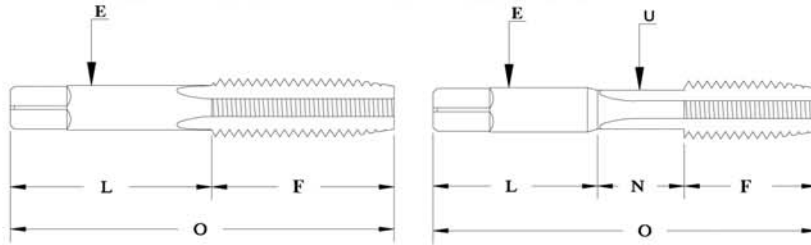
## List No. 2083 Fractional

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	EDP NO.
1/4	20	2	H3	5/8	0.3800	2-1/2	05465
	28	2	H3	5/8	0.3800	2-1/2	05305
5/16	18	2	H3	11/16	0.4400	2-23/32	05494
	24	2	H3	11/16	0.4400	2-23/32	05332
3/8	16	3	H3	3/4	0.5000	2-15/16	05322
7/16	14	3	H3	7/8	—	3-5/32	05500
	20	3	H3	7/8	—	3-5/32	05338
1/2	13	3	H3	15/16	0.4400	3-3/8	05459
	20	3	H3	15/16	0.4400	3-3/8	05460

## List No. 2083 Metric

SIZE	PITCH	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	EDP NO.
M3	0.50	2	D3	5/16	0.3100	1-15/16	05388
M3.5	0.60	2	D4	3/8	0.3100	2"	05390
M4	0.70	2	D4	3/8	0.3800	2-1/8	05393
M4.5	0.75	2	D4	1/2	0.3800	2-1/8	05396
M5	0.80	2	D4	1/2	0.3800	2-1/8	05399
M6	1.00	2	D5	5/8	0.3800	2-1/2	05402
M7	1.00	2	D5	11/16	0.4400	2-23/32	05405
M8	1.25	2	D5	11/16	0.4400	2-23/32	05408
M10	1.50	3	D6	3/4	0.5000	2-15/16	05383
	1.25	3	D5	3/4	0.5000	2-15/16	05384
M12	1.75	3	D6	15/16	—	3-3/8	05387

Special Tap Quoting Form Page 240



<p><b>Basic Tap Information</b></p> <p>Thread Spec = _____</p> <p>Pitch Dia. Limit = _____</p> <p>Thread Depth = _____</p> <p><input type="checkbox"/> Through Hole</p> <p><input type="checkbox"/> Blind Hole</p> <p><input type="checkbox"/> LH Thread*</p> <p>Style:</p> <p><input type="checkbox"/> Spiral Point</p> <p><input type="checkbox"/> Taper</p> <p><input type="checkbox"/> Plug</p> <p><input type="checkbox"/> Semi-Bottoming</p> <p><input type="checkbox"/> Bottoming</p> <p><input type="checkbox"/> Special Chamfer</p> <p>Specify _____</p> <p><input type="checkbox"/> Straight Flutes</p> <p><input type="checkbox"/> Spiral Flutes</p> <p>Specify Spiral _____</p> <p>Number of Flutes= _____</p> <p><small>*Right-Hand Cut and Right Hand Spiral are Standard</small></p>	<p><b>Type of Tap</b></p> <p>Cut Tap <input type="checkbox"/></p> <p>Form Tap <input type="checkbox"/></p> <hr/> <p><b>Dimensions</b></p> <p>Overall Length O = . _____</p> <p><input type="checkbox"/> Necked (CNC) Design</p> <p>Length N = _____</p> <p>Dia. U = _____</p> <p>Shank Diameter E = _____</p> <p>Shank Length L = _____</p> <p>Thread Length F = _____</p> <hr/> <p><b>Quantities / Lead Time</b></p> <p>Quantity _____</p> <p>Desired Lead Time _____</p>	<p><b>Material</b></p> <p><input type="checkbox"/> HSS</p> <p><input type="checkbox"/> PM Premium Steel</p> <p><input type="checkbox"/> Carbide</p> <p><input type="checkbox"/> Other Specify _____</p> <hr/> <p><b>Coating</b></p> <p>Type of Coating _____</p> <hr/> <p><b>Application Specific</b></p> <p>Workpiece Mtl = _____</p> <p>Hardness = _____</p> <p>Machine Type (Describe) _____</p> <hr/> <p><b>Tool Holder</b></p> <p>Radial Float / Tension &amp; Compression _____</p>
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Contact Information		
Morse Distributor	Phone:	Email:
	Phone:	Email:
End User	Phone:	Email:

Approval	
<p>By signing this form the signer accepts responsibility for manufacture to the dimensions and specifications shown. Tolerances and dimensions not shown are Manufactures Standards.</p>	Signed _____
	Date _____



# Cutting Speeds



WORKPIECE MATERIAL	BRINELL HARDNESS (BHN)	SURFACE SPEED (SFM)
Low Carbon Steel - 1118, 12L12, 1108, 1213	≤120	65
Low & Medium Carbon Steel - 1018, 1551, 11L44	120 - 250	40
Medium Carbon and Alloyed Steel - 1040, 1140, 4340, 8640	≤250	40
Free Machining Stainless Steels - 303, 410, 416, 440F	≤260	35
Moderate Machining Stainless Steels - 304, 316	≤300	20

# Standard Taps Cutting Speeds



Workpiece Material	Brinell Hardness (BHN)	Surface Speed (SFM)
Low Carbon Steel - 1018, 12L12, 1108, 1213	≤ 120	65
Low & Medium Carbon Steel - 1018, 1551, 11L44	120 - 250	40
Medium Carbon and Alloyed Steel - 1040, 1140, 4340, 8640	≤ 250	40
Tool and Die Steels - P20, A2, D2, H12	≤ 250	20
Tool and Die Steels - P20, A2, D2, H12	250 - 350	15
Free Machining Stainless Steels - 303, 410, 416, 440F	≤ 260	35
Moderate Machining Stainless Steels - 304, 316	≤ 300	25
Difficult Machining Stainless Steels - 17-4PH, 316L, AM350	≤ 300	10
Cast Iron - Soft Gray	≤ 160	70
Cast Iron - Gray	160 - 260	60
Cast Iron - Ductile	250	50
Cast Iron - Malleable	250 - 330	35
Titanium Alloys - Commercially Pure 99.0	110 - 170	20
Titanium Alloys - Ti-6Al-4V, ASTM B367 Grades C-3, C-4	≤ 250	15
High Temperature Alloys - Inconel, Hastelloy, Waspaloy	≤ 150	25
High Temperature Alloys - Inconel, Hastelloy, Waspaloy	150 - 250	10
Aluminum Alloys - 2025, 6061, A140, 514.0	≤ 150	100
Copper Alloys - Brass and Bronze	≤ 200	50
Magnesium Alloys - AZ80A, HM12A, AM60A, ZE41A	50 - 90	70

**SPEEDS** shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase until the machining cycle is optimized.

**TAP SPEEDS** may be **increased** for coated taps, spiral point taps, fine pitch taps and when the percentage of thread is decreased.

**TAP SPEEDS** may need to be **decreased** for uncoated taps, spiral flute taps, coarse pitch taps, bottoming taps, difficult materials, longer thread lengths, and when the percentage of thread is increased.

**THREAD FORMING TAPS** generally form threads more efficiently at higher speeds. Suggested speeds are 50% to 100% higher than the suggested speeds for cutting taps in similar applications.

**PIPE TAP SPEEDS** should be between one-half and three-quarters of the speeds of taps of comparable diameter and pitch.

## Hole Diameters for Tapping

UNIFIED THREADS			METRIC THREADS		
TAP SIZE	CUTTING TAPS	FORMING TAPS	TAP SIZE	CUTTING TAPS	FORMING TAPS
	Based on 75% Thread (in.)	Based on 65% Thread (in.)		Based on 75% Thread (in.)	Based on 65% Thread (in.)
0-80	0.0478"	0.0545"	M1.6 X 0.35	0.0496"	0.0569"
1-64	0.0578"	0.0661"	M1.8 X 0.35	0.0574"	0.0648"
1-72	0.0595"	0.0669"	M2 X 0.4	0.0634"	0.0718"
2-56	0.0686"	0.0781"	M2.2 X 0.45	0.0694"	0.0788"
2-64	0.0708"	0.0791"	M2.5 X 0.45	0.0812"	0.0906"
3-48	0.0787"	0.0898"	M3 X 0.5	0.0989"	0.1094"
3-56	0.0816"	0.0911"	M3.5 X 0.6	0.1148"	0.1274"
4-40	0.0876"	0.1010"	M4 X 0.7	0.1306"	0.1453"
4-48	0.0917"	0.1028"	M4.5 X 0.75	0.1484"	0.1641"
5-40	0.1006"	0.1140"	M5 X 0.8	0.1662"	0.1829"
5-44	0.1029"	0.1150"	M6 X 1.0	0.1979"	0.2188"
6-32	0.1076"	0.1242"	M7 X 1.0	0.2372"	0.2582"
6-40	0.1136"	0.1270"	M8 X 1.25	0.2670"	0.2932"
8-32	0.1336"	0.1502"	M8 X 1.0	0.2766"	0.2976"
8-36	0.1369"	0.1517"	M10 X 1.5	0.3362"	0.3676"
10-24	0.1494"	0.1716"	M10 X 1.25	0.3458"	0.3719"
10-32	0.1596"	0.1762"	M12 X 1.75	0.4053"	0.4420"
12-24	0.1754"	0.1976"	M12 X 1.25	0.4245"	0.4507"
12-28	0.1812"	0.2002"	M14 X 2.0	0.4745"	0.5164"
1/4-20	0.2013"	0.2279"	M14 X 1.5	0.4936"	0.5251"
1/4-28	0.2152"	0.2342"	M16 X 2.0	0.5532"	0.5951"
5/16-18	0.2584"	0.2879"	M16 X 1.5	0.5724"	0.6038"
5/16-24	0.2719"	0.2941"	M18 X 2.5	0.6128"	0.6652"
3/8-16	0.3141"	0.3474"	M18 X 1.5	0.6511"	0.6826"
3/8-24	0.3344"	0.3566"	M20 X 2.5	0.6915"	0.7439"
7/16-14	0.3679"	0.4059"	M20 X 1.5	0.7299"	0.7613"
7/16-20	0.3888"	0.4154"	M22 X 2.5	0.7702"	0.8226"
1/2-13	0.4251"	0.4660"	M22 X 1.5	0.8086"	0.8400"
1/2-20	0.4513"	0.4779"	M24 X 3.0	0.8298"	0.8927"
9/16-12	0.4813"	0.5257"	M24 X 2.0	0.8682"	
9/16-18	0.5084"	0.5379"	M27 X 3.0	0.9479"	
5/8-11	0.5364"	0.5848"	M27 X 2.0	0.9863"	
5/8-18	0.5709"	0.6004"	M30 X 3.5	1.0469"	
3/4-10	0.6526"	0.7058"	M30 X 2.0	1.1044"	
3/4-16	0.6891"	0.7224"	M33 X 3.5	1.1650"	
7/8-9	0.7668"		M33 X 2.0	1.2225"	
7/8-14	0.8054"		M36 X 4.0	1.2639"	
1-8	0.8782"		M36 X 3.0	1.3023"	
1-12	0.9188"		M39 X 4.0	1.3820"	
1-14	0.9304"		M39 X 3.0	1.4204"	

## Pipe Taps

TAP SIZE	NPT** HOLE SIZE	NPTF** HOLE SIZE	NPS HOLE SIZE	NPSF HOLE SIZE
1/16	0.2460"	0.2420"	0.2500"	0.2460"
1/8	0.3390"	0.3320"	0.3438"	0.3390"
1/4	0.4375"	0.4375"	0.4375"	0.4375"
3/8	0.5781"	0.5625"	0.5781"	0.5781"
1/2	0.7031"	0.7031"	0.7188"	0.7188"
3/4	0.9063"	0.9063"	0.9375"	0.9219"
1	1.1406"	1.1406"	1.1719"	1.1563"
1-1/4	1.4844"	1.4844"	1.5156"	
1-1/2	1.7344"	1.7344"	1.7500"	
2	2.2031"	2.1875"	2.2187"	
2-1/2	2.6250"	2.6250"	2.6563"	
3	3.2500"	3.2500"		

\*\*For tapping without reaming

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# Tap Drill Sizes – STI (Screw Thread Insert) Taps

STI TAP SIZE	ALUMINUM		STEEL, PLASTIC, MAGNESIUM		MINOR DIA. LIMITS (AFTER TAPPING)	
	TAP DRILL SIZE	DECIMAL EQUIV. OF TAP DRILL (INCHES)	TAP DRILL SIZE	DECIMAL EQUIV. OF TAP DRILL (INCHES)	MIN.	MAX.
2 - 56	3/32	.0938	#41	.0960	.0899	.0961
4 - 40	#31	.1200	#31	.1200	.1175	.1252
5 - 40	3.4mm	.1339	#29	.1360	.1305	.1373
6 - 32	#26	.1470	#25	.1495	.1448	.1527
6 - 40	#26	.1470	#25	.1495	.1435	.1503
8 - 32	#17	.1730	#16	.1770	.1708	.1781
10 - 24	13/64	.2031	#5	.2055	.1990	.2080
10 - 32	#7	.2010	13/64	.2031	.1968	.2041
12 - 24	#1	.2280	#1	.2280	.2250	.2340
1/4 - 20	H	.2660	H	.2660	.2608	.2704
1/4 - 28	G	.2610	6.7mm	.2638	.2577	.2646
5/16 - 18	Q	.3320	Q	.3320	.3245	.3342
5/16 - 24	21/64	.3281	21/64	.3281	.3215	.3288
3/8 - 16	X	.3970	X	.3970	.3885	.3987
3/8 - 24	25/64	.3906	25/64	.3906	.3840	.3910
7/16 - 14	29/64	.4531	29/64	.4531	.4530	.4639
7/16 - 20	29/64	.4531	29/64	.4531	.4483	.4561
1/2 - 13	33/64	.5156	17/32	.5312	.5166	.5273
1/2 - 20	33/64	.5156	33/64	.5156	.5108	.5186

Recommended tap drill sizes may vary slightly from recommended minor diameter limits to enable use of standard stock drill sizes. This variance does not cause any issues in most applications.

Drill sizes shown for steel, plastic and magnesium are such as to allow for material contraction in softer materials and to provide increased tap life. Variations in material and equipment may require the use of drills which are larger or smaller than those recommended.

Threads produced should be checked with thread plug gages to ensure that the threads meet required specifications.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

## Tapping Formulas

<b>Formula for Obtaining Tap Drill Sizes for Cutting Taps:</b>			
Major Dia. of Thread	-	$\frac{.01299 \times \text{Amt. of percentage of full thread}}{\text{No. of threads per inch}}$	= Drilled Hole* Size
Note: Select nearest commercial stock drill.			
<b>Percentage of Full Thread for Other Drill Sizes</b>			
No. of Threads per Inch	x	$\frac{\text{Major Dia. Selectedof Thread - Drill Dia.}}{.01299}$	= Percentage of Full Thread
<b>Formula For Obtaining Tap Drill Sizes For Thread Forming Taps:</b>			
*Drill Hole Size (inches)	=	Basic Major Dia. of thread (inches) - .0068	x $\frac{\text{Percentage of Full Thread}}{\text{No. of Threads per Inch}}$
*Drilled Hole Size (mm)	=	Basic Major Dia. of thread (mm)	- $\frac{\text{Percentage of Full Thread X mm Pitch}}{147.06}$
*Note: Drill size should be smaller than hole size by the probable amount the drill will cut oversize.			

# Standard Taps

## Class of Fit Recommendations

These tap recommendations will produce the specified class of fit in most applications. Threads produced should be checked with thread plug gages to ensure that the threads meet required specifications. Threads that gage loose or tight may require experimentation with taps of lower or higher pitch diameter limit ("H" or "D" number).

Unified and American National Screw Threads							
Nominal Size	Threads Per Inch		Recommended Tap for Class of Thread		Pitch Diameter Limits for Class of Thread		
	UNC	UNF	Class 2B	Class 3B	Minimum (Basic)	Maximum Class 2B	Maximum Class 3B
0	—	80	H2	H1	.0519	.0542	.0536
1	64	—	H2	H1	.0629	.0655	.0648
1	—	72	H2	H1	.0640	.0665	.0659
2	56	—	H2	H1	.0744	.0772	.0765
2	—	64	H2	H1	.0759	.0786	.0779
3	48	—	H2	H1	.0855	.0885	.0877
3	—	56	H2	H1	.0874	.0902	.0895
4	40	—	H2	H2	.0958	.0991	.0982
4	—	48	H2	H1	.0985	.1016	.1008
5	40	—	H2	H2	.1088	.1121	.1113
5	—	44	H2	H1	.1102	.1134	.1126
6	32	—	H3	H2	.1177	.1214	.1204
6	—	40	H2	H2	.1218	.1252	.1243
8	32	—	H3	H2	.1437	.1475	.1465
8	—	36	H2	H2	.1460	.1496	.1487
10	24	—	H3	H3	.1629	.1672	.1661
10	—	32	H3	H2	.1697	.1736	.1726
12	24	—	H3	H3	.1889	.1933	.1922
12	—	28	H3	H3	.1928	.1970	.1959
1/4	20	—	H5	H3	.2175	.2224	.2211
1/4	—	28	H4	H3	.2268	.2311	.2300
5/16	18	—	H5	H3	.2764	.2817	.2803
5/16	—	24	H4	H3	.2854	.2902	.2890
3/8	16	—	H5	H3	.3344	.3401	.3387
3/8	—	24	H4	H3	.3479	.3528	.3516
7/16	14	—	H5	H3	.3911	.3972	.3957
7/16	—	20	H5	H3	.4050	.4104	.4091
1/2	13	—	H5	H3	.4500	.4565	.4548
1/2	—	20	H5	H3	.4675	.4731	.4717
9/16	12	—	H5	H3	.5084	.5152	.5135
9/16	—	18	H5	H3	.5264	.5323	.5308
5/8	11	—	H5	H3	.5660	.5732	.5714
5/8	—	18	H5	H3	.5889	.5949	.5934
3/4	10	—	H5	H3	.6850	.6927	.6907
3/4	—	16	H5	H3	.7094	.7159	.7143
7/8	9	—	H6	H4	.8028	.8110	.8089
7/8	—	14	H6	H4	.8286	.8356	.8339
1	8	—	H6	H4	.9188	.9276	.9254
1	—	12	H6	H4	.9459	.9535	.9516
1	—	14*	H6	H4	.9536	.9609	.9590
1 1/8	7	—	H8	H4	1.0322	1.0416	1.0393
1 1/8	—	12	H6	H4	1.0709	1.0787	1.0768
1 1/4	7	—	H8	H4	1.1572	1.1668	1.1644
1 1/4	—	12	H6	H4	1.1959	1.2039	1.2019
1 3/8	6	—	H8	H4	1.2667	1.2771	1.2745
1 3/8	—	12	H6	H4	1.3209	1.3291	1.3270
1 1/2	6	—	H8	H4	1.3917	1.4022	1.3996
1 1/2	—	12	H6	H4	1.4459	1.4542	1.4522

\*UNS

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# Standard Metric Taps

## Class of Fit Recommendations

These tap recommendations will produce the specified class of fit in most applications. Threads produced should be checked with thread plug gages to ensure that the threads meet required specifications. Threads that gage loose or tight may require experimentation with taps of lower or higher pitch diameter limit ("H" or "D" number).

Metric Threads						
Size mm	Pitch mm	Recommended Tap for Class of Thread		Pitch Diameter Limits for Class of Thread		
		Class 4H	Class 6H	Minimum (Basic)	Maximum Class 4H	Maximum Class 6H
M1.6	0.35	D1	D3	1.373	1.426	1.458
M1.8	0.35	D1	D3	1.573	1.626	1.658
M2	0.4	D1	D3	1.740	1.796	1.830
M2.2	0.45	D1	D3	1.908	1.968	2.003
M2.5	0.45	D1	D3	2.208	2.268	2.303
M2.6	0.45	D1	D2	2.308	2.368	2.403
M3	0.5	D1	D3	2.675	2.738	2.775
M3.5	0.6	D1	D4	3.110	3.181	3.222
M4	0.75	D2	D3	3.513	3.588	3.631
M4	0.7	D2	D4	3.545	3.620	3.663
M4.5	0.75	D2	D4	4.013	4.088	4.131
M5	0.9	D2	D3	4.415	4.501	4.549
M5	0.8	D2	D4	4.480	4.560	4.605
M5.5	0.9	D2	D3	4.915	5.002	5.050
M6	1	D3	D5	5.350	5.445	5.500
M6	0.75	D3	D4	5.513	5.598	5.645
M7	1	D3	D5	6.350	6.445	6.500
M8	1.25	D3	D5	7.188	7.288	7.348
M8	1	D3	D5	7.350	7.445	7.500
M9	1.25	D3	D5	8.188	8.288	8.348
M9	1	D3	D5	8.350	8.445	8.500
M10	1.5	D3	D6	9.026	9.138	9.206
M10	1.25	D3	D5	9.188	9.288	9.348
M10	1	D3	D5	9.350	9.445	9.500
M11	1.5	D3	D5	10.026	10.138	10.206
M12	1.75	D3	D6	10.863	10.988	11.063
M12	1.5	D3	D6	11.026	11.144	11.216
M12	1.25	D3	D5	11.188	11.300	11.368
M14	2	D3	D7	12.701	12.833	12.913
M14	1.5	D3	D6	13.026	13.144	13.216
M14	1.25	D3	D5	13.188	13.300	13.368
M16	2	D4	D7	14.701	14.833	14.913
M16	1.5	D3	D6	15.026	15.144	15.216
M18	2.5	D4	D7	16.376	16.516	16.600
M18	1.5	D3	D6	17.026	17.144	17.216
M20	2.5	D4	D7	18.376	18.516	18.600
M20	1.5	D3	D6	19.026	19.144	19.216
M22	2.5	D4	D7	20.376	20.516	20.600
M22	1.5	D3	D6	21.026	21.144	21.216
M24	3	D4	D8	22.051	22.221	22.316
M24	2	D4	D7	22.701	22.841	22.925
M24	1.5	D3	D5	23.026	23.151	23.226
M25	1.5	D3	D5	24.026	24.151	24.226
M27	3	D5	D8	25.051	25.221	25.316
M27	2	D5	D7	25.701	25.841	25.925
M30	3.5	D5	D9	27.727	27.907	28.007
M30	2	D5	D7	28.701	28.841	28.925
M32	2	D5	D7	30.701	30.841	30.925
M33	3.5	D5	D9	30.727	30.907	31.007
M33	2	D5	D7	31.701	31.841	31.925
M36	4	D5	D9	33.402	33.592	33.702
M36	3	D5	D8	34.051	34.221	34.316
M36	2	D5	D7	34.701	34.841	34.925
M39	4	D6	D9	36.402	36.592	36.702
M39	3	D6	D8	37.051	37.221	37.316

# Fluteless Thread Forming Taps

## Class of Fit Recommendations

These tap recommendations will produce the specified class of fit in most applications. Threads produced should be checked with thread plug gages to ensure that the threads meet required specifications. Threads that gage loose or tight may require experimentation with taps of lower or higher pitch diameter limit ("H" or "D" number).

### Machine Screw & Fractional

SIZE	THREADS PER INCH		"H" LIMIT for CLASS of FIT		
	UNC	UNF	2	2B	3B
0	80	—	H2	H3	H2
1	64	—	H2	H3	H2
	—	72	H2	H3	H2
2	56	—	H2	H3	H2
	—	64	H2	H3	H2
3	48	—	H2	H3	H2
	—	56	H2	H3	H2
4	40	—	H3	H5	H3
	—	48	H3	H5	H3
5	40	—	H3	H5	H3
	—	44	H3	H5	H3
6	32	—	H3	H5	H3
	—	40	H3	H5	H3
8	32	—	H3	H5	H3
	—	36	H3	H5	H3
10	24	—	H4	H6	H4
	—	32	H4	H6	H4
12	24	—	H4	H6	H4
	—	28	H4	H6	H4
1/4	20	—	H4	H6	H4
	—	28	H4	H6	H4
5/16	18	—	H5	H7	H5
	—	24	H5	H7	H5
3/8	16	—	H5	H7	H5
	—	24	H5	H7	H5
7/16	14	—	H5	H8	H5
	—	20	H5	H8	H5
1/2	13	—	H5	H8	H5
	—	20	H5	H8	H5
9/16	12	—	H7	H10	H7
	—	18	H7	H10	H7
5/8	11	—	H7	H10	H7
	—	18	H7	H10	H7
3/4	10	—	H7	H10	H7
	—	16	H7	H10	H7

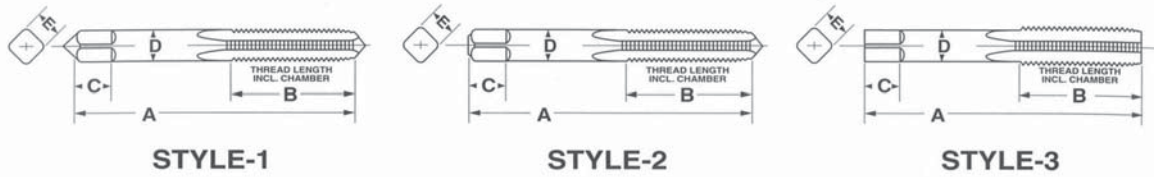
### Metric

SIZE	PITCH	"D" LIMIT for CLASS of FIT	
		4H	6H
M3	0.5	D3	D5
M4	0.7	D4	D6
M5	0.8	D4	D7
M6	1	D5	D8
M8	1.25	D5	D9
M10	1.5	D6	D10
M12	1.75	D6	D11
M14	2	D7	D11
M16	2	D7	D12
M20	2.5	D7	D12

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.



Table 302 — Hand Taps



General Dimensions

NOMINAL DIA. RANGE-INCHES		MACHINE SCREW SIZE NO.	NOMINAL FRACTIONAL DIAMETER (INCHES)	NOMINAL METRIC DIAMETER (MM)	STYLE	TAP DIMENSIONS — INCHES				
						LENGTH OVERALL A	THREAD LENGTH B	SQUARE LENGTH C	SHANK DIAMETER D	SIZE OF SQUARE E
.052	.065	0	1/16	M1.6	1	1 5/8	5/16	3/16	.141	.110
.065	.078	1	—	M1.8	1	1 11/16	3/8	3/16	.141	.110
.078	.091	2	—	M2, M2.2	1	1 3/4	7/16	3/16	.141	.110
.091	.104	3	3/32	M2.5	1	1 13/16	1/2	3/16	.141	.110
.104	.117	4	—	—	1	1 7/8	9/16	3/16	.141	.110
.117	.130	5	1/8	M3, M3.15	1	1 15/16	5/8	3/16	.141	.110
.130	.145	6	—	M3.5	1	2	1 1/16	3/16	.141	.110
.145	.171	8	5/32	M4	1	2 1/8	3/4	1/4	.168	.131
.171	.197	10	3/16	M4.5, M5	1	2 3/8	7/8	1/4	.194	.152
.197	.223	12	7/32	—	1	2 3/8	1 5/16	9/32	.220	.165
.223	.260	14	1/4	M6, M6.3	2	2 1/2	1	5/16	.255	.191
.260	.323		5/16	M7, M8	2	2 23/32	1 1/8	3/8	.318	.238
.323	.395		3/8	M10	2	2 15/16	1 1/4	7/16	.381	.286
.395	.448		7/16	—	3	3 5/32	1 7/16	13/32	.323	.242
.448	.510		1/2	M12, M12.5	3	3 3/8	1 21/32	7/16	.367	.275
.510	.573		9/16	M14	3	3 19/32	1 21/32	1/2	.429	.322
.573	.635		5/8	M16	3	3 13/16	1 13/16	9/16	.480	.360
.635	.709		1 1/16	M18	3	4 1/32	1 13/16	5/8	.542	.406
.709	.760		3/4	—	3	4 1/4	2	1 1/16	.590	.442
.760	.823		13/16	M20	3	4 15/32	2	1 1/16	.652	.489
.823	.885		7/8	M22	3	4 1 1/16	2 7/32	3/4	.697	.523
.885	.948		15/16	M24	3	4 29/32	2 7/32	3/4	.760	.570
.948	1.010		1	M25	3	5 1/8	2 1/2	13/16	.800	.600
1.010	1.073		1 1/16	M27	3	5 1/8	2 1/2	7/8	.896	.672
1.073	1.135		1 1/8	—	3	5 7/16	2 9/16	7/8	.896	.672
1.135	1.198		1 3/16	M30	3	5 7/16	2 9/16	1	1.021	.766
1.198	1.260		1 1/4	—	3	5 3/4	2 9/16	1	1.021	.766
1.260	1.323		1 5/16	M33	3	5 3/4	2 9/16	1 1/16	1.108	.831
1.323	1.385		1 3/8	—	3	6 1/16	3	1 1/16	1.108	.831
1.385	1.448		1 7/16	M36	3	6 1/16	3	1 1/8	1.233	.925
1.448	1.510		1 1/2	—	3	6 3/8	3	1 1/8	1.233	.925
1.510	1.635		1 5/8	M39	3	6 1 1/16	3 3/16	1 1/8	1.305	.979
1.635	1.760		1 3/4	M42	3	7	3 3/16	1 1/4	1.430	1.072
1.760	1.885		1 7/8	—	3	7 5/16	3 3/16	1 1/4	1.519	1.139
1.885	2.010		2	M48	3	7 5/8	3 3/16	1 3/8	1.644	1.233
2.010	2.135		2 1/8	—	3	8	3 3/16	1 3/8	1.769	1.327
2.135	2.260		2 1/4	M56	3	8 1/4	3 3/16	1 7/16	1.894	1.420
2.260	2.385		2 3/8	—	3	8 1/2	4	1 7/16	2.019	1.514
2.385	2.510		2 1/2	—	3	8 3/4	4	1 1/2	2.100	1.575
2.510	2.635		2 5/8	M64	3	8 3/4	4	1 1/2	2.225	1.669
2.635	2.760		2 3/4	—	3	9 1/4	4	1 9/16	2.350	1.762
2.760	2.885		2 7/8	M72	3	9 1/4	4	1 9/16	2.475	1.856

NOTE: Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use in information contained within this chart.

(continued)

# Table 302 — Hand Taps (continued)

## General Dimensions

NOMINAL DIA. RANGE-INCHES		MACHINE SCREW SIZE NO.	NOMINAL FRACTIONAL DIAMETER (INCHES)	NOMINAL METRIC DIAMETER (MM)	STYLE	TAP DIMENSIONS — INCHES				
						LENGTH OVERALL A	THREAD LENGTH B	SQUARE LENGTH C	SHANK DIAMETER D	SIZE OF SQUARE E
2.885	3.010		3	—	3	9-3/4	4-9/16	1-5/8	2.543	1.907
3.010	3.135		3-1/8	—	3	9-3/4	4-9/16	1-5/8	2.668	2.001
3.135	3.260		3-1/4	M80	3	10	4-9/16	1-3/4	2.793	2.095
3.260	3.385		3-3/8	—	3	10	4-9/16	1-3/4	2.883	2.162
3.385	3.510		3-1/2	—	3	10-1/4	4-15/16	2	3.008	2.256
3.510	3.635		3-5/8	M90	3	10-1/4	4-15/16	2	3.133	2.350
3.635	3.760		3-3/4	—	3	10-1/2	5-5/16	2-1/8	3.217	2.413
3.760	3.885		3-7/8	—	3	10-1/2	5-5/16	2-1/8	3.342	2.506
3.885	4.010		4	M100	3	10-3/4	5-5/16	2-1/4	3.467	2.600

### Special Taps

Unless otherwise specified:

Special taps over 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, are made to general dimensions shown in Table 303.

Special ground thread taps are made to limits shown in Table 331 for Unified Inch Screw Threads and Table 341 for Metric M-Profile Screw Threads.

### Notes

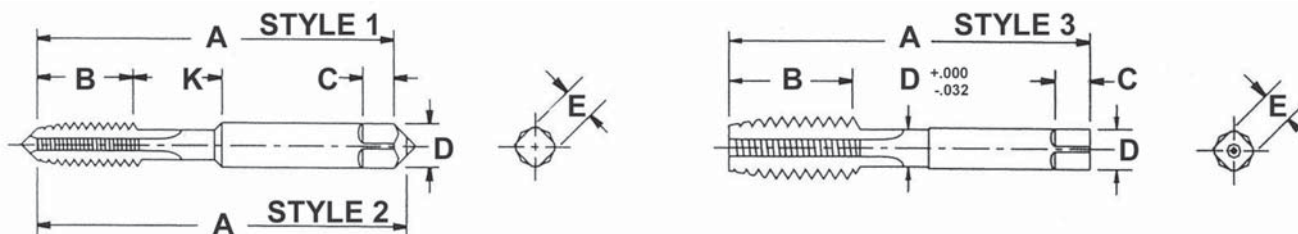
Ground thread taps, sizes .395" and smaller, have external center on thread end (may be removed on bottoming taps). Sizes .223" and smaller have external center on shank end; sizes .224" thru .395" have truncated partial cone centers on shank end (length of cone approximately 1/4 of diameter shank). Sizes over .395" have internal center in thread and shank ends.

For standard thread limits and tolerances for Unified Inch Screw Threads see Table 327 and for Metric Threads see Table 337.

For eccentricity tolerances of tap elements see Table 317.

## Table 302A

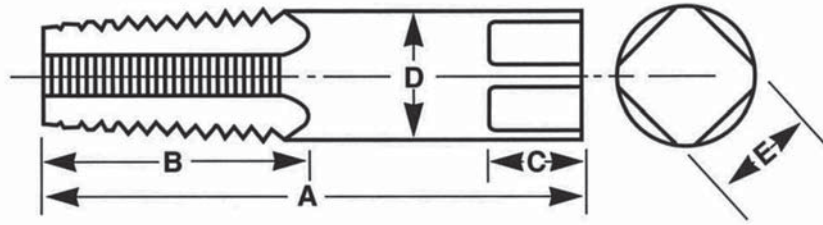
### Optional Neck and Optional Shortened Thread Length Taps



## General Dimensions

NOMINAL DIAMETER RANGE - INCHES		MACHINE SCREW SIZE NO.	NOMINAL FRACTIONAL DIAMETER (INCHES)	NOMINAL METRIC DIAMETER (MM)	STYLE	TAP DIMENSIONS - INCHES					
						OVERALL LENGTH A	THREAD LENGTH B	NECK LENGTH K	SQUARE LENGTH C	SHANK DIAMETER D	SIZE OF SQUARE E
.104	.117	4			1	1.88	.31	.25	.19	.141	.110
.117	.130	5		M3	1	1.94	.31	.31	.19	.141	.110
.130	.145	6		M3.5	1	2.00	.38	.31	.19	.141	.110
.145	.171	8		M4	1	2.13	.38	.38	.25	.168	.131
.171	.197	10		M4.5, M5	1	2.38	.50	.38	.25	.194	.152
.197	.223	12			1	2.38	.50	.44	.28	.220	.165
.223	.260		1/4	M6	2	2.50	.63	.38	.31	.255	.191
.260	.323		5/16	M7, M8	2	2.72	.69	.44	.38	.318	.238
.323	.395		3/8	M10	2	2.94	.75	.50	.44	.381	.286
.395	.448		7/16		3	3.16	.88	—	.41	.323	.242
.448	.510		1/2	M12	3	3.38	.94	—	.44	.367	.275
.510	.573		9/16	M14	3	3.59	1.00	—	.50	.429	.322
.573	.635		5/8	M16	3	3.81	1.09	—	.56	.480	.360
.635	.709		11/16	M18	3	4.03	1.09	—	.63	.542	.406
.709	.760		3/4		3	4.25	1.22	—	.69	.590	.442
.760	.823		13/16	M20	3	4.47	1.22	—	.69	.652	.489
.823	.885		7/8	M22	3	4.69	1.34	—	.75	.697	.523
.885	.948		15/16	M24	3	4.91	1.34	—	.75	.760	.570
.948	1.010		1	M25	3	5.13	1.50	—	.81	.800	.600

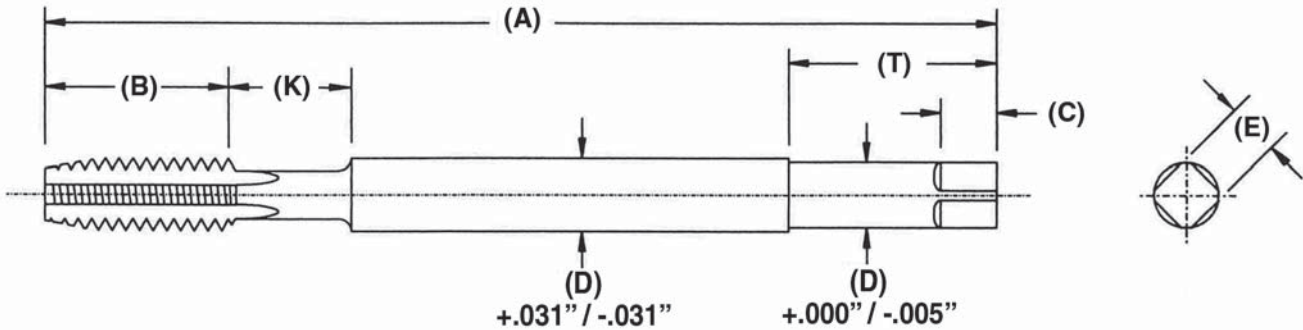
### Table 311 — Pipe Taps



**General Dimensions**

NOMINAL SIZE INCHES	DIMENSIONS - INCHES				
	LENGTH OVERALL A	LENGTH OF THREAD B	LENGTH OF SQUARE C	DIA. OF SHANK D	SIZE OF SQUARE E
1/16	2-1/8	11/16	3/8	.3125	.234
1/8	2-1/8	3/4	3/8	.3125	.234
1/8	2-1/8	3/4	3/8	.4375	.328
1/4	2-7/16	1-1/16	7/16	.5625	.421
3/8	2-9/16	1-1/16	1/2	.7000	.531
1/2	3-1/8	1-3/8	5/8	.6875	.515
3/4	3-1/4	1-3/8	11/16	.9063	.679
1	3-3/4	1-3/4	13/16	1.1250	.843
1-1/4	4	1-3/4	15/16	1.3125	.984
1-1/2	4-1/4	1-3/4	1	1.5000	1.125
2	4-1/2	1-3/4	1-1/8	1.8750	1.406
2-1/2	5-1/2	2-9/16	1-1/4	2.2500	1.687
3	6	2-5/8	1-3/8	2.6250	1.968
3-1/2	6-1/2	2-11/16	1-1/2	2.8125	2.108
4	6-3/4	2-3/4	1-5/8	3.0000	2.250

### Table 310 — Pulley Taps



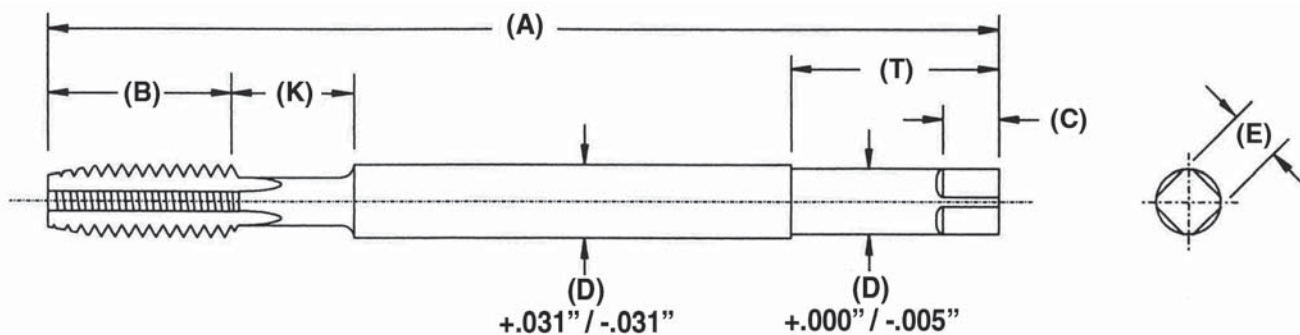
**General Dimensions**

DIAMETER OF TAP INCHES	DIMENSIONS - INCHES						
	LENGTH OVERALL A	LENGTH OF THREAD B	LENGTH OF SQUARE C	DIA. OF SHANK D	LENGTH OF CLOSE TOLERANCE T*	SIZE OF SQUARE E	LENGTH OF NECK K**
1/4	6, 8	1	5/16	.255	1-1/2	.191	3/8
5/16	6, 8	1-1/8	3/8	.318	1-9/16	.238	3/8
3/8	6, 8, 10	1-1/4	7/16	.381	1-5/8	.286	3/8
7/16	6, 8	1-7/16	1/2	.444	1-11/16	.333	7/16
1/2	6, 8, 10, 12	1-21/32	9/16	.507	1-11/16	.380	1/2
5/8	6, 8, 10, 12	1-13/16	11/16	.633	2	.475	5/8
3/4	10, 12	2	3/4	.759	2-1/4	.569	3/4

Formulae (Approximate)  
 Diameter of Shank "D" = Maximum Major Diameter.  
 Size of Square = Diameter of Shank "D" x .75 to nearest .001"

Notes  
 \*T is minimum length of shank which is held to eccentricity tolerances.  
 \*\*K (neck and its length) is optional with manufacturer.

Table 310 — Pulley Taps



## General Dimensions

DIAMETER OF TAP INCHES	DIMENSIONS - INCHES						
	LENGTH OVERALL A	LENGTH OF THREAD B	LENGTH OF SQUARE C	DIA. OF SHANK D	LENGTH OF CLOSE TOLERANCE T*	SIZE OF SQUARE E	LENGTH OF NECK K**
1/4	6, 8	1	5/16	.255	1 1/2	.191	3/8
5/16	6, 8	1 1/8	3/8	.318	1 9/16	.238	3/8
3/8	6, 8, 10	1 1/4	7/16	.381	1 5/8	.286	3/8
7/16	6, 8	1 7/16	1/2	.444	1 11/16	.333	7/16
1/2	6, 8, 10, 12	1 21/32	9/16	.507	1 11/16	.380	1/2
5/8	6, 8, 10, 12	1 13/16	1 1/16	.633	2	.475	5/8
3/4	10, 12	2	3/4	.759	2 1/4	.569	3/4

## Tolerances

ELEMENT	RANGE	DIRECTION	TOLERANCE
Length Overall — A	1/4" to 3/4" incl.	Plus or Minus	1/16"
Length of Thread — B	1/4" to 3/4" incl.	Plus or Minus	1/16"
Length of Square — C	1/4" to 3/4" incl.	Plus or Minus	1/32"
Diameter of Shank — D	1/4" to 3/4" incl.	Minus	.005"
Size of Square — E	1/4" to 1/2" incl. 5/8" to 3/4" incl.	Minus Minus	.004" .006"

## Formulae (Approximate)

Diameter of Shank "D" = Maximum Major Diameter.

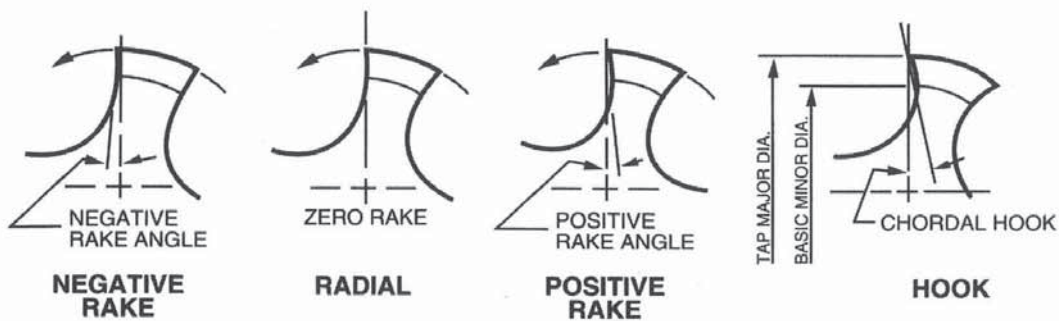
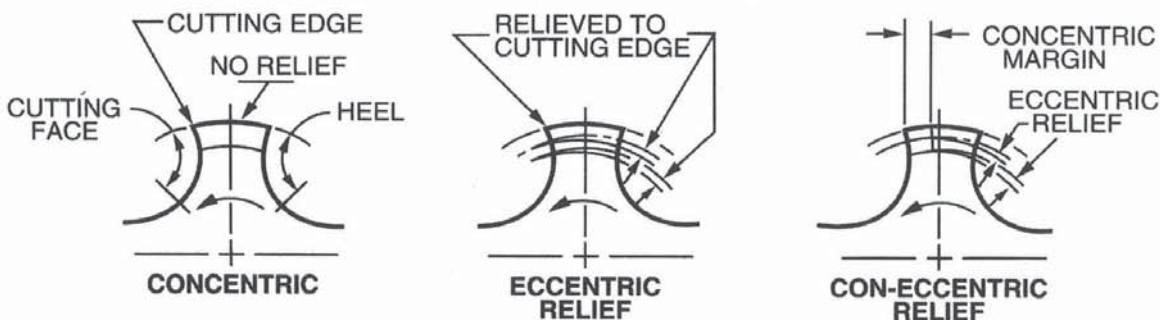
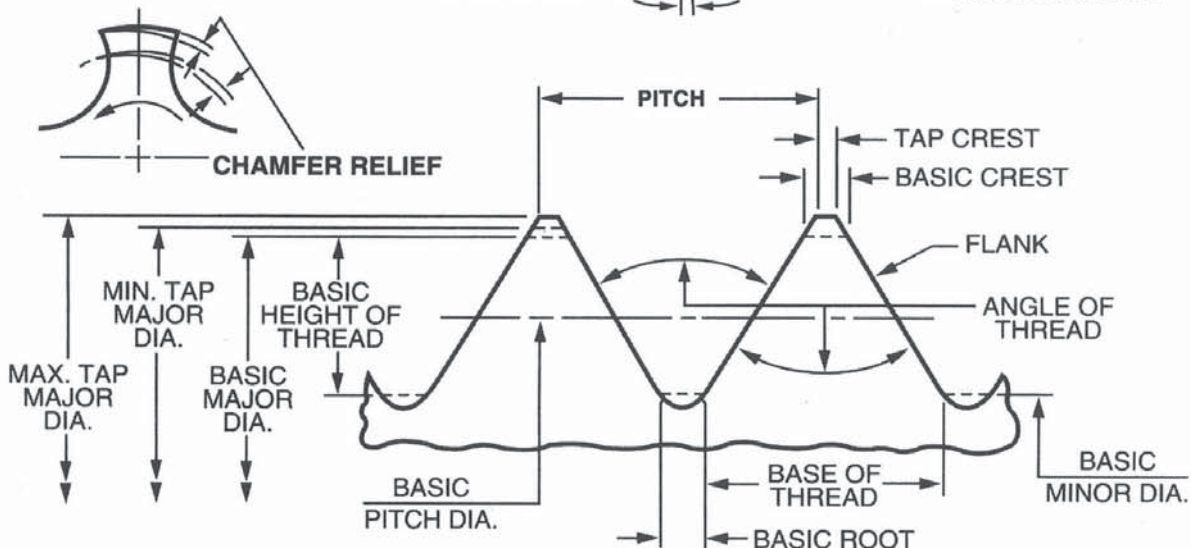
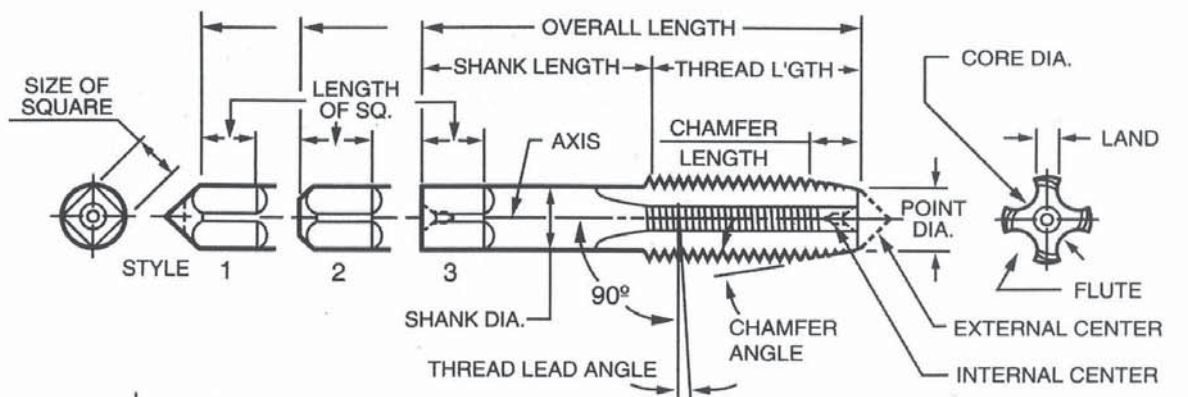
Size of Square = Diameter of Shank "D" x .75 to nearest .001"

## Notes

\*T is minimum length of shank which is held to eccentricity tolerances.

\*\*K (neck and its length) is optional with manufacturer.

# Tap Terminology



# END MILLS

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# variFLUTE® NF

## Solid Carbide Variable Flute

## HPE Ultra-High Performance

## Single End Mills For Aluminum

## and Non-Ferrous Materials

**Center Cutting - 45° Helix Angle**  
**Premium Micrograin Carbide**  
**10% Cobalt Content**

High Performance Milling in Aluminum and Non-Ferrous Materials, Copper Alloys, Bronze/Brass

The Variable Flute Design reduces chatter and improves tool life. The high shear flute designed for rapid chip removal combined with an ultra high polish enable extremely high cutting rates and long tool life.

**ZrN - Zirconium Nitride** coating is a pale gold hard thin high-lubricity coating particularly well suited to machining non-ferrous materials including aluminum, copper alloys and brass.

**DLC, CrN**, and other high performance coatings also available.

**TOLERANCES:**

Diameter  $-.0001/-0.0003$   
 Shank Dia.  $h6$  Tolerance



List No. 5990 & 5990Z 2-Flute — Standard Corner Radius



List No. 5991 & 5991Z 2-Flute — Square End



List No. 5992 & 5992Z 3-Flute — Standard Corner Radius



List No. 5993 & 5993Z 2-Flute — Ball End

**2-Flute** mills have greater chip capacity and are recommended for slotting and roughing operations.

**3-Flute** mills offer greater feed rates than two flute mills while still offering high chip capacity, recommended for profile applications.

**Corner Radius** strengthens the endmill and improves wear characteristics. Small .003- .007 radius enables use in most applications.



**List No. 5990 & 5990Z 2-Flute Standard Corner Radius**

Dia.	Shank Dia.	Length Of Cut	OAL	Corner Radius	List No. 5990 Bright Finish EDP No.	List No. 5990Z ZrN Coated EDP No.
<b>STANDARD LENGTH</b>						
1/4	1/4	3/4	2-1/2	.003 - .005	<b>52900</b>	<b>92600</b>
5/16	5/16	3/4	2-1/2	.003 - .005	<b>52901</b>	<b>92601</b>
3/8	3/8	1	2-1/2	.003 - .005	<b>52902</b>	<b>92602</b>
1/2	1/2	1-1/4	3	.005 - .007	<b>52903</b>	<b>92603</b>
5/8	5/8	1-5/8	3-1/2	.005 - .007	<b>52904</b>	<b>92604</b>
3/4	3/4	1-3/4	4	.005 - .007	<b>52905</b>	<b>92605</b>
1	1	1-3/4	4	.005 - .007	<b>52906</b>	<b>92606</b>
<b>LONG LENGTH</b>						
1/4	1/4	1-1/4	3	.003 - .005	<b>52910</b>	<b>92610</b>
5/16	5/16	1-3/8	3	.003 - .005	<b>52911</b>	<b>92611</b>
3/8	3/8	1-1/2	3-1/2	.003 - .005	<b>52912</b>	<b>92612</b>
1/2	1/2	2	4	.005 - .007	<b>52913</b>	<b>92613</b>
5/8	5/8	2-3/8	5	.005 - .007	<b>52914</b>	<b>92614</b>
3/4	3/4	2-1/2	5	.005 - .007	<b>52915</b>	<b>92615</b>
1	1	3	6	.005 - .007	<b>52916</b>	<b>92616</b>

Shank Diameter Tolerance:  $h6$

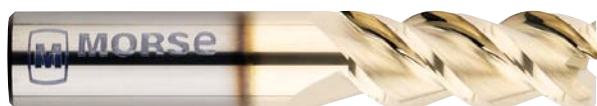
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# variFLUTE® NF

## Solid Carbide Ultra-High Performance End Mills

### for Aluminum and Non Ferrous Materials



**Corner Radius** strengthens the end mill and improves wear characteristics. Small .003- .007 radius enables use in most applications.

**ZrN - Zirconium Nitride** coating is a pale gold hard thin high-lubricity coating particularly well suited to machining non-ferrous materials including aluminum, copper alloys and brass.

**DLC, CrN,** and other high performance coatings also available.

#### List No. 5992 & 5992Z 3-Flute Standard Corner Radius

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	LIST NO. 5992	LIST NO. 5992Z
					BRIGHT FINISH EDP NO.	ZrN COATED EDP NO.
<b>STANDARD LENGTH</b>						
1/4	1/4	3/4	2-1/2	.003 - .005	<b>52930</b>	<b>92630</b>
5/16	5/16	3/4	2-1/2	.003 - .005	<b>52931</b>	<b>92631</b>
3/8	3/8	1	2-1/2	.003 - .005	<b>52932</b>	<b>92632</b>
1/2	1/2	1-1/4	3	.005 - .007	<b>52933</b>	<b>92633</b>
5/8	5/8	1-5/8	3-1/2	.005 - .007	<b>52934</b>	<b>92634</b>
3/4	3/4	1-3/4	4	.005 - .007	<b>52935</b>	<b>92635</b>
1	1	1-3/4	4	.005 - .007	<b>52936</b>	<b>92636</b>
<b>LONG LENGTH</b>						
1/4	1/4	1-1/4	3	.003 - .005	<b>52940</b>	<b>92940</b>
5/16	5/16	1-3/8	3	.003 - .005	<b>52941</b>	<b>92941</b>
3/8	3/8	1-1/2	3-1/2	.003 - .005	<b>52942</b>	<b>92942</b>
1/2	1/2	2	4	.005 - .007	<b>52943</b>	<b>92943</b>
5/8	5/8	2-3/8	5	.005 - .007	<b>52944</b>	<b>92944</b>
3/4	3/4	2-1/2	5	.005 - .007	<b>52945</b>	<b>92945</b>
1	1	3	6	.005 - .007	<b>52946</b>	<b>92946</b>

**Speeds & Feeds: Page 256**



**Square End** for milling and finishing where a sharp corner is required

**ZrN - Zirconium Nitride** coating is a pale gold hard thin high-lubricity coating particularly well suited to machining non-ferrous materials including aluminum, copper alloys and brass.

**DLC, CrN,** and other high performance coatings also available.

#### List No. 5991 & 5991Z 2-Flute Square End

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	LIST NO. 5991	LIST NO. 5991Z
				BRIGHT FINISH EDP NO.	ZrN COATED EDP NO.
<b>STANDARD LENGTH</b>					
1/4	1/4	3/4	2-1/2	<b>52920</b>	<b>92920</b>
5/16	5/16	3/4	2-1/2	<b>52921</b>	<b>92921</b>
3/8	3/8	1	2-1/2	<b>52922</b>	<b>92922</b>
1/2	1/2	1-1/4	3	<b>52923</b>	<b>92923</b>
5/8	5/8	1-5/8	3-1/2	<b>52924</b>	<b>92924</b>
3/4	3/4	1-3/4	4	<b>52925</b>	<b>92925</b>
1	1	1-3/4	4	<b>52926</b>	<b>92926</b>

**Shank Diameter Tolerance: h6 for Shrink Fit Holders**

**HPE ULTRA-HIGH PERFORMANCE END MILLS**

# variFLUTE® NF

## Solid Carbide Ultra-High Performance End Mills for Aluminum and Non Ferrous Materials

Shank Diameter  
Tolerance: h6



**Ball End** for use in contour milling, radius bottom slots, fillets, and cavity milling.

**ZrN - Zirconium Nitride** coating is a pale gold hard thin high-lubricity coating particularly well suited to machining non-ferrous materials including aluminum, copper alloys and brass.

**DLC, CrN**, and other high performance coatings also available.

### List No. 5993 & 5993Z 2-Flute Ball End

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	LIST NO. 5993	LIST NO. 5993Z
				BRIGHT FINISH EDP NO.	ZrN COATED EDP NO.
<b>STANDARD LENGTH</b>					
1/4	1/4	3/4	2-1/2	<b>52950</b>	<b>92650</b>
5/16	5/16	3/4	2-1/2	<b>52951</b>	<b>92651</b>
3/8	3/8	1	2-1/2	<b>52952</b>	<b>92652</b>
1/2	1/2	1-1/4	3	<b>52953</b>	<b>92653</b>
5/8	5/8	1-5/8	3-1/2	<b>52954</b>	<b>92654</b>
3/4	3/4	1-3/4	4	<b>52955</b>	<b>92655</b>
1	1	1-3/4	4	<b>52956</b>	<b>92656</b>

variFLUTE® NF SPEEDS & FEEDS								
MATERIAL	CUTTING SPEED SFM M/MIN	CHIP LOAD PER TOOTH IN / MM						
		1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
Aluminum	1600" - 2000" 490mm - 610mm	0.003" 0.08mm	0.004" 0.10mm	0.005" 0.13mm	0.006" 0.15mm	0.007" 0.18mm	0.008" 0.20mm	0.010" 0.25mm
Copper Alloys	800" - 1200" 240mm - 365mm	0.003" 0.08mm	0.004" 0.10mm	0.005" 0.13mm	0.006" 0.15mm	0.007" 0.18mm	0.008" 0.20mm	0.010" 0.25mm
Brass/Bronze	800" - 1500" 240mm - 460mm	0.003" 0.08mm	0.004" 0.10mm	0.005" 0.13mm	0.006" 0.15mm	0.007" 0.18mm	0.008" 0.20mm	0.010" 0.25mm
Plastics	1200" - 1600" 365mm - 490mm	0.006" 0.16mm	0.008" 0.20mm	0.010" 0.26mm	0.012" 0.30mm	0.014" 0.36mm	0.016" 0.40mm	0.020" 0.50mm

Morse variFLUTE NF mills are capable of very high removal rates.

- Proper coolant under sufficient volume and pressure is important for optimal performance.
- High quality balanced tool holding is recommended.
- Increase chip load based on available machine capability.

RECOMMENDED MAXIMUM DEPTHS OF CUT	PROFILING Radial Depth = .5XD Axial Depth = 1.5XD	SLOTING Axial Depth = 1XD
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**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

**SPEEDS and FEEDS** are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

# variFLUTE®

## Variable Flute ALTiN Coated HPE Ultra-High Performance Solid Carbide Single End Mills

Center Cutting - 38° Helix Angle  
10% Cobalt Micrograin Carbide

HIGH PERFORMANCE MILLING: Carbon Steels, Alloy Steels, Stainless Steels, Mold & Die Steels, High Temperature Alloys, Titanium Alloys, Cast Iron and many other materials.

Variable Flute design reduces chatter, harmonics and cutting forces for increased feed rates, greater depths of cut, improved surface finish and accuracy, minimal tool deflection, reduced machine vibration and increased tool life.

#### TOLERANCES

Diameter +.000/ -.002  
Shank Dia. h6 Tolerance

**ALTiN - Aluminum Titanium Nitride** Coating is an excellent all-around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.



List No. 5985 3-Flute - Corner Radius



List No. 5988 3-Flute - Ball Nose



List No. 5994 4-Flute - Corner Radius

List No. 5995 4-Flute - Square End



List No. 5996 4-Flute - Ball Nose



List No. 5986 5-Flute - Corner Radius

List No. 5987 5-Flute - Square End



List No. 5985 - 3-Flute - Corner Radius

ALTiN  
COATED

**3-Flute** variFLUTE end mills feature tool geometry for high chip evacuation in slotting and roughing applications.

**Corner Radius** strengthens the end mill to minimize chipping and reduce corner wear. Also used when the finished part requires a radius.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.
<b>STUB LENGTH</b>					
1/4	1/4	3/8	2	.015-.020	56270
3/8	3/8	1/2	2	.015-.020	56271
1/2	1/2	5/8	2-1/2	.025-.030	56272
5/8	5/8	3/4	3	.030-.035	56273
3/4	3/4	7/8	3	.030-.035	56274
<b>REGULAR LENGTH</b>					
1/8	1/8	3/8	1-1/2	.010-.015	56275
5/32	3/16	7/16	2	.010-.015	56276
3/16	3/16	7/16	2	.010-.015	56277
7/32	1/4	7/16	2-1/2	.015-.020	56278
1/4	1/4	5/8	2-1/2	.015-.020	56279
9/32	5/16	5/8	2-1/2	.015-.020	56280
5/16	5/16	3/4	2-1/2	.015-.020	56281
3/8	3/8	7/8	2-1/2	.015-.020	56282
7/16	7/16	1	2-3/4	.015-.020	56283
1/2	1/2	1	3	.025-.030	56284
5/8	5/8	1-1/4	3-1/2	.030-.035	56285
3/4	3/4	1-1/2	4	.030-.035	56286
1	1	1-1/2	4	.030-.035	56287

Shank Diameter Tolerance: h6

Speeds & Feeds: Page 261

# variFLUTE® Solid Carbide Single End Mills



List No. 5988 – 3-Flute – Ball Nose

ALTiN COATED

**3-Flute** variFLUTE end mills feature tool geometry for high chip evacuation in slotting and roughing applications.

**Ball Nose** for surfacing applications, fillets, radius bottom slots and die cavities.

Speeds & Feeds: Page 261

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
<b>REGULAR LENGTH</b>				
1/8	1/8	3/8	1-1/2	<a href="#">56320</a>
5/32	3/16	7/16	2	<a href="#">56321</a>
3/16	3/16	7/16	2	<a href="#">56322</a>
7/32	1/4	7/16	2-1/2	<a href="#">56323</a>
1/4	1/4	5/8	2-1/2	<a href="#">56324</a>
9/32	5/16	5/8	2-1/2	<a href="#">56325</a>
5/16	5/16	3/4	2-1/2	<a href="#">56326</a>
3/8	3/8	7/8	2-1/2	<a href="#">56327</a>
7/16	7/16	1	2-3/4	<a href="#">56328</a>
1/2	1/2	1	3	<a href="#">56329</a>



List No. 5996 – 4-Flute – Ball Nose

ALTiN COATED

**4-Flute** variFLUTE end mills feature versatile tool geometry for high chip evacuation in slotting applications while providing high surface finish and rapid feed rates in profiling applications.

**Ball Nose** for surfacing applications, fillets, radius bottom slots and die cavities.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
<b>REGULAR LENGTH</b>				
1/8	1/8	3/8	1-1/2	<a href="#">56373</a>
5/32	3/16	7/16	2	<a href="#">56374</a>
3/16	3/16	7/16	2	<a href="#">56375</a>
7/32	1/4	7/16	2-1/2	<a href="#">56376</a>
1/4	1/4	5/8	2-1/2	<a href="#">56377</a>
9/32	5/16	5/8	2-1/2	<a href="#">56378</a>
5/16	5/16	3/4	2-1/2	<a href="#">56379</a>
3/8	3/8	7/8	2-1/2	<a href="#">56380</a>
7/16	7/16	1	2-3/4	<a href="#">56381</a>
1/2	1/2	1	3	<a href="#">56382</a>
5/8	5/8	1-1/4	3-1/2	<a href="#">56383</a>
3/4	3/4	1-1/2	4	<a href="#">56384</a>
1	1	1-1/2	4	<a href="#">56385</a>

Shank Diameter Tolerance: h6 for Shrink Fit Holders

# variFLUTE® Solid Carbide Single End Mills



**4-Flute** variFLUTE end mills feature versatile tool geometry for high chip evacuation in slotting applications while providing high surface finish and rapid feed rates in profiling applications.

List No. 5994 - 4-Flute - Corner Radius

ALTiN  
COATED

**Corner Radius** strengthens the end mill to minimize chipping and reduce corner wear. Also used when the finished part requires a radius.

Shank Diameter Tolerance: h6

Speeds & Feeds: Page 261

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.
<b>STUB LENGTH</b>					
1/4	1/4	3/8	2	.015 - .020	56335
5/16	5/16	3/8	2	.015 - .020	56336
3/8	3/8	1/2	2	.015 - .020	56337
1/2	1/2	5/8	2-1/2	.025 - .030	56338
5/8	5/8	3/4	3	.030 - .035	56339
3/4	3/4	7/8	3	.030 - .035	56340
1	1	1	4	.030 - .035	56341
<b>REGULAR LENGTH</b>					
1/8	1/8	3/8	1-1/2	.010 - .015	56342
5/32	3/16	7/16	2	.010 - .015	56343
3/16	3/16	7/16	2	.010 - .015	56344
7/32	1/4	7/16	2-1/2	.015 - .020	56345
1/4	1/4	5/8	2-1/2	.015 - .020	56346
9/32	5/16	5/8	2-1/2	.015 - .020	56347
5/16	5/16	3/4	2-1/2	.015 - .020	56348
3/8	3/8	7/8	2-1/2	.015 - .020	56349
7/16	7/16	1	2-3/4	.015 - .020	56350
1/2	1/2	1	3	.025 - .030	56351
5/8	5/8	1-1/4	3-1/2	.030 - .035	56352
3/4	3/4	1-1/2	4	.030 - .035	56353
1	1	1-1/2	4	.030 - .035	56354
<b>LONG LENGTH</b>					
1/4	1/4	1-1/4	3	.015 - .020	56355
3/8	3/8	1-1/4	3	.015 - .020	56356
1/2	1/2	2	4	.025 - .030	56357
5/8	5/8	2-1/4	5	.030 - .035	56358
3/4	3/4	2-1/4	5	.030 - .035	56359
<b>EXTENDED LENGTH</b>					
1/4	1/4	5/8	4	.015 - .020	56360
3/8	3/8	7/8	4	.015 - .020	56361
1/2	1/2	1	6	.025 - .030	56362
5/8	5/8	1-1/4	6	.030 - .035	56363
3/4	3/4	1-1/2	6	.030 - .035	56364

**ALTiN - Aluminum Titanium Nitride** Coating is an excellent all-around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

HPE ULTRA-HIGH PERFORMANCE END MILLS

# variFLUTE® Solid Carbide Single End Mills



**4-Flute** variFLUTE end mills feature versatile tool geometry for high chip evacuation in slotting applications while providing high surface finish and rapid feed rates in profiling applications.

## List No. 5995 – 4-Flute – Square End

ALTiN COATED

**Square End** for peripheral milling and finishing applications requiring machining to a sharp corner.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
<b>REGULAR LENGTH</b>				
1/4	1/4	5/8	2-1/2	<a href="#">56365</a>
5/16	5/16	3/4	2-1/2	<a href="#">56366</a>
3/8	3/8	7/8	2-1/2	<a href="#">56367</a>
7/16	7/16	1	2-3/4	<a href="#">56368</a>
1/2	1/2	1	3	<a href="#">56369</a>
5/8	5/8	1-1/4	3-1/2	<a href="#">56370</a>
3/4	3/4	1-1/2	4	<a href="#">56371</a>
1	1	1-1/2	4	<a href="#">56372</a>



**5-Flute** variFLUTE end mills with increased core thickness and five flutes provide higher feed rates in profiling and finishing applications and enhanced surface finish.

## List No. 5986 – 5-Flute – Corner Radius

ALTiN COATED

**Corner Radius** strengthens the end mill to minimize chipping and reduce corner wear. Also used when the finished part requires a radius.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.
<b>STUB LENGTH</b>					
1/4	1/4	3/8	2	.015-.020	<a href="#">56290</a>
3/8	3/8	1/2	2	.015-.020	<a href="#">56291</a>
1/2	1/2	5/8	2-1/2	.025-.030	<a href="#">56292</a>
5/8	5/8	3/4	3	.030-.035	<a href="#">56293</a>
3/4	3/4	7/8	3	.030-.035	<a href="#">56294</a>
<b>REGULAR LENGTH</b>					
1/4	1/4	5/8	2-1/2	.015-.020	<a href="#">56295</a>
5/16	5/16	3/4	2-1/2	.015-.020	<a href="#">56296</a>
3/8	3/8	7/8	2-1/2	.015-.020	<a href="#">56297</a>
7/16	7/16	1	2-3/4	.015-.020	<a href="#">56298</a>
1/2	1/2	1	3	.025-.030	<a href="#">56299</a>
5/8	5/8	1-1/4	3-1/2	.030-.035	<a href="#">56300</a>
3/4	3/4	1-1/2	4	.030-.035	<a href="#">56301</a>
1	1	1-1/2	4	.030-.035	<a href="#">56302</a>
<b>LONG LENGTH</b>					
1/4	1/4	1-1/4	3	.015-.020	<a href="#">56330</a>
3/8	3/8	1-1/4	3	.015-.020	<a href="#">56331</a>
1/2	1/2	2	4	.025-.030	<a href="#">56332</a>
5/8	5/8	2-1/4	5	.030-.035	<a href="#">56333</a>
3/4	3/4	2-1/4	5	.030-.035	<a href="#">56334</a>
<b>EXTENDED LENGTH</b>					
1/4	1/4	5/8	4	.015-.020	<a href="#">56303</a>
3/8	3/8	7/8	4	.015-.020	<a href="#">56304</a>
1/2	1/2	1	6	.025-.030	<a href="#">56305</a>
5/8	5/8	1-1/4	6	.030-.035	<a href="#">56306</a>
3/4	3/4	1-1/2	6	.030-.035	<a href="#">56307</a>

Shank Diameter Tolerance: h6

Speeds & Feeds: Page 261

# variFLUTE® Solid Carbide Single End Mills



List No. 5987 - 5-Flute - Square End

ALTiN  
COATED

**5-Flute** variFLUTE end mills with increased core thickness and five flutes provide higher feed rates in profiling and finishing applications and enhanced surface finish.

**Square End** for peripheral milling and finishing applications requiring machining to a sharp corner.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
<b>REGULAR LENGTH</b>				
1/4	1/4	5/8	2-1/2	<b>56310</b>
5/16	5/16	3/4	2-1/2	<b>56311</b>
3/8	3/8	7/8	2-1/2	<b>56312</b>
7/16	7/16	1	2-3/4	<b>56313</b>
1/2	1/2	1	3	<b>56314</b>
5/8	5/8	1-1/4	3-1/2	<b>56315</b>
3/4	3/4	1-1/2	4	<b>56316</b>
1	1	1-1/2	4	<b>56317</b>

## variFLUTE® SPEEDS & FEEDS

Shank Diameter Tolerance: h6 for Shrink Fit Holders

Workpiece Material	Hardness BHN	Type of Cut	Surface Speed (SFM)	FEED PER TOOTH BY END MILL DIAMETER				
				1/8"	1/4"	1/2"	3/4"	1"
<b>Plain Steels - Low &amp; Medium Carbon</b> 1008, 1010, 1020	175	Profile	625	0.0005	0.0016	0.0036	0.0046	0.0050
			500	0.0004	0.0012	0.0029	0.0036	0.0041
<b>Plain Steels - Low &amp; Medium Carbon</b> 1008, 1010, 1020	275	Profile	500	0.0005	0.0016	0.0036	0.0046	0.0050
			400	0.0004	0.0012	0.0029	0.0036	0.0041
<b>Alloy Steels - Medium Carbon</b> 4140, 4150, 4340	275	Profile	500	0.0004	0.0012	0.0030	0.0042	0.0048
			400	0.0002	0.0010	0.0024	0.0034	0.0038
<b>Alloy Steels - Medium Carbon</b> 4140, 4150, 4340	375	Profile	375	0.0004	0.0012	0.0030	0.0042	0.0048
			300	0.0002	0.0010	0.0024	0.0034	0.0038
<b>Mold &amp; Die Steels</b> O1, A2, D2, H13, P20	275	Profile	225	0.0002	0.0012	0.0030	0.0042	0.0048
			180	0.0002	0.0010	0.0024	0.0034	0.0038
<b>Stainless Steels 300 Series</b> 304, 310, 316	275	Profile	360	0.0004	0.0012	0.0030	0.0042	0.0050
			290	0.0002	0.0010	0.0024	0.0034	0.0041
<b>Stainless Steels 400 Series</b> 409, 430, 436	325	Profile	300	0.0004	0.0012	0.0030	0.0042	0.0050
			240	0.0002	0.0010	0.0024	0.0034	0.0041
<b>Stainless Steels Precipitation Hardened</b> 15-5PH, 17-4PH	325	Profile	300	0.0002	0.0012	0.0026	0.0036	0.0048
			240	0.0002	0.0010	0.0022	0.0029	0.0038
<b>High Temperature Alloys</b> Inconel, Hastelloy, Waspaloy	300	Profile	80	0.0002	0.0008	0.0024	0.0030	0.0038
			65	0.0002	0.0007	0.0019	0.0024	0.0031
<b>Titanium Alloys</b> Ti-6Al-4V, ASTM B367 Grades C-3, C-4	300	Profile	315	0.0004	0.0012	0.0030	0.0032	0.0042
			250	0.0002	0.0010	0.0024	0.0026	0.0034
<b>Cast Iron</b> Grey	200	Profile	605	0.0005	0.0014	0.0036	0.0046	0.0050
			485	0.0004	0.0012	0.0029	0.0036	0.0041
<b>Cast Iron</b> Ductile	300	Profile	275	0.0004	0.0012	0.0036	0.0040	0.0050
			220	0.0002	0.0010	0.0029	0.0031	0.0041

SPEEDS and FEEDS are suggested starting points and may be increased or decreased depending on actual material and machining conditions. In pocketing operations ramping and spiral plunging are the preferred methods of entry. A 5° ramp angle at about 50% feed are suggested.

<b>RECOMMENDED MAXIMUM DEPTHS OF CUT</b>	<b>PROFILING</b> Radial Depth = .5XD Axial Depth = 1.5XD	<b>SLOTTING</b> Axial Depth = 1XD
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May be increased or decreased depending on actual material and machining conditions.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

**variFLUTE®**  
**7-Flute Variable Flute**  
**HPE Ultra-High Performance**  
**Solid Carbide Single End Mills**



List No. 5998 7-Flute nACo Coated

Center Cutting - 45° Helix Angle  
 10% Cobalt Micrograin Carbide

**TOLERANCES**

Diameter +.000/-0.002  
 Shank Dia. h6 Tolerance

nACo Coated



nACo - Aluminum Titanium Nitride + Silicon Nitride coating for high heat and wear resistance.

**Variable Flute** reduces chatter and harmonics for increased feed rates, improved finish and minimal tool deflection.

**7-Flute** mills are recommended for light to medium finishing profiling cuts in steels, stainless steels, high temp alloys, titanium alloys and cast irons up to 52Rc hardness.

**Corner Radius** to minimize chipping and reduce corner wear.

**Total Reach** combines the flute length with a necked shank to provide clearance for milling in deeper cavities.

List No. 5998 7-Flute Inch Sizes

Speeds & Feeds: Page 266

DIA.	SHANK DIA.	LOC	TOTAL REACH	OAL	CORNER RADIUS	EDP NO.
1/8	1/8	3/16	—	1-1/2	—	97750
1/8	1/8	3/16	—	1-1/2	.010	97751
1/8	1/8	3/8	—	1-1/2	—	97752
1/8	1/8	3/8	—	1-1/2	.010	97753
3/16	3/16	9/32	—	1-1/2	—	97754
3/16	3/16	9/32	—	1-1/2	.010	97755
3/16	3/16	9/16	—	2	—	97756
3/16	3/16	9/16	—	2	.010	97757
1/4	1/4	3/8	—	2	—	97758
1/4	1/4	3/8	—	2	.015	97759
1/4	1/4	3/8	2-1/8	4	.015	97760
1/4	1/4	3/8	—	4	.015	97761
1/4	1/4	3/4	1	2-1/2	—	97762
1/4	1/4	3/4	1	2-1/2	.015	97763
3/8	3/8	1/2	—	2	—	97764
3/8	3/8	1/2	—	2	.015	97765
3/8	3/8	1/2	1-1/8	3	.015	97766
3/8	3/8	1/2	2-1/8	4	.015	97767
3/8	3/8	1	—	2-1/2	—	97768
3/8	3/8	1	—	2-1/2	.015	97769
1/2	1/2	5/8	—	2-1/2	—	97770
1/2	1/2	5/8	—	2-1/2	.015	97771
1/2	1/2	5/8	1-1/2	4	.015	97772
1/2	1/2	5/8	2-1/4	4	.015	97773
1/2	1/2	1	1-1/4	3	—	97774
1/2	1/2	1	1-1/4	3	.015	97775
1/2	1/2	1	1-1/4	3	.030	97776
1/2	1/2	1-1/4	—	3	—	97777
1/2	1/2	1-1/4	—	3	.015	97778
1/2	1/2	1-1/4	—	3	.030	97779
5/8	5/8	3/4	—	3	—	97780
5/8	5/8	3/4	—	3	.030	97781
5/8	5/8	3/4	1-5/8	5	.030	97782
5/8	5/8	1-1/4	1-1/2	3-1/2	—	97783
5/8	5/8	1-1/4	1-1/2	3-1/2	.030	97784
3/4	3/4	7/8	—	3	—	97785
3/4	3/4	7/8	—	3	.030	97786
3/4	3/4	7/8	2	5	.030	97787
3/4	3/4	1-1/2	1-3/4	4	—	97788
3/4	3/4	1-1/2	1-3/4	4	.030	97789
1	1	1-1/2	1-3/4	4	—	97790
1	1	1-1/2	1-3/4	4	.030	97791

Shank Diameter Tolerance: h6 for Shrink Fit Holders



# variFLUTE® Metric

## 7-Flute Variable Flute

### HPE Ultra-High Performance

### Solid Carbide Single End Mills



List No. 5998M 7-Flute nACo Coated

Center Cutting - 45° Helix Angle  
10% Cobalt Micrograin Carbide

#### TOLERANCES

Diameter +.000/-0.050 mm  
Shank Dia. h6 Tolerance

nACo Coated



nACo - Aluminum Titanium Nitride + Silicon Nitride coating for high heat and wear resistance.

**Variable Flute** reduces chatter and harmonics for increased feed rates, improved finish and minimal tool deflection.

**7-Flute** mills are recommended for light to medium finishing profiling cuts in steels, stainless steels, high temp alloys, titanium alloys and cast irons up to 52Rc hardness.

**Corner Radius** to minimize chipping and reduce corner wear.

**Total Reach** combines the flute length with a necked shank to provide clearance for milling in deeper cavities.

List No. 5998M 7-Flute Metric Sizes

Speeds & Feeds: Page 266

DIA.	SHANK DIA.	LOC	TOTAL REACH	OAL	CORNER RADIUS	EDP NO.
3 mm	3 mm	6 mm	—	38 mm	—	97795
3 mm	3 mm	6 mm	—	38 mm	.25 mm	97796
3 mm	3 mm	12 mm	—	38 mm	—	97797
3 mm	3 mm	12 mm	—	38 mm	.25 mm	97798
4 mm	4 mm	12 mm	—	51 mm	—	97799
4 mm	4 mm	12 mm	—	51 mm	.25 mm	97800
6 mm	6 mm	20 mm	26 mm	63 mm	—	97801
6 mm	6 mm	20 mm	26 mm	63 mm	.50 mm	97802
6 mm	6 mm	20 mm	—	100 mm	.50 mm	97803
8 mm	8 mm	20 mm	26 mm	63 mm	—	97804
8 mm	8 mm	20 mm	26 mm	63 mm	.50 mm	97805
8 mm	8 mm	20 mm	26 mm	63 mm	1 mm	97806
8 mm	8 mm	20 mm	—	100 mm	.50 mm	97807
10 mm	10 mm	24 mm	30 mm	70 mm	—	97808
10 mm	10 mm	24 mm	30 mm	70 mm	.50 mm	97809
10 mm	10 mm	24 mm	30 mm	70 mm	1 mm	97810
10 mm	10 mm	24 mm	—	100 mm	.50 mm	97811
12 mm	12 mm	25 mm	31 mm	76 mm	—	97812
12 mm	12 mm	25 mm	31 mm	76 mm	.50 mm	97813
12 mm	12 mm	25 mm	31 mm	76 mm	1 mm	97814
12 mm	12 mm	25 mm	31 mm	76 mm	2 mm	97815
12 mm	12 mm	25 mm	—	100 mm	.50 mm	97816
14 mm	14 mm	32 mm	38 mm	89 mm	—	97817
14 mm	14 mm	32 mm	38 mm	89 mm	.50 mm	97818
14 mm	14 mm	32 mm	38 mm	89 mm	1 mm	97819
16 mm	16 mm	32 mm	38 mm	89 mm	—	97820
16 mm	16 mm	32 mm	38 mm	89 mm	.50 mm	97821
16 mm	16 mm	32 mm	38 mm	89 mm	1 mm	97822
16 mm	16 mm	32 mm	38 mm	89 mm	2 mm	97823
16 mm	16 mm	32 mm	—	100 mm	.50 mm	97824
18 mm	18 mm	36 mm	42 mm	100 mm	—	97825
18 mm	18 mm	36 mm	42 mm	100 mm	.50 mm	97826
18 mm	18 mm	36 mm	42 mm	100 mm	1 mm	97827
20 mm	20 mm	36 mm	42 mm	100 mm	—	97828
20 mm	20 mm	36 mm	42 mm	100 mm	.50 mm	97829
20 mm	20 mm	36 mm	42 mm	100 mm	1 mm	97830
20 mm	20 mm	36 mm	42 mm	100 mm	2 mm	97831
20 mm	20 mm	36 mm	42 mm	100 mm	3 mm	97832
25 mm	25 mm	36 mm	42 mm	100 mm	—	97833
25 mm	25 mm	36 mm	42 mm	100 mm	.50 mm	97834
25 mm	25 mm	36 mm	42 mm	100 mm	1 mm	97835
25 mm	25 mm	36 mm	42 mm	100 mm	3 mm	97836

HPE ULTRA-HIGH PERFORMANCE END MILLS

**variFLUTE®**  
**9-Flute Variable Flute**  
**HPE Ultra-High Performance**  
**Solid Carbide Single End Mills**



List No. 5999 9-Flute nCo Coated

Center Cutting - 45° Helix Angle  
 10% Cobalt Micrograin Carbide

**TOLERANCES**

Diameter +.000/-0.002  
 Shank Dia. h6 Tolerance

nCo Coated



nCo - Aluminum Titanium Nitride + Silicon Nitride coating for high heat and wear resistance.

**Variable Flute** reduces chatter and harmonics for increased feed rates, improved finish and minimal tool deflection.

**9-Flute** mills are recommended for fine finishing profiling cuts in steels, stainless steels, high temp alloys, titanium alloys and cast irons up to 52Rc hardness.

**Corner Radius** to minimize chipping and reduce corner wear.

**Total Reach** combines the flute length with a necked shank to provide clearance for milling in deeper cavities.

List No. 5999 9-Flute Inch Sizes

**Speeds & Feeds: Page 267**

DIA.	SHANK DIA.	LOC	TOTAL REACH	OAL	CORNER RADIUS	EDP NO.
3/16	3/16	9/32	—	1-1/2	—	97840
3/16	3/16	9/32	—	1-1/2	.010	97841
3/16	3/16	9/16	—	2	—	97842
3/16	3/16	9/16	—	2	.010	97843
1/4	1/4	3/8	—	2	—	97844
1/4	1/4	3/8	—	2	.015	97845
1/4	1/4	3/8	2-1/8	4	.015	97846
1/4	1/4	3/8	—	4	.015	97847
1/4	1/4	3/4	1	2-1/2	—	97848
1/4	1/4	3/4	1	2-1/2	.015	97849
3/8	3/8	1/2	—	2	—	97850
3/8	3/8	1/2	—	2	.015	97851
3/8	3/8	1/2	1-1/8	3	.015	97852
3/8	3/8	1/2	2-1/8	4	.015	97853
3/8	3/8	1	—	2-1/2	—	97854
3/8	3/8	1	—	2-1/2	.015	97855
1/2	1/2	5/8	—	2-1/2	—	97856
1/2	1/2	5/8	—	2-1/2	.015	97857
1/2	1/2	5/8	1-1/2	4	.015	97858
1/2	1/2	5/8	2-1/4	4	.015	97859
1/2	1/2	1	1-1/4	3	—	97860
1/2	1/2	1	1-1/4	3	.015	97861
1/2	1/2	1	1-1/4	3	.030	97862
1/2	1/2	1-1/4	—	3	—	97863
1/2	1/2	1-1/4	—	3	.015	97864
1/2	1/2	1-1/4	—	3	.030	97865
5/8	5/8	3/4	—	3	—	97866
5/8	5/8	3/4	—	3	.030	97867
5/8	5/8	3/4	1-5/8	5	.030	97868
5/8	5/8	1-1/4	1-1/2	3-1/2	—	97869
5/8	5/8	1-1/4	1-1/2	3-1/2	.030	97870
3/4	3/4	7/8	—	3	—	97871
3/4	3/4	7/8	—	3	.030	97872
3/4	3/4	7/8	2	5	.030	97873
3/4	3/4	1-1/2	1-3/4	4	—	97874
3/4	3/4	1-1/2	1-3/4	4	.030	97875
1	1	1-1/2	1-3/4	4	—	97876
1	1	1-1/2	1-3/4	4	.030	97877

**Shank Diameter Tolerance: h6 for Shrink Fit Holders**

# variFLUTE® Metric

## 9-Flute Variable Flute

### HPE Ultra-High Performance

### Solid Carbide Single End Mills



List No. 5999M 9-Flute nACO Coated

Center Cutting - 45° Helix Angle  
10% Cobalt Micrograin Carbide

#### TOLERANCES

Diameter +.000/-0.050 mm  
Shank Dia. h6 Tolerance

nACO Coated



nACO - Aluminum Titanium Nitride + Silicon Nitride coating for high heat and wear resistance.

**Variable Flute** reduces chatter and harmonics for increased feed rates, improved finish and minimal tool deflection.

**9-Flute** mills are recommended for fine finishing profiling cuts in steels, stainless steels, high temp alloys, titanium alloys and cast irons up to 52Rc hardness.

**Corner Radius** to minimize chipping and reduce corner wear.

**Total Reach** combines the flute length with a necked shank to provide clearance for milling in deeper cavities.

List No. 5999M 9-Flute Metric Sizes

Speeds & Feeds: Page 267

DIA.	SHANK DIA.	LOC	TOTAL REACH	OAL	CORNER RADIUS	EDP NO.
4 mm	4 mm	12 mm	—	51 mm	—	97880
4 mm	4 mm	12 mm	—	51 mm	.25 mm	97881
6 mm	6 mm	20 mm	26 mm	63 mm	—	97882
6 mm	6 mm	20 mm	26 mm	63 mm	.50 mm	97883
6 mm	6 mm	20 mm	—	100 mm	.50 mm	97884
8 mm	8 mm	20 mm	26 mm	63 mm	—	97885
8 mm	8 mm	20 mm	26 mm	63 mm	.50 mm	97886
8 mm	8 mm	20 mm	26 mm	63 mm	1 mm	97887
8 mm	8 mm	20 mm	—	100 mm	.50 mm	97888
10 mm	10 mm	24 mm	30 mm	70 mm	—	97889
10 mm	10 mm	24 mm	30 mm	70 mm	.50 mm	97890
10 mm	10 mm	24 mm	30 mm	70 mm	1 mm	97891
10 mm	10 mm	24 mm	—	100 mm	.50 mm	97892
12 mm	12 mm	25 mm	31 mm	76 mm	—	97893
12 mm	12 mm	25 mm	31 mm	76 mm	.50 mm	97894
12 mm	12 mm	25 mm	31 mm	76 mm	1 mm	97895
12 mm	12 mm	25 mm	31 mm	76 mm	2 mm	97896
12 mm	12 mm	25 mm	—	100 mm	.50 mm	97897
14 mm	14 mm	32 mm	38 mm	89 mm	—	97898
14 mm	14 mm	32 mm	38 mm	89 mm	.50 mm	97899
14 mm	14 mm	32 mm	38 mm	89 mm	1 mm	97900
16 mm	16 mm	32 mm	38 mm	89 mm	—	97901
16 mm	16 mm	32 mm	38 mm	89 mm	.50 mm	97902
16 mm	16 mm	32 mm	38 mm	89 mm	1 mm	97903
16 mm	16 mm	32 mm	38 mm	89 mm	2 mm	97904
16 mm	16 mm	32 mm	—	100 mm	.50 mm	97905
18 mm	18 mm	36 mm	42 mm	100 mm	—	97906
18 mm	18 mm	36 mm	42 mm	100 mm	.50 mm	97907
18 mm	18 mm	36 mm	42 mm	100 mm	1 mm	97908
20 mm	20 mm	36 mm	42 mm	100 mm	—	97909
20 mm	20 mm	36 mm	42 mm	100 mm	.50 mm	97910
20 mm	20 mm	36 mm	42 mm	100 mm	1 mm	97911
20 mm	20 mm	36 mm	42 mm	100 mm	2 mm	97912
20 mm	20 mm	36 mm	42 mm	100 mm	3 mm	97913
25 mm	25 mm	36 mm	42 mm	100 mm	—	97914
25 mm	25 mm	36 mm	42 mm	100 mm	.50 mm	97915
25 mm	25 mm	36 mm	42 mm	100 mm	1 mm	97916
25 mm	25 mm	36 mm	42 mm	100 mm	3 mm	97917

HPE ULTRA-HIGH PERFORMANCE END MILLS

# 7-Flute variFLUTE® Speed and Feed Recommendations



	WORKPIECE MATERIAL	TYPE OF CUT	AXIAL DOC	RADIAL DOC	SURFACE SPEED (SFM)	FEED PER TOOTH BY END MILL DIAMETER							
						1/8" 3 MM	3/16" 4.5 MM	1/4" 6 MM	3/8" 10 MM	1/2" 12 MM	5/8" 16 MM	3/4" 20 MM	1" 25 MM
Steels - ISO P	Low Alloy Steels 10XX, 11XX, 13XX	High Speed Profiling	Full LOC	< .1 D	525	.0014	.0023	.0028	.0041	.0055	.0069	.0083	.0111
		Profiling	Full LOC	< .08 D	400	.0016	.0024	.0032	.0057	.0063	.0079	.0095	.0127
	Medium Alloy Steels 200, 250, 300	High Speed Profiling	Full LOC	< .1 D	425	.0013	.0019	.0025	.0038	.0050	.0063	.0076	.0101
		Profiling	Full LOC	< .08 D	375	.0014	.0023	.0029	.0043	.0058	.0072	.0086	.0116
	High Alloy Steels Mold & Die A2, P20, 01, 02, D2, H13	High Speed Profiling	Full LOC	< .1 D	475	.0011	.0016	.0022	.0032	.0042	.0053	.0064	.0086
		Profiling	Full LOC	< .08 D	350	.0013	.0018	.0024	.0037	.0049	.0061	.0073	.0098
High Strength Steels 4140, 4340, 52100	High Speed Profiling	Full LOC	< .1 D	500	.0013	.0019	.0025	.0038	.0050	.0063	.0076	.0101	
	Profiling	Full LOC	< .08 D	375	.0014	.0023	.0029	.0043	.0058	.0072	.0086	.0116	
Stainless Steels - ISO M	Martensitic Stainless Steels 403, 410, 416	High Speed Profiling	Full LOC	< .1 D	500	.0013	.0019	.0025	.0038	.0050	.0063	.0076	.0101
		Profiling	Full LOC	< .08 D	375	.0014	.0022	.0029	.0043	.0058	.0072	.0086	.0116
	Austenitic Stainless Steels 302, 303, 304L, 316L	High Speed Profiling	Full LOC	< .1 D	475	.0014	.0019	.0028	.0042	.0057	.0070	.0085	.0113
		Profiling	Full LOC	< .08 D	325	.0014	.0020	.0027	.0041	.0054	.0068	.0081	.0109
	Precipitation Hardened Stainless Steels 13-8, 15-5, 17-4PH	High Speed Profiling	Full LOC	< .1 D	450	.0012	.0017	.0023	.0035	.0047	.0059	.0070	.0094
		Profiling	Full LOC	< .08 D	325	.0012	.0016	.0023	.0034	.0045	.0057	.0068	.0091
High Temp Alloys - ISO S	Iron Base High Temp Alloys Incoloy 800-802, Multimet N155	High Speed Profiling	Full LOC	< .1 D	155	.0004	.0005	.0008	.0013	.0017	.0021	.0025	.0033
		Profiling	Full LOC	< .08 D	130	.0004	.0006	.0009	.0014	.0019	.0023	.0028	.0038
	Nickel Base High Temp Alloys Inconel 600, 625, 718, Nickel 200, Monel 400, 405, K-Monel, Incoloy 600	High Speed Profiling	Full LOC	< .1 D	160	.0004	.0005	.0007	.0010	.0017	.0016	.0026	.0026
		Profiling	Full LOC	< .08 D	145	.0004	.0005	.0007	.0011	.0018	.0018	.0022	.0022
	Cobalt Base High Temp Alloys Stellite, Haynes 25, 188, X40	High Speed Profiling	Full LOC	< .1 D	175	.0003	.0004	.0005	.0008	.0011	.0014	.0016	.0022
		Profiling	Full LOC	< .08 D	150	.0003	.0005	.0007	.0007	.0013	.0016	.0020	.0026
Titanium Alloys 6AL-4V, ASTM 1, 2, 3, 6AL-2S	High Speed Profiling	Full LOC	< .1 D	425	.0011	.0016	.0022	.0032	.0043	.0054	.0065	.0086	
	Profiling	Full LOC	< .08 D	300	.0011	.0016	.0021	.0032	.0041	.0052	.0062	.0083	
Cast Irons - ISO K	Cast Iron Gray	High Speed Profiling	Full LOC	< .1 D	500	.0012	.0018	.0023	.0035	.0048	.0059	.0071	.0095
		Profiling	Full LOC	< .08 D	375	.0014	.0022	.0027	.0041	.0054	.0068	.0081	.0109
	Cast Iron Ductile	High Speed Profiling	Full LOC	< .1 D	475	.0010	.0014	.0020	.0030	.0040	.0050	.0059	.0079
		Profiling	Full LOC	< .08 D	350	.0012	.0015	.0023	.0034	.0045	.0057	.0068	.0091

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# 9-Flute variFLUTE®

## Speed and Feed Recommendations



	WORKPIECE MATERIAL	TYPE OF CUT	AXIAL DOC	RADIAL DOC	SURFACE SPEED (SFM)	3/16" 4.5 MM	1/4" 6 MM	3/8" 10 MM	1/2" 12 MM	5/8" 16 MM	3/4" 20 MM	1" 25 MM
Steels – ISO P	Low Alloy Steels 10XX, 11XX, 13XX	High Speed Profiling	Full LOC	< .025 D	525	.0023	.0028	.0041	.0055	.0069	.0083	.0111
		Profiling	Full LOC	< .015 D	400	.0024	.0032	.0057	.0063	.0079	.0095	.0127
	Medium Alloy Steels 200, 250, 300	High Speed Profiling	Full LOC	< .025 D	425	.0019	.0025	.0038	.0050	.0063	.0076	.0101
		Profiling	Full LOC	< .015 D	375	.0023	.0029	.0043	.0058	.0072	.0086	.0116
	High Alloy Steels Mold & Die A2, P20, 01, 02, D2, H13	High Speed Profiling	1 x D	< .025 D	475	.0016	.0022	.0032	.0042	.0053	.0064	.0086
		Profiling	Full LOC	< .015 D	350	.0018	.0024	.0037	.0049	.0061	.0073	.0098
	High Strength Steels 4140, 4340, 52100	High Speed Profiling	1 x D	< .025 D	500	.0019	.0025	.0038	.0050	.0063	.0076	.0101
		Profiling	Full LOC	< .015 D	375	.0023	.0029	.0043	.0058	.0072	.0086	.0116
Stainless Steels – ISO M	Martensitic Stainless Steels 403, 410, 416	High Speed Profiling	1.5 x D	< .025 D	500	.0019	.0025	.0038	.0050	.0063	.0076	.0101
		Profiling	Full LOC	< .015 D	375	.0022	.0029	.0043	.0058	.0072	.0086	.0116
	Austenitic Stainless Steels 302, 303, 304L, 316L	High Speed Profiling	1.5 x D	< .025 D	475	.0019	.0028	.0042	.0057	.0070	.0085	.0113
		Profiling	Full LOC	< .015 D	350	.0020	.0027	.0041	.0054	.0068	.0081	.0109
	Precipitation Hardened Stainless Steels 13-8, 15-5, 17-4PH	High Speed Profiling	1.5 x D	< .025 D	450	.0017	.0023	.0035	.0047	.0059	.0070	.0094
		Profiling	Full LOC	< .015 D	325	.0016	.0023	.0034	.0045	.0057	.0068	.0091
High Temp Alloys – ISO S	Iron Base High Temp Alloys Incoloy 800-802, Multimet N155	High Speed Profiling	.5 x D	< .02 D	155	.0005	.0008	.0013	.0017	.0021	.0025	.0033
		Profiling	Full LOC	< .01 D	130	.0006	.0009	.0014	.0019	.0023	.0028	.0038
	Nickel Base High Temp Alloys Inconel 600, 625, 718, Nickel 200, Monel 400, 405, K-Monel, Incoloy 600	High Speed Profiling	.5 x D	< .02 D	160	.0005	.0007	.0010	.0017	.0016	.0026	.0026
		Profiling	Full LOC	< .01 D	145	.0005	.0007	.0011	.0018	.0018	.0022	.0022
	Cobalt Base High Temp Alloys Stellite, Haynes 25, 188, X40	High Speed Profiling	.5 x D	< .02 D	175	.0004	.0005	.0008	.0011	.0014	.0016	.0022
		Profiling	Full LOC	< .01 D	150	.0005	.0007	.0007	.0013	.0016	.0020	.0026
	Titanium Alloys 6AL-4V, ASTM 1, 2, 3, 6AL-2S	High Speed Profiling	1.5 x D	< .025 D	425	.0016	.0022	.0032	.0043	.0054	.0065	.0086
		Profiling	Full LOC	< .015 D	300	.0016	.0021	.0032	.0041	.0052	.0062	.0083
Cast Irons – ISO K	Cast Iron Gray	High Speed Profiling	Full LOC	< .025 D	500	.0018	.0023	.0035	.0048	.0059	.0071	.0095
		Profiling	Full LOC	< .015 D	375	.0022	.0027	.0041	.0054	.0068	.0081	.0109
	Cast Iron Ductile	High Speed Profiling	Full LOC	< .025 D	475	.0014	.0020	.0030	.0040	.0050	.0059	.0079
		Profiling	Full LOC	< .015 D	350	.0015	.0023	.0034	.0045	.0057	.0068	.0091

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

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# VP2-End Mill

## High Performance

### Variable Flute

### veri4 Coated

## Solid Carbide Single End Mills

Center Cutting - Honed Cutting Edge - 37° Helix Angle  
 10% Cobalt Submicron Carbide  
 veri4 - Aluminum Chromium Titanium Nitride Coating



Corner Radius

Honed Cutting Edge



List No. 5981 4-Flute - Corner Radius

VP2-End Mill excels at High Performance Milling in a Wide Range of Materials.

**Honed Cutting Edge** for enhanced edge strength and tool life.

**Corner Radius** strengthens the end mill to minimize chipping and reduce corner wear. Also used when the finished part requires a radius.

**veri4 Coating** for maximum toughness, wear resistance and lubricity.

### List No. 5981 - 4-Flute - Corner Radius

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.
<b>STUB LENGTH</b>					
1/8	1/8	1/4	1-1/2	.010	95880
3/16	3/16	3/8	2	.010	95881
1/4	1/4	7/16	2	.015	95882
5/16	5/16	1/2	2	.015	95883
3/8	3/8	5/8	2	.015	95884
1/2	1/2	5/8	2-1/2	.030	95885
5/8	5/8	3/4	3	.030	95886
3/4	3/4	1	3	.030	95887
<b>REGULAR LENGTH</b>					
1/8	1/8	1/2	1-1/2	.010	95900
1/8	1/8	1/2	1-1/2	.030	95901
3/16	3/16	5/8	2	.010	95902
3/16	3/16	5/8	2	.030	95903
1/4	1/4	3/4	2-1/2	.015	95904
1/4	1/4	3/4	2-1/2	.030	95905
1/4	1/4	3/4	2-1/2	.060	95906
5/16	5/16	13/16	2-1/2	.015	95907
5/16	5/16	13/16	2-1/2	.030	95908
5/16	5/16	13/16	2-1/2	.060	95909
3/8	3/8	1	2-1/2	.015	95910
3/8	3/8	1	2-1/2	.030	95911
3/8	3/8	1	2-1/2	.060	95912
7/16	7/16	1	2-3/4	.030	95913
7/16	7/16	1	2-3/4	.060	95914
1/2	1/2	1	3	.030	95915
1/2	1/2	1	3	.060	95916
1/2	1/2	1	3	.090	95917
1/2	1/2	1	3	.125	95918
5/8	5/8	1-1/4	3-1/2	.030	95919
5/8	5/8	1-1/4	3-1/2	.060	95920
3/4	3/4	1-1/2	4	.030	95921
3/4	3/4	1-1/2	4	.060	95922
3/4	3/4	1-1/2	4	.090	95923
1	1	1-1/2	4	.030	95924
1	1	1-1/2	4	.060	95925
1	1	1-1/2	4	.090	95926
1	1	1-1/2	4	.125	95927

Shank Diameter Tolerance: h6 for Shrink Fit Holders

(continued)

# VP2-End Mill

## High Performance

### Variable Flute

### veri4 Coated

## Solid Carbide Single End Mills

Center Cutting - Honed Cutting Edge - 37° Helix Angle  
 10% Cobalt Submicron Carbide  
 veri4 - Aluminum Chromium Titanium Nitride Coating



Corner Radius

Honed Cutting Edge



List No. 5981 4-Flute - Corner Radius

VP2-End Mill excels at High Performance Milling in a Wide Range of Materials.

Honed Cutting Edge for enhanced edge strength and tool life.

Corner Radius strengthens the end mill to minimize chipping and reduce corner wear. Also used when the finished part requires a radius.

veri4 Coating for maximum toughness, wear resistance and lubricity.

VP2 HIGH PERFORMANCE END MILLS

### List No. 5981 - 4-Flute - Corner Radius (continued)

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.
<b>LONG LENGTH</b>					
1/8	1/8	3/4	2 1/4	.015	95945
3/16	3/16	3/4	2 1/2	.015	95946
1/4	1/4	1-1/8	3	.015	95947
1/4	1/4	1-1/8	3	.030	95948
5/16	5/16	1-1/8	3	.015	95949
5/16	5/16	1-1/8	3	.030	95950
3/8	3/8	1-1/8	3	.015	95951
3/8	3/8	1-1/8	3	.030	95952
3/8	3/8	1-1/8	3	.060	95953
1/2	1/2	1-1/2	4	.030	95954
1/2	1/2	1-1/2	4	.060	95955
1/2	1/2	2	4	.030	95956
1/2	1/2	2	4	.060	95957
5/8	5/8	2-1/4	5	.030	95958
5/8	5/8	2-1/4	5	.060	95959
3/4	3/4	2-1/4	5	.030	95960
3/4	3/4	2-1/4	5	.060	95961
1	1	2-1/4	5	.030	95962
1	1	2-1/4	5	.060	95963
<b>EXTRA LONG LENGTH</b>					
1/8	1/8	1	3	.015	95975
3/16	3/16	1-1/8	3	.015	95976
1/4	1/4	1-1/2	4	.015	95977
1/4	1/4	1-1/2	4	.030	95978
5/16	5/16	1-5/8	4	.015	95979
5/16	5/16	1-5/8	4	.030	95980
3/8	3/8	1-3/4	4	.015	95981
3/8	3/8	1-3/4	4	.030	95982
1/2	1/2	3	6	.030	95983
1/2	1/2	3	6	.060	95984
5/8	5/8	3	6	.030	95985
5/8	5/8	3	6	.060	95986
3/4	3/4	3	6	.030	95987
3/4	3/4	3	6	.060	95988
3/4	3/4	4	7	.030	95989
3/4	3/4	4	7	.060	95990
1	1	3	6	.030	95991
1	1	4	7	.030	95992
1	1	4	7	.060	95993

Tolerances and Speeds & Feeds: Page 271

Shank Diameter  
Tolerance: h6

# VP2-End Mill

## High Performance

### Variable Flute

### veri4 Coated

### Solid Carbide Single End Mills



List No. 5980 4-Flute - Square End

VP2-End Mill excels at High Performance Milling in a Wide Range of Materials.

Honed Cutting Edge for enhanced edge strength and tool life.

veri4 Coating for maximum toughness, wear resistance and lubricity.

Center Cutting - Honed Cutting Edge - 37° Helix Angle  
10% Cobalt Submicron Carbide  
veri4 - Aluminum Chromium Titanium Nitride Coating

Honed Cutting Edge

Shank Diameter Tolerance: h6

List No. 5980 - 4-Flute - Square End

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
<b>STUB LENGTH</b>				
1/8	1/8	1/4	1-1/2	95820
3/16	3/16	3/8	2	95821
1/4	1/4	7/16	2	95822
5/16	5/16	1/2	2	95823
3/8	3/8	5/8	2	95824
1/2	1/2	5/8	2-1/2	95825
5/8	5/8	3/4	3	95826
3/4	3/4	1	3	95827
<b>REGULAR LENGTH</b>				
1/8	1/8	1/2	1-1/2	95830
3/16	3/16	5/8	2	95831
1/4	1/4	3/4	2-1/2	95832
5/16	5/16	13/16	2-1/2	95833
3/8	3/8	1	2-1/2	95834
7/16	7/16	1	2-3/4	95835
1/2	1/2	1	3	95836
1/2	1/2	1-1/4	3	95837
5/8	5/8	1-1/4	3-1/2	95838
3/4	3/4	1-1/2	4	95839
1	1	1-1/2	4	95840
<b>LONG LENGTH</b>				
1/8	1/8	3/4	2-1/4	95845
3/16	3/16	3/4	2-1/2	95846
1/4	1/4	1-1/8	3	95847
5/16	5/16	1-1/8	3	95848
3/8	3/8	1-1/8	3	95849
7/16	7/16	2	4	95850
1/2	1/2	1-1/2	4	95851
1/2	1/2	2	4	95852
5/8	5/8	2-1/4	5	95853
3/4	3/4	2-1/4	5	95854
1	1	2-1/4	5	95855
<b>EXTRA LONG LENGTH</b>				
1/8	1/8	1	3	95860
3/16	3/16	1-1/8	3	95861
1/4	1/4	1-1/2	4	95862
5/16	5/16	1-5/8	4	95863
3/8	3/8	1-3/4	4	95864
7/16	7/16	3	6	95865
1/2	1/2	3	6	95866
5/8	5/8	3	6	95867
3/4	3/4	3	6	95868
3/4	3/4	4	7	95869
1	1	3	6	95870
1	1	4	7	95871

Tolerances and Speeds & Feeds: Page 271



	WORKPIECE MATERIAL	HARDNESS	TYPE OF CUT	SURFACE SPEED (SFM)	FEED PER TOOTH BY END MILL DIAMETER				
					1/8"	1/4"	1/2"	3/4"	1"
ISO P	Plain Steels - Low and Medium Carbon 1018, 12L12, 1108, 1213	175 BRN	Profile	600	0.0004	0.0015	0.0034	0.0043	0.0047
		-	Slot	480	0.0003	0.0011	0.0027	0.0034	0.0038
	Plain Steels - Low and Medium Carbon 1018, 12L12, 1108, 1213	275 BRN	Profile	480	0.0004	0.0015	0.0034	0.0043	0.0047
		28 HRc	Slot	385	0.0003	0.0011	0.0027	0.0034	0.0038
	Alloy Steels - Medium Carbon 4140, 4150, 4340	275 BRN	Profile	480	0.0003	0.0011	0.0028	0.0039	0.0045
		28 HRc	Slot	385	0.0002	0.0009	0.0022	0.0031	0.0036
	Alloy Steels - Medium Carbon 4140, 4150, 4340	375 BRN	Profile	360	0.0003	0.0011	0.0028	0.0039	0.0045
		41 HRC	Slot	290	0.0002	0.0009	0.0022	0.0031	0.0036
	Mold & Die Steels O1, A2, D2, H13, P20	275 BRN	Profile	215	0.0002	0.0011	0.0028	0.0039	0.0045
		28 HRc	Slot	175	0.0002	0.0009	0.0022	0.0031	0.0036
ISO M	300 Series Stainless Steels 304, 316, 416, 440F	275 BRN	Profile	345	0.0003	0.0011	0.0028	0.0039	0.0047
		28 HRc	Slot	275	0.0002	0.0009	0.0022	0.0031	0.0038
	400 Series Stainless Steels 430, 436	325 BRN	Profile	290	0.0003	0.0011	0.0028	0.0039	0.0047
		35 HRc	Slot	230	0.0002	0.0009	0.0022	0.0031	0.0038
	Precipitation Hardened Stainless Steels 17-4PH, 15-4PH	325 BRN	Profile	290	0.0002	0.0011	0.0025	0.0034	0.0045
		35 HRc	Slot	230	0.0002	0.0009	0.0020	0.0027	0.0036
ISO K	Cast Iron Gray	200 BRN	Profile	580	0.0004	0.0013	0.0034	0.0043	0.0047
		-	Slot	460	0.0003	0.0011	0.0027	0.0034	0.0038
	Cast Iron Ductile	300 BRN	Profile	265	0.0003	0.0011	0.0034	0.0037	0.0047
		32 HRc	Slot	210	0.0002	0.0009	0.0027	0.0029	0.0038
ISO S	Titanium Alloys Ti-6Al-4V, ASTM B367 Grades C-3, C-4	300 BRN	Profile	300	0.0003	0.0011	0.0028	0.0030	0.0039
		32 HRc	Slot	240	0.0002	0.0009	0.0022	0.0025	0.0031
	High Temperature Alloys Inconel, Hastelloy, Waspaloy	300 BRN	Profile	75	0.0002	0.0008	0.0022	0.0028	0.0036
		32 HRc	Slot	60	0.0002	0.0007	0.0018	0.0022	0.0029

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

In general, use lower speeds and feeds for hard and difficult-to-machine materials. Use higher speeds and feeds for easy-to-machine materials. Use higher speeds for lighter cuts, smaller tools, and better finishes. Higher feed rates can improve tool life and performance in softer materials and more abrasive materials.

For long and extra long tools reduce feed rates by 50%.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

### Successful Machining

**Tool Holding** - High Quality tool holders should be used to minimize run-out and maximize rigidity.

**Machine** - A rigid machine with a high quality spindle is required.

**Work-Holding** - The workpiece should be securely held to prevent movement and vibration while machining.

**Coolant** - A high quality coolant under adequate pressure should be used to enhance chip control and improve tool life.

**Plunging** - When Plunging or Ramping the feed rate should be reduced 50%.

**Tool Choice** - The shortest tool that will do the job is recommended to reduce chatter and deflection.

**Speed and Feed** - Using correct speed and feed rates will provide a better surface finish and improve tool life.

VP2-MILL Diameter Tolerances		
Mill Diameter: <b>+0.000/-0.002</b> (All Sizes)		
Shank Diameter: <b>h6</b>		
Shank Dia. Range		Tolerance
< 3mm .1181"	≤ 6mm .2362"	+0.000mm/-0.008mm +0.0000"/-0.00031"
> 6mm .2362"	≤ 10mm .3937"	+0.000mm/-0.009mm +0.0000"/-0.00035"
> 10mm .3937"	≤ 18mm .7087"	+0.000mm/-0.011mm +0.0000"/-0.00043"
> 18mm .7087"	≤ 30mm 1.1811"	+0.000mm/-0.013mm +0.0000"/-0.00051"

# High Speed High Performance 2-Flute Carbide End Mills for Aluminum

Micrograin Carbide — 35° Helix Angle  
Center Cutting — Extended Reach

High Speed High Performance Milling of Aluminum Alloys,  
Copper & Copper Alloys. Balanced for high spindle  
speeds and reduced chatter. Polished flutes for  
enhanced chip flow, surface finish and accuracy.

DLC - Amorphous Diamond-Like Carbon coating is  
recommended for Aluminum and Non-Ferrous Materials.

**NOTE:** For use in High Speed Machining Centers with  
Shrink Fit Tooling Only.

### TOLERANCES

Diameter +.000 / -.002  
Shank Dia. +.0001 / -.0004



List No. 5903 2-Flute Square Uncoated  
List No. 5903E 2-Flute Square DLC Coated



List No. 5926 2-Flute Ball Nose Uncoated  
List No. 5926E 2-Flute Ball Nose DLC Coated

2-Flute end mills provide increased chip capacity  
and are recommended for slotting applications.

### 2-Flute Square End

List No. 5903 Uncoated - List No. 5903E DLC Coated

**SPEEDS & FEEDS: Page 274**

DIA.	SHANK DIA.	LOC	LENGTH BELOW SHANK	OAL	5903 UNCOATED EDP #	5903E DLC COATED EDP #
3/8	3/8	1/2	1-1/8	3	53560	93150
3/8	3/8	1/2	2-1/8	4	53561	93151
1/2	1/2	5/8	1-3/8	3	53562	93152
1/2	1/2	5/8	2-1/8	4	53563	93153
1/2	1/2	5/8	3-3/8	6	53564	93154
5/8	5/8	3/4	1-5/8	4	53565	93155
5/8	5/8	3/4	2-3/8	5	53566	93156
5/8	5/8	3/4	3-3/8	6	53567	93157
3/4	3/4	1	2	4	53568	93158
3/4	3/4	1	2-1/2	5	53569	93159
3/4	3/4	1	3-3/8	6	53570	93160
1	1	1-1/4	2-5/8	5	53571	93161
1	1	1-1/4	3-3/8	6	53572	93162
1	1	1-1/4	4-3/8	7	53573	93163

### 2-Flute Ball Nose

List No. 5926 Uncoated - List No. 5926E DLC Coated

DIA.	SHANK DIA.	LOC	LENGTH BELOW SHANK	OAL	5926 UNCOATED EDP #	5926E DLC COATED EDP #
3/8	3/8	1/2	1-1/8	3	53574	93164
3/8	3/8	1/2	2-1/8	4	53575	93165
1/2	1/2	5/8	1-3/8	3	53576	93166
1/2	1/2	5/8	2-1/8	4	53577	93167
1/2	1/2	5/8	3-3/8	6	53578	93168
5/8	5/8	3/4	1-5/8	4	53579	93169
5/8	5/8	3/4	2-3/8	5	53580	93170
5/8	5/8	3/4	3-3/8	6	53581	93171
3/4	3/4	1	2	4	53582	93172
3/4	3/4	1	2-1/2	5	53583	93173
3/4	3/4	1	3-3/8	6	53584	93174
1	1	1-1/4	2-5/8	5	53585	93175
1	1	1-1/4	3-3/8	6	53586	93176
1	1	1-1/4	4-3/8	7	53587	93177

# High Speed High Performance 3-Flute Carbide End Mills for Aluminum

Micrograin Carbide — 37° Helix Angle  
Center Cutting — Extended Reach

High Speed High Performance Milling of Aluminum Alloys,  
Copper & Copper Alloys. Balanced for high spindle  
speeds and reduced chatter. Polished flutes for  
enhanced chip flow, surface finish and accuracy.

DLC - Amorphous Diamond-Like Carbon coating is  
recommended for Aluminum and Non-Ferrous Materials.

**NOTE: For use in High Speed Machining Centers with  
Shrink Fit Tooling Only.**

### TOLERANCES

Diameter +.000 / -.002  
Shank Dia. +.0001 / -.0004



List No. 5904 3-Flute Square Uncoated  
List No. 5904E 3-Flute Square DLC Coated



List No. 5930 3-Flute Ball Nose Uncoated  
List No. 5930E 3-Flute Ball Nose DLC Coated

3-Flute end mills offer higher feed rates than 2-flute  
mills while still offering high chip capacity and are  
recommended for profiling applications.

### 3-Flute Square End

List No. 5904 Uncoated - List No. 5904E DLC Coated

**SPEEDS & FEEDS: Page 274**

DIA.	SHANK DIA.	LOC	LENGTH BELOW SHANK	OAL	5904	5904E
					UNCOATED EDP #	DLC COATED EDP #
3/8	3/8	1/2	1-1/8	3	53590	93180
3/8	3/8	1/2	2-1/8	4	53591	93181
1/2	1/2	5/8	1-3/8	3	53592	93182
1/2	1/2	5/8	2-1/8	4	53593	93183
1/2	1/2	5/8	3-3/8	6	53594	93184
5/8	5/8	3/4	1-5/8	4	53595	93185
5/8	5/8	3/4	2-3/8	5	53596	93186
5/8	5/8	3/4	3-3/8	6	53597	93187
3/4	3/4	1	2	4	53598	93188
3/4	3/4	1	2-1/2	5	53599	93189
3/4	3/4	1	3-3/8	6	53600	93190
1	1	1-1/4	2-5/8	5	53601	93191
1	1	1-1/4	3-3/8	6	53602	93192
1	1	1-1/4	4-3/8	7	53603	93193

### 3-Flute Ball Nose

List No. 5930 Uncoated - List No. 5930E DLC Coated

DIA.	SHANK DIA.	LOC	LENGTH BELOW SHANK	OAL	5930	5930E
					UNCOATED EDP #	DLC COATED EDP #
3/8	3/8	1/2	1-1/8	3	53604	93194
3/8	3/8	1/2	2-1/8	4	53605	93195
1/2	1/2	5/8	1-3/8	3	53606	93196
1/2	1/2	5/8	2-1/8	4	53607	93197
1/2	1/2	5/8	3-3/8	6	53608	93198
5/8	5/8	3/4	1-5/8	4	53609	93199
5/8	5/8	3/4	2-3/8	5	53610	93200
5/8	5/8	3/4	3-3/8	6	53611	93201
3/4	3/4	1	2	4	53612	93202
3/4	3/4	1	2-1/2	5	53613	93203
3/4	3/4	1	3-3/8	6	53614	93204
1	1	1-1/4	2-5/8	5	53615	93205
1	1	1-1/4	3-3/8	6	53616	93206
1	1	1-1/4	4-3/8	7	53617	93207

# High Speed High Performance Carbide End Mills for Aluminum

## Speed and Feed Recommendations

**NOTE: For use in High Speed Machining Centers with Shrink Fit Tooling Only.**

### 2-Flute • List Nos. 5903, 5903E, 5926, 5926E

Material	Type of Cut	Surface Speed (SFM)	Feed Per Tooth by End Mill Diameter					Depth of Cut	
			3/8"	1/2"	5/8"	3/4"	1"	Axial	Radial
Wrought Aluminum Alloys	Slotting	1540 - 1760	.0054	.0063	.0072	.0081	.0108	1xD	—
	Heavy Peripheral		.0081	.0095	.0108	.0117	.0144	1xD	.5xD
	Light Peripheral		.0036	.0045	.0054	.0063	.0090	2xD	.05xD
Low Silicon Aluminum Alloys < 12%	Slotting	1650 - MAX	.0036	.0045	.0054	.0063	.0090	1xD	—
	Heavy Peripheral		.0072	.0083	.0099	.0108	.0126	1xD	.5xD
	Light Peripheral		.0027	.0036	.0045	.0054	.0071	2xD	.05xD
High Silicon Aluminum Alloys > 12%	Slotting	1650 - MAX	.0023	.0025	.0027	.0036	.0059	1xD	—
	Heavy Peripheral		.0050	.0063	.0072	.0081	.0099	1xD	.5xD
	Light Peripheral		.0023	.0027	.0036	.0045	.0063	2xD	.05xD
Copper & Copper Alloys	Slotting	550 - 935	.0027	.0032	.0036	.0045	.0063	1xD	—
	Heavy Peripheral		.0063	.0077	.0081	.0090	.0117	1xD	.5xD
	Light Peripheral		.0032	.0041	.0045	.0059	.0076	2xD	.05xD

### 3-Flute • List Nos. 5904, 5904E, 5930, 5930E

Material	Type of Cut	Surface Speed (SFM)	Feed Per Tooth by End Mill Diameter					Depth of Cut	
			3/8"	1/2"	5/8"	3/4"	1"	Axial	Radial
Wrought Aluminum Alloys	Slotting	1650 - 2000	.0059	.0069	.0079	.0089	.0120	1xD	—
	Heavy Peripheral		.0089	.0104	.0119	.0129	.0158	1xD	.5xD
	Light Peripheral		.0040	.0049	.0059	.0069	.0100	2xD	.05xD
Low Silicon Aluminum Alloys < 12%	Slotting	2000 - MAX	.0040	.0049	.0059	.0069	.0099	1xD	—
	Heavy Peripheral		.0079	.0091	.0109	.0119	.0138	1xD	.5xD
	Light Peripheral		.0030	.0040	.0049	.0059	.0079	2xD	.05xD
High Silicon Aluminum Alloys > 12%	Slotting	2000 - MAX	.0025	.0028	.0030	.0040	.0064	1xD	—
	Heavy Peripheral		.0054	.0069	.0079	.0089	.0109	1xD	.5xD
	Light Peripheral		.0025	.0030	.0040	.0049	.0070	2xD	.05xD
Copper & Copper Alloys	Slotting	600 - 1020	.0030	.0035	.0040	.0049	.0069	1xD	—
	Heavy Peripheral		.0069	.0084	.0089	.0099	.0129	1xD	.5xD
	Light Peripheral		.0035	.0045	.0049	.0064	.0085	2xD	.05xD

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

NOTE: Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# Spherical Ball End Mills

Micrograin Carbide - Center Cutting

220°, 270° & 300° Cutting Arc

2-Flute & 4-Flute

## TOLERANCES

Diameter < 1/8" +/- .0005"

Diameter ≥ 1/8" +.000" / -.002"

Shank Dia. h6 Tolerance for Shrink Fit Holders



List No. 5920 - 220° Arc - nAco Coated

List No. 5922 - 270° Arc - nAco Coated

List No. 5924 - 300° Arc - nAco Coated

Designed for Multi-Axis Machining, Undercutting, Deburring and many other operations in Pre-Hardened Steels up to 45Rc Hardness.

nAco - Aluminum Titanium Nitride + Silicon Nitride coating for high heat and wear resistance.

## List No. 5920 - 2-Flute - 220°

DIA.	SHANK DIA.	LOC	NECK DIA.	NECK LENGTH	OAL	EDP NO.
1/16	1/8	.042	.047	.150	1-1/2	98900
3/32	1/8	.063	.070	.150	1-1/2	98901
1/8	1/8	.084	.094	.150	1-1/2	98902
1/8	1/8	.084	.094	.150	3	98903
3/16	3/16	.126	.141	.150	2	98904
3/16	3/16	.126	.141	.150	3	98905
1/4	1/4	.168	.188	.200	2-1/2	98906
1/4	1/4	.168	.188	.200	4	98907
3/8	3/8	.252	.281	.200	2-1/2	98908
3/8	3/8	.252	.281	.200	4	98909
1/2	1/2	.336	.375	.250	3	98910
1/2	1/2	.336	.375	.250	6	98911

## List No. 5920 - 4-Flute - 220°



DIA.	SHANK DIA.	LOC	NECK DIA.	NECK LENGTH	OAL	EDP NO.
1/16	1/8	.042	.047	.150	1-1/2	98912
3/32	1/8	.063	.070	.150	1-1/2	98913
1/8	1/8	.084	.094	.150	1-1/2	98914
1/8	1/8	.084	.094	.500	1-1/2	98915
1/8	1/8	.084	.094	.150	3	98916
1/8	1/8	.084	.094	1.000	3	98917
1/8	1/8	.084	.094	1.500	3	98918
3/16	3/16	.126	.141	.150	2	98919
3/16	3/16	.126	.141	.500	2	98920
3/16	3/16	.126	.141	.150	3	98921
3/16	3/16	.126	.141	1.000	3	98922
1/4	1/4	.168	.188	.200	2-1/2	98923
1/4	1/4	.168	.188	.750	2-1/2	98924
1/4	1/4	.168	.188	.200	4	98925
1/4	1/4	.168	.188	1.500	4	98926
1/4	1/4	.168	.188	2.250	4	98927
5/16	5/16	.210	.234	.750	2-1/2	98928
5/16	5/16	.210	.234	1.500	4	98929
3/8	3/8	.252	.281	.200	2-1/2	98930
3/8	3/8	.252	.281	.750	2-1/2	98931
3/8	3/8	.252	.281	.200	4	98932
3/8	3/8	.252	.281	1.500	4	98933
3/8	3/8	.252	.281	2.250	4	98934
1/2	1/2	.336	.375	.250	3	98935
1/2	1/2	.336	.375	1.000	3	98936
1/2	1/2	.336	.375	.250	6	98937
1/2	1/2	.336	.375	2.000	6	98938



Speeds & Feeds  
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# Spherical Ball End Mills

List No. 5922 - 2-Flute - 270°



DIA.	SHANK DIA.	LOC	NECK DIA.	NECK LENGTH	OAL	EDP NO.
1/32	1/8	.027	.016	.062	1-1/2	98939
1/32	1/8	.027	.016	.093	1-1/2	98940
1/32	1/8	.027	.016	.125	1-1/2	98941
1/32	1/8	.027	.016	.187	1-1/2	98942
3/64	1/8	.040	.029	.093	1-1/2	98943
1/16	1/8	.053	.037	.093	1-1/2	98944
1/16	1/8	.053	.037	.125	1-1/2	98945
1/16	1/8	.053	.037	.187	1-1/2	98946
1/16	1/8	.053	.037	.250	1-1/2	98947
1/16	1/8	.053	.037	.312	1-1/2	98948
5/64	1/8	.067	.045	.125	1-1/2	98949
3/32	1/8	.079	.054	.125	1-1/2	98953
3/32	1/8	.079	.054	.250	1-1/2	98954
3/32	1/8	.079	.054	.312	1-1/2	98950
3/32	1/8	.079	.054	.375	1-1/2	98955
3/32	1/8	.079	.054	.500	2	98951
3/32	1/8	.079	.054	.625	2	98952

List No. 5922 - 4-Flute - 270°



DIA.	SHANK DIA.	LOC	NECK DIA.	NECK LENGTH	OAL	EDP NO.
1/8	1/8	.107	.076	.125	1-1/2	98956
1/8	1/8	.107	.076	.375	1-1/2	98957
1/8	1/8	.107	.076	.500	1-1/2	98958
1/8	1/8	.107	.076	.625	2	98959
1/8	1/8	.107	.076	.750	2	98960
1/8	1/8	.107	.076	1.000	3	98961
1/8	1/8	.107	.076	1.250	3	98962
1/8	1/8	.107	.076	1.500	3	98963
9/64	3/16	.119	.084	.250	2	98964
9/64	3/16	.119	.084	.500	2	98965
3/16	3/16	.160	.117	.125	2	98966
3/16	3/16	.160	.117	.375	2	98967
3/16	3/16	.160	.117	.500	2	98968
3/16	3/16	.160	.117	.750	2	98969
3/16	3/16	.160	.117	1.000	3	98970
3/16	3/16	.160	.117	1.250	3	98971
3/16	3/16	.160	.117	1.500	3	98972
3/16	3/16	.160	.117	1.750	3	98973
1/4	1/4	.213	.158	.375	2-1/2	98974
1/4	1/4	.213	.158	.500	2-1/2	98975
1/4	1/4	.213	.158	.625	2-1/2	98976
1/4	1/4	.213	.158	.750	2-1/2	98977
1/4	1/4	.213	.158	1.125	2-1/2	98978
1/4	1/4	.213	.158	1.500	4	98979
1/4	1/4	.213	.158	2.000	4	98980
1/4	1/4	.213	.158	2.250	4	98981
1/4	1/4	.213	.158	2.500	4	98982

(continued)



Speeds & Feeds:  
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# Spherical Ball End Mills



## List No. 5922 - 4-Flute - 270° (continued)

DIA.	SHANK DIA.	LOC	NECK DIA.	NECK LENGTH	OAL	EDP NO.
5/16	5/16	.266	.201	.375	2-1/2	98983
5/16	5/16	.266	.201	.750	2-1/2	98984
5/16	5/16	.266	.201	1.125	4	98985
5/16	5/16	.266	.201	1.500	4	98986
5/16	5/16	.266	.201	2.000	4	98987
5/16	5/16	.266	.201	2.250	4	98988
3/8	3/8	.320	.241	.187	2-1/2	98989
3/8	3/8	.320	.241	.750	2-1/2	98990
3/8	3/8	.320	.241	1.500	4	98991
3/8	3/8	.320	.241	2.000	4	98992
1/2	1/2	.427	.323	.500	3	98993
1/2	1/2	.427	.323	1.000	6	98994

## List No. 5924 - 2-Flute - 300°



DIA.	SHANK DIA.	LOC	NECK DIA.	NECK LENGTH	OAL	EDP NO.
1/16	1/8	.057	.024	.078	1-1/2	98995
5/64	1/8	.072	.031	.093	1-1/2	98996
3/32	1/8	.086	.038	.125	1-1/2	98997

## List No. 5924 - 4-Flute - 300°



DIA.	SHANK DIA.	LOC	NECK DIA.	NECK LENGTH	OAL	EDP NO.
1/8	1/8	.116	.053	.093	1-1/2	98998
1/8	1/8	.116	.053	.281	1-1/2	98999
5/32	3/16	.145	.071	.250	2	99000
3/16	3/16	.174	.082	.125	2	99001
3/16	3/16	.174	.082	.437	2	99002
1/4	1/4	.233	.112	.187	2-1/2	99003
1/4	1/4	.233	.112	.625	2-1/2	99004
5/16	5/16	.291	.143	.250	2-1/2	99005
5/16	5/16	.291	.143	.437	2-1/2	99006
3/8	3/8	.349	.172	.250	2-1/2	99007
3/8	3/8	.349	.172	1.000	3	99008
1/2	1/2	.466	.230	.312	3	99009
1/2	1/2	.466	.230	1.250	4	99010

### Spherical Ball End Mill Speeds & Feeds ISO-H Pre-Hardened Steels from 25Rc - 45Rc Hardness

TYPE OF CUT	TYPE OF MACHINING	AXIAL DOC	RADIAL DOC	SURFACE SPEED (SFM)	FEED PER TOOTH BY END MILL DIAMETER						
					1/16"	3/32"	1/8"	3/16"	1/4"	3/8"	1/2"
Roughing	Standard	≤ .06 x D	≤ .30 x D	60-180	.0008	.001	.002	.003	.004	.006	.007
	High Speed			250-340							
Finishing	Standard	≤ .07 x D	≤ .02-.60 x D	60-200	.002	.002	.003	.004	.004	.005	.006
	High Speed			250-350							

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# Solid Carbide 2-Flute Single End Mills

**Micrograin Carbide - Center Cutting  
30° Helix Angle**

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. Ideal for plunge cutting and slotting. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**TOLERANCES**  
 Size to 1/4" +.000 - .002  
 9/32" to 1" +.000 - .003  
 Shank Dia. +.0000 - .0005

**Speeds & Feeds:  
Page 300**



List No. 5944 Regular Length



List No. 5954 Medium Length & Long Length



List No. 5950 Extra Long Length & Extension Length



(See Next Page)

## List No. 5944 Regular Length

DIA.	SHANK		OAL	UNCOATED	TIN COATED	TICN COATED	ALTIN COATED
	DIA.	LOC		EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/64	1/8	3/64	1-1/2	58001	89999	—	89996
1/32	1/8	1/8	1-1/2	58002	90000	—	89997
3/64	1/8	1/8	1-1/2	58003	90001	—	89998
1/16	1/8	3/16	1-1/2	58004	90002	90039	90076
5/64	1/8	3/16	1-1/2	58005	90003	90040	90077
3/32	1/8	3/8	1-1/2	58006	90004	90041	90078
7/64	1/8	3/8	1-1/2	58007	90005	90042	90079
1/8	1/8	1/2	1-1/2	58008	90006	90043	90080
9/64	3/16	9/16	2	58009	90007	90044	90081
5/32	3/16	9/16	2	58010	90008	90045	90082
11/64	3/16	5/8	2	58011	90009	90046	90083
3/16	3/16	5/8	2	58012	90010	90047	90084
13/64	1/4	5/8	2-1/2	58013	90011	90048	90085
7/32	1/4	5/8	2-1/2	58014	90012	90049	90086
15/64	1/4	3/4	2-1/2	58065	92875	92890	92905
1/4	1/4	3/4	2-1/2	58016	90014	90051	90088
17/64	5/16	3/4	2-1/2	58066	92876	92891	92906
9/32	5/16	3/4	2-1/2	58018	90016	90053	90090
19/64	5/16	13/16	2-1/2	58067	92877	92892	92907
5/16	5/16	13/16	2-1/2	58020	90018	90055	90092
21/64	3/8	1	2-1/2	58068	92878	92893	92908
11/32	3/8	1	2-1/2	58069	92879	92894	92909
23/64	3/8	1	2-1/2	58070	92880	92895	92910
3/8	3/8	1	2-1/2	58024	90022	90059	90096
25/64	7/16	1	2-3/4	58071	92881	92896	92911
13/32	7/16	1	2-3/4	58072	92882	92897	92912
27/64	7/16	1	2-3/4	58073	92883	92898	92913
7/16	7/16	1	2-3/4	58028	90026	90063	90100
29/64	1/2	1	3	58074	92884	92899	92914
15/32	1/2	1	3	58075	92885	92900	92915
31/64	1/2	1	3	58076	92886	92901	92916
1/2	1/2	1	3	58032	90030	90067	90104
1/2	1/2	1-1/4	3	58077	92887	92902	92917
33/64	9/16	1-1/4	3-1/2	58078	92888	92903	92918
17/32	9/16	1-1/4	3-1/2	58079	92889	92904	92919
9/16	9/16	1-1/4	3-1/2	58036	90031	90068	90105
5/8	5/8	1-1/4	3-1/2	58040	90032	90069	90106
11/16	3/4	1-1/2	4	58044	90033	90070	90107
3/4	3/4	1-1/2	4	58048	90034	90071	90108
7/8	7/8	1-1/2	4	58056	90035	90072	90109
1	1	1-1/2	4	58064	90036	90073	90110

## List No. 5954 Medium Length & Long Length

DIA.	SHANK		OAL	UNCOATED	TIN COATED	TICN COATED	ALTIN COATED
	DIA.	LOC		EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	3/4	2-1/4	58238	90120	90130	90140
5/32	3/16	3/4	2-1/2	58295	90118	90116	90114
3/16	3/16	3/4	2-1/2	58239	90121	90131	90141
1/4	1/4	1-1/8	3	58241	90122	90132	90142
5/16	5/16	1-1/8	3	58250	90123	90133	90143
3/8	3/8	1-1/8	3	58254	90124	90134	90144
7/16	7/16	2	4	58258	90125	90135	90145
1/2	1/2	1-1/2	4	58296	90119	90117	90115
1/2	1/2	2	4	58262	90126	90136	90146
5/8	5/8	2-1/4	5	58270	90127	90137	90147
3/4	3/4	2-1/4	5	58278	90128	90138	90148
1	1	2-1/4	5	58294	90129	90139	90149

(continued)



# Solid Carbide 2-Flute Single End Mills

(continued)



List No. 5950 Extra Long Length & Extension Length



List No. 5950 Extra Long Length & Extension Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTiN COATED EDP NO.
1/8	1/8	1	3	58408	90160	90170	90180
5/32	3/16	1-1/8	3	58465	90150	90190	92538
3/16	3/16	1-1/8	3	58412	90161	90171	90181
1/4	1/4	1-1/2	4	58416	90162	90172	90182
1/4	1/4	1-1/2	6	58466	90151	90191	92539
5/16	5/16	1-5/8	4	58420	90163	90173	90183
5/16	5/16	1-1/2	6	58467	90152	90192	92540
3/8	3/8	1-3/4	4	58424	90164	90174	90184
3/8	3/8	1-1/2	6	58468	90153	90193	92541
7/16	7/16	3	6	58428	90165	90175	90185
1/2	1/2	1-1/2	6	58469	90154	90194	92542
1/2	1/2	3	6	58432	90166	90176	90186
5/8	5/8	1-1/2	6	58470	90155	90195	92543
5/8	5/8	3	6	58440	90167	90177	90187
3/4	3/4	1-1/2	6	58471	90156	90196	92544
3/4	3/4	3	6	58448	90168	90178	90188
3/4	3/4	4	7	58472	90157	90197	92545
1	1	1-1/2	6	58473	90158	90198	92546
1	1	3	6	58464	90169	90179	90189
1	1	4	7	58474	90159	90199	92547

# Solid Carbide Stub Length 2-Flute Single End Mills



List No. 5973 Stub Length

## Micrograin Carbide — Center Cutting 30° Helix Angle

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. Tool Coatings further enhance milling performance in a wide range of applications.

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. Ideal for plunge cutting and slotting. Center Cutting end allows for plunge cutting like a drill into solid material.

### TOLERANCES

Size to 1/4" +.000 - .002  
5/16" to 3/4" +.000 - .003  
Shank Dia. +.0000 - .0005

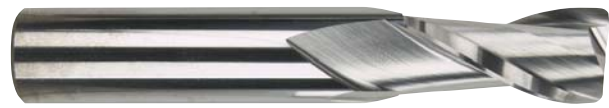
### STANDARD PACKAGE

All sizes - 1 each

Stub Length for high rigidity & minimal tool deflection.

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.
1/32	1/8	1/16	1-1/2	57085	92860
3/64	1/8	3/32	1-1/2	57086	92861
1/16	1/8	1/8	1-1/2	57025	92800
5/64	1/8	5/32	1-1/2	56582	92868
3/32	1/8	3/16	1-1/2	57026	92801
7/64	1/8	7/32	1-1/2	56583	92869
1/8	1/8	1/4	1-1/2	57027	92802
9/64	3/16	9/32	2	56584	92870
5/32	3/16	5/16	2	57028	92803
11/64	3/16	5/16	2	56585	92871
3/16	3/16	3/8	2	57029	92804
13/64	1/4	3/8	2	56586	92872
7/32	1/4	7/16	2	57030	92805
15/64	1/4	7/16	2	56587	92873
1/4	1/4	1/2	2	57031	92806
9/32	5/16	1/2	2	56588	92874
5/16	5/16	1/2	2	57032	92807
3/8	3/8	5/8	2	57033	92808
7/16	7/16	5/8	2-1/2	57034	92809
1/2	1/2	5/8	2-1/2	57035	92810
5/8	5/8	3/4	3	57036	92811
3/4	3/4	1	3	57037	92812

# Solid Carbide 2-Flute Corner Radius Single End Mills



List No. 5967 2-Flute

**Micrograin Carbide - Center Cutting  
30° Helix Angle**

**Corner Radius** strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron.

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

**TOLERANCES**

Size to 1/4" +.000 - .002  
5/16" to 1" +.000 - .003  
Shank Dia. +.0000 - .0005

**STANDARD PACKAGE**

All sizes - 1 each

**Corner Radius**



DIA	SHANK DIA.	LOC	OAL	CORNER RADIUS	COATING			
					UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTiN COATED EDP NO.
1/8	1/8	1/2	1-1/2	.015	59094	95379	95401	95423
1/8	1/8	1/2	1-1/2	.020	58910	94830	94875	94920
1/8	1/8	1/2	1-1/2	.030	59095	95380	95402	95424
3/16	3/16	5/8	2	.015	59096	95381	95403	95425
3/16	3/16	5/8	2	.020	58913	94833	94878	94923
3/16	3/16	5/8	2	.030	58914	94834	94879	94924
1/4	1/4	3/4	2-1/2	.015	59097	95382	95404	95426
1/4	1/4	3/4	2-1/2	.020	58916	94836	94881	94926
1/4	1/4	3/4	2-1/2	.030	58917	94837	94882	94927
1/4	1/4	3/4	2-1/2	.045	59098	95383	95405	95427
1/4	1/4	3/4	2-1/2	.060	59099	95384	95406	95428
5/16	5/16	13/16	2-1/2	.015	59100	95385	95407	95429
5/16	5/16	13/16	2-1/2	.020	58920	94840	94885	94930
5/16	5/16	13/16	2-1/2	.030	58921	94841	94886	94931
5/16	5/16	13/16	2-1/2	.045	59101	95386	95408	95430
5/16	5/16	13/16	2-1/2	.060	59102	95387	95409	95431
3/8	3/8	1	2-1/2	.015	59103	95388	95410	95432
3/8	3/8	1	2-1/2	.020	58924	94844	94889	94934
3/8	3/8	1	2-1/2	.030	58925	94845	94890	94935
3/8	3/8	1	2-1/2	.045	59104	95389	95411	95433
3/8	3/8	1	2-1/2	.060	59105	95390	95412	95434
1/2	1/2	1	3	.015	59106	95391	95413	95435
1/2	1/2	1	3	.020	58929	94849	94894	94939
1/2	1/2	1	3	.030	58930	94850	94895	94940
1/2	1/2	1	3	.045	59107	95392	95414	95436
1/2	1/2	1	3	.060	58932	94852	94897	94942
1/2	1/2	1	3	.090	59108	95393	95415	95437
1/2	1/2	1	3	.125	59109	95394	95416	95438
5/8	5/8	1-1/4	3-1/2	.015	59110	95395	95417	95439
5/8	5/8	1-1/4	3-1/2	.020	58936	94856	94901	94946
5/8	5/8	1-1/4	3-1/2	.030	58937	94857	94902	94947
5/8	5/8	1-1/4	3-1/2	.045	59111	95396	95418	95440
5/8	5/8	1-1/4	3-1/2	.060	58939	94859	94904	94949
5/8	5/8	1-1/4	3-1/2	.090	58940	94860	94905	94950
3/4	3/4	1-1/2	4	.015	59112	95397	95419	95441
3/4	3/4	1-1/2	4	.020	58942	94862	94907	94952
3/4	3/4	1-1/2	4	.030	58943	94863	94908	94953
3/4	3/4	1-1/2	4	.045	59113	95398	95420	95442
3/4	3/4	1-1/2	4	.060	58945	94865	94910	94955
3/4	3/4	1-1/2	4	.090	58946	94866	94911	94956
3/4	3/4	1-1/2	4	.125	58947	94867	94912	94957
1	1	1-1/2	4	.015	59114	95399	95421	95443
1	1	1-1/2	4	.020	58949	94869	94914	94959
1	1	1-1/2	4	.030	58950	94870	94915	94960
1	1	1-1/2	4	.045	59115	95400	95422	95444
1	1	1-1/2	4	.060	58952	94872	94917	94962
1	1	1-1/2	4	.090	58953	94873	94918	94963
1	1	1-1/2	4	.125	58954	94874	94919	94964

# Solid Carbide Metric 2-Flute Single End Mills

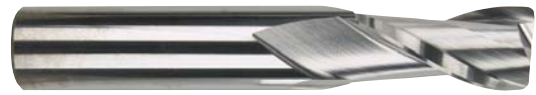
Micrograin Carbide - Center Cutting  
30° Helix Angle

**TOLERANCES**

All Sizes +.000mm/-.051mm  
Shank Dia. +000mm/-.013mm

**STANDARD PACKAGE**

All sizes - 1 each



List No. 5959

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. Ideal for plunge cutting and slotting. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTIN COATED EDP NO.
1 mm	3 mm	3 mm	39 mm	59280	90200	90220	90240
1.5 mm	3 mm	5 mm	39 mm	59281	90201	90221	90241
2 mm	3 mm	7 mm	39 mm	59282	90202	90222	90242
2.5 mm	3 mm	7 mm	39 mm	59283	90203	90223	90243
3 mm	3 mm	9 mm	39 mm	59284	90204	90224	90244
3.5 mm	4 mm	12 mm	51 mm	59285	90205	90225	90245
4 mm	4 mm	14 mm	51 mm	59286	90206	90226	90246
4.5 mm	5 mm	14 mm	51 mm	59287	90207	90227	90247
5 mm	5 mm	16 mm	51 mm	59288	90208	90228	90248
6 mm	6 mm	19 mm	64 mm	59289	90209	90229	90249
7 mm	8 mm	19 mm	64 mm	59290	90210	90230	90250
8 mm	8 mm	21 mm	64 mm	59291	90211	90231	90251
9 mm	10 mm	22 mm	70 mm	59292	90212	90232	90252
10 mm	10 mm	22 mm	70 mm	59293	90213	90233	90253
11 mm	11 mm	25 mm	70 mm	59294	90214	90234	90254
12 mm	12 mm	25 mm	76 mm	59295	90215	90235	90255
14 mm	14 mm	31 mm	89 mm	59297	90216	90236	90256
16 mm	16 mm	32 mm	89 mm	59298	90217	90237	90257
18 mm	18 mm	35 mm	102 mm	59299	90218	90238	90258
20 mm	20 mm	38 mm	102 mm	59300	90219	90239	90259

# Solid Carbide 2-Flute Double End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle



Speeds & Feeds:  
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List No. 5947 Stub Length



List No. 5896 Regular Length

List No. 5947 Stub Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTIN COATED EDP NO.
1/16	1/8	1/8	1-1/2	57250	90300	90311	90322
3/32	1/8	3/16	1-1/2	57251	90301	90312	90323
1/8	1/8	1/4	1-1/2	57252	90302	90313	90324
5/32	3/16	5/16	2	57253	90303	90314	90325
3/16	3/16	3/8	2	57254	90304	90315	90326
7/32	1/4	1/2	2-1/2	57255	90305	90316	90327
1/4	1/4	1/2	2-1/2	57256	90306	90317	90328
5/16	5/16	1/2	2-1/2	57257	90307	90318	90329
3/8	3/8	9/16	3	57258	90308	90319	90330
7/16	7/16	9/16	3	57259	90309	90320	90331
1/2	1/2	5/8	3	57260	90310	90321	90332

List No. 5896 Regular Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTIN COATED EDP NO.
1/8	3/8	3/8	3-1/8	57158	90350	90360	90370
5/32	3/8	7/16	3-1/8	57160	90351	90361	90371
3/16	3/8	1/2	3-1/4	57162	90352	90362	90372
7/32	3/8	9/16	3-3/8	57164	90353	90363	90373
1/4	3/8	5/8	3-3/8	57166	90354	90364	90374
9/32	3/8	11/16	3-3/8	57168	90355	90365	90375
5/16	3/8	3/4	3-1/2	57170	90356	90366	90376
3/8	3/8	3/4	3-1/2	57174	90357	90367	90377
7/16	1/2	7/8	4	57178	90358	90368	90378
1/2	1/2	1	4	57182	90359	90369	90379

# Solid Carbide 2-Flute Ball Nose Single End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. Ball Nose mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. Center Cutting end allows for plunge cutting like a drill into solid material.



List No. 5940 Regular Length



List No. 5956 Medium Length & Long Length



List No. 5952 Extra Long Length & Extension Length

(See Next Page)



## List No. 5940 Regular Length

DIA.	SHANK		OAL	UNCOATED	TIN COATED	TICN COATED	ALTIN COATED
	DIA.	LOC		EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/64	1/8	3/64	1-1/2	58101	90397	—	90394
1/32	1/8	1/8	1-1/2	58102	90398	—	90395
3/64	1/8	1/8	1-1/2	58103	90399	—	90396
1/16	1/8	3/16	1-1/2	58104	90400	90423	90446
5/64	1/8	3/16	1-1/2	58105	90401	90424	90447
3/32	1/8	3/8	1-1/2	58106	90402	90425	90448
7/64	1/8	3/8	1-1/2	58107	90403	90426	90449
1/8	1/8	1/2	1-1/2	58108	90404	90427	90450
9/64	3/16	9/16	2	58109	90405	90428	90451
5/32	3/16	9/16	2	58110	90406	90429	90452
11/64	3/16	5/8	2	58111	90407	90430	90453
3/16	3/16	5/8	2	58112	90408	90431	90454
13/64	1/4	5/8	2-1/2	58113	90409	90432	90455
7/32	1/4	5/8	2-1/2	58114	90410	90433	90456
15/64	1/4	3/4	2-1/2	57105	92382	92394	92554
1/4	1/4	3/4	2-1/2	58116	90411	90434	90457
17/64	5/16	3/4	2-1/2	57106	92383	92395	92555
9/32	5/16	3/4	2-1/2	58118	90412	90435	90458
19/64	5/16	13/16	2-1/2	57107	92384	92396	92556
5/16	5/16	13/16	2-1/2	58120	90413	90436	90459
21/64	3/8	1	2-1/2	57133	92385	92397	92557
11/32	3/8	1	2-1/2	57134	92386	92398	92558
23/64	3/8	1	2-1/2	57135	92387	92399	92559
3/8	3/8	1	2-1/2	58124	90414	90437	90460
25/64	7/16	1	2-3/4	57136	92388	92548	92560
13/32	7/16	1	2-3/4	57137	92389	92549	92561
27/64	7/16	1	2-3/4	57138	92390	92550	92562
7/16	7/16	1	2-3/4	58128	90415	90438	90461
29/64	1/2	1	3	57139	92391	92551	92563
15/32	1/2	1	3	57140	92392	92552	92564
31/64	1/2	1	3	57141	92393	92553	92565
1/2	1/2	1	3	58132	90416	90439	90462
9/16	9/16	1-1/4	3-1/2	58136	90417	90440	90463
5/8	5/8	1-1/4	3-1/2	58140	90418	90441	90464
11/16	3/4	1-1/2	4	58144	90419	90442	90465
3/4	3/4	1-1/2	4	58148	90420	90443	90466
7/8	7/8	1-1/2	4	58156	90421	90444	90467
1	1	1-1/2	4	58164	90422	90445	90468

## List No. 5956 Medium Length & Long Length

DIA.	SHANK		OAL	UNCOATED	TIN COATED	TICN COATED	ALTIN COATED
	DIA.	LOC		EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	3/4	2-1/4	57575	90470	90480	90490
5/32	3/16	3/4	2-1/2	57142	92566	92568	92570
3/16	3/16	3/4	2-1/2	57577	90471	90481	90491
1/4	1/4	1-1/8	3	57581	90472	90482	90492
5/16	5/16	1-1/8	3	57583	90473	90483	90493
3/8	3/8	1-1/8	3	57585	90474	90484	90494
7/16	7/16	2	4	57587	90475	90485	90495
1/2	1/2	1-1/2	4	57143	92567	92569	92571
1/2	1/2	2	4	57589	90476	90486	90496
5/8	5/8	2-1/4	5	57591	90477	90487	90497
3/4	3/4	2-1/4	5	57593	90478	90488	90498
1	1	2-1/4	5	57595	90479	90489	90499

(continued)

# Solid Carbide 2-Flute Ball Nose Single End Mills

(continued)



List No. 5952 Extra Long Length & Extension Length



List No. 5952 Extra Long Length & Extension Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	TIN COATED	TICN COATED	ALTIN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	1	3	58608	90500	90510	90520
5/32	3/16	1-1/8	3	57144	92572	92580	92588
3/16	3/16	1-1/8	3	58612	90501	90511	90521
1/4	1/4	1-1/2	4	58616	90502	90512	90522
1/4	1/4	1-1/2	6	57145	92573	92581	92589
5/16	5/16	1-5/8	4	58620	90503	90513	90523
5/16	5/16	1-1/2	6	57146	92574	92582	92590
3/8	3/8	1-3/4	4	58624	90504	90514	90524
3/8	3/8	1-1/2	6	57147	92575	92583	92591
7/16	7/16	3	6	58628	90505	90515	90525
1/2	1/2	1-1/2	6	57148	92576	92584	92592
1/2	1/2	3	6	58632	90506	90516	90526
5/8	5/8	1-1/2	6	57149	92577	92585	92593
5/8	5/8	3	6	58640	90507	90517	90527
3/4	3/4	1-1/2	6	57150	92578	92586	92594
3/4	3/4	3	6	58648	90508	90518	90528
1	1	1-1/2	6	57151	92579	92587	92595
1	1	3	6	58664	90509	90519	90529

# Solid Carbide 2-Flute Stub Length Ball Nose Single End Mills

Micrograin Carbide — Center Cutting  
30° Helix Angle

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

### TOLERANCES

Size to 1/4" +.000 - .002  
5/16" to 3/4" +.000 - .003  
Shank Dia. +.0000 - .0005

### STANDARD PACKAGE

All sizes - 1 each



List No. 5974 Stub Length

Speeds & Feeds:  
Page 300

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Stub Length for high rigidity & minimal tool deflection.

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	ALTIN COATED
				EDP NO.	EDP NO.
1/32	1/8	1/16	1-1/2	57089	92864
3/64	1/8	3/32	1-1/2	57090	92865
1/16	1/8	1/8	1-1/2	57055	92830
5/64	1/8	5/32	1-1/2	57093	92370
3/32	1/8	3/16	1-1/2	57056	92831
7/64	1/8	7/32	1-1/2	57094	92371
1/8	1/8	1/4	1-1/2	57057	92832
9/64	3/16	9/32	2	57095	92372
5/32	3/16	5/16	2	57058	92833
11/64	3/16	5/16	2	57096	92373
3/16	3/16	3/8	2	57059	92834
13/64	1/4	3/8	2	57097	92374
7/32	1/4	7/16	2	57060	92835
15/64	1/4	7/16	2	57098	92375
1/4	1/4	1/2	2	57061	92836
5/16	5/16	1/2	2	57062	92837
3/8	3/8	5/8	2	57063	92838
7/16	7/16	5/8	2-1/2	57064	92839
1/2	1/2	5/8	2-1/2	57065	92840
5/8	5/8	3/4	3	57066	92841
3/4	3/4	1	3	57067	92842

# Solid Carbide Metric 2-Flute Ball Nose Single End Mills

**Micrograin Carbide - Center Cutting**  
**30° Helix Angle**

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 5963

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

**TOLERANCES**

All Sizes +.000mm/-.051mm  
Shank Dia. +000mm/-.013mm

**STANDARD PACKAGE**

All sizes - 1 each

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTIN COATED EDP NO.
1 mm	3 mm	3 mm	39 mm	59400	90540	90560	90580
1.5 mm	3 mm	5 mm	39 mm	59401	90541	90561	90581
2 mm	3 mm	7 mm	39 mm	59402	90542	90562	90582
2.5 mm	3 mm	7 mm	39 mm	59403	90543	90563	90583
3 mm	3 mm	9 mm	39 mm	59404	90544	90564	90584
3.5 mm	4 mm	12 mm	51 mm	59405	90545	90565	90585
4 mm	4 mm	14 mm	51 mm	59406	90546	90566	90586
4.5 mm	5 mm	14 mm	51 mm	59407	90547	90567	90587
5 mm	5 mm	16 mm	51 mm	59408	90548	90568	90588
6 mm	6 mm	19 mm	64 mm	59409	90549	90569	90589
7 mm	8 mm	19 mm	64 mm	59410	90550	90570	90590
8 mm	8 mm	21 mm	64 mm	59411	90551	90571	90591
9 mm	10 mm	22 mm	70 mm	59412	90552	90572	90592
10 mm	10 mm	22 mm	70 mm	59413	90553	90573	90593
11 mm	11 mm	25 mm	70 mm	59414	90554	90574	90594
12 mm	12 mm	25 mm	76 mm	59415	90555	90575	90595
14 mm	14 mm	31 mm	89 mm	59417	90556	90576	90596
16 mm	16 mm	32 mm	89 mm	59418	90557	90577	90597
18 mm	18 mm	35 mm	102 mm	59419	90558	90578	90598
20 mm	20 mm	38 mm	102 mm	59420	90559	90579	90599
22 mm	22 mm	38 mm	102 mm	59421*	—	—	—
25 mm	25 mm	38 mm	102 mm	59422*	—	—	—

\*Available While Supplies Last

Speeds & Feeds:  
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# Solid Carbide 2-Flute Stub Length Ball Nose Double End Mills

**Micrograin Carbide - Center Cutting**  
**30° Helix Angle**



List No. 5948

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**TOLERANCES**

Size to 1/4" +.000 - .002  
9/32" to 1" +.000 - .003  
Shank Dia. +.0000 - .0005

**STANDARD PACKAGE**

All sizes - 1 each

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTIN COATED EDP NO.
1/16	1/8	1/8	1-1/2	58304	90600	90611	90622
3/32	1/8	3/16	1-1/2	58306	90601	90612	90623
1/8	1/8	1/4	1-1/2	58308	90602	90613	90624
5/32	3/16	5/16	2	58310	90603	90614	90625
3/16	3/16	3/8	2	58312	90604	90615	90626
7/32	1/4	1/2	2-1/2	58314	90605	90616	90627
1/4	1/4	1/2	2-1/2	58316	90606	90617	90628
5/16	5/16	1/2	2-1/2	58320	90607	90618	90629
3/8	3/8	9/16	2-1/2	58324	90608	90619	90630
7/16	7/16	9/16	3	58328	90609	90620	90631
1/2	1/2	5/8	3	58332	90610	90621	90632

# Solid Carbide 3-Flute Single End Mills

**Micrograin Carbide — Center Cutting  
30° Helix Angle**

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life.

**Tool Coatings** further enhance milling performance in a wide range of applications.

**3-Flute** mills provide a compromise between the chip capacity of 2-flute mills and the tool strength, higher feed rate and improved surface finish of 4-flute mills. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron.

**Center Cutting** end allows for plunge cutting like a drill into solid material

**TOLERANCES**

Size to 1/4"	+ .000 - .002
9/32" to 1"	+ .000 - .003
Shank Dia.	+ .0000 - .0005

Tool  
Coatings  
Also  
Available



List No. 5941 Square End



List No. 5969 Ball Nose

**Ball Nose** end mills are designed for milling die cavities, fillets, round bottomed holes and radius bottom slots.



DIA.	SHANK DIA.	LOC	OAL	SQUARE END		BALL NOSE	
				UNCOATED EDP NO.	ALTiN COATED EDP NO.	UNCOATED EDP NO.	ALTiN COATED EDP NO.
1/32	1/8	1/8	1-1/2	54785	92965	54805	92985
3/64	1/8	1/8	1-1/2	54786	92966	54806	92986
1/16	1/8	1/4	1-1/2	54787	92967	54807	92987
5/64	1/8	1/4	1-1/2	54788	92968	54808	92988
3/32	1/8	3/8	1-1/2	54789	92969	54809	92989
7/64	1/8	3/8	1-1/2	54790	92970	54810	92990
1/8	1/8	1/2	1-1/2	54791	92971	54811	92991
5/32	3/16	9/16	2	54792	92972	54812	92992
3/16	3/16	5/8	2	54793	92973	54813	92993
7/32	1/4	5/8	2-1/2	54794	92974	54814	92994
1/4	1/4	3/4	2-1/2	54795	92975	54815	92995
9/32	5/16	3/4	2-1/2	54796	92976	54816	92996
5/16	5/16	13/16	2-1/2	54797	92977	54817	92997
3/8	3/8	1	2-1/2	54798	92978	54818	92998
7/16	7/16	1	2-3/4	54799	92979	54819	92999
1/2	1/2	1	3	54800	92980	54820	93000
9/16	9/16	1-1/4	3-1/2	54801	92981	54821	93001
5/8	5/8	1-1/4	3-1/2	54802	92982	54822	93002
3/4	3/4	1-1/2	4	54803	92983	54823	93003
1	1	1-1/2	4	54804	92984	54824	93004

TOOL COATING SERVICE	
Tool Coatings enhance cutting tool performance for increased productivity and lower overall tooling cost.	
<b>TiN</b> — Titanium Nitride <b>TiALN</b> — Titanium Aluminum Nitride <b>CrN</b> — Chromium Nitride	<b>TiCN</b> — Titanium Carbonitride <b>ALTiN</b> — Aluminum Titanium Nitride <b>CrC</b> — Chromium Carbide

# Solid Carbide Single End Mills With Weldon Flat On Shank

**Micrograin Carbide - Center Cutting  
30° Helix Angle**

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron.

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish.

**Center Cutting** end allows for plunge cutting like a drill into solid material.

**Weldon Flat on Shank**



**List No. 5979 2-Flute**



**List No. 5978 4-Flute**

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life.

**ALTIN - Aluminum Titanium Nitride** Coating is an excellent all-around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

**TOLERANCES**

Size to 1/4"     +.000 - .002  
3/8" to 1"     +.000 - .003  
Shank Dia.     +.0000 - .0005

**Speeds & Feeds:  
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**List No. 5979 2-Flute Weldon Flat**

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	ALTIN COATED
				EDP NO.	EDP NO.
1/4	1/4	1/2	2	59218	95591
1/4	1/4	3/4	2-1/2	59219	95592
3/8	3/8	5/8	2	59220	95593
3/8	3/8	1	2-1/2	59221	95594
1/2	1/2	5/8	2-1/2	59222	95595
1/2	1/2	1	3	59223	95596
5/8	5/8	3/4	3	59224	95597
5/8	5/8	1-1/4	3-1/2	59225	95598
3/4	3/4	1	3	59226	95599
3/4	3/4	1-1/2	4	59227	95600
7/8	7/8	1-1/2	4	59229	95602
1	1	1-1/2	4	59231	95604

**List No. 5978 4-Flute Weldon Flat**

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	ALTIN COATED
				EDP NO.	EDP NO.
1/4	1/4	1/2	2	59204	95577
1/4	1/4	3/4	2-1/2	59205	95578
3/8	3/8	5/8	2	59206	95579
3/8	3/8	1	2-1/2	59207	95580
1/2	1/2	5/8	2-1/2	59208	95581
1/2	1/2	1	3	59209	95582
5/8	5/8	3/4	3	59210	95583
5/8	5/8	1-1/4	3-1/2	59211	95584
3/4	3/4	1	3	59212	95585
3/4	3/4	1-1/2	4	59213	95586
7/8	7/8	1-1/2	4	59215	95588
1	1	1-1/2	4	59217	95590



# Solid Carbide Stub Length 4-Flute Single End Mills



List No. 5975 Stub Length

## Micrograin Carbide — Center Cutting 30° Helix Angle

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Stub Length for high rigidity & minimal tool deflection.

### TOLERANCES

Size to 1/4" +.000 - .002  
5/16" to 3/4" +.000 - .003  
Shank Dia. +.0000 - .0005

### STANDARD PACKAGE

All sizes - 1 each



DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.
1/32	1/8	1/16	1-1/2	57087	92862
3/64	1/8	3/32	1-1/2	57088	92863
1/16	1/8	1/8	1-1/2	57040	92815
5/64	1/8	5/32	1-1/2	56589	91045
3/32	1/8	3/16	1-1/2	57041	92816
7/64	1/8	7/32	1-1/2	56590	91046
1/8	1/8	1/4	1-1/2	57042	92817
9/64	3/16	9/32	2	56591	91047
5/32	3/16	5/16	2	57043	92818
11/64	3/16	5/16	2	56592	91048
3/16	3/16	3/8	2	57044	92819
13/64	1/4	3/8	2	56593	91049
7/32	1/4	7/16	2	57045	92820
15/64	1/4	7/16	2	56594	91080
1/4	1/4	1/2	2	57046	92821
9/32	5/16	1/2	2	56595	91081
5/16	5/16	1/2	2	57047	92822
3/8	3/8	5/8	2	57048	92823
7/16	7/16	5/8	2-1/2	57049	92824
1/2	1/2	5/8	2-1/2	57050	92825
5/8	5/8	3/4	3	57051	92826
3/4	3/4	1	3	57052	92827
1	1	1	3	56596	91082

## TOOL COATING SERVICE

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish. **PLEASE INQUIRE.**

**TiN** — Titanium Nitride

**TiCN** — Titanium Carbonitride

**TiALN** — Titanium Aluminum Nitride

**ALTiN** — Aluminum Titanium Nitride

**CrN** — Chromium Nitride

**CrC** — Chromium Carbide

**DLC** — Amorphous Diamond-Like Carbon

# Solid Carbide 4-Flute Single End Mills

**Micrograin Carbide - Center Cutting  
30° Helix Angle**

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**\* Extended LOC for milling the edges of steel sheet and plate in one pass.**



List No. 5943 Regular Length



List No. 5955 Medium Length & Long Length

(See Next Page)



List No. 5951 Extra Long Length & Extension Length

(See Next Page)



## List No. 5943 Regular Length

DIA.	SHANK		OAL	UNCOATED	TIN COATED	TICN COATED	ALTiN COATED
	DIA.	LOC		EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/64	1/8	3/64	1-1/2	57901	90699	—	90696
1/32	1/8	1/8	1-1/2	57902	90700	—	90697
3/64	1/8	1/8	1-1/2	57903	90701	—	90698
1/16	1/8	3/16	1-1/2	57904	90702	90739	90776
5/64	1/8	3/16	1-1/2	57905	90703	90740	90777
3/32	1/8	3/8	1-1/2	57906	90704	90741	90778
7/64	1/8	3/8	1-1/2	57907	90705	90742	90779
1/8	1/8	1/2	1-1/2	57908	90706	90743	90780
9/64	3/16	9/16	2	57909	90707	90744	90781
5/32	3/16	9/16	2	57910	90708	90745	90782
11/64	3/16	5/8	2	57911	90709	90746	90783
3/16	3/16	5/8	2	57912	90710	90747	90784
13/64	1/4	5/8	2-1/2	57913	90711	90748	90785
7/32	1/4	5/8	2-1/2	57914	90712	90749	90786
15/64	1/4	3/4	2-1/2	57915	90713	90762	90815
1/4	1/4	3/4	2-1/2	57916	90714	90751	90788
1/4	1/4	7/8*	2-1/2	57961*	—	—	90633*
17/64	5/16	3/4	2-1/2	57917	90715	90764	90816
9/32	5/16	3/4	2-1/2	57918	90716	90753	90790
19/64	5/16	13/16	2-1/2	57919	90717	90765	90817
5/16	5/16	13/16	2-1/2	57920	90718	90755	90792
5/16	5/16	1*	2-1/2	57962*	—	—	90634*
21/64	3/8	1	2-1/2	57921	90719	90766	90818
11/32	3/8	1	2-1/2	57922	90720	90774	90819
23/64	3/8	1	2-1/2	57923	90721	90775	90850
3/8	3/8	1	2-1/2	57924	90722	90759	90796
3/8	3/8	1-1/8*	2-1/2	57963*	—	—	90635*
25/64	7/16	1	2-3/4	57925	90723	90787	90851
13/32	7/16	1	2-3/4	57926	90724	90789	90852
27/64	7/16	1	2-3/4	57927	90725	90791	90853
7/16	7/16	1	2-3/4	57928	90726	90763	90800
29/64	1/2	1	3	57929	90727	90793	90854
15/32	1/2	1	3	57930	90728	90794	90855
31/64	1/2	1	3	57931	90729	90795	90856
1/2	1/2	1	3	57932	90730	90767	90804
1/2	1/2	1-1/4*	3	57933*	90737*	90797*	90857*
33/64	9/16	1-1/4	3-1/2	57934	90738	90798	90858
17/32	9/16	1-1/4	3-1/2	57935	90750	90799	90859
9/16	9/16	1-1/4	3-1/2	57936	90731	90768	90805
19/32	5/8	1-1/4	3-1/2	57937	90752	90801	90890
5/8	5/8	1-1/4	3-1/2	57940	90732	90769	90806
5/8	5/8	1-3/8*	3-1/2	57965*	—	—	90636*
41/64	3/4	1-1/2	4	57938	90754	90802	90891
21/32	3/4	1-1/2	4	57939	90756	90803	90892
11/16	3/4	1-1/2	4	57944	90733	90770	90807
47/64	3/4	1-1/2	4	57941	90757	90811	90893
3/4	3/4	1-1/2	4	57948	90734	90771	90808
3/4	3/4	1-5/8*	4	57966*	—	—	90637*
13/16	7/8	1-1/2	4	57942	90758	90812	90894
7/8	7/8	1-1/2	4	57956	90735	90772	90809
15/16	1	1-1/2	4	57943	90760	90813	90895
1	1	1-1/2	4	57964	90736	90773	90810
1	1	1-3/4*	4	57967*	—	—	90638*
1-1/4	1-1/4	2	4-1/2	57945	90761	90814	90896

(continued)

# Solid Carbide 4-Flute Single End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 5955 Medium Length & Long Length

**TOLERANCES**

Size to 1/4" +.000 - .002  
9/32" to 1" +.000 - .003  
Shank Dia. +.0000 - .0005

Speeds & Feeds:  
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List No. 5955 Medium Length & Long Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTIN COATED EDP NO.
1/8	1/8	3/4	2-1/4	58138	90820	90830	90840
5/32	3/16	3/4	2-1/2	58142	90897	90960	90963
3/16	3/16	3/4	2-1/2	58139	90821	90831	90841
1/4	1/4	1-1/8	3	58141	90822	90832	90842
5/16	5/16	1-1/8	3	58150	90823	90833	90843
3/8	3/8	1-1/8	3	58154	90824	90834	90844
7/16	7/16	2	4	58158	90825	90835	90845
1/2	1/2	1	4	58143	90898	90961	90964
1/2	1/2	1-1/2	4	58145	90899	90962	90965
1/2	1/2	2	4	58162	90826	90836	90846
5/8	5/8	2-1/4	5	58170	90827	90837	90847
3/4	3/4	2-1/4	5	58178	90828	90838	90848
1	1	2-1/4	5	58194	90829	90839	90849

# Solid Carbide 4-Flute Single End Mills



List No. 5951 Extra Long Length & Extension Length

List No. 5951 Extra Long Length & Extension Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTIN COATED EDP NO.
1/8	1/8	1	3	58508	90860	90870	90880
5/32	3/16	1-1/8	3	57946	90966	90980	90993
3/16	3/16	1-1/8	3	58512	90861	90871	90881
3/16	3/16	1	4	57947	90967	90981	90994
1/4	1/4	1	4	57949	90968	90982	90995
1/4	1/4	1-1/2	4	58516	90862	90872	90882
1/4	1/4	1-1/2	6	57950	90969	90983	90996
5/16	5/16	1-5/8	4	58520	90863	90873	90883
5/16	5/16	1-1/2	6	57951	90970	90984	90997
3/8	3/8	1	4	57952	90971	90985	90998
3/8	3/8	1-3/4	4	58524	90864	90874	90884
3/8	3/8	1-1/2	6	57953	90972	90986	90999
7/16	7/16	3	6	58528	90865	90875	90885
1/2	1/2	1-1/2	6	57954	90973	90987	91033
1/2	1/2	3	6	58532	90866	90876	90886
5/8	5/8	1-1/2	6	57955	90974	90988	91034
5/8	5/8	3	6	58540	90867	90877	90887
3/4	3/4	1-1/2	6	57957	90975	90989	91035
3/4	3/4	3	6	58548	90868	90878	90888
3/4	3/4	4	7	57958	90976	90990	91036
1	1	1-1/2	6	57959	90977	90991	91037
1	1	3	6	58564	90869	90879	90889
1	1	4	7	57960	90979	90992	91038

# Solid Carbide 4-Flute Corner Radius Single End Mills

**Micrograin Carbide - Center Cutting  
30° Helix Angle**

**Corner Radius** strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish.



List No. 5968 4-Flute

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

**TOLERANCES**

Size to 1/4" +.000 - .002  
 5/16" to 1" +.000 - .003  
 Shank Dia. +.0000 - .0005

**STANDARD PACKAGE**

All sizes - 1 each

**Corner Radius**



DIA	SHANK DIA.	LOC	OAL	CORNER RADIUS	UNCOATED	TIN COATED	TICN COATED	ALTiN COATED
					EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	1/2	1-1/2	.015	59116	95445	95467	95489
1/8	1/8	1/2	1-1/2	.020	59000	94965	95010	95055
1/8	1/8	1/2	1-1/2	.030	59117	95446	95468	95490
3/16	3/16	5/8	2	.015	59118	95447	95469	95491
3/16	3/16	5/8	2	.020	59003	94968	95013	95058
3/16	3/16	5/8	2	.030	59004	94969	95014	95059
1/4	1/4	3/4	2-1/2	.015	59119	95448	95470	95492
1/4	1/4	3/4	2-1/2	.020	59006	94971	95016	95061
1/4	1/4	3/4	2-1/2	.030	59007	94972	95017	95062
1/4	1/4	3/4	2-1/2	.045	59120	95449	95471	95493
1/4	1/4	3/4	2-1/2	.060	59121	95450	95472	95494
5/16	5/16	13/16	2-1/2	.015	59122	95451	95473	95495
5/16	5/16	13/16	2-1/2	.020	59010	94975	95020	95065
5/16	5/16	13/16	2-1/2	.030	59011	94976	95021	95066
5/16	5/16	13/16	2-1/2	.045	59123	95452	95474	95496
5/16	5/16	13/16	2-1/2	.060	59124	95453	95475	95497
3/8	3/8	1	2-1/2	.015	59125	95454	95476	95498
3/8	3/8	1	2-1/2	.020	59014	94979	95024	95069
3/8	3/8	1	2-1/2	.030	59015	94980	95025	95070
3/8	3/8	1	2-1/2	.045	59126	95455	95477	95499
3/8	3/8	1	2-1/2	.060	59127	95456	95478	95500
1/2	1/2	1	3	.015	59128	95457	95479	95501
1/2	1/2	1	3	.020	59019	94984	95029	95074
1/2	1/2	1	3	.030	59020	94985	95030	95075
1/2	1/2	1	3	.045	59129	95458	95480	95502
1/2	1/2	1	3	.060	59022	94987	95032	95077
1/2	1/2	1	3	.090	59130	95459	95481	95503
1/2	1/2	1	3	.125	59131	95460	95482	95504
5/8	5/8	1-1/4	3-1/2	.015	59132	95461	95483	95505
5/8	5/8	1-1/4	3-1/2	.020	59026	94991	95036	95081
5/8	5/8	1-1/4	3-1/2	.030	59027	94992	95037	95082
5/8	5/8	1-1/4	3-1/2	.045	59133	95462	95484	95506
5/8	5/8	1-1/4	3-1/2	.060	59029	94994	95039	95084
5/8	5/8	1-1/4	3-1/2	.090	59030	94995	95040	95085
3/4	3/4	1-1/2	4	.015	59134	95463	95485	95507
3/4	3/4	1-1/2	4	.020	59032	94997	95042	95087
3/4	3/4	1-1/2	4	.030	59033	94998	95043	95088
3/4	3/4	1-1/2	4	.045	59135	95464	95486	95508
3/4	3/4	1-1/2	4	.060	59035	95000	95045	95090
3/4	3/4	1-1/2	4	.090	59036	95001	95046	95091
3/4	3/4	1-1/2	4	.125	59037	95002	95047	95092
1	1	1-1/2	4	.015	59136	95465	95487	95509
1	1	1-1/2	4	.020	59039	95004	95049	95094
1	1	1-1/2	4	.030	59040	95005	95050	95095
1	1	1-1/2	4	.045	59137	95466	95488	95510
1	1	1-1/2	4	.060	59042	95007	95052	95097
1	1	1-1/2	4	.090	59043	95008	95053	95098
1	1	1-1/2	4	.125	59044	95009	95054	95099

# Solid Carbide Metric 4-Flute Single End Mills

**TOLERANCE**  
All Sizes +.000mm/-0.051mm  
Shank Dia. +.000mm/-0.013mm



## List No. 5961

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Micrograin Carbide  
Center Cutting  
30° Helix Angle



DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTiN COATED EDP NO.
1 mm	3 mm	3 mm	39 mm	59310	90900	90920	90940
1.5 mm	3 mm	5 mm	39 mm	59311	90901	90921	90941
2 mm	3 mm	7 mm	39 mm	59312	90902	90922	90942
2.5 mm	3 mm	7 mm	39 mm	59313	90903	90923	90943
3 mm	3 mm	9 mm	39 mm	59314	90904	90924	90944
3.5 mm	4 mm	12 mm	51 mm	59315	90905	90925	90945
4 mm	4 mm	14 mm	51 mm	59316	90906	90926	90946
4.5 mm	5 mm	14 mm	51 mm	59317	90907	90927	90947
5 mm	5 mm	16 mm	51 mm	59318	90908	90928	90948
6 mm	6 mm	19 mm	64 mm	59319	90909	90929	90949
7 mm	8 mm	19 mm	64 mm	59320	90910	90930	90950
8 mm	8 mm	21 mm	64 mm	59321	90911	90931	90951
9 mm	10 mm	22 mm	70 mm	59322	90912	90932	90952
10 mm	10 mm	22 mm	70 mm	59323	90913	90933	90953
11 mm	11 mm	25 mm	70 mm	59324	90914	90934	90954
12 mm	12 mm	25 mm	76 mm	59325	90915	90935	90955
14 mm	14 mm	31 mm	89 mm	59327	90916	90936	90956
16 mm	16 mm	32 mm	89 mm	59328	90917	90937	90957
18 mm	18 mm	35 mm	102 mm	59329	90918	90938	90958
20 mm	20 mm	38 mm	102 mm	59330	90919	90939	90959
22 mm	22 mm	38 mm	102 mm	59331	91039	91041	91043
25 mm	25 mm	38 mm	102 mm	59332	91040	91042	91044

# Solid Carbide 4-Flute Double End Mills

Speeds & Feeds:  
Page 300



## List No. 5946 Stub Length

Micrograin Carbide - Center Cutting  
30° Helix Angle



## List No. 5895 Regular Length

STANDARD PACKAGE  
All sizes - 1 each

### List No. 5946 Stub Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTiN COATED EDP NO.
1/16	1/8	1/8	1-1/2	57270	91000	91011	91022
3/32	1/8	3/16	1-1/2	57271	91001	91012	91023
1/8	1/8	1/4	1-1/2	57272	91002	91013	91024
5/32	3/16	5/16	2	57273	91003	91014	91025
3/16	3/16	3/8	2	57274	91004	91015	91026
7/32	1/4	1/2	2-1/2	57275	91005	91016	91027
1/4	1/4	1/2	2-1/2	57276	91006	91017	91028
5/16	5/16	1/2	2-1/2	57277	91007	91018	91029
3/8	3/8	9/16	3	57278	91008	91019	91030
7/16	7/16	9/16	3	57279	91009	91020	91031
1/2	1/2	5/8	3	57280	91010	91021	91032

### List No. 5895 Regular Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	ALTiN COATED EDP NO.
1/8	3/8	3/8	3-1/8	57108	91050	91060	91070
5/32	3/8	7/16	3-1/8	57110	91051	91061	91071
3/16	3/8	1/2	3-1/4	57112	91052	91062	91072
7/32	3/8	9/16	3-3/8	57114	91053	91063	91073
1/4	3/8	5/8	3-3/8	57116	91054	91064	91074
9/32	3/8	11/16	3-3/8	57118	91055	91065	91075
5/16	3/8	3/4	3-1/2	57120	91056	91066	91076
3/8	3/8	3/4	3-1/2	57124	91057	91067	91077
7/16	1/2	7/8	4	57128	91058	91068	91078
1/2	1/2	1	4	57132	91059	91069	91079

# Solid Carbide 4-Flute Ball Nose Single End Mills

**Micrograin Carbide - Center Cutting  
30° Helix Angle**

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 5942 Regular Length



List No. 5957 Medium Length & Long Length



List No. 5953 Extra Long Length & Extension Length  
(See Next Page)



## List No. 5942 Regular Length

DIA.	SHANK			UNCOATED	TIN COATED	TICN COATED	ALTIN COATED
	DIA.	LOC	OAL	EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/64	1/8	3/64	1-1/2	58201	91097	—	91094
1/32	1/8	1/8	1-1/2	58202	91098	—	91095
3/64	1/8	1/8	1-1/2	58203	91099	—	91096
1/16	1/8	3/16	1-1/2	58204	91100	91123	91146
5/64	1/8	3/16	1-1/2	58205	91101	91124	91147
3/32	1/8	3/8	1-1/2	58206	91102	91125	91148
7/64	1/8	3/8	1-1/2	58207	91103	91126	91149
1/8	1/8	1/2	1-1/2	58208	91104	91127	91150
9/64	3/16	9/16	2	58209	91105	91128	91151
5/32	3/16	9/16	2	58210	91106	91129	91152
11/64	3/16	5/8	2	58211	91107	91130	91153
3/16	3/16	5/8	2	58212	91108	91131	91154
13/64	1/4	5/8	2-1/2	58213	91109	91132	91155
7/32	1/4	5/8	2-1/2	58214	91110	91133	91156
15/64	1/4	3/4	2-1/2	57152	92596	92625	92644
1/4	1/4	3/4	2-1/2	58216	91111	91134	91157
17/64	5/16	3/4	2-1/2	57153	92597	92626	92645
9/32	5/16	3/4	2-1/2	58218	91112	91135	91158
19/64	5/16	13/16	2-1/2	57154	92598	92627	92646
5/16	5/16	13/16	2-1/2	58220	91113	91136	91159
21/64	3/8	1	2-1/2	57155	92599	92628	92647
11/32	3/8	1	2-1/2	57156	92617	92629	92648
23/64	3/8	1	2-1/2	57157	92618	92637	92649
3/8	3/8	1	2-1/2	58224	91114	91137	91160
25/64	7/16	1	2-3/4	57183	92619	92638	92657
13/32	7/16	1	2-3/4	57184	92620	92639	92658
27/64	7/16	1	2-3/4	57185	92621	92640	92659
7/16	7/16	1	2-3/4	58228	91115	91138	91161
29/64	1/2	1	3	57186	92622	92641	93110
15/32	1/2	1	3	57187	92623	92642	93111
31/64	1/2	1	3	57188	92624	92643	93112
1/2	1/2	1	3	58232	91116	91139	91162
9/16	9/16	1-1/4	3-1/2	58236	91117	91140	91163
5/8	5/8	1-1/4	3-1/2	58240	91118	91141	91164
11/16	3/4	1-1/2	4	58244	91119	91142	91165
3/4	3/4	1-1/2	4	58248	91120	91143	91166
7/8	7/8	1-1/2	4	58256	91121	91144	91167
1	1	1-1/2	4	58264	91122	91145	91168

## List No. 5957 Medium Length & Long Length

DIA.	SHANK			UNCOATED	TIN COATED	TICN COATED	ALTIN COATED
	DIA.	LOC	OAL	EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	3/4	2-1/4	58838	91170	91180	91190
5/32	3/16	3/4	2-1/2	57189	93113	93115	93117
3/16	3/16	3/4	2-1/2	58840	91171	91181	91191
1/4	1/4	1-1/8	3	58844	91172	91182	91192
5/16	5/16	1-1/8	3	58850	91173	91183	91193
3/8	3/8	1-1/8	3	58854	91174	91184	91194
7/16	7/16	2	4	58858	91175	91185	91195
1/2	1/2	1-1/2	4	57190	93114	93116	93118
1/2	1/2	2	4	58862	91176	91186	91196
5/8	5/8	2-1/4	5	58870	91177	91187	91197
3/4	3/4	2-1/4	5	58878	91178	91188	91198
1	1	2-1/4	5	58894	91179	91189	91199

(continued)

# Solid Carbide 4-Flute Ball Nose Single End Mills



List No. 5953 Extra Long Length & Extension Length

(continued)



List No. 5953 Extra Long Length & Extension Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	TIN COATED	TICN COATED	ALTiN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	1	3	58708	91200	91210	91220
5/32	3/16	1-1/8	3	57191	93119	93129	93139
3/16	3/16	1-1/8	3	58712	91201	91211	91221
3/16	3/16	1	4	57192	93120	93130	93140
1/4	1/4	1	4	57193	93121	93131	93141
1/4	1/4	1-1/2	4	58716	91202	91212	91222
1/4	1/4	1-1/2	6	57194	93122	93132	93142
5/16	5/16	1-5/8	4	58720	91203	91213	91223
5/16	5/16	1-1/2	6	57195	93123	93133	93143
3/8	3/8	1-3/4	4	58724	91204	91214	91224
3/8	3/8	1-1/2	6	57196	93124	93134	93144
7/16	7/16	3	6	58728	91205	91215	91225
1/2	1/2	1-1/2	6	57197	93125	93135	93145
1/2	1/2	3	6	58732	91206	91216	91226
5/8	5/8	1-1/2	6	57198	93126	93136	93146
5/8	5/8	3	6	58740	91207	91217	91227
3/4	3/4	1-1/2	6	57199	93127	93137	93147
3/4	3/4	3	6	58748	91208	91218	91228
1	1	1-1/2	6	57200	93128	93138	93148
1	1	3	6	58764	91209	91219	91229

# Solid Carbide 4-Flute Stub Length Ball Nose Single End Mills



List No. 5976 Stub Length

Speeds & Feeds:  
Page 300

**Micrograin Carbide — Center Cutting  
30° Helix Angle**

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

**TOLERANCES**

Size to 1/4"     +.000 - .002  
5/16" to 3/4"   +.000 - .003  
Shank Dia.     +.0000 - .0005

**STANDARD PACKAGE**

All sizes - 1 each

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Stub Length for high rigidity & minimal tool deflection.

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	ALTiN COATED
				EDP NO.	EDP NO.
1/32	1/8	1/16	1-1/2	57091	92866
3/64	1/8	3/32	1-1/2	57092	92867
1/16	1/8	1/8	1-1/2	57070	92845
5/64	1/8	5/32	1-1/2	57099	92376
3/32	1/8	3/16	1-1/2	57071	92846
7/64	1/8	7/32	1-1/2	57100	92377
1/8	1/8	1/4	1-1/2	57072	92847
9/64	3/16	9/32	2	57101	92378
5/32	3/16	5/16	2	57073	92848
11/64	3/16	5/16	2	57102	92379
3/16	3/16	3/8	2	57074	92849
13/64	1/4	3/8	2	57103	92380
7/32	1/4	7/16	2	57075	92850
15/64	1/4	7/16	2	57104	92381
1/4	1/4	1/2	2	57076	92851
5/16	5/16	1/2	2	57077	92852
3/8	3/8	5/8	2	57078	92853
7/16	7/16	5/8	2-1/2	57079	92854
1/2	1/2	5/8	2-1/2	57080	92855
5/8	5/8	3/4	3	57081	92856
3/4	3/4	1	3	57082	92857

# Solid Carbide Metric 4-Flute Ball Nose Single End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 5965

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

**TOLERANCE**

All Sizes +.000mm/-.051mm  
Shank Dia. +.000mm/-.013mm

**STANDARD PACKAGE**

All sizes - 1 each



DIA.	SHANK DIA.	LOC	OAL	UNCOATED	TIN COATED	TICN COATED	ALTIN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1 mm	3 mm	3 mm	39 mm	59440	91240	91260	91280
1.5 mm	3 mm	5 mm	39 mm	59441	91241	91261	91281
2 mm	3 mm	7 mm	39 mm	59442	91242	91262	91282
2.5 mm	3 mm	7 mm	39 mm	59443	91243	91263	91283
3 mm	3 mm	9 mm	39 mm	59444	91244	91264	91284
3.5 mm	4 mm	12 mm	51 mm	59445	91245	91265	91285
4 mm	4 mm	14 mm	51 mm	59446	91246	91266	91286
4.5 mm	5 mm	14 mm	51 mm	59447	91247	91267	91287
5 mm	5 mm	16 mm	51 mm	59448	91248	91268	91288
6 mm	6 mm	19 mm	64 mm	59449	91249	91269	91289
7 mm	8 mm	19 mm	64 mm	59450	91250	91270	91290
8 mm	8 mm	21 mm	64 mm	59451	91251	91271	91291
9 mm	10 mm	22 mm	70 mm	59452	91252	91272	91292
10 mm	10 mm	22 mm	70 mm	59453	91253	91273	91293
11 mm	11 mm	25 mm	70 mm	59454	91254	91274	91294
12 mm	12 mm	25 mm	76 mm	59455	91255	91275	91295
14 mm	14 mm	31 mm	89 mm	59457	91256	91276	91296
16 mm	16 mm	32 mm	89 mm	59458	91257	91277	91297
18 mm	18 mm	35 mm	102 mm	59459	91258	91278	91298
20 mm	20 mm	38 mm	102 mm	59460	91259	91279	91299

# Solid Carbide 4-Flute Stub Length Ball Nose Double End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle



List No. 5949

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**TOLERANCES**

Size to 1/4" +.000 - .002  
9/32" to 1" +.000 - .003  
Shank Dia. +.0000 - .0005

**STANDARD PACKAGE**

All sizes - 1 each

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	TIN COATED	TICN COATED	ALTIN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/16	1/8	1/8	1-1/2	58354	91300	91311	91322
3/32	1/8	3/16	1-1/2	58356	91301	91312	91323
1/8	1/8	1/4	1-1/2	58358	91302	91313	91324
5/32	3/16	5/16	2	58360	91303	91314	91325
3/16	3/16	3/8	2	58362	91304	91315	91326
7/32	1/4	1/2	2-1/2	58364	91305	91316	91327
1/4	1/4	1/2	2-1/2	58366	91306	91317	91328
5/16	5/16	1/2	2-1/2	58370	91307	91318	91329
3/8	3/8	9/16	2-1/2	58374	91308	91319	91330
7/16	7/16	9/16	3	58378	91309	91320	91331
1/2	1/2	5/8	3	58382	91310	91321	91332



# Solid Carbide DRILL-MILL™

2-Flute & 4-Flute  
60° & 90° Point Angle

**Micrograin Carbide • 30° Right Hand Helix**

DRILL-MILL™ performs drilling, spotting, countersinking, chamfering, slotting, side milling, profile milling, "V" grooving and other drilling & milling operations with the same tool in vertical milling machine applications.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

TOLERANCE +.000 - .002

**M42 Cobalt  
Drill-Mills  
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## 2-Flute 90° Point Angle



List No. 5989 - 2-Flute



List No. 5989 - 4-Flute

STANDARD PACKAGE All sizes — 1 each

**Speeds & Feeds: Page 300**



DIA.	SHANK DIA.	LOC*	OAL*	UNCOATED	TIN COATED	TICN COATED	ALTiN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
.030	1/8	.090	1-1/2	59055	—	—	95356
.045	1/8	.105	1-1/2	59056	—	—	95357
.060	1/8	.180	1-1/2	59057	—	—	95358
1/16	1/8	3/16	1-1/2	59058	—	—	95359
3/32	1/8	3/8	1-1/2	59059	—	—	95360
1/8	1/8	1/2	1-1/2	59060	95300	95320	95340
1/8**	1/8	1/2	1-1/2	59061	95301	95321	95341
3/16	3/16	5/8	2	59062	95302	95322	95342
3/16**	3/16	5/8	2	59063	95303	95323	95343
1/4	1/4	3/4	2-1/2	59064	95304	95324	95344
1/4**	1/4	3/4	2-1/2	59065	95305	95325	95345
5/16	5/16	13/16	2-1/2	59066	95306	95326	95346
5/16**	5/16	13/16	2-1/2	59067	95307	95327	95347
3/8	3/8	1	2-1/2	59068	95308	95328	95348
3/8**	3/8	1	2-1/2	59069	95309	95329	95349
7/16	7/16	1	2-3/4	59070	95310	95330	95350
1/2	1/2	1	3	59071	95311	95331	95351
1/2**	1/2	1	3	59072	95312	95332	95352
5/8	5/8	1-1/4	3-1/2	59073	95313	95333	95353
5/8**	5/8	1-1/4	3-1/2	59074	95314	95334	95354
3/4	3/4	1-1/2	4	59075	95315	95335	95355

\* Lengths include the conical cutting point

\*\* Features sharper point with a .005"/.008" tip diameter for "V" grooving where a sharper point is required. (Standard carbide Drill-Mills supplied with tip diameter of .030" or larger to provide strength.)

DIA.	SHANK DIA.	LOC*	OAL*	2-Flute 60° Point Angle		4-Flute 60° Point Angle		4-Flute 90° Point Angle	
				UNCOATED	ALTiN COATED	UNCOATED	ALTiN COATED	UNCOATED	ALTiN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/16	1/8	3/16	1-1/2	59076	95361	59202	95575	59085	95370
3/32	1/8	3/8	1-1/2	59077	95362	59203	95576	59086	95371
1/8	1/8	1/2	1-1/2	59078	95363	59142	95515	59087	95372
3/16	3/16	5/8	2	59079	95364	59143	95516	59088	95373
1/4	1/4	3/4	2-1/2	59080	95365	59144	95517	59089	95374
5/16	5/16	13/16	2-1/2	59138	95511	59145	95518	59140	95513
3/8	3/8	1	2-1/2	59081	95366	59146	95519	59090	95375
7/16	7/16	1	2-3/4	59139	95512	59147	95520	59141	95514
1/2	1/2	1	3	59082	95367	59148	95521	59091	95376
5/8	5/8	1-1/4	3-1/2	59083	95368	59149	95522	59092	95377
3/4	3/4	1-1/2	4	59084	95369	59150	95523	59093	95378

\* Lengths include the conical cutting point

# Solid Carbide Chamfer Mills

Micrograin Carbide  
60°, 82° & 90° Point Angle  
Single End & Double End

**Recommended** for deburring, chamfering and beveling in a wide range of materials. Can also be used for spotting and countersinking.

**Solid Carbide** offers excellent rigidity, hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life.

**Aluminum Titanium Nitride (ALTiN) Coating** increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. For a wide range of materials including abrasive and tough materials that generate higher cutting temperatures.



List No. 5997 Single End 2-Flute & 4-Flute



List No. 5997 Double End 2-Flute & 4-Flute

**TOLERANCES**

Dia. +.0000 - .0005

Shank Dia. +.0000 - .0005



## 2-Flute Single End

DIA.	SHANK DIA.	OAL	60°		82°		90°	
			UNCOATED	ALTiN COATED	UNCOATED	ALTiN COATED	UNCOATED	ALTiN COATED
			EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	1-1/2	59151	95524	59157	95530	59163	95536
3/16	3/16	2	59152	95525	59158	95531	59164	95537
1/4	1/4	2-1/2	59153	95526	59159	95532	59165	95538
3/8	3/8	2-1/2	59154	95527	59160	95533	59166	95539
1/2	1/2	3	59155	95528	59161	95534	59167	95540
3/4	3/4	3	59156	95529	59162	95535	59168	95541

## 2-Flute Double End

DIA.	SHANK DIA.	OAL	60°		90°	
			UNCOATED	ALTiN COATED	UNCOATED	ALTiN COATED
			EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	1-1/2	59169	95542	59174	95547
3/16	3/16	2	59170	95543	59175	95548
1/4	1/4	2-1/2	59171	95544	59176	95549
3/8	3/8	2-1/2	59172	95545	59177	95550
1/2	1/2	3	59173	95546	59178	95551

Tool Coatings Also Available

## 4-Flute Single End

DIA.	SHANK DIA.	OAL	60°		82°		90°	
			UNCOATED	ALTiN COATED	UNCOATED	ALTiN COATED	UNCOATED	ALTiN COATED
			EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	1-1/2	59179	95552	59185	95558	59191	95564
3/16	3/16	2	59180	95553	59186	95559	59192	95565
1/4	1/4	2-1/2	59181	95554	59187	95560	59193	95566
3/8	3/8	2-1/2	59182	95555	59188	95561	59194	95567
1/2	1/2	3	59183	95556	59189	95562	59195	95568
3/4	3/4	3	59184	95557	59190	95563	59196	95569

## 4-Flute Double End

DIA.	SHANK DIA.	OAL	90°	
			UNCOATED	ALTiN COATED
			EDP NO.	EDP NO.
1/8	1/8	1-1/2	59197	95570
3/16	3/16	2	59198	95571
1/4	1/4	2-1/2	59199	95572
3/8	3/8	2-1/2	59200	95573
1/2	1/2	3	59201	95574

**CUTTING FLUIDS** provide many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Solid Carbide Roughing / Finishing Single End Mills

## Micrograin Carbide - Center Cutting 3-Flute & 4-Flute - Corner Radius

Chipbreaker geometry permits high feed rates in roughing operations while producing a finish near that produced by standard end mills. Benefits include smaller more manageable chips and reduced cutting forces, chatter, deflection & horsepower required. Increased productivity with longer tool life. Recommended for aggressive milling in stainless steels, difficult-to-machine materials and wide range of other materials.

**Corner Radius** strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

**Aluminum Titanium Nitride (ALTiN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resist chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

Fewer flutes provide increased chip capacity. Especially recommended for slotting & pocket milling applications.



List No. 5928 3-Flute Corner Radius



List No. 5929 4-Flute Corner Radius

**TOLERANCES**

Dia.                   +.000 - .002  
Shank Dia.       +.0000 - .0005

Also Available  
in Ball Nose

Please inquire



### 3-Flute

DIA.	SHANK DIA.	LOC	OAL	CORNER RADIUS	LIST 5928 UNCOATED EDP NO.	LIST 5928T ALTiN COATED EDP NO.
1/8	1/8	1/2	1-1/2	.005 - .010	57455	92350
3/16	3/16	5/8	2	.005 - .010	57456	92351
1/4	1/4	3/4	2-1/2	.005 - .010	57457	92352
5/16	5/16	13/16	2-1/2	.005 - .010	57458	92353
3/8	3/8	1	2-1/2	.010 - .015	57459	92354
7/16	7/16	1	2-3/4	.010 - .015	57460	92355
1/2	1/2	1	3	.010 - .015	57461	92356
5/8	5/8	1-1/4	3-1/2	.015 - .020	57462	92357
3/4	3/4	1-1/2	4	.015 - .020	57463	92358
1	1	1-1/2	4	.015 - .020	57464	92359

### 4-Flute

DIA.	SHANK DIA.	LOC	OAL	CORNER RADIUS	LIST 5929 UNCOATED EDP NO.	LIST 5929T ALTiN COATED EDP NO.
1/8	1/8	1/2	1-1/2	.005 - .010	57465	92360
3/16	3/16	5/8	2	.005 - .010	57466	92361
1/4	1/4	3/4	2-1/2	.005 - .010	57467	92362
5/16	5/16	13/16	2-1/2	.005 - .010	57468	92363
3/8	3/8	1	2-1/2	.010 - .015	57469	92364
7/16	7/16	1	2-3/4	.010 - .015	57470	92365
1/2	1/2	1	3	.010 - .015	57471	92366
5/8	5/8	1-1/4	3-1/2	.015 - .020	57472	92367
3/4	3/4	1-1/2	4	.015 - .020	57473	92368
1	1	1-1/2	4	.015 - .020	57474	92369

Tool Coatings Also Available

# Solid Carbide Fine Pitch Roughing End Mills

Micrograin Carbide - Center Cutting  
20° Helix Angle - Weldon Flats

**Roughing** end mills feature a chip breaker type cutting edge for heavier cuts and higher speeds and feeds. **Fine Pitch Roughing End Mills** are recommended for tougher applications including harder, higher tensile strength materials up to 50Rc hardness and materials prone to work-hardening. **Recommended for Alloy Steels, Mold Steels, Nickel Alloys and Work-Hardening Stainless Steels.**

**Solid Carbide** offers excellent rigidity, hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life.

**ALTiN - Aluminum Titanium Nitride** Coating increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding.

**Unequal Flute Spacing** reduces chatter for increased feed rates, smoother cutting and improved tool life.



List No. 5971 — Bright Finish



List No. 5971T — ALTiN Coated

**Weldon Flat on Shank**

**TOLERANCES**

Dia. +.000 - .003  
Shank Dia. +.000 - .0004

**STANDARD PACKAGE**  
All sizes - 1 each



DIA.	SHANK DIA.	LOC	OAL	CORNER CHAMFER	NO. OF FLUTES	LIST 5971 UNCOATED EDP NO	LIST 5971T ALTiN COATED EDP NO.
1/4	1/4	1/2	2	.020	4	56553	90664
1/4	1/4	3/4	2-1/2	.020	4	56554	90665
5/16	5/16	1/2	2	.020	4	56555	90666
5/16	5/16	13/16	2-1/2	.020	4	56556	90667
3/8	3/8	5/8	2	.020	4	56557	90668
3/8	3/8	1	2-1/2	.020	4	56558	90669
7/16	7/16	1	2-3/4	.020	4	56559	90670
1/2	1/2	5/8	2-1/2	.025	4	56560	90671
1/2	1/2	1-1/4	3	.025	4	56561	90672
1/2	1/2	2	4	.025	4	56562	90673
5/8	5/8	3/4	3	.025	4	56563	90674
5/8	5/8	1-5/8	4	.025	4	56564	90675
3/4	3/4	1	3-1/2	.025	4	56565	90676
3/4	3/4	1-3/4	4	.025	4	56566	90677
3/4	3/4	2-1/4	5	.025	4	56567	90678
3/4	3/4	3	6	.025	4	56568	90679
1	1	2	5	.025	5	56569	90680
1	1	2-5/8	5	.025	5	56570	90681
1	1	3-1/4	6	.025	5	56571	90682
1	1	4-1/8	7	.025	5	56572	90683

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Solid Carbide Medium Pitch Roughing End Mills

Micrograin Carbide - Center Cutting  
37° Helix Angle - Weldon Flats

**Roughing** end mills feature a chip breaker type cutting edge for heavier cuts and higher speeds and feeds. **Medium Pitch Roughing End Mills** are recommended for low to medium hardness materials under 40Rc hardness. **37° Helix Angle** for rapid chip evacuation and higher feed rates. **Recommended for Carbon Steels, Tool Steels, Free Machining Stainless Steels and other materials.**

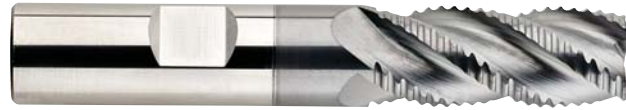
**Solid Carbide** offers excellent rigidity, hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life.

**ALTiN - Aluminum Titanium Nitride** Coating increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding.

**Unequal Flute Spacing** reduces chatter for increased feed rates, smoother cutting and improved tool life.



List No. 5977 — Bright Finish



List No. 5977T — ALTiN Coated

Weldon Flat on Shank

**TOLERANCES**

Dia. +.000 - .003  
Shank Dia. +.000 - .0004

**STANDARD PACKAGE**  
All sizes - 1 each



DIA.	SHANK DIA.	LOC	OAL	CORNER CHAMFER	NO. OF FLUTES	LIST 5977 UNCOATED EDP NO	LIST 5977T ALTiN COATED EDP NO.
3/16	3/16	5/8	2	.020	3	56573	90684
1/4	1/4	3/4	2-1/2	.020	4	56574	90685
5/16	5/16	3/4	2-1/2	.020	4	56575	90686
3/8	3/8	7/8	2-1/2	.020	4	56576	90687
7/16	7/16	1	2-3/4	.025	4	56577	90688
1/2	1/2	1-1/4	3	.025	4	56578	90689
5/8	5/8	1-1/4	3-1/2	.025	4	56579	90690
3/4	3/4	1-5/8	4	.025	4	56580	90691
1	1	1-3/4	4	.025	5	56581	90692

# Solid Carbide Four-Flute Medium Pitch Roughing End Mills

Micrograin Carbide - Center Cutting  
20° Helix Angle

**Roughing** end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. Recommended for a wide range of materials including mild steel, steel alloys, stainless steel, cast iron and many other applications. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life.

**Tool Coatings** further enhance milling performance in a wide range of applications.



List No. 5972G — TiN Coated



List No. 5972C — TiCN Coated

**STANDARD PACKAGE**  
All sizes - 1 each

DIA.	SHANK DIA.	LOC	OAL	NO. OF FLUTES	TiN COATED EDP NO.	TiCN COATED EDP NO.
1/4	1/4	3/4	2-1/2	4	56760	56780
5/16	5/16	13/16	2-1/2	4	56761	56781
3/8	3/8	1	2-1/2	4	56762	56782
1/2	1/2	1-1/4	3	4	56764	56784
5/8	5/8	1-1/4	3-1/2	4	56765	56785
3/4	3/4	1-1/2	4	4	56766	56786

# Standard Solid Carbide End Mill Speed and Feed Recommendations



WORKPIECE MATERIAL	TYPE OF CUT	SURFACE SPEED (SFM)	FEED PER TOOTH BY END MILL DIAMETER				
			1/8"	1/4"	1/2"	3/4"	1"
Low Carbon Steel ≤ 40 Rc 1018, 12L12, 1108, 1213	Profile	275	0.0006	0.0012	0.0025	0.0037	0.0050
	Slot	220	0.0005	0.0010	0.0020	0.0030	0.0040
Medium Carbon Steel ≤ 40 Rc 1040, 1140, 4340, 8640	Profile	250	0.0006	0.0012	0.0025	0.0037	0.0050
	Slot	200	0.0005	0.0010	0.0020	0.0030	0.0040
Tool and Die Steels ≤ 40 Rc P20, A2, D2, H12	Profile	250	0.0006	0.0012	0.0025	0.0037	0.0050
	Slot	200	0.0005	0.0010	0.0020	0.0030	0.0040
Tool and Die Steels > 40 & ≤ 50 Rc P20, A2, D2, H12	Profile	200	0.0003	0.0007	0.0015	0.0022	0.0030
	Slot	160	0.0002	0.0006	0.0012	0.0018	0.0024
Free Machining Stainless Steels 303, 410, 416, 440F	Profile	250	0.0005	0.0010	0.0020	0.0030	0.0040
	Slot	200	0.0004	0.0008	0.0016	0.0024	0.0032
Moderate Machining Stainless Steels 304, 316	Profile	225	0.0003	0.0007	0.0015	0.0022	0.0030
	Slot	180	0.0002	0.0006	0.0012	0.0018	0.0024
Difficult Machining Stainless Steels 17-4PH, 316L, AM350	Profile	150	0.0002	0.0006	0.0012	0.0018	0.0024
	Slot	120	0.0002	0.0004	0.0010	0.0014	0.0019
Cast Iron Gray	Profile	300	0.0005	0.0010	0.0020	0.0030	0.0040
	Slot	240	0.0004	0.0008	0.0016	0.0024	0.0032
Cast Iron Ductile	Profile	250	0.0005	0.0010	0.0020	0.0030	0.0040
	Slot	200	0.0004	0.0008	0.0016	0.0024	0.0032
Cast Iron Malleable	Profile	200	0.0005	0.0011	0.0022	0.0033	0.0044
	Slot	160	0.0004	0.0009	0.0018	0.0026	0.0035
Titanium Alloys Ti-6Al-4V, ASTM B367 Grades C-3, C-4	Profile	125	0.0005	0.0010	0.0020	0.0040	0.0060
	Slot	100	0.0004	0.0008	0.0016	0.0032	0.0048
High Temperature Alloys Inconel, Hastelloy, Waspaloy	Profile	90	0.0005	0.0011	0.0022	0.0033	0.0044
	Slot	70	0.0004	0.0009	0.0018	0.0026	0.0035
Aluminum Alloys 2025, 6061, A140, 514.0	Profile	650	0.0010	0.0020	0.0040	0.0060	0.0080
	Slot	520	0.0008	0.0016	0.0032	0.0048	0.0064
Copper Alloys Brass and Bronze	Profile	300	0.0008	0.0015	0.0030	0.0047	0.0060
	Slot	240	0.0006	0.0012	0.0024	0.0038	0.0048
Composites & Plastics	Profile	375	0.0009	0.0018	0.0035	0.0055	0.0070
	Slot	300	0.0007	0.0014	0.0028	0.0044	0.0056
Magnesium Alloys AZ80A, HM12A, AM60A, ZE41A	Profile	450	0.0010	0.0020	0.0040	0.0060	0.0080
	Slot	360	0.0008	0.0016	0.0032	0.0048	0.0064
Graphite	Profile	450	0.0009	0.0018	0.0035	0.0055	0.0070
	Slot	360	0.0007	0.0014	0.0028	0.0044	0.0056

SPEEDS and FEEDS are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

In general, use lower speeds and feeds for hard and difficult-to-machine materials. Use higher speeds and feeds for easy-to-machine materials. Use higher surface speed for lighter cuts, smaller tools, and better finishes. Higher feed rates can improve tool life and performance in softer materials and more abrasive materials.

For long and extra long tools reduce feed rates by 50%.

For TiN and TiCN coated tools, increase speed by up to 20% with the feed rate unchanged. For ALTiN coated tools, speeds may be increased by up to 50% with the feed rate unchanged.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# Solid Carbide 2-Flute Miniature Square End Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
Stub Length & Regular Length  
For materials less than 48Rc hardness  
Dia. Tolerance +.0005" / -.0005"



List No. 5914 2-Flute Square End

Speeds & Feeds: Page 317

ALTiN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.



DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.005	1/8	.008	1.5x	1-1/2	Stub	45465	—	—
.005	1/8	.015	3x	1-1/2	Regular	45466	96534	—
.006	1/8	.009	1.5x	1-1/2	Stub	45467	—	—
.006	1/8	.018	3x	1-1/2	Regular	45468	—	—
.007	1/8	.011	1.5x	1-1/2	Stub	45469	—	—
.007	1/8	.021	3x	1-1/2	Regular	45470	—	—
.008	1/8	.012	1.5x	1-1/2	Stub	45471	—	—
.008	1/8	.024	3x	1-1/2	Regular	45472	—	—
.009	1/8	.014	1.5x	1-1/2	Stub	45473	—	—
.009	1/8	.027	3x	1-1/2	Regular	45474	—	—
.010	1/8	.015	1.5x	1-1/2	Stub	45475	96535	—
.010	1/8	.030	3x	1-1/2	Regular	45476	96536	96625
.011	1/8	.017	1.5x	1-1/2	Stub	45477	—	—
.011	1/8	.033	3x	1-1/2	Regular	45478	—	—
.012	1/8	.018	1.5x	1-1/2	Stub	45479	—	—
.012	1/8	.036	3x	1-1/2	Regular	45480	96537	—
.013	1/8	.020	1.5x	1-1/2	Stub	45481	—	—
.013	1/8	.039	3x	1-1/2	Regular	45482	—	—
.014	1/8	.021	1.5x	1-1/2	Stub	45483	—	—
.014	1/8	.042	3x	1-1/2	Regular	45484	—	—
.015 (1/64)	1/8	.023	1.5x	1-1/2	Stub	45485	96538	—
.015 (1/64)	1/8	.045	3x	1-1/2	Regular	45486	96539	96626
.016	1/8	.024	1.5x	1-1/2	Stub	45487	—	—
.016	1/8	.048	3x	1-1/2	Regular	45488	—	—
.017	1/8	.026	1.5x	1-1/2	Stub	45489	—	—
.017	1/8	.051	3x	1-1/2	Regular	45490	—	—
.018	1/8	.027	1.5x	1-1/2	Stub	45491	—	—
.018	1/8	.054	3x	1-1/2	Regular	45492	96540	—
.019	1/8	.029	1.5x	1-1/2	Stub	45493	—	—
.019	1/8	.057	3x	1-1/2	Regular	45494	—	—
.020	1/8	.030	1.5x	1-1/2	Stub	45495	96541	—
.020	1/8	.060	3x	1-1/2	Regular	45496	96542	96627
.021	1/8	.032	1.5x	1-1/2	Stub	45497	—	—
.021	1/8	.063	3x	1-1/2	Regular	45498	—	—
.022	1/8	.033	1.5x	1-1/2	Stub	45499	—	—
.022	1/8	.066	3x	1-1/2	Regular	45500	—	—
.023	1/8	.035	1.5x	1-1/2	Stub	45501	—	—
.023	1/8	.069	3x	1-1/2	Regular	45502	—	—
.024	1/8	.036	1.5x	1-1/2	Stub	45503	—	—
.024	1/8	.072	3x	1-1/2	Regular	45504	—	—
.025	1/8	.038	1.5x	1-1/2	Stub	45505	96543	—
.025	1/8	.075	3x	1-1/2	Regular	45506	96544	96628
.026	1/8	.039	1.5x	1-1/2	Stub	45507	—	—
.026	1/8	.078	3x	1-1/2	Regular	45508	—	—
.027	1/8	.041	1.5x	1-1/2	Stub	45509	—	—
.027	1/8	.081	3x	1-1/2	Regular	45510	—	—
.028	1/8	.042	1.5x	1-1/2	Stub	45511	—	—
.028	1/8	.084	3x	1-1/2	Regular	45512	—	—
.029	1/8	.044	1.5x	1-1/2	Stub	45513	—	—
.029	1/8	.087	3x	1-1/2	Regular	45514	—	—
.030	1/8	.045	1.5x	1-1/2	Stub	45515	96545	—
.030	1/8	.090	3x	1-1/2	Regular	45516	96546	96629
.031 (1/32)	1/8	.047	1.5x	1-1/2	Stub	45517	96547	—
.031 (1/32)	1/8	.093	3x	1-1/2	Regular	45518	96548	96630
.032	1/8	.048	1.5x	1-1/2	Stub	45519	—	—
.032	1/8	.096	3x	1-1/2	Regular	45520	—	—
.033	1/8	.050	1.5x	1-1/2	Stub	45521	—	—
.033	1/8	.099	3x	1-1/2	Regular	45522	—	—
.034	1/8	.051	1.5x	1-1/2	Stub	45523	—	—
.034	1/8	.102	3x	1-1/2	Regular	45524	—	—

(continued)

# Solid Carbide 2-Flute Miniature Square End Single End Mills

List No. 5914 2-Flute Square End

(continued)



DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.035	1/8	.053	1.5x	1-1/2	Stub	45525	96549	—
.035	1/8	.105	3x	1-1/2	Regular	45526	96550	96631
.036	1/8	.054	1.5x	1-1/2	Stub	45527	—	—
.036	1/8	.108	3x	1-1/2	Regular	45528	—	—
.037	1/8	.056	1.5x	1-1/2	Stub	45529	—	—
.037	1/8	.111	3x	1-1/2	Regular	45530	—	—
.038	1/8	.057	1.5x	1-1/2	Stub	45531	—	—
.038	1/8	.114	3x	1-1/2	Regular	45532	—	—
.039	1/8	.059	1.5x	1-1/2	Stub	45533	—	—
.039	1/8	.117	3x	1-1/2	Regular	45534	96551	—
.040	1/8	.060	1.5x	1-1/2	Stub	45535	96552	—
.040	1/8	.120	3x	1-1/2	Regular	45536	96553	96632
.041	1/8	.123	3x	1-1/2	Regular	45537	—	—
.042	1/8	.126	3x	1-1/2	Regular	45538	—	—
.043	1/8	.129	3x	1-1/2	Regular	45539	—	—
.044	1/8	.132	3x	1-1/2	Regular	45540	—	—
.045	1/8	.068	1.5x	1-1/2	Stub	45541	96554	—
.045	1/8	.135	3x	1-1/2	Regular	45542	96555	96633
.046	1/8	.138	3x	1-1/2	Regular	45543	—	—
.047 (3/64)	1/8	.071	1.5x	1-1/2	Stub	45544	96556	—
.047 (3/64)	1/8	.141	3x	1-1/2	Regular	45545	96557	96634
.048	1/8	.144	3x	1-1/2	Regular	45546	—	—
.049	1/8	.147	3x	1-1/2	Regular	45547	—	—
.050	1/8	.074	1.5x	1-1/2	Stub	45548	96558	—
.050	1/8	.150	3x	1-1/2	Regular	45549	96559	96635
.051	1/8	.153	3x	1-1/2	Regular	45550	—	—
.052	1/8	.156	3x	1-1/2	Regular	45551	—	—
.053	1/8	.159	3x	1-1/2	Regular	45552	—	—
.054	1/8	.162	3x	1-1/2	Regular	45553	—	—
.055	1/8	.083	1.5x	1-1/2	Stub	45554	96560	—
.055	1/8	.165	3x	1-1/2	Regular	45555	96561	96636
.056	1/8	.168	3x	1-1/2	Regular	45556	—	—
.057	1/8	.171	3x	1-1/2	Regular	45557	—	—
.058	1/8	.174	3x	1-1/2	Regular	45558	—	—
.059	1/8	.177	3x	1-1/2	Regular	45559	—	—
.060	1/8	.090	1.5x	1-1/2	Stub	45560	96562	—
.060	1/8	.180	3x	1-1/2	Regular	45561	96563	96637
.062 (1/16)	1/8	.093	1.5x	1-1/2	Stub	45562	96564	—
.062 (1/16)	1/8	.186	3x	1-1/2	Regular	45563	96565	96638
.065	1/8	.098	1.5x	1-1/2	Stub	45564	96566	—
.065	1/8	.195	3x	1-1/2	Regular	45565	96567	96639
.070	1/8	.105	1.5x	1-1/2	Stub	45566	96568	—
.070	1/8	.210	3x	1-1/2	Regular	45567	96569	96640
.075	1/8	.113	1.5x	1-1/2	Stub	45568	96570	—
.075	1/8	.225	3x	1-1/2	Regular	45569	96571	—
.078 (5/64)	1/8	.117	1.5x	1-1/2	Stub	45570	96572	—
.078 (5/64)	1/8	.234	3x	1-1/2	Regular	45571	96573	96641
.080	1/8	.120	1.5x	1-1/2	Stub	45572	96574	—
.080	1/8	.240	3x	1-1/2	Regular	45573	96575	96642
.085	1/8	.128	1.5x	1-1/2	Stub	45574	96576	—
.085	1/8	.255	3x	1-1/2	Regular	45575	96577	—
.090	1/8	.135	1.5x	1-1/2	Stub	45576	96578	—
.090	1/8	.270	3x	1-1/2	Regular	45577	96579	96643
.093 (3/32)	1/8	.140	1.5x	1-1/2	Stub	45578	96580	—
.093 (3/32)	1/8	.279	3x	1-1/2	Regular	45579	96581	96644
.095	1/8	.143	1.5x	1-1/2	Stub	45580	96582	—
.095	1/8	.285	3x	1-1/2	Regular	45581	96583	—
.100	1/8	.150	1.5x	1-1/2	Stub	45582	96584	—
.100	1/8	.300	3x	1-1/2	Regular	45583	96585	96645
.105	1/8	.158	1.5x	1-1/2	Stub	45584	96586	—
.105	1/8	.315	3x	1-1/2	Regular	45585	96587	—
.110	1/8	.165	1.5x	1-1/2	Stub	45586	96588	—
.110	1/8	.330	3x	1-1/2	Regular	45587	96589	—
.115	1/8	.173	1.5x	1-1/2	Stub	45588	96590	—
.115	1/8	.345	3x	1-1/2	Regular	45589	96591	—
.120	1/8	.180	1.5x	1-1/2	Stub	52452	—	—
.120	1/8	.360	3x	1-1/2	Regular	52601	—	—



# Solid Carbide 2-Flute Miniature Ball Nose Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
Stub Length & Regular Length  
For materials less than 48Rc hardness  
Dia. Tolerance +.0005" / -.0005"



List No. 5915 2-Flute Ball Nose

Speeds & Feeds: Page 317

ALTiN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.



DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.005	1/8	.008	1.5x	1-1/2	Stub	45594	—	—
.005	1/8	.015	3x	1-1/2	Regular	45595	—	—
.006	1/8	.009	1.5x	1-1/2	Stub	45596	—	—
.006	1/8	.018	3x	1-1/2	Regular	45597	—	—
.007	1/8	.011	1.5x	1-1/2	Stub	45598	—	—
.007	1/8	.021	3x	1-1/2	Regular	45599	—	—
.008	1/8	.012	1.5x	1-1/2	Stub	45600	—	—
.008	1/8	.024	3x	1-1/2	Regular	45601	—	—
.009	1/8	.014	1.5x	1-1/2	Stub	45602	—	—
.009	1/8	.027	3x	1-1/2	Regular	45603	—	—
.010	1/8	.015	1.5x	1-1/2	Stub	45604	96594	—
.010	1/8	.030	3x	1-1/2	Regular	45605	96595	96649
.011	1/8	.017	1.5x	1-1/2	Stub	45606	—	—
.011	1/8	.033	3x	1-1/2	Regular	45607	—	—
.012	1/8	.018	1.5x	1-1/2	Stub	45608	—	—
.012	1/8	.036	3x	1-1/2	Regular	45609	—	—
.013	1/8	.020	1.5x	1-1/2	Stub	45610	—	—
.013	1/8	.039	3x	1-1/2	Regular	45611	—	—
.014	1/8	.021	1.5x	1-1/2	Stub	45612	—	—
.014	1/8	.042	3x	1-1/2	Regular	45613	—	—
.015 (1/64)	1/8	.023	1.5x	1-1/2	Stub	45614	96596	—
.015 (1/64)	1/8	.045	3x	1-1/2	Regular	45615	96597	96650
.016	1/8	.024	1.5x	1-1/2	Stub	45616	—	—
.016	1/8	.048	3x	1-1/2	Regular	45617	—	—
.017	1/8	.026	1.5x	1-1/2	Stub	45618	—	—
.017	1/8	.051	3x	1-1/2	Regular	45619	—	—
.018	1/8	.027	1.5x	1-1/2	Stub	45620	—	—
.018	1/8	.054	3x	1-1/2	Regular	45621	—	—
.019	1/8	.029	1.5x	1-1/2	Stub	45622	—	—
.019	1/8	.057	3x	1-1/2	Regular	45623	—	—
.020	1/8	.030	1.5x	1-1/2	Stub	45624	96598	—
.020	1/8	.060	3x	1-1/2	Regular	45625	96599	96651
.021	1/8	.032	1.5x	1-1/2	Stub	45626	—	—
.021	1/8	.063	3x	1-1/2	Regular	45627	—	—
.022	1/8	.033	1.5x	1-1/2	Stub	45628	—	—
.022	1/8	.066	3x	1-1/2	Regular	45629	—	—
.023	1/8	.035	1.5x	1-1/2	Stub	45630	—	—
.023	1/8	.069	3x	1-1/2	Regular	45631	—	—
.024	1/8	.036	1.5x	1-1/2	Stub	45632	—	—
.024	1/8	.072	3x	1-1/2	Regular	45633	—	—
.025	1/8	.038	1.5x	1-1/2	Stub	45634	96600	—
.025	1/8	.075	3x	1-1/2	Regular	45635	96601	96652
.026	1/8	.039	1.5x	1-1/2	Stub	45636	—	—
.026	1/8	.078	3x	1-1/2	Regular	45637	—	—
.027	1/8	.041	1.5x	1-1/2	Stub	45638	—	—
.027	1/8	.081	3x	1-1/2	Regular	45639	—	—
.028	1/8	.042	1.5x	1-1/2	Stub	45640	—	—
.028	1/8	.084	3x	1-1/2	Regular	45641	—	—
.029	1/8	.044	1.5x	1-1/2	Stub	45642	—	—
.029	1/8	.087	3x	1-1/2	Regular	45643	—	—
.030	1/8	.045	1.5x	1-1/2	Stub	45644	96602	—
.030	1/8	.090	3x	1-1/2	Regular	45645	96603	96653
.031 (1/32)	1/8	.047	1.5x	1-1/2	Stub	45646	96604	—
.031 (1/32)	1/8	.093	3x	1-1/2	Regular	45647	96605	96654
.032	1/8	.048	1.5x	1-1/2	Stub	45648	—	—
.032	1/8	.096	3x	1-1/2	Regular	45649	—	—

(continued)

# Solid Carbide 2-Flute Miniature Ball Nose Single End Mills

List No. 5915 2-Flute Ball Nose

(continued)



DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.033	1/8	.050	1.5x	1-1/2	Stub	45650	—	—
.033	1/8	.099	3x	1-1/2	Regular	45651	—	—
.034	1/8	.051	1.5x	1-1/2	Stub	45652	—	—
.034	1/8	.102	3x	1-1/2	Regular	45653	—	—
.035	1/8	.053	1.5x	1-1/2	Stub	45654	96606	—
.035	1/8	.105	3x	1-1/2	Regular	45655	96607	96655
.036	1/8	.054	1.5x	1-1/2	Stub	45656	—	—
.036	1/8	.108	3x	1-1/2	Regular	45657	—	—
.037	1/8	.056	1.5x	1-1/2	Stub	45658	—	—
.037	1/8	.111	3x	1-1/2	Regular	45659	—	—
.038	1/8	.057	1.5x	1-1/2	Stub	45660	—	—
.038	1/8	.114	3x	1-1/2	Regular	45661	—	—
.039	1/8	.059	1.5x	1-1/2	Stub	45662	—	—
.039	1/8	.117	3x	1-1/2	Regular	45663	—	—
.040	1/8	.060	1.5x	1-1/2	Stub	45664	96608	—
.040	1/8	.120	3x	1-1/2	Regular	45665	96609	96656
.041	1/8	.123	3x	1-1/2	Regular	45666	—	—
.042	1/8	.126	3x	1-1/2	Regular	45667	—	—
.043	1/8	.129	3x	1-1/2	Regular	45668	—	—
.044	1/8	.132	3x	1-1/2	Regular	45669	—	—
.045	1/8	.068	1.5x	1-1/2	Stub	45670	—	—
.045	1/8	.135	3x	1-1/2	Regular	45671	96610	96657
.046	1/8	.138	3x	1-1/2	Regular	45672	—	—
.047 (3/64)	1/8	.071	1.5x	1-1/2	Stub	45673	96611	—
.047 (3/64)	1/8	.141	3x	1-1/2	Regular	45674	96612	96658
.048	1/8	.144	3x	1-1/2	Regular	45675	—	—
.049	1/8	.147	3x	1-1/2	Regular	45676	—	—
.050	1/8	.075	1.5x	1-1/2	Stub	45677	—	—
.050	1/8	.150	3x	1-1/2	Regular	45678	96613	96659
.051	1/8	.153	3x	1-1/2	Regular	45679	—	—
.052	1/8	.156	3x	1-1/2	Regular	45680	—	—
.053	1/8	.159	3x	1-1/2	Regular	45681	—	—
.054	1/8	.162	3x	1-1/2	Regular	45682	—	—
.055	1/8	.083	1.5x	1-1/2	Stub	45683	—	—
.055	1/8	.165	3x	1-1/2	Regular	45684	96614	96660
.056	1/8	.168	3x	1-1/2	Regular	45685	—	—
.057	1/8	.171	3x	1-1/2	Regular	45686	—	—
.058	1/8	.174	3x	1-1/2	Regular	45687	—	—
.059	1/8	.177	3x	1-1/2	Regular	45688	—	—
.060	1/8	.090	1.5x	1-1/2	Stub	45689	—	—
.060	1/8	.180	3x	1-1/2	Regular	45690	96615	96661
.062 (1/16)	1/8	.093	1.5x	1-1/2	Stub	45691	96616	—
.062 (1/16)	1/8	.186	3x	1-1/2	Regular	45692	96617	96662
.065	1/8	.098	1.5x	1-1/2	Stub	45693	—	—
.065	1/8	.195	3x	1-1/2	Regular	45694	—	96663
.070	1/8	.105	1.5x	1-1/2	Stub	45695	—	—
.070	1/8	.210	3x	1-1/2	Regular	45696	—	96664
.075	1/8	.113	1.5x	1-1/2	Stub	45697	—	—
.075	1/8	.225	3x	1-1/2	Regular	45698	—	—
.078 (5/64)	1/8	.117	1.5x	1-1/2	Stub	45699	96618	—
.078 (5/64)	1/8	.234	3x	1-1/2	Regular	45700	96619	96665
.080	1/8	.120	1.5x	1-1/2	Stub	45701	—	—
.080	1/8	.240	3x	1-1/2	Regular	45702	—	96666
.085	1/8	.128	1.5x	1-1/2	Stub	45703	—	—
.085	1/8	.255	3x	1-1/2	Regular	45704	—	—
.090	1/8	.135	1.5x	1-1/2	Stub	45705	—	—
.090	1/8	.270	3x	1-1/2	Regular	45706	—	96667
.093 (3/32)	1/8	.140	1.5x	1-1/2	Stub	45707	96620	—
.093 (3/32)	1/8	.279	3x	1-1/2	Regular	45708	96621	96668
.095	1/8	.143	1.5x	1-1/2	Stub	45709	—	—
.095	1/8	.285	3x	1-1/2	Regular	45710	—	—
.100	1/8	.150	1.5x	1-1/2	Stub	45711	—	—
.100	1/8	.300	3x	1-1/2	Regular	45712	—	96669
.105	1/8	.315	3x	1-1/2	Regular	45713	—	—
.110	1/8	.330	3x	1-1/2	Regular	45714	—	—
.115	1/8	.345	3x	1-1/2	Regular	45715	—	—
.120	1/8	.360	3x	1-1/2	Regular	45716	—	—
.120	1/8	.180	1.5x	1-1/2	Stub	52477	—	—

# Solid Carbide 3-Flute Miniature Square End Single End Mills



Micrograin Carbide - Center Cutting - 30° Helix Angle  
 For materials less than 48Rc hardness  
 Dia. Tolerance +.0005" / -.0005"

List No. 5916 3-Flute Square End

ALTiN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

Speeds & Feeds: Page 317

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.



DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.010	1/8	.015	1.5x	.030	3x	2-1/2	45970	97020	—
.010	1/8	.015	1.5x	.050	5x	2-1/2	45971	97021	97480
.010	1/8	.015	1.5x	.080	8x	2-1/2	45972	97022	97481
.010	1/8	.015	1.5x	.125	12x	2-1/2	45973	97023	97482
.010	1/8	.015	1.5x	.150	15x	2-1/2	45974	97024	—
.010	1/8	.050	5x	—	—	2-1/2	45975	97025	97483
.010	1/8	.050	5x	.100	10x	2-1/2	45976	97026	97484
.015 (1/64)	1/8	.022	1.5x	.045	3x	2-1/2	45977	97027	—
.015 (1/64)	1/8	.022	1.5x	.078	5x	2-1/2	45978	97028	97485
.015 (1/64)	1/8	.022	1.5x	.125	8x	2-1/2	45979	97029	97486
.015 (1/64)	1/8	.022	1.5x	.156	10x	2-1/2	45980	97030	—
.015 (1/64)	1/8	.022	1.5x	.225	15x	2-1/2	45981	97031	97487
.015 (1/64)	1/8	.022	1.5x	.270	18x	2-1/2	45982	97032	—
.015 (1/64)	1/8	.022	1.5x	.300	20x	2-1/2	45983	97033	—
.015 (1/64)	1/8	.022	1.5x	.375	25x	2-1/2	45984	97034	—
.015 (1/64)	1/8	.078	5x	—	—	2-1/2	45985	97035	97488
.015 (1/64)	1/8	.078	5x	.150	10x	2-1/2	45986	97036	97489
.015 (1/64)	1/8	.125	8x	—	—	2-1/2	45987	97037	97490
.015 (1/64)	1/8	.187	12x	—	—	2-1/2	45988	97038	—
.020	1/8	.030	1.5x	.100	5x	2-1/2	45989	97039	97491
.020	1/8	.030	1.5x	.160	8x	2-1/2	45990	97040	97492
.020	1/8	.030	1.5x	.200	10x	2-1/2	45991	97041	—
.020	1/8	.030	1.5x	.250	12x	2-1/2	45992	97042	97493
.020	1/8	.030	1.5x	.300	15x	2-1/2	45993	97043	97494
.020	1/8	.030	1.5x	.500	25x	2-1/2	45994	97044	—
.020	1/8	.100	5x	—	—	2-1/2	45995	97045	97495
.020	1/8	.100	5x	.200	10x	2-1/2	45996	97046	97496
.020	1/8	.160	8x	—	—	2-1/2	45997	97047	—
.020	1/8	.250	12x	—	—	2-1/2	45998	97048	—
.025	1/8	.037	1.5x	.075	3x	2-1/2	45999	97049	—
.025	1/8	.037	1.5x	.125	5x	2-1/2	46000	97050	97497
.025	1/8	.037	1.5x	.203	8x	2-1/2	46001	97051	97498
.025	1/8	.037	1.5x	.250	10x	2-1/2	46002	97052	—
.025	1/8	.037	1.5x	.375	15x	2-1/2	46003	97053	97499
.025	1/8	.037	1.5x	.500	20x	2-1/2	46004	97054	—
.025	1/8	.125	5x	—	—	2-1/2	46005	97055	97500
.025	1/8	.125	5x	.250	10x	2-1/2	46006	97056	97501
.025	1/8	.203	8x	—	—	2-1/2	46007	97057	—
.030	1/8	.045	1.5x	.090	3x	2-1/2	46008	97058	—
.030	1/8	.045	1.5x	.156	5x	2-1/2	46009	97059	97502
.030	1/8	.045	1.5x	.250	8x	2-1/2	46010	97060	97503
.030	1/8	.045	1.5x	.312	10x	2-1/2	46011	97061	—
.030	1/8	.045	1.5x	.375	12x	2-1/2	46012	97062	97504
.030	1/8	.150	5x	—	—	2-1/2	46013	97063	97505
.030	1/8	.150	5x	.300	10x	2-1/2	46014	97064	97506
.030	1/8	.250	8x	—	—	2-1/2	46015	97065	—
.031 (1/32)	1/8	.046	1.5x	.093	3x	2-1/2	46016	97066	—
.031 (1/32)	1/8	.046	1.5x	.156	5x	2-1/2	46017	97067	97507
.031 (1/32)	1/8	.046	1.5x	.250	8x	2-1/2	46018	97068	97508
.031 (1/32)	1/8	.046	1.5x	.312	10x	2-1/2	46019	97069	—
.031 (1/32)	1/8	.046	1.5x	.375	12x	2-1/2	46020	97070	97509
.031 (1/32)	1/8	.046	1.5x	.470	15x	2-1/2	46021	97071	97510
.031 (1/32)	1/8	.046	1.5x	.565	18x	2-1/2	46022	97072	—
.031 (1/32)	1/8	.046	1.5x	.625	20x	2-1/2	46023	97073	—
.031 (1/32)	1/8	.046	1.5x	.775	25x	2-1/2	46024	97074	—
.031 (1/32)	1/8	.046	1.5x	.937	30x	2-1/2	46025	—	—
.031 (1/32)	1/8	.156	5x	—	—	2-1/2	46026	97075	97511
.031 (1/32)	1/8	.156	5x	.310	10x	2-1/2	46027	97076	97512

(continued)

# Solid Carbide 3-Flute Miniature Square End Single End Mills

List No. 5916 3-Flute Square End



(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.031 (1/32)	1/8	.250	8x	—	—	2-1/2	46028	97077	97513
.031 (1/32)	1/8	.312	10x	—	—	2-1/2	46029	97078	—
.031 (1/32)	1/8	.375	12x	—	—	2-1/2	46030	97079	97514
.031 (1/32)	1/8	.470	15x	—	—	2-1/2	46031	97080	—
.035	1/8	.052	1.5x	.105	3x	2-1/2	46032	97081	—
.035	1/8	.052	1.5x	.187	5x	2-1/2	46033	97082	97515
.035	1/8	.052	1.5x	.281	8x	2-1/2	46034	97083	97516
.035	1/8	.052	1.5x	.425	12x	2-1/2	46035	97084	97517
.035	1/8	.052	1.5x	.525	15x	2-1/2	46036	97085	—
.035	1/8	.175	5x	—	—	2-1/2	46037	97086	97518
.035	1/8	.175	5x	.350	10x	2-1/2	46038	97087	97519
.035	1/8	.280	8x	—	—	2-1/2	46039	97088	—
.039	1/8	.059	1.5x	.117	3x	2-1/2	46040	97089	—
.039	1/8	.059	1.5x	.203	5x	2-1/2	46041	97090	—
.039	1/8	.059	1.5x	.325	8x	2-1/2	46042	97091	—
.039	1/8	.059	1.5x	.480	12x	2-1/2	46043	97092	—
.039	1/8	.203	5x	—	—	2-1/2	46044	97093	—
.040	1/8	.060	1.5x	.120	3x	2-1/2	46045	97094	—
.040	1/8	.060	1.5x	.203	5x	2-1/2	46046	97095	97520
.040	1/8	.060	1.5x	.325	8x	2-1/2	46047	97096	97521
.040	1/8	.060	1.5x	.400	10x	2-1/2	46048	97097	—
.040	1/8	.060	1.5x	.480	12x	2-1/2	46049	97098	97522
.040	1/8	.060	1.5x	.600	15x	2-1/2	46050	97099	—
.040	1/8	.060	1.5x	.800	20x	2-1/2	46051	97100	—
.040	1/8	.200	5x	—	—	2-1/2	46052	97101	97523
.040	1/8	.200	5x	.400	10x	2-1/2	46053	97102	97524
.040	1/8	.325	8x	—	—	2-1/2	46054	97103	—
.040	1/8	.480	12x	—	—	2-1/2	46055	97104	—
.045	1/8	.067	1.5x	.450	10x	2-1/2	46056	97105	—
.045	1/8	.067	1.5x	.550	12x	2-1/2	46057	97106	97525
.045	1/8	.067	1.5x	.680	15x	2-1/2	46058	97107	—
.045	1/8	.067	1.5x	.900	20x	2-1/2	46059	97108	—
.045	1/8	.225	5x	—	—	2-1/2	46060	97109	97526
.045	1/8	.375	8x	—	—	2-1/2	46061	97110	—
.045	1/8	.550	12x	—	—	2-1/2	46062	97111	—
.047 (3/64)	1/8	.070	1.5x	.141	3x	2-1/2	46063	97112	—
.047 (3/64)	1/8	.070	1.5x	.250	5x	2-1/2	46064	97113	97527
.047 (3/64)	1/8	.070	1.5x	.375	8x	2-1/2	46065	97114	97528
.047 (3/64)	1/8	.070	1.5x	.480	10x	2-1/2	46066	97115	—
.047 (3/64)	1/8	.070	1.5x	.570	12x	2-1/2	46067	97116	97529
.047 (3/64)	1/8	.070	1.5x	.710	15x	2-1/2	46068	97117	—
.047 (3/64)	1/8	.070	1.5x	.850	18x	2-1/2	46069	97118	—
.047 (3/64)	1/8	.070	1.5x	.950	20x	2-1/2	46070	97119	—
.047 (3/64)	1/8	.250	5x	—	—	2-1/2	46071	97120	97530
.047 (3/64)	1/8	.250	5x	.500	10x	2-1/2	46072	97121	97531
.047 (3/64)	1/8	.375	8x	—	—	2-1/2	46073	97122	97532
.047 (3/64)	1/8	.480	10x	—	—	2-1/2	46074	97123	—
.047 (3/64)	1/8	.570	12x	—	—	2-1/2	46075	97124	97533
.047 (3/64)	1/8	.710	15x	—	—	2-1/2	46076	97125	—
.050	1/8	.075	1.5x	.150	3x	2-1/2	46077	97126	—
.050	1/8	.075	1.5x	.250	5x	2-1/2	46078	97127	97534
.050	1/8	.075	1.5x	.400	8x	2-1/2	46079	97128	97535
.050	1/8	.075	1.5x	.500	10x	2-1/2	46080	97129	—
.050	1/8	.075	1.5x	.600	12x	2-1/2	46081	97130	97536
.050	1/8	.075	1.5x	.750	15x	2-1/2	46082	97131	—
.050	1/8	.300	6x	—	—	2-1/2	46083	97132	97537
.050	1/8	.400	8x	—	—	2-1/2	46084	97133	—
.050	1/8	.600	12x	—	—	2-1/2	46085	97134	—
.055	1/8	.082	1.5x	.165	3x	2-1/2	46086	97135	—
.055	1/8	.082	1.5x	.275	5x	2-1/2	46087	97136	97538
.055	1/8	.082	1.5x	.450	8x	2-1/2	46088	97137	97539
.055	1/8	.082	1.5x	.560	10x	2-1/2	46089	97138	—
.055	1/8	.082	1.5x	.660	12x	2-1/2	46090	97139	97540

(continued)

# Solid Carbide 3-Flute Miniature Square End Single End Mills

List No. 5916 3-Flute Square End

(continued)

Speeds & Feeds: Page 317



END MILLS

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.055	1/8	.082	1.5x	.825	15x	2-1/2	46091	97140	—
.055	1/8	.275	5x	—	—	2-1/2	46092	97141	—
.055	1/8	.385	7x	—	—	2-1/2	46093	97142	97541
.055	1/8	.385	7x	.770	14x	2-1/2	46094	97143	97542
.055	1/8	.660	12x	—	—	2-1/2	46095	97144	—
.060	1/8	.090	1.5x	.180	3x	2-1/2	46096	97145	—
.060	1/8	.090	1.5x	.312	5x	2-1/2	46097	97146	97543
.060	1/8	.090	1.5x	.500	8x	2-1/2	46098	97147	97544
.060	1/8	.090	1.5x	.625	10x	2-1/2	46099	97148	—
.060	1/8	.090	1.5x	.720	12x	2-1/2	46100	97149	97545
.060	1/8	.090	1.5x	.900	15x	2-1/2	46101	97150	—
.060	1/8	.312	5x	—	—	2-1/2	46102	97151	—
.060	1/8	.500	8x	—	—	2-1/2	46103	97152	97546
.062 (1/16)	1/8	.093	1.5x	.186	3x	2-1/2	46104	97153	—
.062 (1/16)	1/8	.093	1.5x	.312	5x	2-1/2	46105	97154	97547
.062 (1/16)	1/8	.093	1.5x	.500	8x	2-1/2	46106	97155	97548
.062 (1/16)	1/8	.093	1.5x	.625	10x	2-1/2	46107	97156	—
.062 (1/16)	1/8	.093	1.5x	.750	12x	2-1/2	46108	97157	97549
.062 (1/16)	1/8	.093	1.5x	.950	15x	2-1/2	46109	97158	97550
.062 (1/16)	1/8	.093	1.5x	1.125	18x	2-1/2	46110	97159	—
.062 (1/16)	1/8	.093	1.5x	1.250	20x	2-1/2	46111	97160	—
.062 (1/16)	1/8	.093	1.5x	1.375	22x	3	46112	97161	—
.062 (1/16)	1/8	.093	1.5x	1.550	25x	3	46113	97162	—
.062 (1/16)	1/8	.312	5x	—	—	2-1/2	46114	97163	97551
.062 (1/16)	1/8	.500	8x	—	—	2-1/2	46115	97164	97552
.062 (1/16)	1/8	.500	8x	1.000	16x	2-1/2	46116	97165	97553
.062 (1/16)	1/8	.625	10x	—	—	2-1/2	46117	97166	—
.062 (1/16)	1/8	.750	12x	—	—	2-1/2	46118	97167	97554
.062 (1/16)	1/8	.950	15x	—	—	2-1/2	46119	97168	97555
.065	1/8	.097	1.5x	.325	5x	2-1/2	46120	97169	—
.065	1/8	.097	1.5x	.530	8x	2-1/2	46121	97170	97556
.065	1/8	.097	1.5x	.800	12x	2-1/2	46122	97171	—
.065	1/8	.325	5x	—	—	2-1/2	46123	97172	—
.065	1/8	.500	8x	—	—	2-1/2	46124	97173	97557
.070	1/8	.105	1.5x	.375	5x	2-1/2	46125	97174	—
.070	1/8	.105	1.5x	.570	8x	2-1/2	46126	97175	97558
.070	1/8	.105	1.5x	.850	12x	2-1/2	46127	97176	—
.070	1/8	.105	1.5x	1.062	15x	2-1/2	46128	97177	—
.070	1/8	.375	5x	—	—	2-1/2	46129	97178	—
.070	1/8	.500	7x	—	—	2-1/2	46130	97179	97559
.070	1/8	.500	7x	1.000	14x	2-1/2	46131	97180	97560
.075	1/8	.112	1.5x	.375	5x	2-1/2	46132	97181	—
.075	1/8	.112	1.5x	.625	8x	2-1/2	46133	97182	97561
.075	1/8	.112	1.5x	.900	12x	2-1/2	46134	97183	—
.075	1/8	.375	5x	—	—	2-1/2	46135	97184	—
.075	1/8	.500	7x	—	—	2-1/2	46136	97185	97562
.078 (5/64)	1/8	.117	1.5x	.234	3x	2-1/2	46137	97186	—
.078 (5/64)	1/8	.117	1.5x	.406	5x	2-1/2	46138	97187	97563
.078 (5/64)	1/8	.117	1.5x	.625	8x	2-1/2	46139	97188	97564
.078 (5/64)	1/8	.117	1.5x	.800	10x	2-1/2	46140	97189	—
.078 (5/64)	1/8	.117	1.5x	.940	12x	2-1/2	46141	97190	97565
.078 (5/64)	1/8	.117	1.5x	1.187	15x	2-1/2	46142	97191	—
.078 (5/64)	1/8	.117	1.5x	1.562	20x	3	46143	97192	—
.078 (5/64)	1/8	.406	5x	—	—	2-1/2	46144	97193	97566
.078 (5/64)	1/8	.500	6x	1.000	12x	2-1/2	46145	97194	97567
.078 (5/64)	1/8	.625	8x	—	—	2-1/2	46146	97195	97568
.078 (5/64)	1/8	.800	10x	—	—	2-1/2	46147	97196	—
.078 (5/64)	1/8	.940	12x	—	—	2-1/2	46148	97197	97569
.078 (5/64)	1/8	1.187	15x	—	—	2-1/2	46149	97198	97570
.080	1/8	.120	1.5x	.406	5x	2-1/2	46150	97199	—
.080	1/8	.120	1.5x	.650	8x	2-1/2	46151	97200	97571
.080	1/8	.120	1.5x	.960	12x	2-1/2	46152	97201	—
.080	1/8	.406	5x	—	—	2-1/2	46153	97202	—

(continued)

# Solid Carbide 3-Flute Miniature Square End Single End Mills

List No. 5916 3-Flute Square End



(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.080	1/8	.750	9x	—	—	2-1/2	46154	97203	97572
.080	1/8	.750	9x	1.250	15x	2-1/2	46155	97204	97573
.080	1/8	.960	12x	—	—	2-1/2	46156	97205	—
.085	1/8	.127	1.5x	.425	5x	2-1/2	46157	97206	—
.085	1/8	.127	1.5x	.700	8x	2-1/2	46158	97207	97574
.085	1/8	.127	1.5x	1.020	12x	2-1/2	46159	97208	—
.085	1/8	.425	5x	—	—	2-1/2	46160	97209	—
.085	1/8	.750	9x	—	—	2-1/2	46161	97210	97575
.085	1/8	.750	9x	1.250	14x	2-1/2	46162	97211	97576
.090	1/8	.135	1.5x	.450	5x	2-1/2	46163	97212	—
.090	1/8	.135	1.5x	.750	8x	2-1/2	46164	97213	97577
.090	1/8	.135	1.5x	1.080	12x	2-1/2	46165	97214	—
.090	1/8	.450	5x	—	—	2-1/2	46166	97215	—
.090	1/8	.750	8x	—	—	2-1/2	46167	97216	97578
.090	1/8	.750	8x	1.250	13x	2-1/2	46168	97217	97579
.090	1/8	1.080	12x	—	—	2-1/2	46169	97218	—
.093 (3/32)	1/8	.139	1.5x	.279	3x	2-1/2	46170	97219	—
.093 (3/32)	1/8	.139	1.5x	.500	5x	2-1/2	46171	97220	97580
.093 (3/32)	1/8	.139	1.5x	.750	8x	2-1/2	46172	97221	97581
.093 (3/32)	1/8	.139	1.5x	.950	10x	2-1/2	46173	97222	—
.093 (3/32)	1/8	.139	1.5x	1.125	12x	2-1/2	46174	97223	97582
.093 (3/32)	1/8	.139	1.5x	1.400	15x	3	46175	97224	97583
.093 (3/32)	1/8	.139	1.5x	1.675	18x	3	46176	97225	—
.093 (3/32)	1/8	.139	1.5x	1.875	20x	4	46177	97226	—
.093 (3/32)	1/8	.500	5x	—	—	2-1/2	46178	97227	97584
.093 (3/32)	1/8	.750	8x	—	—	2-1/2	46179	97228	97585
.093 (3/32)	1/8	.750	8x	1.250	13x	2-1/2	46180	97229	97586
.093 (3/32)	1/8	.950	10x	—	—	2-1/2	46181	97230	—
.093 (3/32)	1/8	1.125	12x	—	—	2-1/2	46182	97231	97587
.093 (3/32)	1/8	1.400	15x	—	—	3	46183	97232	97588
.095	1/8	.142	1.5x	.500	5x	2-1/2	46184	97233	—
.095	1/8	.142	1.5x	.750	8x	2-1/2	46185	97234	97589
.095	1/8	.142	1.5x	1.150	12x	2-1/2	46186	97235	—
.100	1/8	.150	1.5x	.500	5x	2-1/2	46187	97236	—
.100	1/8	.150	1.5x	.800	8x	2-1/2	46188	97237	97590
.100	1/8	.150	1.5x	1.200	12x	2-1/2	46189	97238	—
.100	1/8	.150	1.5x	1.500	15x	3	46190	97239	—
.100	1/8	.500	5x	—	—	2-1/2	46191	97240	—
.100	1/8	.750	7.5x	—	—	2-1/2	46192	97241	97591
.100	1/8	.750	7.5x	1.250	12x	2-1/2	46193	97242	97592
.100	1/8	1.200	12x	—	—	2-1/2	46194	97243	—
.109 (7/64)	1/8	.163	1.5x	.570	5x	2-1/2	46195	97244	—
.109 (7/64)	1/8	.163	1.5x	.900	8x	2-1/2	46196	97245	—
.109 (7/64)	1/8	.570	5x	—	—	2-1/2	46197	97246	—
.109 (7/64)	1/8	.900	8x	—	—	2-1/2	46198	97247	—
.118	1/8	.177	1.5x	.625	5x	2-1/2	46199	97248	—
.118	1/8	.177	1.5x	.950	8x	2-1/2	46200	97249	—
.118	1/8	.177	1.5x	1.420	12x	3	46201	97250	—
.118	1/8	.625	5x	—	—	2-1/2	46202	97251	—
.118	1/8	.950	8x	—	—	2-1/2	46203	97252	—
.125 (1/8)	1/8	.187	1.5x	.375	3x	2-1/2	46204	97253	—
.125 (1/8)	1/8	.187	1.5x	.625	5x	2-1/2	46205	97254	97593
.125 (1/8)	1/8	.187	1.5x	1.000	8x	2-1/2	46206	97255	97594
.125 (1/8)	1/8	.187	1.5x	1.250	10x	2-1/2	46207	97256	—
.125 (1/8)	1/8	.187	1.5x	1.500	12x	3	46208	97257	97595
.125 (1/8)	1/8	.187	1.5x	1.875	15x	3	46209	97258	—
.125 (1/8)	1/8	.187	1.5x	2.250	18x	4	46210	97259	—
.125 (1/8)	1/8	.187	1.5x	2.500	20x	4	46211	97260	—
.125 (1/8)	1/8	.187	1.5x	3.125	25x	4	46212	97261	—
.125 (1/8)	1/8	.625	5x	—	—	2-1/2	46213	97262	97596
.125 (1/8)	1/8	1.000	8x	—	—	2-1/2	46214	97263	97597
.125 (1/8)	1/8	1.000	8x	1.500	12x	2-1/2	46215	97264	97598
.125 (1/8)	1/8	1.250	10x	—	—	2-1/2	46216	97265	—

(continued)

# Solid Carbide 3-Flute Miniature Square End Single End Mills

List No. 5916 3-Flute Square End



(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.125 (1/8)	1/8	1.500	12x	—	—	3	46217	97266	97599
.125 (1/8)	1/8	1.875	15x	—	—	3	46218	97267	97600
.140 (9/64)	3/16	.211	1.5x	.750	5x	3	46219	97268	—
.140 (9/64)	3/16	.211	1.5x	1.125	8x	3	46220	97269	—
.156 (5/32)	3/16	.234	1.5x	.470	3x	3	46221	97270	—
.156 (5/32)	3/16	.234	1.5x	.750	5x	3	46222	97271	—
.156 (5/32)	3/16	.234	1.5x	1.250	8x	3	46223	97272	—
.156 (5/32)	3/16	.234	1.5x	1.875	12x	4	46224	97273	—
.156 (5/32)	3/16	.234	1.5x	2.375	15x	4	46225	97274	—
.187 (3/16)	3/16	.281	1.5x	.570	3x	3	46226	97275	—
.187 (3/16)	3/16	.281	1.5x	1.000	5x	3	46227	97276	97601
.187 (3/16)	3/16	.281	1.5x	1.500	8x	3	46228	97277	97602
.187 (3/16)	3/16	.281	1.5x	1.875	10x	4	46229	97278	—
.187 (3/16)	3/16	.281	1.5x	2.250	12x	4	46230	97279	97603
.187 (3/16)	3/16	.281	1.5x	2.812	15x	4	46231	97280	—
.187 (3/16)	3/16	.281	1.5x	3.750	20x	6	46232	97281	—
.187 (3/16)	3/16	1.125	6x	1.625	8x	3	46233	97282	97604
.250 (1/4)	1/4	.375	1.5x	1.250	5x	4	46234	97283	97605
.250 (1/4)	1/4	.375	1.5x	2.000	8x	4	46235	97284	97606
.250 (1/4)	1/4	.375	1.5x	2.500	10x	4	46236	97285	—
.250 (1/4)	1/4	.375	1.5x	3.000	12x	6	46237	97286	97607
.250 (1/4)	1/4	.375	1.5x	3.750	15x	6	46238	97287	—
.250 (1/4)	1/4	1.500	6x	2.000	8x	4	46239	97288	97608

# Solid Carbide 3-Flute Miniature Ball Nose Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
For materials less than 48Rc hardness  
Dia. Tolerance +.0005" / -.0005"



List No. 5917 3-Flute Ball Nose

ALTIN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.

Speeds & Feeds: Page 317

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.010	1/8	.015	1.5x	.050	5x	2-1/2	46250	97295	97620
.010	1/8	.015	1.5x	.080	8x	2-1/2	46251	97296	97621
.010	1/8	.015	1.5x	.125	12x	2-1/2	46252	97297	97622
.010	1/8	.015	1.5x	.150	15x	2-1/2	46253	97298	97623
.010	1/8	.050	5x	—	—	2-1/2	46254	97299	97624
.010	1/8	.050	5x	.100	10x	2-1/2	46255	97300	97625
.015 (1/64)	1/8	.022	1.5x	.045	3x	2-1/2	46256	97301	—
.015 (1/64)	1/8	.022	1.5x	.078	5x	2-1/2	46257	97302	97626
.015 (1/64)	1/8	.022	1.5x	.125	8x	2-1/2	46258	97303	97627
.015 (1/64)	1/8	.022	1.5x	.156	10x	2-1/2	46259	97304	97628
.015 (1/64)	1/8	.022	1.5x	.187	12x	2-1/2	46260	97305	97629
.015 (1/64)	1/8	.022	1.5x	.225	15x	2-1/2	46261	97306	97630
.015 (1/64)	1/8	.022	1.5x	.300	20x	2-1/2	46262	97307	97631
.015 (1/64)	1/8	.078	5x	—	—	2-1/2	46263	97308	97632
.015 (1/64)	1/8	.078	5x	.150	10x	2-1/2	46264	97309	97633
.015 (1/64)	1/8	.125	8x	—	—	2-1/2	46265	97310	97634
.020	1/8	.030	1.5x	.060	3x	2-1/2	46266	97311	—
.020	1/8	.030	1.5x	.100	5x	2-1/2	46267	97312	97635
.020	1/8	.030	1.5x	.160	8x	2-1/2	46268	97313	97636
.020	1/8	.030	1.5x	.200	10x	2-1/2	46269	97314	—
.020	1/8	.030	1.5x	.250	12x	2-1/2	46270	97315	97637
.020	1/8	.030	1.5x	.300	15x	2-1/2	46271	97316	97638
.020	1/8	.030	1.5x	.400	20x	2-1/2	46272	97317	—

(continued)

# Solid Carbide 3-Flute Miniature Ball Nose Single End Mills

List No. 5917 3-Flute Ball Nose

(continued)



DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.020	1/8	.100	5x	—	—	2-1/2	46273	97318	97639
.020	1/8	.100	5x	.200	10x	2-1/2	46274	97319	97640
.020	1/8	.160	8x	—	—	2-1/2	46275	97320	—
.025	1/8	.037	1.5x	.075	3x	2-1/2	46276	97321	—
.025	1/8	.037	1.5x	.125	5x	2-1/2	46277	97322	97641
.025	1/8	.037	1.5x	.203	8x	2-1/2	46278	97323	97642
.025	1/8	.037	1.5x	.312	12x	2-1/2	46279	97324	97643
.025	1/8	.037	1.5x	.375	15x	2-1/2	46280	97325	97644
.030	1/8	.045	1.5x	.156	5x	2-1/2	46281	97326	97645
.030	1/8	.045	1.5x	.250	8x	2-1/2	46282	97327	97646
.030	1/8	.045	1.5x	.375	12x	2-1/2	46283	97328	97647
.030	1/8	.045	1.5x	.450	15x	2-1/2	46284	97329	—
.030	1/8	.150	5x	—	—	2-1/2	46285	97330	97648
.030	1/8	.150	5x	.300	10x	2-1/2	46286	97331	97649
.031 (1/32)	1/8	.046	1.5x	.093	3x	2-1/2	46287	97332	97650
.031 (1/32)	1/8	.046	1.5x	.156	5x	2-1/2	46288	97333	97651
.031 (1/32)	1/8	.046	1.5x	.250	8x	2-1/2	46289	97334	97652
.031 (1/32)	1/8	.046	1.5x	.312	10x	2-1/2	46290	97335	97653
.031 (1/32)	1/8	.046	1.5x	.375	12x	2-1/2	46291	97336	97654
.031 (1/32)	1/8	.046	1.5x	.470	15x	2-1/2	46292	97337	97655
.031 (1/32)	1/8	.046	1.5x	.565	18x	2-1/2	46293	97338	97656
.031 (1/32)	1/8	.046	1.5x	.625	20x	2-1/2	46294	97339	97657
.031 (1/32)	1/8	.046	1.5x	.775	25x	2-1/2	46295	97340	—
.031 (1/32)	1/8	.156	5x	—	—	2-1/2	46296	97341	97658
.031 (1/32)	1/8	.156	5x	.310	10x	2-1/2	46297	97342	97659
.031 (1/32)	1/8	.250	8x	—	—	2-1/2	46298	97343	97660
.031 (1/32)	1/8	.312	10x	—	—	2-1/2	46299	97344	—
.031 (1/32)	1/8	.375	12x	—	—	2-1/2	46300	97345	97661
.031 (1/32)	1/8	.470	15x	—	—	2-1/2	46301	97346	—
.035	1/8	.052	1.5x	.187	5x	2-1/2	46302	97347	97662
.035	1/8	.052	1.5x	.281	8x	2-1/2	46303	97348	97663
.035	1/8	.175	5x	—	—	2-1/2	46304	97349	97664
.040	1/8	.060	1.5x	.120	3x	2-1/2	46305	97350	—
.040	1/8	.060	1.5x	.203	5x	2-1/2	46306	97351	97665
.040	1/8	.060	1.5x	.325	8x	2-1/2	46307	97352	97666
.040	1/8	.060	1.5x	.400	10x	2-1/2	46308	97353	—
.040	1/8	.060	1.5x	.480	12x	2-1/2	46309	97354	97667
.040	1/8	.060	1.5x	.600	15x	2-1/2	46310	97355	97668
.040	1/8	.060	1.5x	.800	20x	2-1/2	46311	97356	—
.040	1/8	.200	5x	—	—	2-1/2	46312	97357	97669
.040	1/8	.200	5x	.400	10x	2-1/2	46313	97358	97670
.040	1/8	.325	8x	—	—	2-1/2	46314	97359	—
.040	1/8	.480	12x	—	—	2-1/2	46315	97360	—
.045	1/8	.067	1.5x	.225	5x	2-1/2	46316	97361	97671
.045	1/8	.067	1.5x	.375	8x	2-1/2	46317	97362	97672
.045	1/8	.067	1.5x	.550	12x	2-1/2	46318	97363	97673
.045	1/8	.225	5x	.450	10x	2-1/2	46319	97364	97674
.047 (3/64)	1/8	.070	1.5x	.141	3x	2-1/2	46320	97365	—
.047 (3/64)	1/8	.070	1.5x	.250	5x	2-1/2	46321	97366	97675
.047 (3/64)	1/8	.070	1.5x	.375	8x	2-1/2	46322	97367	97676
.047 (3/64)	1/8	.070	1.5x	.480	10x	2-1/2	46323	97368	—
.047 (3/64)	1/8	.070	1.5x	.570	12x	2-1/2	46324	97369	97677
.047 (3/64)	1/8	.070	1.5x	.710	15x	2-1/2	46325	97370	97678
.047 (3/64)	1/8	.070	1.5x	.950	20x	2-1/2	46326	97371	97679
.047 (3/64)	1/8	.070	1.5x	1.187	25x	2-1/2	46327	97372	—
.047 (3/64)	1/8	.250	5x	—	—	2-1/2	46328	97373	97680
.047 (3/64)	1/8	.250	5x	.500	10x	2-1/2	46329	97374	97681
.047 (3/64)	1/8	.375	8x	—	—	2-1/2	46330	97375	97682
.050	1/8	.075	1.5x	.250	5x	2-1/2	46331	97376	97683
.050	1/8	.075	1.5x	.400	8x	2-1/2	46332	97377	97684
.050	1/8	.075	1.5x	.600	12x	2-1/2	46333	97378	97685
.050	1/8	.300	6x	—	—	2-1/2	46334	97379	97686
.050	1/8	.300	6x	.600	12x	2-1/2	46335	97380	97687

(continued)



# Solid Carbide 3-Flute Miniature Ball Nose Single End Mills

List No. 5917 3-Flute Ball Nose

(continued)

Speeds & Feeds: Page 317



END MILLS

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTN COATED EDP NO.	DLC COATED EDP NO.
.055	1/8	.082	1.5x	.165	3x	2-1/2	46336	97381	—
.055	1/8	.082	1.5x	.275	5x	2-1/2	46337	97382	97688
.055	1/8	.082	1.5x	.450	8x	2-1/2	46338	97383	97689
.055	1/8	.082	1.5x	.660	12x	2-1/2	46339	97384	97690
.055	1/8	.275	5x	—	—	2-1/2	46340	97385	—
.060	1/8	.090	1.5x	.180	3x	2-1/2	46341	97386	—
.060	1/8	.090	1.5x	.312	5x	2-1/2	46342	97387	97691
.060	1/8	.090	1.5x	.500	8x	2-1/2	46343	97388	97692
.060	1/8	.090	1.5x	.625	10x	2-1/2	46344	97389	—
.060	1/8	.090	1.5x	.720	12x	2-1/2	46345	97390	97693
.060	1/8	.312	5x	—	—	2-1/2	46346	97391	—
.060	1/8	.500	8x	1.000	16x	2-1/2	46347	97392	97694
.062 (1/16)	1/8	.093	1.5x	.186	3x	2-1/2	46348	97393	97695
.062 (1/16)	1/8	.093	1.5x	.312	5x	2-1/2	46349	97394	97696
.062 (1/16)	1/8	.093	1.5x	.500	8x	2-1/2	46350	97395	97697
.062 (1/16)	1/8	.093	1.5x	.625	10x	2-1/2	46351	97396	97698
.062 (1/16)	1/8	.093	1.5x	.750	12x	2-1/2	46352	97397	97699
.062 (1/16)	1/8	.093	1.5x	.950	15x	2-1/2	46353	97398	97700
.062 (1/16)	1/8	.093	1.5x	1.125	18x	2-1/2	46354	97399	—
.062 (1/16)	1/8	.093	1.5x	1.250	20x	2-1/2	46355	97400	97701
.062 (1/16)	1/8	.093	1.5x	1.550	25x	3	46356	97401	—
.062 (1/16)	1/8	.312	5x	—	—	2-1/2	46357	97402	97702
.062 (1/16)	1/8	.500	8x	—	—	2-1/2	46358	97403	97703
.062 (1/16)	1/8	.500	8x	1.000	16x	2-1/2	46359	97404	97704
.062 (1/16)	1/8	.625	10x	—	—	2-1/2	46360	97405	—
.062 (1/16)	1/8	.750	12x	—	—	2-1/2	46361	97406	97705
.062 (1/16)	1/8	.950	15x	—	—	2-1/2	46362	97407	97706
.065	1/8	.097	1.5x	.325	5x	2-1/2	46363	—	—
.065	1/8	.097	1.5x	.530	8x	2-1/2	46364	97408	97707
.065	1/8	.500	8x	—	—	2-1/2	46365	97409	97708
.070	1/8	.105	1.5x	.375	5x	2-1/2	46366	—	—
.070	1/8	.105	1.5x	.570	8x	2-1/2	46367	97410	97709
.070	1/8	.500	7x	—	—	2-1/2	46368	97411	97710
.070	1/8	.500	7x	1.000	14x	2-1/2	46369	97412	97711
.075	1/8	.112	1.5x	.375	5x	2-1/2	46370	—	—
.075	1/8	.112	1.5x	.625	8x	2-1/2	46371	97413	97712
.078 (5/64)	1/8	.117	1.5x	.406	5x	2-1/2	46372	97414	97713
.078 (5/64)	1/8	.117	1.5x	.625	8x	2-1/2	46373	97415	97714
.078 (5/64)	1/8	.117	1.5x	.800	10x	2-1/2	46374	97416	—
.078 (5/64)	1/8	.117	1.5x	.940	12x	2-1/2	46375	97417	97715
.078 (5/64)	1/8	.117	1.5x	1.187	15x	2-1/2	46376	97418	—
.078 (5/64)	1/8	.117	1.5x	1.562	20x	3	46377	97419	—
.078 (5/64)	1/8	.406	5x	—	—	2-1/2	46378	97420	97716
.078 (5/64)	1/8	.500	6x	1.000	12x	2-1/2	46379	97421	97717
.078 (5/64)	1/8	.625	8x	—	—	2-1/2	46380	97422	97718
.078 (5/64)	1/8	.940	12x	—	—	2-1/2	46381	97423	97719
.078 (5/64)	1/8	1.187	15x	—	—	2-1/2	46382	97424	97720
.085	1/8	.127	1.5x	.425	5x	2-1/2	46383	97425	—
.085	1/8	.750	9x	1.250	14x	2-1/2	46384	97426	97721
.090	1/8	.135	1.5x	.450	5x	2-1/2	46385	—	—
.090	1/8	.750	8x	1.250	13x	2-1/2	46386	97427	97722
.093 (3/32)	1/8	.139	1.5x	.279	3x	2-1/2	46387	97428	—
.093 (3/32)	1/8	.139	1.5x	.500	5x	2-1/2	46388	97429	97723
.093 (3/32)	1/8	.139	1.5x	.750	8x	2-1/2	46389	97430	97724
.093 (3/32)	1/8	.139	1.5x	.950	10x	2-1/2	46390	97431	—
.093 (3/32)	1/8	.139	1.5x	1.125	12x	2-1/2	46391	97432	97725
.093 (3/32)	1/8	.139	1.5x	1.400	15x	3	46392	97433	97726
.093 (3/32)	1/8	.139	1.5x	1.875	20x	4	46393	97434	—
.093 (3/32)	1/8	.139	1.5x	2.312	25x	4	46394	97435	—
.093 (3/32)	1/8	.500	5x	—	—	2-1/2	46395	97436	97727
.093 (3/32)	1/8	.750	8x	—	—	2-1/2	46396	97437	97728
.093 (3/32)	1/8	.750	8x	1.250	13x	2-1/2	46397	97438	97729
.093 (3/32)	1/8	1.125	12x	—	—	2-1/2	46398	97439	97730
.093 (3/32)	1/8	1.400	15x	—	—	3	46399	97440	97731

(continued)

# Solid Carbide 3-Flute Miniature Ball Nose Single End Mills

List No. 5917 3-Flute Ball Nose

(continued)



DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.100	1/8	.150	1.5x	.500	5x	2-1/2	46400	97441	—
.100	1/8	.150	1.5x	.800	8x	2-1/2	46401	97442	97732
.100	1/8	.150	1.5x	1.200	12x	2-1/2	46402	97443	—
.100	1/8	.500	5x	—	—	2-1/2	46403	97444	—
.125 (1/8)	1/8	.187	1.5x	.375	3x	2-1/2	46404	97445	—
.125 (1/8)	1/8	.187	1.5x	.625	5x	2-1/2	46405	97446	97733
.125 (1/8)	1/8	.187	1.5x	1.000	8x	2-1/2	46406	97447	97734
.125 (1/8)	1/8	.187	1.5x	1.250	10x	2-1/2	46407	97448	—
.125 (1/8)	1/8	.187	1.5x	1.500	12x	3	46408	97449	97735
.125 (1/8)	1/8	.187	1.5x	1.875	15x	3	46409	97450	97736
.125 (1/8)	1/8	.187	1.5x	2.250	18x	4	46410	97451	—
.125 (1/8)	1/8	.187	1.5x	2.500	20x	4	46411	97452	97737
.125 (1/8)	1/8	.187	1.5x	3.125	25x	4	46412	—	—
.125 (1/8)	1/8	.625	5x	—	—	2-1/2	46413	97453	97738
.125 (1/8)	1/8	1.000	8x	—	—	2-1/2	46414	97454	97739
.125 (1/8)	1/8	1.000	8x	1.500	12x	2-1/2	46415	97455	97740
.125 (1/8)	1/8	1.250	10x	—	—	2-1/2	46416	97456	—
.125 (1/8)	1/8	1.500	12x	—	—	3	46417	97457	97741
.125 (1/8)	1/8	1.875	15x	—	—	3	46418	97458	97742
.156 (5/32)	3/16	.234	1.5x	1.250	8x	3	46419	97459	—
.187 (3/16)	3/16	.281	1.5x	1.000	5x	3	46420	97460	97743
.187 (3/16)	3/16	.281	1.5x	1.500	8x	3	46421	97461	97744
.187 (3/16)	3/16	.281	1.5x	1.875	10x	4	46422	97462	—
.187 (3/16)	3/16	.281	1.5x	2.250	12x	4	46423	97463	97745
.187 (3/16)	3/16	.281	1.5x	2.812	15x	4	46424	97464	—
.250 (1/4)	1/4	.375	1.5x	1.250	5x	4	46425	97465	97746
.250 (1/4)	1/4	.375	1.5x	2.000	8x	4	46426	97466	97747
.250 (1/4)	1/4	.375	1.5x	2.500	10x	4	46427	97467	—
.250 (1/4)	1/4	.375	1.5x	3.000	12x	6	46428	97468	97748
.250 (1/4)	1/4	.375	1.5x	3.750	15x	6	46429	97469	—

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

## TOOL COATING SERVICE

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish. **PLEASE INQUIRE.**

**TiN** — Titanium Nitride

**TiCN** — Titanium Carbonitride

**TiAlN** — Titanium Aluminum Nitride

**AlTiN** — Aluminum Titanium Nitride

**CrN** — Chromium Nitride

**CrC** — Chromium Carbide

**DLC** — Amorphous Diamond-Like Carbon

# Solid Carbide 4-Flute Miniature Square End Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
Stub Length & Regular Length  
For materials less than 48Rc hardness  
Dia. Tolerance +.0005" / -.0005"



List No. 5918 4-Flute Square End

Speeds & Feeds: Page 317

ALTiN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.



DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.005	1/8	.008	1.5x	1-1/2	Stub	45719	—	—
.005	1/8	.015	3x	1-1/2	Regular	45720	—	—
.006	1/8	.009	1.5x	1-1/2	Stub	45721	—	—
.006	1/8	.018	3x	1-1/2	Regular	45722	—	—
.007	1/8	.011	1.5x	1-1/2	Stub	45723	—	—
.007	1/8	.021	3x	1-1/2	Regular	45724	—	—
.008	1/8	.012	1.5x	1-1/2	Stub	45725	—	—
.008	1/8	.024	3x	1-1/2	Regular	45726	—	—
.009	1/8	.014	1.5x	1-1/2	Stub	45727	—	—
.009	1/8	.027	3x	1-1/2	Regular	45728	—	—
.010	1/8	.015	1.5x	1-1/2	Stub	45729	96675	96910
.010	1/8	.030	3x	1-1/2	Regular	45730	96676	96911
.011	1/8	.017	1.5x	1-1/2	Stub	45731	96677	—
.011	1/8	.033	3x	1-1/2	Regular	45732	96678	96912
.012	1/8	.018	1.5x	1-1/2	Stub	45733	96679	—
.012	1/8	.036	3x	1-1/2	Regular	45734	96680	96913
.013	1/8	.020	1.5x	1-1/2	Stub	45735	96681	—
.013	1/8	.039	3x	1-1/2	Regular	45736	96682	96914
.014	1/8	.021	1.5x	1-1/2	Stub	45737	96683	—
.014	1/8	.042	3x	1-1/2	Regular	45738	96684	96915
.015 (1/64)	1/8	.023	1.5x	1-1/2	Stub	45739	96685	96916
.015 (1/64)	1/8	.045	3x	1-1/2	Regular	45740	96686	96917
.016	1/8	.024	1.5x	1-1/2	Stub	45741	96687	—
.016	1/8	.048	3x	1-1/2	Regular	45742	96688	96918
.017	1/8	.026	1.5x	1-1/2	Stub	45743	96689	—
.017	1/8	.051	3x	1-1/2	Regular	45744	96690	96919
.018	1/8	.027	1.5x	1-1/2	Stub	45745	96691	—
.018	1/8	.054	3x	1-1/2	Regular	45746	96692	96920
.019	1/8	.029	1.5x	1-1/2	Stub	45747	96693	—
.019	1/8	.057	3x	1-1/2	Regular	45748	96694	96921
.020	1/8	.030	1.5x	1-1/2	Stub	45749	96695	96922
.020	1/8	.060	3x	1-1/2	Regular	45750	96696	96923
.021	1/8	.032	1.5x	1-1/2	Stub	45751	96697	—
.021	1/8	.063	3x	1-1/2	Regular	45752	96698	96924
.022	1/8	.033	1.5x	1-1/2	Stub	45753	96699	—
.022	1/8	.066	3x	1-1/2	Regular	45754	96700	96925
.023	1/8	.035	1.5x	1-1/2	Stub	45755	96701	—
.023	1/8	.069	3x	1-1/2	Regular	45756	96702	96926
.024	1/8	.036	1.5x	1-1/2	Stub	45757	96703	—
.024	1/8	.072	3x	1-1/2	Regular	45758	96704	96927
.025	1/8	.038	1.5x	1-1/2	Stub	45759	96705	96928
.025	1/8	.075	3x	1-1/2	Regular	45760	96706	96929
.026	1/8	.039	1.5x	1-1/2	Stub	45761	96707	—
.026	1/8	.078	3x	1-1/2	Regular	45762	96708	96930
.027	1/8	.041	1.5x	1-1/2	Stub	45763	96709	—
.027	1/8	.081	3x	1-1/2	Regular	45764	96710	96931
.028	1/8	.042	1.5x	1-1/2	Stub	45765	96711	—
.028	1/8	.084	3x	1-1/2	Regular	45766	96712	96932
.029	1/8	.044	1.5x	1-1/2	Stub	45767	96713	—
.029	1/8	.087	3x	1-1/2	Regular	45768	96714	96933
.030	1/8	.045	1.5x	1-1/2	Stub	45769	96715	96934
.030	1/8	.090	3x	1-1/2	Regular	45770	96716	96935
.031 (1/32)	1/8	.047	1.5x	1-1/2	Stub	45771	96717	96936
.031 (1/32)	1/8	.093	3x	1-1/2	Regular	45772	96718	96937
.032	1/8	.048	1.5x	1-1/2	Stub	45773	96719	—
.032	1/8	.096	3x	1-1/2	Regular	45774	96720	—
.033	1/8	.050	1.5x	1-1/2	Stub	45775	96721	—
.033	1/8	.099	3x	1-1/2	Regular	45776	96722	—
.034	1/8	.051	1.5x	1-1/2	Stub	45777	96723	—
.034	1/8	.102	3x	1-1/2	Regular	45778	96724	—

(continued)

# Solid Carbide 4-Flute Miniature Square End Single End Mills

List No. 5918 4-Flute Square End

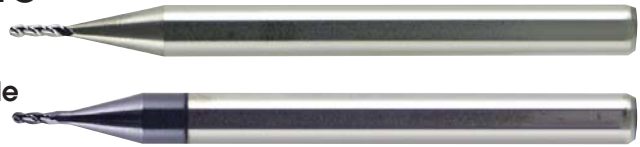
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DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.035	1/8	.053	1.5x	1-1/2	Stub	45779	96725	96938
.035	1/8	.105	3x	1-1/2	Regular	45780	96726	96939
.036	1/8	.054	1.5x	1-1/2	Stub	45781	96727	—
.036	1/8	.108	3x	1-1/2	Regular	45782	96728	—
.037	1/8	.056	1.5x	1-1/2	Stub	45783	96729	—
.037	1/8	.111	3x	1-1/2	Regular	45784	96730	—
.038	1/8	.057	1.5x	1-1/2	Stub	45785	96731	—
.038	1/8	.114	3x	1-1/2	Regular	45786	96732	—
.039	1/8	.059	1.5x	1-1/2	Stub	45787	96733	—
.039	1/8	.117	3x	1-1/2	Regular	45788	96734	—
.040	1/8	.060	1.5x	1-1/2	Stub	45789	96735	96940
.040	1/8	.120	3x	1-1/2	Regular	45790	96736	96941
.041	1/8	.123	3x	1-1/2	Regular	45791	96737	—
.042	1/8	.126	3x	1-1/2	Regular	45792	96738	—
.043	1/8	.129	3x	1-1/2	Regular	45793	96739	—
.044	1/8	.132	3x	1-1/2	Regular	45794	96740	—
.045	1/8	.068	1.5x	1-1/2	Stub	45795	96741	96942
.045	1/8	.135	3x	1-1/2	Regular	45796	96742	96943
.046	1/8	.138	3x	1-1/2	Regular	45797	96743	—
.047 (3/64)	1/8	.071	1.5x	1-1/2	Stub	45798	96744	96944
.047 (3/64)	1/8	.141	3x	1-1/2	Regular	45799	96745	96945
.048	1/8	.144	3x	1-1/2	Regular	45800	96746	—
.049	1/8	.147	3x	1-1/2	Regular	45801	96747	—
.050	1/8	.075	1.5x	1-1/2	Stub	45802	96748	96946
.050	1/8	.150	3x	1-1/2	Regular	45803	96749	96947
.051	1/8	.153	3x	1-1/2	Regular	45804	96750	—
.052	1/8	.156	3x	1-1/2	Regular	45805	96751	—
.053	1/8	.159	3x	1-1/2	Regular	45806	96752	—
.054	1/8	.162	3x	1-1/2	Regular	45807	96753	—
.055	1/8	.083	1.5x	1-1/2	Stub	45808	96754	96948
.055	1/8	.165	3x	1-1/2	Regular	45809	96755	96949
.056	1/8	.168	3x	1-1/2	Regular	45810	96756	—
.057	1/8	.171	3x	1-1/2	Regular	45811	96757	—
.058	1/8	.174	3x	1-1/2	Regular	45812	96758	—
.059	1/8	.177	3x	1-1/2	Regular	45813	96759	—
.060	1/8	.090	1.5x	1-1/2	Stub	45814	96760	96950
.060	1/8	.180	3x	1-1/2	Regular	45815	96761	96951
.062 (1/16)	1/8	.093	1.5x	1-1/2	Stub	45816	96762	96952
.062 (1/16)	1/8	.186	3x	1-1/2	Regular	45817	96763	96953
.065	1/8	.098	1.5x	1-1/2	Stub	45818	96764	—
.065	1/8	.195	3x	1-1/2	Regular	45819	96765	96954
.070	1/8	.105	1.5x	1-1/2	Stub	45820	96766	—
.070	1/8	.210	3x	1-1/2	Regular	45821	96767	96955
.075	1/8	.113	1.5x	1-1/2	Stub	45822	96768	—
.075	1/8	.225	3x	1-1/2	Regular	45823	96769	96956
.078 (5/64)	1/8	.117	1.5x	1-1/2	Stub	45824	96770	96957
.078 (5/64)	1/8	.234	3x	1-1/2	Regular	45825	96771	96958
.080	1/8	.120	1.5x	1-1/2	Stub	45826	96772	—
.080	1/8	.240	3x	1-1/2	Regular	45827	96773	96959
.085	1/8	.128	1.5x	1-1/2	Stub	45828	96774	—
.085	1/8	.255	3x	1-1/2	Regular	45829	96775	96960
.090	1/8	.135	1.5x	1-1/2	Stub	45830	96776	—
.090	1/8	.270	3x	1-1/2	Regular	45831	96777	96961
.093 (3/32)	1/8	.140	1.5x	1-1/2	Stub	45832	96778	96962
.093 (3/32)	1/8	.279	3x	1-1/2	Regular	45833	96779	96963
.095	1/8	.143	1.5x	1-1/2	Stub	45834	96780	—
.095	1/8	.285	3x	1-1/2	Regular	45835	96781	96964
.100	1/8	.150	1.5x	1-1/2	Stub	45836	96782	—
.100	1/8	.300	3x	1-1/2	Regular	45837	96783	96965
.105	1/8	.158	1.5x	1-1/2	Stub	45838	96784	—
.105	1/8	.315	3x	1-1/2	Regular	45839	96785	96966
.110	1/8	.165	1.5x	1-1/2	Stub	45840	96786	—
.110	1/8	.330	3x	1-1/2	Regular	45841	96787	96967
.115	1/8	.173	1.5x	1-1/2	Stub	45842	96788	—
.115	1/8	.345	3x	1-1/2	Regular	45843	96789	96968
.120	1/8	.180	1.5x	1-1/2	Stub	52502	—	—
.120	1/8	.360	3x	1-1/2	Regular	52751	—	—

# Solid Carbide 4-Flute Miniature Ball Nose Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
Stub Length & Regular Length  
For materials less than 48Rc hardness  
Dia. Tolerance +.0005" / -.0005"



List No. 5919 4-Flute Ball Nose

Speeds & Feeds: Page 317

ALTiN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.



DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.010	1/8	.015	1.5x	1-1/2	Stub	45849	96794	96974
.010	1/8	.030	3x	1-1/2	Regular	45850	96795	96975
.011	1/8	.017	1.5x	1-1/2	Stub	45851	96796	—
.011	1/8	.033	3x	1-1/2	Regular	45852	96797	—
.012	1/8	.018	1.5x	1-1/2	Stub	45853	96798	—
.012	1/8	.036	3x	1-1/2	Regular	45854	96799	—
.013	1/8	.020	1.5x	1-1/2	Stub	45855	96800	—
.013	1/8	.039	3x	1-1/2	Regular	45856	96801	—
.014	1/8	.021	1.5x	1-1/2	Stub	45857	96802	—
.014	1/8	.042	3x	1-1/2	Regular	45858	96803	—
.015 (1/64)	1/8	.023	1.5x	1-1/2	Stub	45859	96804	96976
.015 (1/64)	1/8	.045	3x	1-1/2	Regular	45860	96805	96977
.016	1/8	.024	1.5x	1-1/2	Stub	45861	96806	—
.016	1/8	.048	3x	1-1/2	Regular	45862	96807	—
.017	1/8	.026	1.5x	1-1/2	Stub	45863	96808	—
.017	1/8	.051	3x	1-1/2	Regular	45864	96809	—
.018	1/8	.027	1.5x	1-1/2	Stub	45865	96810	—
.018	1/8	.054	3x	1-1/2	Regular	45866	96811	—
.019	1/8	.029	1.5x	1-1/2	Stub	45867	96812	—
.019	1/8	.057	3x	1-1/2	Regular	45868	96813	—
.020	1/8	.030	1.5x	1-1/2	Stub	45869	96814	96978
.020	1/8	.060	3x	1-1/2	Regular	45870	96815	96979
.021	1/8	.032	1.5x	1-1/2	Stub	45871	96816	—
.021	1/8	.063	3x	1-1/2	Regular	45872	96817	—
.022	1/8	.033	1.5x	1-1/2	Stub	45873	96818	—
.022	1/8	.066	3x	1-1/2	Regular	45874	96819	—
.023	1/8	.035	1.5x	1-1/2	Stub	45875	96820	—
.023	1/8	.069	3x	1-1/2	Regular	45876	96821	—
.024	1/8	.036	1.5x	1-1/2	Stub	45877	96822	—
.024	1/8	.072	3x	1-1/2	Regular	45878	96823	—
.025	1/8	.038	1.5x	1-1/2	Stub	45879	96824	96980
.025	1/8	.075	3x	1-1/2	Regular	45880	96825	96981
.026	1/8	.039	1.5x	1-1/2	Stub	45881	96826	—
.026	1/8	.078	3x	1-1/2	Regular	45882	96827	—
.027	1/8	.041	1.5x	1-1/2	Stub	45883	96828	—
.027	1/8	.081	3x	1-1/2	Regular	45884	96829	—
.028	1/8	.042	1.5x	1-1/2	Stub	45885	96830	—
.028	1/8	.084	3x	1-1/2	Regular	45886	96831	—
.029	1/8	.044	1.5x	1-1/2	Stub	45887	96832	—
.029	1/8	.087	3x	1-1/2	Regular	45888	96833	—
.030	1/8	.045	1.5x	1-1/2	Stub	45889	96834	96982
.030	1/8	.090	3x	1-1/2	Regular	45890	96835	96983
.031 (1/32)	1/8	.047	1.5x	1-1/2	Stub	45891	96836	96984
.031 (1/32)	1/8	.093	3x	1-1/2	Regular	45892	96837	96985
.032	1/8	.048	1.5x	1-1/2	Stub	45893	96838	—
.032	1/8	.096	3x	1-1/2	Regular	45894	96839	—
.033	1/8	.050	1.5x	1-1/2	Stub	45895	96840	—
.033	1/8	.099	3x	1-1/2	Regular	45896	96841	—
.034	1/8	.051	1.5x	1-1/2	Stub	45897	96842	—
.034	1/8	.102	3x	1-1/2	Regular	45898	96843	—
.035	1/8	.053	1.5x	1-1/2	Stub	45899	96844	96986
.035	1/8	.105	3x	1-1/2	Regular	45900	96845	96987
.036	1/8	.054	1.5x	1-1/2	Stub	45901	96846	—
.036	1/8	.108	3x	1-1/2	Regular	45902	96847	—
.037	1/8	.056	1.5x	1-1/2	Stub	45903	96848	—
.037	1/8	.111	3x	1-1/2	Regular	45904	96849	—

(continued)

# Solid Carbide 4-Flute Miniature Ball Nose Single End Mills

List No. 5919 4-Flute Ball Nose

(continued)



DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.038	1/8	.057	1.5x	1-1/2	Stub	45905	96850	—
.038	1/8	.114	3x	1-1/2	Regular	45906	96851	—
.039	1/8	.059	1.5x	1-1/2	Stub	45907	96852	—
.039	1/8	.117	3x	1-1/2	Regular	45908	96853	—
.040	1/8	.060	1.5x	1-1/2	Stub	45909	96854	96988
.040	1/8	.120	3x	1-1/2	Regular	45910	96855	96989
.041	1/8	.123	3x	1-1/2	Regular	45911	96856	—
.042	1/8	.126	3x	1-1/2	Regular	45912	96857	—
.043	1/8	.129	3x	1-1/2	Regular	45913	96858	—
.044	1/8	.132	3x	1-1/2	Regular	45914	96859	—
.045	1/8	.068	1.5x	1-1/2	Stub	45915	96860	96990
.045	1/8	.135	3x	1-1/2	Regular	45916	96861	96991
.046	1/8	.138	3x	1-1/2	Regular	45917	96862	—
.047 (3/64)	1/8	.071	1.5x	1-1/2	Stub	45918	96863	96992
.047 (3/64)	1/8	.141	3x	1-1/2	Regular	45919	96864	96993
.048	1/8	.144	3x	1-1/2	Regular	45920	96865	—
.049	1/8	.147	3x	1-1/2	Regular	45921	96866	—
.050	1/8	.075	1.5x	1-1/2	Stub	45922	96867	96994
.050	1/8	.150	3x	1-1/2	Regular	45923	96868	96995
.051	1/8	.153	3x	1-1/2	Regular	45924	96869	—
.052	1/8	.156	3x	1-1/2	Regular	45925	96870	—
.053	1/8	.159	3x	1-1/2	Regular	45926	96871	—
.054	1/8	.162	3x	1-1/2	Regular	45927	96872	—
.055	1/8	.083	1.5x	1-1/2	Stub	45928	96873	96996
.055	1/8	.165	3x	1-1/2	Regular	45929	96874	96997
.056	1/8	.168	3x	1-1/2	Regular	45930	96875	—
.057	1/8	.171	3x	1-1/2	Regular	45931	96876	—
.058	1/8	.174	3x	1-1/2	Regular	45932	96877	—
.059	1/8	.177	3x	1-1/2	Regular	45933	96878	—
.060	1/8	.090	1.5x	1-1/2	Stub	45934	96879	96998
.060	1/8	.180	3x	1-1/2	Regular	45935	96880	96999
.062 (1/16)	1/8	.093	1.5x	1-1/2	Stub	45936	96881	97000
.062 (1/16)	1/8	.186	3x	1-1/2	Regular	45937	96882	97001
.065	1/8	.098	1.5x	1-1/2	Stub	45938	96883	—
.065	1/8	.195	3x	1-1/2	Regular	45939	96884	97002
.070	1/8	.105	1.5x	1-1/2	Stub	45940	96885	—
.070	1/8	.210	3x	1-1/2	Regular	45941	96886	97003
.075	1/8	.113	1.5x	1-1/2	Stub	45942	96887	—
.075	1/8	.225	3x	1-1/2	Regular	45943	96888	—
.078 (5/64)	1/8	.117	1.5x	1-1/2	Stub	45944	96889	97004
.078 (5/64)	1/8	.234	3x	1-1/2	Regular	45945	96890	97005
.080	1/8	.120	1.5x	1-1/2	Stub	45946	96891	—
.080	1/8	.240	3x	1-1/2	Regular	45947	96892	97006
.085	1/8	.128	1.5x	1-1/2	Stub	45948	96893	—
.085	1/8	.255	3x	1-1/2	Regular	45949	96894	—
.090	1/8	.135	1.5x	1-1/2	Stub	45950	96895	—
.090	1/8	.270	3x	1-1/2	Regular	45951	96896	97007
.093 (3/32)	1/8	.140	1.5x	1-1/2	Stub	45952	96897	97008
.093 (3/32)	1/8	.279	3x	1-1/2	Regular	45953	96898	97009
.095	1/8	.143	1.5x	1-1/2	Stub	45954	96899	—
.095	1/8	.285	3x	1-1/2	Regular	45955	96900	—
.100	1/8	.150	1.5x	1-1/2	Stub	45956	96901	—
.100	1/8	.300	3x	1-1/2	Regular	45957	96902	97010
.105	1/8	.315	3x	1-1/2	Regular	45958	96903	—
.110	1/8	.330	3x	1-1/2	Regular	45959	96904	—
.115	1/8	.345	3x	1-1/2	Regular	45960	96905	—
.120	1/8	.360	3x	1-1/2	Regular	45961	96906	—
.120	1/8	.180	1.5x	1-1/2	Stub	52527	—	—

# Miniature Solid Carbide End Mill Speed and Feed Recommendations



Workpiece		Type and Depth of Cut	Surface Speed (SFM)	FEED PER TOOTH BY END MILL DIAMETER								
Material	Examples			.005 - .015	.015 - .030	.030 - .045	.045 - .060	.060 - .075	.075 - .090	.090 - .105	.105 - .125	
Steel (ISO P)	Low Alloy Steels - Maraging	10XX, 11XX, 13XX	Slotting ≤ 15% of D	150	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
			Profiling 6% of D Axial & ≤ 35% of D Radial	300	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
	Medium Alloy Steels	200, 250, 300	Slotting ≤ 15% of D	125	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006
			Profiling 6% of D Axial & ≤ 30% of D Radial	250	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006
	High Alloy Steels - Mold and Die	A-2, P20, O1, D2, H-13	Slotting ≤ 10% of D	125	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 20% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
	High Strength Steels	4140, 4340, 52100	Slotting ≤ 15% of D	100	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 30% of D Radial	180	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
Stainless Steel (ISO M)	Martensitic	403, 410, 416	Slotting ≤ 15% of D	100	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 30% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
	Austenitic	302, 303, 304L, 316L	Slotting ≤ 15% of D	100	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 30% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
	Precipitation Hardened	13-8, 15-5 PH, 17-4 PH, A-236, AM-350	Slotting ≤ 10% of D	90	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 20% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
Cast Iron (ISO K)	Cast Iron	Grey Cast Iron	Slotting ≤ 25% of D	125	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010
			Profiling 10% of D Axial & ≤ 35% of D Radial	400	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010
	Ductile Iron	Ductile Cast Iron	Slotting ≤ 15% of D	100	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
			Profiling 10% of D Axial & ≤ 25% of D Radial	250	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
High Temperature Alloys (ISO S)	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting ≤ 7% of D	80	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
			Profiling 5% of D Axial & ≤ 20% of D Radial	100	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermoNikel 300, Incoly 600	Slotting ≤ 7% of D	40	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
			Profiling 5% of D Axial & ≤ 20% of D Radial	60	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting ≤ 7% of D	50	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
			Profiling 5% of D Axial & ≤ 20% of D Radial	80	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-25 (Decrease SFM & IPM 25% for 5553)	Slotting ≤ 15% of D	125	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 20% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
Al (ISO N)	Aluminum Alloys	6061-T6, 7075	Slotting ≤ 15% of D	650	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010
			Profiling 10% of D Axial & ≤ 35% of D Radial	775	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

In general, use lower speeds and feeds for hard and difficult-to-machine materials. Use higher speeds and feeds for easy-to-machine materials. Use higher surface speed for lighter cuts, smaller tools, and better finishes. Higher feed rates can improve tool life and performance in softer materials and more abrasive materials.

For longer length tools, reduce feed rates by 50%.

For coated tools, speeds may be increased by up to 20% with the feed rate unchanged.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

# 2-Flute Single End Mills

**High Speed Steel & M42 Cobalt**  
**Bright Finish & TiN Coated**  
**Center Cutting**

**2-Flute** end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**Titanium Nitride (TiN) Coating** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.



- List No. 1898 High Speed Steel
- List No. 1898G High Speed Steel TiN Coated
- List No. 4580 M42 Cobalt

**STANDARD PACKAGE** All sizes — 1 each

Tool  
Coatings  
Also  
Available



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1898	1898G	4580
					High Speed Steel EDP NO.	High Speed Steel TIN COATED EDP NO.	COBALT EDP NO.
1/8	.1250	3/8	3/8	2-5/16	43651	96150	44376
5/32	.1562	3/8	7/16	2-5/16	43691	96152	44387
11/64	.1719	3/8	7/16	2-5/16	43705	—	—
3/16	.1875	3/8	7/16	2-5/16	43652	96154	44377
13/64	.2031	3/8	1/2	2-5/16	43706	—	—
7/32	.2187	3/8	1/2	2-3/8	43692	96156	44388
15/64	.2344	3/8	1/2	2-5/16	43707	—	—
1/4	.2500	3/8	1/2	2-5/16	43653	96158	44378
17/64	.2656	3/8	9/16	2-5/16	43708	—	—
9/32	.2812	3/8	9/16	2-3/8	43693	96160	44389
19/64	.2969	3/8	9/16	2-5/16	43709	—	—
5/16	.3125	3/8	9/16	2-5/16	43654	96162	44379
21/64	.3281	3/8	9/16	2-5/16	43710	—	—
11/32	.3437	3/8	9/16	2-5/16	43694	96164	—
23/64	.3594	3/8	9/16	2-5/16	43711	—	—
3/8	.3750	3/8	9/16	2-5/16	43655	96166	44380
25/64	.3906	3/8	13/16	2-1/2	43712	—	—
13/32	.4062	3/8	13/16	2-1/2	43695	96168	44391
27/64	.4219	3/8	13/16	2-1/2	43713	—	—
7/16	.4375	3/8	13/16	2-1/2	43656	96170	44392
15/32	.4687	1/2	13/16	3	43696	96172	44393
31/64	.4844	1/2	13/16	3	43715	—	—
1/2	.5000	3/8	13/16	2-1/2	43657	96183	—
1/2	.5000	1/2	1	3	43658	96174	44381
33/64	.5156	1/2	1	3	43716	—	—
17/32	.5312	1/2	1-1/8	3-1/8	43697	96184	—
35/64	.5469	1/2	1-1/8	3-1/8	43717	—	—
9/16	.5625	1/2	1-1/8	3-1/8	43659	96185	44394

(continued)



# 2-Flute Single End Mills (continued)



**END MILLS**

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1898	1898G	4580
					High Speed Steel	High Speed Steel	COBALT
					EDP NO.	TIN COATED EDP NO.	EDP NO.
37/64	.5781	1/2	1-1/8	3-1/8	43718	—	—
19/32	.5937	1/2	1-1/8	3-1/8	43698	—	—
39/64	.6094	1/2	1-1/8	3-1/8	43719	—	—
5/8	.6250	1/2	1-1/8	3-1/8	43660	96186	—
5/8	.6250	5/8	1-5/16	3-7/16	43661	96176	44382
11/16	.6875	1/2	1-5/16	3-5/16	43662	—	—
11/16	.6875	5/8	1-5/16	3-7/16	43663	96187	—
3/4	.7500	1/2	1-5/16	3-7/16	43664	—	—
3/4	.7500	5/8	1-5/16	3-7/16	43665	96188	—
3/4	.7500	3/4	1-5/16	3-9/16	43666	96178	44383
13/16	.8125	5/8	1-1/2	3-5/8	43667	—	—
13/16	.8125	3/4	1-1/2	3-3/4	43668	96189	—
7/8	.8750	5/8	1-1/2	3-3/4	43669	—	—
7/8	.8750	3/4	1-1/2	3-3/4	43670	96190	44395
7/8	.8750	7/8	1-1/2	3-3/4	43671	96191	—
15/16	.9375	5/8	1-1/2	3-3/4	43672	—	—
15/16	.9375	3/4	1-1/2	3-3/4	43673	—	—
15/16	.9375	7/8	1-1/2	3-3/4	43674	—	—
1	1.0000	5/8	1-1/2	3-3/4	43675	—	—
1	1.0000	3/4	1-1/2	3-3/4	43676	96192	44396
1	1.0000	7/8	1-1/2	3-3/4	43677	—	—
1	1.0000	1	1-5/8	4-1/8	43678	96182	44384
1-1/8	1.1250	3/4	1-5/8	3-7/8	43720	—	—
1-1/8	1.1250	7/8	1-5/8	3-7/8	43679	—	—
1-1/8	1.1250	1	1-5/8	4-1/8	43680	96193	—
1-1/4	1.2500	3/4	1-5/8	3-7/8	43721	—	—
1-1/4	1.2500	7/8	1-5/8	3-7/8	43681	—	—
1-1/4	1.2500	1	1-5/8	4-1/8	43682	96194	—
1-1/4	1.2500	1-1/4	1-5/8	4-1/8	43683	—	44385
1-3/8	1.3750	3/4	1-5/8	3-7/8	43722	—	—
1-3/8	1.3750	1	1-5/8	4-1/8	43684	96195	—
1-1/2	1.5000	3/4	1-5/8	3-7/8	43723	—	—
1-1/2	1.5000	1	1-5/8	4-1/8	43685	—	—
1-1/2	1.5000	1-1/4	1-5/8	4-1/8	43686	96196	44386
1-5/8	1.6250	1-1/4	1-5/8	4-1/8	43687	—	—
1-3/4	1.7500	3/4	1-5/8	3-7/8	43724	—	—
1-3/4	1.7500	1-1/4	1-5/8	4-1/8	43688	—	—
1-7/8	1.8750	1-1/4	1-5/8	4-1/8	43689	—	—
2	2.0000	1-1/4	1-5/8	4-1/8	43690	—	—

## TOOL COATING SERVICE

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish. **PLEASE INQUIRE.**

**TiN** — Titanium Nitride

**TiCN** — Titanium Carbonitride

**TiAlN** — Titanium Aluminum Nitride

**AlTiN** — Aluminum Titanium Nitride

**CrN** — Chromium Nitride

**CrC** — Chromium Carbide

**DLC** — Amorphous Diamond-Like Carbon

# 2-Flute Long Length Single End Mills

High Speed Steel & M42 Cobalt  
Bright Finish & TiN Coated  
Center Cutting

**2-Flute** end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**Long Length** end mills provide a longer length of cut for deeper milling applications

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**Titanium Nitride (TiN) Coating** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.



- List No. 4599 High Speed Steel
- List No. 4599G High Speed Steel TiN Coated
- List No. 4584 M42 Cobalt

**STANDARD PACKAGE** All sizes — 1 each

Tool  
Coatings  
Also  
Available



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	4599	4599G	4584
					High Speed Steel	High Speed Steel	COBALT
					EDP NO.	TIN COATED EDP NO.	EDP NO.
3/16	.1875	3/8	1-1/4	3-1/16	43001	96200	—
7/32	.2188	3/8	1-1/4	3-1/16	43002	—	—
1/4	.2500	3/8	1-1/4	3-1/16	43003	96201	—
9/32	.2812	3/8	1-3/8	3-1/8	43005	—	—
5/16	.3125	3/8	1-3/8	3-1/8	43006	96202	—
11/32	.3438	3/8	1-1/2	3-1/4	43007	—	—
3/8	.3750	3/8	1-1/2	3-1/4	44601	96203	45370
7/16	.4375	1/2	1-3/4	3-3/4	43009	96204	—
1/2	.5000	1/2	2	4	44602	96205	45371
5/8	.6250	5/8	2	4-1/8	44603	96206	45372
3/4	.7500	3/4	2-1/4	4-1/2	44604	96207	45373
7/8	.8750	7/8	2-1/2	4-3/4	44605	96208	—
1	1.0000	1	3	5-1/2	44606	96209	45374
1-1/8	1.1250	1	3	5-1/2	44607	—	—
1-1/4	1.2500	1	3	5-1/2	44608	—	—
1-1/4	1.2500	1-1/4	3	5-1/2	44609	—	—
1-3/8	1.3750	1	3	5-1/2	44610	—	—
1-1/2	1.5000	1-1/4	3	5-1/2	44611	—	—

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# 2-Flute Extended Length Single End Mills



**High Speed Steel & M42 Cobalt**  
**Bright Finish & TiN Coated**  
**Center Cutting**

List No. 1899 High Speed Steel  
 List No. 1899G High Speed Steel TiN Coated  
 List No. 4585 M42 Cobalt

**2-Flute** end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**STANDARD PACKAGE** All sizes — 1 each

**Extended Length** end mills are recommended for applications that require a longer reach but not a longer length of cut. The increased rigidity of the unfluted extended shank reduces deflection.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	LENGTH BELOW SHANK	OAL	1899 High Speed Steel EDP NO.	1899G High Speed Steel TIN COATED EDP NO.	4585 COBALT EDP NO.
1/8	.1250	3/8	3/8	13/16	2-9/16	43749	96215	—
3/16	.1875	3/8	1/2	1-1/8	2-11/16	43750	96216	45381*
1/4	.2500	3/8	5/8	1-1/2	3-1/16	43751	96217	45382*
5/16	.3125	3/8	3/4	1-3/4	3-5/16	43752	96218	—
3/8	.3750	3/8	3/4	1-3/4	3-5/16	43753	96219	45384*
1/2	.5000	1/2	1	2-1/4	4	43754	96221	45385*
5/8	.6250	5/8	1-3/8	2-3/4	4-5/8	43755	96222	—
3/4	.7500	3/4	1-5/8	3-3/8	5-3/8	43756	96223	—
1	1.0000	1	2-1/2	5	7-1/4	43757	96225	—

\* Available While Supplies Last



# Metric 2-Flute Single End Mills



**High Speed Steel**  
**Center Cutting**

List No. 1898M

**2-Flute** end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**STANDARD PACKAGE** All sizes — 1 each

DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
3.0	.1181	3/8	3/8	2-5/16	43339	14.0	.5512	1/2	1-1/8	3-1/8	43319
4.0	.1575	3/8	7/16	2-5/16	43340	15.0	.5906	1/2	1-1/8	3-1/8	43321
5.0	.1968	3/8	1/2	2-5/16	43333	16.0	.6299	5/8	1-5/16	3-7/16	43322
6.0	.2362	3/8	1/2	2-5/16	43335	17.0	.6693	5/8	1-5/16	3-7/16	43323
7.0	.2756	3/8	9/16	2-5/16	43337	18.0	.7087	5/8	1-5/16	3-7/16	43324
8.0	.3150	3/8	9/16	2-5/16	43307	19.0	.7480	3/4	1-5/8	3-7/8	43325
9.0	.3543	3/8	9/16	2-5/16	43309	20.0	.7874	3/4	1-1/2	3-3/4	43326
10.0	.3937	3/8	13/16	2-1/2	43311	22.0	.8661	3/4	1-1/2	3-3/4	43328
11.0	.4331	3/8	13/16	2-1/2	43313	23.0	.9055	7/8	1-7/8	4-1/8	43329
12.0	.4724	3/8	13/16	2-1/2	43315	24.0	.9449	1	2	4-1/2	43330
13.0	.5118	1/2	1-1/8	3-1/8	43317	25.0	.9843	1	2	4-1/2	43331

Tool Coatings Also Available

# M42 Cobalt DRILL-MILL™



Specially designed to perform both drilling and milling operations with the same tool in vertical milling machine applications. Increased productivity with fewer tool changes.

**DRILL-MILL™ performs:** drilling, spotting countersinking, chamfering, slotting, side milling, profile milling and other drilling & milling operations

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.



List No. 1980

90° Point Angle

2-Flute

30° Right Hand Helix

Solid Carbide  
Drill-Mills  
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**STANDARD PACKAGE** All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL*	EDP NO.
1/8	.1250	3/8	3/8	2-5/16	44619
3/16	.1875	3/8	7/16	2-5/16	44620
1/4	.2500	3/8	5/8	2-7/16	44621
5/16	.3125	3/8	23/32	2-15/32	44622
3/8	.3750	3/8	3/4	2-1/2	44623
7/16	.4375	3/8	1-1/32	2-23/32	44624
1/2	.5000	1/2	1-1/4	3-1/4	44625

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL*	EDP NO.
9/16	.5625	1/2	1-13/32	3-13/32	44626
5/8	.6250	5/8	1-5/8	3-3/4	44627
11/16	.6875	5/8	1-21/32	3-25/32	44628
3/4	.7500	3/4	1-11/16	3-15/16	44629
13/16	.8125	3/4	1-29/32	4-5/32	44630
7/8	.8750	3/4	1-15/16	4-3/16	44631
15/16	.9375	3/4	1-31/32	4-7/32	44632
1	1.0000	3/4	2	4-1/4	44633

\* Lengths include the 90° conical cutting point.

# High Helix 2-Flute Single End Mills



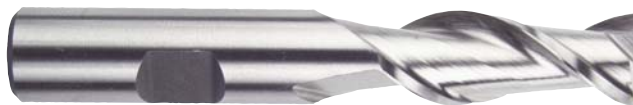
List No. 1921 Long Length

High Speed Steel — Center Cutting  
37° Helix Angle

**2-Flute** end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**High Helix** end mills are recommended for aluminum, magnesium, zinc alloys and other soft non-ferrous materials. The higher helix angle provides a positive smoother cutting shearing action and enhanced chip evacuation.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/4	.2500	3/8	1-1/4	3-1/16	44051
5/16	.3125	3/8	1-3/8	3-1/8	44052
3/8	.3750	3/8	1-1/2	3-1/4	44053
7/16	.4375	1/2	1-3/4	3-3/4	44054
1/2	.5000	1/2	2	4	44055
5/8	.6250	5/8	2-1/2	4-5/8	44056
3/4	.7500	3/4	3	5-1/4	44057
7/8	.8750	7/8	3-1/2	5-3/4	44058*
1	1.0000	1	4	6-1/2	44059
2	2.0000	1-1/4	4	6-1/2	44062*



List No. 1920 Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/4	.2500	3/8	5/8	2-7/16	44021
5/16	.3125	3/8	3/4	2-1/2	44022
3/8	.3750	3/8	3/4	2-1/2	44023
7/16	.4375	3/8	1	2-11/16	44024
1/2	.5000	1/2	1-1/4	3-1/4	44025
5/8	.6250	5/8	1-5/8	3-3/4	44026
3/4	.7500	3/4	1-5/8	3-7/8	44027
7/8	.8750	7/8	1-7/8	4-1/8	44028
1	1.0000	1	2	4-1/2	44029



List No. 1922 Extra Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/4	.2500	3/8	1-3/4	3-9/16	44076
5/16	.3125	3/8	2	3-3/4	44077
3/8	.3750	3/8	2-1/2	4-1/4	44078
1/2	.5000	1/2	3	5	44079
5/8	.6250	5/8	4	6-1/8	44080
3/4	.7500	3/4	4	6-1/4	44081
1	1.0000	1	6	8-1/2	44082

\* Available While Supplies Last

# 2-Flute Double End Mills

High Speed Steel & M42 Cobalt  
Bright Finish & TiN Coated  
Center Cutting

**2-Flute** end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.



List No. 1896 High Speed Steel  
List No. 1896G High Speed Steel TiN Coated  
List No. 4581 M42 Cobalt

**Titanium Nitride (TiN) Coating** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

**STANDARD PACKAGE** All sizes — 1 each



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1896	1896G	4581
					High Speed Steel EDP NO.	High Speed Steel TIN COATED EDP NO.	COBALT EDP NO.
1/8	.1250	3/8	3/8	3-1/16	43412	96050	44560
9/64	.1406	3/8	7/16	3-1/8	43431	—	—
5/32	.1562	3/8	7/16	3-1/8	43413	96052	44561
11/64	.1719	3/8	7/16	3-1/8	43432	—	—
3/16	.1875	3/8	7/16	3-1/4	43414	96054	44562
13/64	.2031	3/8	1/2	3-1/4	43433	—	—
7/32	.2188	3/8	1/2	3-1/4	43415	96056	44563
15/64	.2344	3/8	1/2	3-3/8	43434	—	—
1/4	.2500	3/8	1/2	3-3/8	43416	96058	44564
17/64	.2656	3/8	9/16	3-3/8	43435	—	—
9/32	.2812	3/8	9/16	3-3/8	43417	96060	44565
19/64	.2969	3/8	9/16	3-1/2	43436	—	—
5/16	.3125	3/8	9/16	3-1/2	43418	96062	44566
21/64	.3281	3/8	9/16	3-1/2	43437	—	—
11/32	.3438	3/8	9/16	3-1/2	43419	96064	44567
23/64	.3594	3/8	9/16	3-1/2	43438	—	—
3/8	.3750	3/8	9/16	3-1/2	43420	96066	44568
25/64	.3906	1/2	13/16	4-1/8	43439	—	—
13/32	.4062	1/2	13/16	4-1/8	43421	96068	44569
27/64	.4219	1/2	13/16	4-1/8	43440	—	—
7/16	.4375	1/2	13/16	4-1/8	43422	96070	44570
29/64	.4531	1/2	13/16	4-1/8	43441	—	—
15/32	.4688	1/2	13/16	4-1/8	43423	96072	—
31/64	.4844	1/2	13/16	4-1/8	43442	—	—
1/2	.5000	1/2	13/16	4-1/8	43424	96074	44571
9/16	.5625	5/8	1-1/8	5	43425	96075	44572
5/8	.6250	5/8	1-1/8	5	43426	96076	44573
11/16	.6875	3/4	1-5/16	5	43427	96077	44577
23/32	.7188	3/4	1-5/16	5	43446*	—	—
3/4	.7500	3/4	1-5/16	5	43428	96078	44574
13/16	.8125	7/8	1-9/16	5-1/2	43448	—	—
27/32	.8438	7/8	1-9/16	5-1/2	43449*	—	—
7/8	.8750	7/8	1-9/16	5-1/2	43429	—	44575*
29/32	.9062	1	1-5/8	5-7/8	43450*	—	—
15/16	.9375	1	1-5/8	5-7/8	43451*	—	—
31/32	.9688	1	1-5/8	5-7/8	43452*	—	—
1	1.0000	1	1-5/8	5-7/8	43430	96082	44576*

\* Available While Supplies Last

## 2-Flute Miniature Stub Length Double End Mills

3/16" Dia. Shank — Center Cutting  
High Speed Steel & M42 Cobalt

**Miniature 3/16" Shank** end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**STANDARD PACKAGE** All sizes — 1 each



List No. 4571 High Speed Steel  
List No. 4571C M42 Cobalt



DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	4571	4571C
				High Speed Steel EDP NO.	COBALT EDP NO.
1/32	.0312	3/64	2	44326	44360
3/64	.0469	1/16	2	44327	44361
1/16	.0625	3/32	2	44328	44362
5/64	.0781	1/8	2	44329	44363
3/32	.0938	9/64	2	44330	44364
7/64	.1094	5/32	2	44331	44365
1/8	.1250	3/16	2	44332	44366
9/64	.1406	7/32	2	44333	44367
5/32	.1562	15/64	2	44334	44368
11/64	.1719	1/4	2	44335	44369
3/16	.1875	9/32	2	44336	44370

## 2-Flute Miniature Regular Length Double End Mills

3/16" Dia. Shank — Center Cutting  
High Speed Steel & M42 Cobalt

**Miniature 3/16" Shank** end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**STANDARD PACKAGE** All sizes — 1 each



List No. 1896 High Speed Steel  
List No. 1896C M42 Cobalt



DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1896	1896C
				High Speed Steel EDP NO.	COBALT EDP NO.
1/32	.0312	3/32	2-1/4	43401	44348
3/64	.0469	9/64	2-1/4	43402	44349
1/16	.0625	3/16	2-1/4	43403	44350
5/64	.0781	15/64	2-1/4	43404	44351
3/32	.0938	9/32	2-1/4	43405	44352
7/64	.1094	21/64	2-1/4	43406	44353
1/8	.1250	3/8	2-1/4	43407	44354
9/64	.1406	13/32	2-1/4	43408	44355
5/32	.1562	7/16	2-1/4	43409	44356
11/64	.1719	1/2	2-1/4	43410	44357
3/16	.1875	1/2	2-1/4	43411	44358

Tool  
Coatings  
Also  
Available

### CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# 2-Flute Miniature Long Length Double End Mills

3/16" Dia. Shank — Center Cutting High Speed Steel & M42 Cobalt

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. Center Cutting end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

List No. 1894 High Speed Steel  
List No. 1894C M42 Cobalt



DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1894	1894C
				High Speed Steel EDP NO.	COBALT EDP NO.
1/16	.0625	7/32	2-1/2	43251	43256
3/32	.0938	9/32	2-5/8	43252	43257
1/8	.1250	3/4	3-1/8	43253	43258
5/32	.1562	7/8	3-1/4	43254	43259
3/16	.1875	1	3-3/8	43255	43260

# 2-Flute Stub Length Double End Mills

High Speed Steel — Center Cutting

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. Center Cutting end allows for plunge cutting like a drill into solid material.

Stub Length provides increased rigidity when milling shallow slots, keyways and pockets.

STANDARD PACKAGE All sizes — 1 each



List No. 4563 High Speed Steel



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/8	.1250	3/8	3/16	2-3/4	44313
5/32	.1562	3/8	15/64	2-3/4	44314
3/16	.1875	3/8	9/32	2-3/4	44315
7/32	.2188	3/8	21/64	2-3/4	44316
1/4	.2500	3/8	3/8	2-3/4	44317

# SHEARMILL™ M42 Cobalt 3-Flute 60° High Helix Single End Mills

Center Cutting High Spiral Design Cuts Cleanly & Efficiently

Tool Coatings Also Available

Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.



List No. 4686

60° High Helix angle keeps the cutting edges constantly engaged in the workpiece reducing cutting load variations. The result is a clean efficient cutting action with decreased cutting resistance, enhanced chip control, excellent surface finish and long tool life.

Recommended for tough milling jobs including stainless steel, titanium, inconel, mold and die steels and other abrasive and difficult materials. Center Cutting end allows for plunge cutting like a drill into solid material.

STANDARD PACKAGE All sizes — 1 each



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
7/8	.8750	3/4	1-7/8	4-1/8	42944*
7/8	.8750	3/4	3-1/2	5-3/4	42945*
1-1/4	1.2500	1	2	4-1/2	42970*
1-1/4	1.2500	1-1/4	2	4-1/2	42971*

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1-1/2	1.5000	1-1/4	2	4-1/2	42980*
1-3/4	1.7500	1-1/4	2	4-1/2	42989*
2	2.0000	1-1/4	2	4-1/2	42995*
2	2.0000	2	2	5-3/4	43000*

\*Available While Supplies Last

## 3-Flute Single End Mills

High Speed Steel  
Center Cutting

3-Flute end mills provide a compromise between the chip capacity of 2-flute end mills and the improved surface finish, greater core strength and higher feed rate of multi-flute end mills. They are recommended for general milling and for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

### List No. 1880 Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/8	.1250	3/8	3/8	2-5/16	42050
3/16	.1875	3/8	1/2	2-3/8	42051
1/4	.2500	3/8	5/8	2-7/16	42052
5/16	.3125	3/8	3/4	2-1/2	42053
3/8	.3750	3/8	3/4	2-1/2	42054
7/16	.4375	3/8	1	2-11/16	42055
1/2	.5000	3/8	1	2-11/16	42056
1/2	.5000	1/2	1-1/4	3-1/4	42057
9/16	.5625	1/2	1-3/8	3-3/8	42058
5/8	.6250	1/2	1-3/8	3-3/8	42059

### List No. 1881 Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/4	.2500	3/8	1-1/4	3-1/16	42080
5/16	.3125	3/8	1-3/8	3-1/8	42081
3/8	.3750	3/8	1-1/2	3-1/4	42082
7/16	.4375	1/2	1-3/4	3-3/4	42083
1/2	.5000	1/2	2	4	42084

## 3-Flute Double End Mills

High Speed Steel  
Center Cutting

3-Flute end mills provide a compromise between the chip capacity of 2-flute end mills and the improved surface finish, greater core strength and higher feed rate of multi-flute end mills. They are recommended for general milling and for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/8	.1250	3/8	3/8	3-1/16	42100
3/16	.1875	3/8	1/2	3-1/4	42101
1/4	.2500	3/8	5/8	3-3/8	42102
5/16	.3125	3/8	3/4	3-1/2	42103
3/8	.3750	3/8	3/4	3-1/2	42104
7/16	.4375	1/2	1	4-1/8	42105



List No. 1880 - Regular Length



List No. 1881 - Long Length

STANDARD PACKAGE All sizes — 1 each



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
5/8	.6250	5/8	1-5/8	3-3/4	42060
3/4	.7500	3/4	1-5/8	3-7/8	42061
7/8	.8750	3/4	1-7/8	4-1/8	42062
7/8	.8750	7/8	1-7/8	4-1/8	42063
1	1.0000	3/4	1-7/8	4-1/8	42064
1	1.0000	1	2	4-1/2	42065
1-1/8	1.1250	1	2	4-1/2	42066
1-1/2	1.5000	1-1/4	2	4-1/2	42069
2	2.0000	2	3	6-3/4	42071

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
5/8	.6250	5/8	2-1/2	4-5/8	42085
3/4	.7500	3/4	3	5-1/4	42086
2	2.0000	1-1/4	4	6-1/2	42092*

\* Available While Supplies Last



List No. 1882

STANDARD PACKAGE All sizes — 1 each

Tool Coatings Also Available

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/2	.5000	1/2	1	4-1/8	42106
9/16	.5625	5/8	1-3/8	5	42107
5/8	.6250	5/8	1-3/8	5	42108
3/4	.7500	3/4	1-5/8	5-5/8	42109
7/8	.8750	7/8	1-7/8	6-1/8	42110



# Multi-Flute Coarse Pitch Roughing End Mills

High Speed Steel



Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. Economical **High Speed Steel** roughing end mills are recommended for most materials of low to medium hardness.

List No. 4593

STANDARD PACKAGE

All sizes — 1 each

## Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
1/4	.2500	3/8	5/8	27/16	3	44464
5/16	.3125	3/8	3/4	2 1/2	3	44465
3/8	.3750	3/8	3/4	2 1/2	4	44466
1/2	.5000	1/2	1 1/4	3 1/4	4	44476
5/8	.6250	5/8	1 5/8	3 3/4	4	44477
3/4	.7500	3/4	1 5/8	3 3/8	4	44478
1	1.0000	3/4	1 7/8	4 1/8	5	44463
1	1.0000	1	2	4 1/2	5	44480
1	1.0000	1	3	5 1/2	5	44468
1 1/4	1.2500	3/4	2	4 1/2	6	44469
1 1/4	1.2500	1 1/4	2	4 1/2	6	44482
1 1/2	1.5000	3/4	2 1/4	4 1/2	6	44470
1 1/2	1.5000	1 1/4	2	4 1/2	6	44483
2	2.0000	1 1/4	2	4 1/2	8	44471

## Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
1/2	.5000	1/2	2	4	4	44467
3/4	.7500	3/4	3	5 1/4	4	44488
1	1.0000	1	4	6 1/2	5	44490
1 1/4	1.2500	1 1/4	4	6 1/2	6	44491
1 1/2	1.5000	1 1/4	4	6 1/2	6	44492
2	2.0000	2	6	9 3/4	8	44494*

\* Available While Supplies Last

Tool Coatings Also Available

END MILLS



Center Cutting

## 2-Flute 6-Pc. Sets

Sizes 1/8", 3/16", 1/4", 5/16", 3/8", 1/2"

(Sizes 1/8" - 3/8" are 3/8" shank, size 1/2" is 1/2" shank)

SET NO.	LIST NO.	DESCRIPTION	EDP NO.
W-11	1887	2 Flute, Single End, Ball Nose	45001
W-13	1896	2 Flute, Double End	45015
W-15	1898	2 Flute, Single End	45025

## End Mill Sets

Single End and Double End  
High Speed Steel  
In Wooden Stand



Non-Center Cutting

## 4-Flute 6-Pc. Sets

Sizes 1/8", 3/16", 1/4", 5/16", 3/8", 1/2"

(Sizes 1/8" - 3/8" are 3/8" shank, size 1/2" is 1/2" shank)

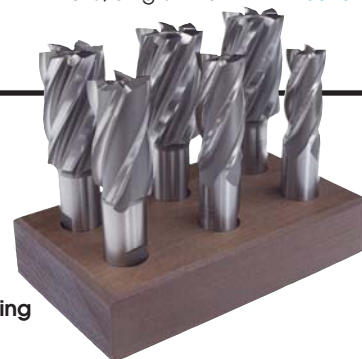
SET NO.	LIST NO.	DESCRIPTION	EDP NO.
W-12	1895	4 Flute, Double End	45010
W-14	1897	4 Flute, Single End	45020

## 3/4" Shank 6-Pc. Multi-Flute Set

Sizes 3/4", 7/8", 1", 1-1/8", 1-1/4", 1-1/2"

SET NO.	LIST NO.	DESCRIPTION	EDP NO.
W-21	1897	Multi-Flute, Single End	45021

Non-Center Cutting



# Multi-Flute Single End Mills

**High Speed Steel & M42 Cobalt**

**Bright Finish & TiN Coated**

**Multi-Flute** end mills offer higher feed rates, improved surface finish and greater core strength for reduced tool deflection.

**Center Cutting** end allows for plunge cutting like a drill into solid material.

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**Titanium Nitride (TiN) Coating** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.



- List No. 1897 High Speed Steel
- List No. 4550 High Speed Steel Center Cutting
- List No. 4550G High Speed Steel Center Cutting  
TiN Coated
- List No. 4586 M42 Cobalt Center Cutting

**STANDARD PACKAGE** All sizes — 1 each

Tool  
Coatings  
Also  
Available



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1897	4550	4550G	4586
						High Speed Steel NON-CENTER CUTTING EDP NO.	High Speed Steel CENTER CUTTING EDP NO.	High Speed Steel CENTER CUTTING TIN COATED EDP NO.	COBALT CENTER CUTTING EDP NO.
1/8	.1250	3/8	3/8	2-5/16	4	43501	44135	96100	44426
5/32	.1562	3/8	7/16	2-5/16	4	43541	43021	96102	44415
11/64	.1719	3/8	1/2	2-3/8	4	43562	—	—	—
3/16	.1875	3/8	1/2	2-3/8	4	43502	44136	96104	44427
13/64	.2031	3/8	1/2	2-3/8	4	43563	—	—	—
7/32	.2188	3/8	1/2	2-3/8	4	43542	44149	96106	44416
15/64	.2344	3/8	5/8	2-7/16	4	43564	—	—	—
1/4	.2500	3/8	5/8	2-7/16	4	43503	44137	96108	44428
17/64	.2656	3/8	11/16	2-1/2	4	43565	—	—	—
9/32	.2812	3/8	11/16	2-1/2	4	43543	44150	96110	44417
19/64	.2969	3/8	3/4	2-1/2	4	43566	—	—	—
5/16	.3125	3/8	3/4	2-1/2	4	43504	44138	96112	44429
21/64	.3281	3/8	3/4	2-1/2	4	43567	—	—	—
11/32	.3438	3/8	3/4	2-1/2	4	43544	44151	96114	44418
23/64	.3594	3/8	3/4	2-1/2	4	43568	—	—	—
3/8	.3750	3/8	3/4	2-1/2	4	43505	44139	96116	44430
25/64	.3906	3/8	1	2-11/16	4	43569	—	—	—
13/32	.4062	3/8	1	2-11/16	4	43545	44152	96118	44419
27/64	.4219	3/8	1	2-11/16	4	43570	—	—	—
7/16	.4375	3/8	1	2-11/16	4	43506	44153	96120	44420
29/64	.4531	1/2	1-1/4	3-1/4	4	43571	—	—	—
15/32	.4688	1/2	1-1/4	3-1/4	4	43546	44154	96122	44421
31/64	.4844	1/2	1-1/4	3-1/4	4	43572	—	—	—
1/2	.5000	3/8	1	2-11/16	4	43507	43033	—	—
1/2	.5000	1/2	1-1/4	3-1/4	4	43508	44140	96124	44431
17/32	.5312	1/2	1-3/8	3-3/8	4	43547	44155	96096	—
9/16	.5625	1/2	1-3/8	3-3/8	4	43509	44156	96125	44422
19/32	.5938	1/2	1-3/8	3-3/8	4	43548	—	—	—
5/8	.6250	1/2	1-3/8	3-3/8	4	43510	43034	96098	—
5/8	.6250	5/8	1-5/8	3-3/4	4	43511	44141	96126	44432
5/8	.6250	5/8	1-5/8	3-3/4	6	—	—	—	44433
21/32	.6562	5/8	1-5/8	3-3/4	4	43549	—	—	—
11/16	.6875	1/2	1-5/8	3-5/8	4	43512	—	—	—
11/16	.6875	5/8	1-5/8	3-3/4	4	43513	44142	96127	—

(continued)

# Multi-Flute Single End Mills (continued)



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1897	4550	4550G	4586
						High Speed Steel NON-CENTER CUTTING	High Speed Steel CENTER CUTTING	High Speed Steel CENTER CUTTING TIN COATED	COBALT CENTER CUTTING
						EDP NO.	EDP NO.	EDP NO.	EDP NO.
23/32	.7188	1/2	1-5/8	3-5/8	4	43550	—	—	—
3/4	.7500	1/2	1-5/8	3-5/8	4	43514	—	—	—
3/4	.7500	5/8	1-5/8	3-3/4	4	43515	43035	96133	—
3/4	.7500	3/4	1-5/8	3-7/8	4	43516	44143	96128	44434
3/4	.7500	3/4	1-5/8	3-7/8	6	—	—	—	44435
25/32	.7812	1/2	1-5/8	3-5/8	4	43551	—	—	—
13/16	.8125	5/8	1-7/8	4	4	—	44161	—	—
13/16	.8125	5/8	1-7/8	4	6	43517	—	—	—
13/16	.8125	3/4	1-7/8	4-1/8	4	43518	44157	96129	—
27/32	.8438	7/8	1-7/8	4-1/8	4	43552	—	—	—
7/8	.8750	5/8	1-7/8	4	6	43519	—	—	—
7/8	.8750	3/4	1-7/8	4-1/8	4	43520	43036	96130	—
7/8	.8750	7/8	1-7/8	4-1/8	4	43521	44144	—	44423
29/32	.9062	7/8	1-7/8	4-1/8	4	43553	—	—	—
15/16	.9375	3/4	1-7/8	4-1/8	4	43523	—	—	—
15/16	.9375	7/8	1-7/8	4-1/8	4	43524	44158	—	—
31/32	.9688	1	2	4-1/2	4	43554	—	—	—
1	1.0000	5/8	1-7/8	4	6	43525	—	—	—
1	1.0000	3/4	1-7/8	4-1/8	4	43526	43038	96134	—
1	1.0000	7/8	1-7/8	4-1/8	4	43527	—	—	—
1	1.0000	1	2	4-1/2	4	43528	44145	96132	44436
1	1.0000	1	2	4-1/2	6	—	—	—	44437
1-1/8	1.1250	3/4	1-1/2	3-7/8	6	43555	—	—	—
1-1/8	1.1250	1	2	4-1/2	4	—	44146	96135	—
1-1/8	1.1250	1	2	4-1/2	6	43530	—	—	—
1-1/4	1.2500	3/4	2	4-1/4	6	43556	—	—	—
1-1/4	1.2500	7/8	2	4-1/4	6	43531	—	—	—
1-1/4	1.2500	1	2	4-1/2	6	43532	43041	96136	—
1-1/4	1.2500	1-1/4	2	4-1/2	4	—	44147	—	44438
1-1/4	1.2500	1-1/4	2	4-1/2	6	43533	—	—	44439
1-3/8	1.3750	3/4	1-1/2	3-7/8	6	43557	—	—	—
1-3/8	1.3750	1	2	4-1/2	6	43534	—	—	—
1-1/2	1.5000	3/4	2	4-1/4	6	43558	—	—	—
1-1/2	1.5000	1	2	4-1/2	6	43535	—	—	—
1-1/2	1.5000	1-1/4	2	4-1/2	4	—	—	—	44440
1-1/2	1.5000	1-1/4	2	4-1/2	6	43536	44148	96138	44441
1-5/8	1.6250	1-1/4	2	4-1/2	6	43537	—	—	—
1-3/4	1.7500	3/4	1-1/2	3-7/8	6	43559	—	—	—
1-3/4	1.7500	1-1/4	2	4-1/2	6	43538	44159	—	44424
2	2.0000	3/4	2	4-1/16	8	43560	—	—	—
2	2.0000	1-1/4	2	4-1/2	6	—	44160	—	—
2	2.0000	1-1/4	2	4-1/2	8	43540	—	—	—

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Multi-Flute Long Length Single End Mills

**High Speed Steel & M42 Cobalt  
Bright Finish & TiN Coated**

**Multi-Flute** end mills offer higher feed rates, improved surface finish and greater core strength for reduced tool deflection.

**Center Cutting** end allows for plunge cutting like a drill into solid material.

**Long Length** end mills provide a longer length of cut for deeper milling applications.

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.



- List No. 1900 High Speed Steel
- List No. 4551 High Speed Steel Center Cutting
- List No. 4551G High Speed Steel Center Cutting  
TiN Coated
- List No. 4587 M42 Cobalt Center Cutting

**Titanium Nitride (TiN) Coating** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

**STANDARD PACKAGE** All sizes — 1 each

Tool  
Coatings  
Also  
Available



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1900	4551	4551G	4587
						High Speed Steel NON-CENTER CUTTING EDP NO.	High Speed Steel CENTER CUTTING EDP NO.	High Speed Steel CENTER CUTTING TIN COATED EDP NO.	COBALT CENTER CUTTING EDP NO.
3/16	.1875	3/8	1-1/4	3-1/16	4	—	44169	96230	—
7/32	.2188	3/8	1-1/4	3-1/16	4	—	44170	96231	—
1/4	.2500	3/8	1-1/4	3-1/16	4	43776	44171	96232	44534
9/32	.2812	3/8	1-3/8	3-1/8	4	—	44180	96233	44535
5/16	.3125	3/8	1-3/8	3-1/8	4	43777	44172	96234	44536
11/32	.3438	3/8	1-1/2	3-1/4	4	—	44181	96235	44537
3/8	.3750	3/8	1-1/2	3-1/4	4	—	44173	96236	44541
13/32	.4062	1/2	1-3/4	3-3/4	4	—	44182	96237	—
7/16	.4375	1/2	1-3/4	3-3/4	4	43779	44183	96238	—
15/32	.4688	1/2	2	4	4	—	44184	96239	—
1/2	.5000	1/2	2	4	4	—	44174	96240	44542
5/8	.6250	5/8	2-1/2	4-5/8	4	43781	44175	96241	44543
3/4	.7500	3/4	3	5-1/4	4	43782	44176	96242	44544
3/4	.7500	3/4	3	5-1/4	6	—	—	—	44545
7/8	.8750	7/8	3-1/2	5-3/4	4	43783	44177	96244	44540
1	1.0000	1	4	6-1/2	4	43784	44178	96245	44546
1	1.0000	1	4	6-1/2	6	—	—	—	44547
1-1/8	1.1250	1	4	6-1/2	4	—	44185	—	—
1-1/8	1.1250	1	4	6-1/2	6	43785	—	—	—
1-1/4	1.2500	1	4	6-1/2	4	—	44186	—	—
1-1/4	1.2500	1	4	6-1/2	6	43786	—	—	—
1-1/4	1.2500	1-1/4	4	6-1/2	4	—	44179	—	44548
1-1/4	1.2500	1-1/4	4	6-1/2	6	43787	—	—	44549
1-3/8	1.3750	1	4	6-1/2	6	43788	—	—	—
1-1/2	1.5000	1	4	6-1/2	4	—	44187	—	—
1-1/2	1.5000	1	4	6-1/2	6	43789	—	—	—
1-1/2	1.5000	1-1/4	4	6-1/2	4	—	44188	—	—
1-1/2	1.5000	1-1/4	4	6-1/2	6	43790	—	—	—
1-3/4	1.7500	1-1/4	4	6-1/2	6	43791	—	—	—
2	2.0000	1-1/4	4	6-1/2	4	—	44190	—	—
2	2.0000	1-1/4	4	6-1/2	8	43792	—	—	—

# Multi-Flute Extra Long Length Single End Mills

**High Speed Steel & M42 Cobalt  
Bright Finish & TiN Coated**

**Multi-Flute** end mills offer higher feed rates, improved surface finish and greater core strength for reduced tool deflection.

**Center Cutting** end allows for plunge cutting like a drill into solid material.

**Long Length** end mills provide a longer length of cut for deeper milling applications.

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.



- List No. 1901 High Speed Steel
- List No. 4552 High Speed Steel Center Cutting
- List No. 4552G High Speed Steel Center Cutting  
TiN Coated
- List No. 4588 M42 Cobalt Center Cutting

**Titanium Nitride (TiN) Coating** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

**STANDARD PACKAGE** All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1901	4552	4552G	4588
						High Speed Steel NON-CENTER CUTTING	High Speed Steel CENTER CUTTING	High Speed Steel CENTER CUTTING TIN COATED	COBALT CENTER CUTTING
						EDP NO.	EDP NO.	EDP NO.	EDP NO.
3/16	.1875	3/8	1-3/4	3-9/16	4	—	44199	—	—
1/4	.2500	3/8	1-3/4	3-9/16	4	43826	44201	96252	45390
9/32	.2812	3/8	1-3/4	3-3/4	4	—	44210	96253	45391
5/16	.3125	3/8	2	3-3/4	4	43827	44202	96254	45392
11/32	.3438	3/8	2-1/2	4-1/4	4	—	44211	96255	45393
3/8	.3750	3/8	2-1/2	4-1/4	4	43828	44203	96256	44520
7/16	.4375	1/2	2-3/4	4-3/4	4	—	44213	96258	45395
15/32	.4688	1/2	3	5	4	—	44214	96259	—
1/2	.5000	1/2	3	5	4	43829	44204	96260	44521
5/8	.6250	5/8	4	6-1/8	4	43830	44205	96261	44522
3/4	.7500	3/4	4	6-1/4	4	43831	44206	96262	44523
3/4	.7500	3/4	4	6-1/4	6	—	—	—	44524
7/8	.8750	7/8	5	7-1/4	4	43832	44207	96264	—
1	1.0000	1	6	8-1/2	4	43833	44208	96265	44525
1-1/4	1.2500	1-1/4	6	8-1/2	4	—	44209	—	44527
1-1/2	1.5000	1-1/4	8	10-1/2	6	43835	—	—	—



# Metric 4-Flute Single End Mills

**High Speed Steel  
Center Cutting**

**Multi-Flute** end mills offer higher feed rates, improved surface finish and greater core strength for reduced tool deflection.



List No. 1897M

**STANDARD PACKAGE** All sizes — 1 each

DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
3.0	.1181	3/8	3/8	2-5/16	43392	14.0	.5512	1/2	1-3/8	3-3/8	43379
4.0	.1575	3/8	7/16	2-5/16	43393	15.0	.5906	1/2	1-3/8	3-3/8	43381
5.0	.1968	3/8	9/16	2-1/2	43361	16.0	.6299	5/8	1-5/8	3-3/4	43382
6.0	.2362	3/8	5/8	2-1/2	43363	17.0	.6693	5/8	1-5/8	3-3/4	43383
7.0	.2756	3/8	5/8	2-1/2	43365	18.0	.7087	5/8	1-5/8	3-3/4	43384
8.0	.3150	3/8	3/4	2-1/2	43367	19.0	.7480	3/4	1-5/8	3-7/8	43385
9.0	.3543	3/8	3/4	2-1/2	43369	20.0	.7874	3/4	1-7/8	4-1/8	43386
10.0	.3937	3/8	1	2-11/16	43371	22.0	.8661	3/4	1-7/8	4-1/8	43388
11.0	.4331	3/8	1	2-11/16	43373	23.0	.9055	7/8	1-7/8	4-1/8	43389
12.0	.4724	3/8	1	2-11/16	43375	24.0	.9449	1	2	4-1/2	43390
13.0	.5118	1/2	1-3/8	3-3/8	43377	25.0	.9843	1	2	4-1/2	43391

# 4-Flute Double End Mills

**High Speed Steel & M42 Cobalt**  
**Bright Finish & TiN Coated**

**Multi-Flute** end mills offer higher feed rates, improved surface finish and greater core strength for reduced tool deflection.

**Center Cutting** end allows for plunge cutting like a drill into solid material.

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and longer life in production applications.



- List No. 1895 High Speed Steel
- List No. 4553 High Speed Steel Center Cutting
- List No. 4553G High Speed Steel Center Cutting  
TiN Coated
- List No. 4582 M42 Cobalt Center Cutting

**Titanium Nitride (TiN) Coating** is an excellent coating for machining a wide variety of materials at increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

**STANDARD PACKAGE** All sizes — 1 each

Tool  
Coatings  
Also  
Available



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1895	4553	4553G	4582
					High Speed Steel NON-CENTER CUTTING EDP NO.	High Speed Steel CENTER CUTTING EDP NO.	High Speed Steel CENTER CUTTING TIN COATED EDP NO.	COBALT CENTER CUTTING EDP NO.
1/8	.1250	3/8	3/8	3-1/16	43266	44251	96000	44580
9/64	.1406	3/8	7/16	3-1/8	43286	43050	—	—
5/32	.1562	3/8	7/16	3-1/8	43267	43051	96002	44581
11/64	.1719	3/8	1/2	3-1/8	43287	43052	—	—
3/16	.1875	3/8	1/2	3-1/4	43268	44252	96004	44582
13/64	.2031	3/8	9/16	3-1/4	43288	43053	—	—
7/32	.2188	3/8	9/16	3-1/4	43269	43054	96006	44583
15/64	.2344	3/8	5/8	3-3/8	43289	—	—	—
1/4	.2500	3/8	5/8	3-3/8	43270	44253	96008	44584
17/64	.2656	3/8	11/16	3-3/8	43290	43056	—	—
9/32	.2812	3/8	11/16	3-3/8	43271	43057	96010	44585
19/64	.2969	3/8	3/4	3-1/2	43291	43058	—	—
5/16	.3125	3/8	3/4	3-1/2	43272	44254	96012	44586
21/64	.3281	3/8	3/4	3-1/2	43292	43059	—	—
11/32	.3438	3/8	3/4	3-1/2	43273	43060	96014	44587
23/64	.3594	3/8	3/4	3-1/2	43293	43061	—	—
3/8	.3750	3/8	3/4	3-1/2	43274	44255	96016	44588
25/64	.3906	1/2	1	4-1/8	43294	43062	—	—
13/32	.4062	1/2	1	4-1/8	43275	43063	96018	44589
27/64	.4219	1/2	1	4-1/8	43295	43064	—	—
7/16	.4375	1/2	1	4-1/8	43276	43065	96020	44590
29/64	.4531	1/2	1	4-1/8	43296*	43066	—	—
15/32	.4687	1/2	1	4-1/8	43277	43067	96022	—
31/64	.4844	1/2	1	4-1/8	43297	43068	—	—
1/2	.5000	1/2	1	4-1/8	43278	44256	96024	44591
9/16	.5625	5/8	1-3/8	5	43279	43069	—	44592
5/8	.6250	5/8	1-3/8	5	43280	44257	96026	44593
11/16	.6875	3/4	1-5/8	5-5/8	43281	43070	—	—
3/4	.7500	3/4	1-5/8	5-5/8	43282	44258	96028	44594
13/16	.8125	7/8	1-7/8	6-1/8	43283	—	—	—
27/32	.8438	7/8	1-7/8	6-1/8	43303*	—	—	—
7/8	.8750	7/8	1-7/8	6-1/8	43284	44259	—	44595
29/32	.9062	1	1-7/8	6-3/8	43304*	—	—	—
15/16	.9375	1	1-7/8	6-3/8	43305	—	—	44599*
31/32	.9688	1	1-7/8	6-3/8	43306*	—	—	—
1	1.0000	1	1-7/8	6-3/8	43285	44260	96032	44596

\* Available While Supplies Last

# 4-Flute Miniature Stub Length Double End Mills

**3/16" Shank — Center Cutting High Speed Steel & M42 Cobalt**

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. Center Cutting end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.



List No. 4569 High Speed Steel  
List No. 4569C M42 Cobalt

Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**STANDARD PACKAGE** All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	4569	4569C
				High Speed Steel	COBALT
				EDP NO.	EDP NO.
1/16	.0625	3/32	2	44120	44126
3/32	.0938	9/64	2	44121	44128
1/8	.1250	3/16	2	44122	44130
5/32	.1562	15/64	2	44123	44132
3/16	.1875	9/32	2	44124	44134



# 4-Flute Miniature Regular Length Double End Mills

**3/16" Dia. Shank — Center Cutting High Speed Steel & M42 Cobalt**

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. Center Cutting end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.



List No. 1895 High Speed Steel  
List No. 1895C M42 Cobalt

Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**STANDARD PACKAGE** All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1895	1895C
				High Speed Steel	COBALT
				EDP NO.	EDP NO.
1/16	.0625	3/16	2-1/4	43261	43220
3/32	.0938	9/32	2-1/4	43262	43222
1/8	.1250	3/8	2-1/4	43263	43224
5/32	.1562	7/16	2-1/4	43264	43226
3/16	.1875	1/2	2-1/4	43265	43228



## TOOL COATING SERVICE

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish. **PLEASE INQUIRE.**

**TiN** — Titanium Nitride

**TiCN** — Titanium Carbonitride

**TiAlN** — Titanium Aluminum Nitride

**AlTiN** — Aluminum Titanium Nitride

**CrN** — Chromium Nitride

**CrC** — Chromium Carbide

**DLC** — Amorphous Diamond-Like Carbon

# 4-Flute Miniature Long Length Double End Mills

**3/16" Dia. Shank — Center Cutting High Speed Steel & M42 Cobalt**

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1893 High Speed Steel EDP NO.	1893C COBALT EDP NO.
1/16	.0625	7/32	2-1/2	43241	44320
3/32	.0938	9/32	2-5/8	43242	44321
1/8	.1250	3/4	3-1/8	43243	44322
5/32	.1562	7/8	3-1/4	43244	44323
3/16	.1875	1	3-3/8	43245	44324



List No. 1893 High Speed Steel

List No. 1893C M42 Cobalt

Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**STANDARD PACKAGE** All sizes — 1 each



# 4-Flute Stub Length Double End Mills

**High Speed Steel**

Multi-Flute end mills offer higher feed rates, improved surface finish and greater core strength for reduced tool deflection.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/8	.1250	3/8	3/16	2-3/4	44193
5/32	.1562	3/8	15/64	2-3/4	44194
3/16	.1875	3/8	9/32	2-3/4	44195
7/32	.2188	3/8	21/64	2-3/4	44196
1/4	.2500	3/8	3/8	2-3/4	44197



List No. 4561 High Speed Steel

**STANDARD PACKAGE** All sizes — 1 each

**Stub Length** provides increased rigidity in shallow milling applications.

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

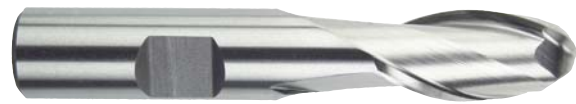
Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**



# 2-Flute Ball Nose Single End Mills

High Speed Steel & M42 Cobalt  
Bright Finish & TiN Coated  
Center Cutting

**Ball Nose** end mills are designed for milling die cavities, fillets, round bottomed holes and radius bottom slots. **2-Flute** end mills provide increased chip capacity. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 1887 High Speed Steel  
List No. 1887G High Speed Steel TiN Coated  
List No. 4583 M42 Cobalt

STANDARD PACKAGE All sizes — 1 each



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1887	1887G	4583
					High Speed Steel	High Speed Steel	COBALT
					EDP NO.	TIN COATED EDP NO.	EDP NO.
1/8	.1250	3/8	3/8	2-5/16	43111	96460	44401
3/16	.1875	3/8	1/2	2-3/8	43112	96461	44402
1/4	.2500	3/8	5/8	2-7/16	43113	96462	44403
5/16	.3125	3/8	3/4	2-1/2	43114	96463	44404
3/8	.3750	3/8	3/4	2-1/2	43115	96464	44405
7/16	.4375	1/2	1	3	43116	96465	—
1/2	.5000	1/2	1	3	43117	96466	44406
9/16	.5625	1/2	1-1/8	3-1/8	43118	—	—
5/8	.6250	5/8	1-3/8	3-1/2	43120	96467	44407
3/4	.7500	3/4	1-5/8	3-7/8	43122	96468	44408
7/8	.8750	7/8	2	4-1/4	43123	96469	44412
1	1.0000	1	2-1/4	4-3/4	43124	96470	44409
1-1/8	1.1250	1	2-1/4	4-3/4	43125	—	—
1-1/4	1.2500	1-1/4	2-1/2	5	43126	—	44410
1-1/2	1.5000	1-1/4	2-1/2	5	43127	—	44411

# 2-Flute Ball Nose Extended Length Single End Mills

High Speed Steel & M42 Cobalt  
Bright Finish & TiN Coated  
Center Cutting

**Extended Length** for applications that require longer reach but not a longer length of cut. The increased rigidity of the unfluted shank reduces deflection.



List No. 1888 High Speed Steel  
List No. 1888G High Speed Steel TiN Coated  
List No. 4590 M42 Cobalt

STANDARD PACKAGE All sizes — 1 each



DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	LENGTH BELOW SHANK	OAL	1888	1888G	4590
						High Speed Steel	High Speed Steel	COBALT
						EDP NO.	TIN COATED EDP NO.	EDP NO.
1/8	.1250	3/8	3/8	13/16	2-9/16	43136	96480	45405
3/16	.1875	3/8	1/2	1-1/8	2-11/16	43137	96481	45406
1/4	.2500	3/8	5/8	1-1/2	3-1/16	43138	96482	45407
5/16	.3125	3/8	3/4	1-3/4	3-5/16	43139	96483	45408
3/8	.3750	3/8	3/4	1-3/4	3-5/16	43140	96484	45409
7/16	.4375	1/2	1	1-7/8	3-3/4	43141*	—	—
1/2	.5000	1/2	1	2-1/4	4	43142	96486	45410
5/8	.6250	5/8	1-3/8	2-3/4	4-5/8	43143	—	—
3/4	.7500	3/4	1-5/8	3-3/8	5-3/8	43144	96487	45411
1	1.0000	1	2-1/2	5	7-1/4	43146	96488	45412
1-1/4	1.2500	1-1/4	3	5	7-1/4	43147	—	—

\* Available While Supplies Last

# 2-Flute Ball Nose Double End Mills



**High Speed Steel  
Bright Finish & TiN Coated  
Center Cutting**

**Ball Nose** end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots. **2-Flute** end mills provide increased chip capacity. **Center Cutting** end allows for plunging cutting like a drill into solid material.

List No. 1889 High Speed Steel  
List No. 1889G High Speed Steel TiN Coated

**Titanium Nitride (TiN) Coating** is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

**STANDARD PACKAGE** All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1889	1889G
					High Speed Steel EDP NO.	High Speed Steel TIN COATED EDP NO.
1/8	.1250	3/8	3/8	3 1/16	43161	96495
3/16	.1875	3/8	7/16	3 1/8	43162	96496
7/32	.2188	3/8	1/2	3 1/8	43173	—
1/4	.2500	3/8	1/2	3 1/8	43163	96497
9/32	.2812	3/8	9/16	3 1/8	43174	—
5/16	.3125	3/8	9/16	3 1/8	43164	96498
11/32	.3438	3/8	9/16	3 1/8	43175	—
3/8	.3750	3/8	9/16	3 1/8	43165	96499
7/16	.4375	1/2	13/16	3 3/4	43166	—
1/2	.5000	1/2	13/16	3 3/4	43167	96500
5/8	.6250	5/8	1 1/8	5	43168	—
3/4	.7500	3/4	1 5/16	5	43169	—
7/8	.8750	7/8	1 9/16	6 1/8	43170*	—
1	1.0000	1	1 5/8	6 3/8	43171*	—

**Tool Coatings  
Also Available**

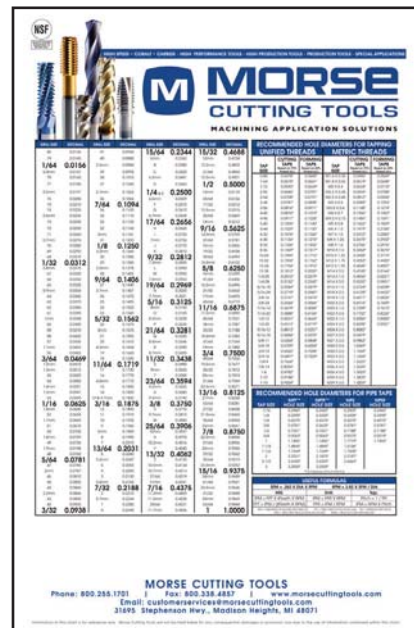
\* Available While Supplies Last

## Morse® Plastic Wall Chart



NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24" x 36" printed on heavy duty .023" gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 EDP No. 01650



# 2-Flute Miniature Ball Nose Stub Length Double End Mills

3/16" Dia. Shank — Center Cutting High Speed Steel & M42 Cobalt

Miniature 3/16" Shank ball nose end mills are designed for small diameter milling of die cavities, fillets, round bottom holes and radius bottom slots. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	4570	4570C
				High Speed Steel EDP NO.	COBALT EDP NO.
1/16	.0625	3/32	2	44340	43210
3/32	.0938	9/64	2	44341	43212
1/8	.1250	3/16	2	44342	43214
5/32	.1562	15/64	2	44343	43216
3/16	.1875	9/32	2	44344	43218



List No. 4570 High Speed Steel  
List No. 4570C M42 Cobalt

Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each



Tool Coatings Also Available

# 2-Flute Miniature Ball Nose Regular Length Double End Mills

3/16" Dia. Shank — Center Cutting High Speed Steel & M42 Cobalt

Miniature 3/16" Shank ball nose end mills are designed for small diameter milling of die cavities, fillets, round bottom holes and radius bottom slots. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1890	1890C
				High Speed Steel EDP NO.	COBALT EDP NO.
1/32	.0312	3/32	2-1/4	43186	—
1/16	.0625	3/16	2-1/4	43188	43200
3/32	.0938	9/32	2-1/4	43190	43202
1/8	.1250	3/8	2-1/4	43192	43204
5/32	.1562	7/16	2-1/4	43194	43206
3/16	.1875	1/2	2-1/4	43196	43208



List No. 1890 High Speed Steel  
List No. 1890C M42 Cobalt

Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each



**CUTTING FLUIDS** provide many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Multi-Flute Ball Nose Single End Mills

**High Speed Steel & M42 Cobalt**  
**Bright Finish & TiN Coated**  
**Center Cutting**

**Ball Nose** end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots.

**Multi-Flute** end mills offer improved surface finish and feature greater core strength for reduced tool deflection.

**Center Cutting** end allows for plunge cutting like a drill into solid material.



- List No. 4554 High Speed Steel
- List No. 4554G High Speed Steel TiN Coated
- List No. 4589 M42 Cobalt

**STANDARD PACKAGE** All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	4554	4554G	4589
						High Speed Steel	High Speed Steel	COBALT
						EDP NO.	TIN COATED EDP NO.	EDP NO.
1/8	.1250	3/8	3/8	2-5/16	4	—	—	44451
3/16	.1875	3/8	1/2	2-3/8	4	—	—	44452
1/4	.2500	3/8	3/4	2-9/16	4	44274	96512	44453
5/16	.3125	3/8	1	2-3/4	4	44275	96513	44454
3/8	.3750	3/8	1	2-3/4	4	44276	96514	44455
1/2	.5000	1/2	1-1/4	3-1/4	4	44277	96515	44456
5/8	.6250	5/8	1-5/8	3-3/4	4	44278	96516	44457
3/4	.7500	3/4	1-5/8	3-3/4	4	44279	96517	44458
7/8	.8750	7/8	1-7/8	4-1/8	4	44280	96518	—
1	1.0000	1	2	4-1/2	4	44281	96519	44460
1	1.0000	1	2	4-1/2	6	—	—	44461



# Multi-Flute Long Length Ball Nose Single End Mills

**High Speed Steel**  
**Bright Finish & TiN Coated**  
**Center Cutting**



- List No. 4555 High Speed Steel
- List No. 4555G High Speed Steel TiN Coated

**STANDARD PACKAGE** All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	4555	4555G
						High Speed Steel	High Speed Steel
						EDP NO.	TIN COATED EDP NO.
1/4	.2500	3/8	1-1/4	3-1/16	4	44298	96525
5/16	.3125	3/8	1-3/8	3-1/8	4	44299	96526
3/8	.3750	3/8	1-1/2	3-1/4	4	44300	96527
1/2	.5000	1/2	2	4	4	44301	96528
5/8	.6250	5/8	2-1/2	4-5/8	4	44302	96529
3/4	.7500	3/4	3	5-1/4	4	44303	96530
1	1.0000	1	4	6-1/2	4	44304	—
1-1/4	1.2500	1-1/4	4	6-1/2	4	44305	—
1-1/2	1.5000	1-1/4	4	6-1/2	4	44306	—

## TOOL COATING SERVICE

Tool Coatings enhance cutting tool performance for increased productivity and lower overall tooling cost.

**TiN** — Titanium Nitride  
**TiAlN** — Titanium Aluminum Nitride  
**CrN** — Chromium Nitride

**TiCN** — Titanium Carbonitride  
**AlTiN** — Aluminum Titanium Nitride  
**CrC** — Chromium Carbide

# M42 Cobalt Roughing / Finishing End Mills

## Center Cutting

**Roughing / Finishing** end mills rough and finish in a single pass, removing material at roughing rates while producing a finish near that produced by standard end mills. Recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys.



List No. 4640 — Bright Finish

List No. 4640G — TiN Coated

List No. 4640C — TiCN Coated

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED	TIN COATED	TICN COATED
						EDP NO.	EDP NO.	EDP NO.
3/16	.1875	3/8	1/2	2-3/8	4	45100	45200	45300
1/4	.2500	3/8	5/8	2-7/16	4	45101	45201	45301
5/16	.3125	3/8	3/4	2-1/2	4	45102	45202	45302
5/16	.3125	3/8	1-3/8	3-1/8	4	45103	45203	45303
3/8	.3750	3/8	3/4	2-1/2	4	45104	45204	45304
7/16	.4375	3/8	1	2-11/16	4	45105	45205	45305
1/2	.5000	1/2	1-1/4	3-1/4	4	45106	45206	45306
1/2	.5000	1/2	2	4	4	45107	45207	45307
1/2	.5000	1/2	3	5	4	45108	45208	45308
9/16	.5625	1/2	1-3/8	3-3/8	4	45112	45212	45312
5/8	.6250	5/8	1-5/8	3-3/4	4	45113	45213	45313
5/8	.6250	5/8	2-1/2	4-5/8	4	45114	45214	45314
11/16	.6875	5/8	1-5/8	3-3/4	4	45119	45219	45319
3/4	.7500	5/8	1-5/8	3-3/4	4	45120	45220	45320
3/4	.7500	3/4	1-5/8	3-7/8	4	45121	45221	45321
3/4	.7500	3/4	3	5-1/4	4	45122	45222	45322
3/4	.7500	3/4	4-1/8	6-3/8	4	45123	45223	45323
13/16	.8125	3/4	1-7/8	4-1/8	5	45127	45227	45327
7/8	.8750	3/4	1-7/8	4-1/8	5	45128	45228	45328
1	1.0000	3/4	2	4-1/4	5	45132	45232	45332
1	1.0000	1	2	4-1/2	5	45137	45237	45337
1	1.0000	1	4	6-1/2	5	45138	45238	45338
1	1.0000	1	6	8-1/2	5	45139	45239	45339
1	1.0000	1	3	5-1/2	5	45142	45242	45342
1-1/8	1.1250	3/4	2	4-1/4	6	45143	45243	45343
1-1/4	1.2500	3/4	2	4-1/2	6	45145	45245	45345
1-1/4	1.2500	1-1/4	2	4-1/2	6	45147	45247	45347
1-1/4	1.2500	1-1/4	4	6-1/2	6	45148	45248	45348
1-1/4	1.2500	1-1/4	6	8-1/2	6	45149	45249	45349
1-1/2	1.5000	3/4	2	4-1/2	6	45153	45253	45353
1-1/2	1.5000	3/4	1-1/8	3-3/8	6	45154*	—	—
1-1/2	1.5000	1-1/4	2	4-1/2	6	45156	45256	45356
1-1/2	1.5000	1-1/4	4	6-1/2	6	45157	45257	45357
1-1/2	1.5000	1-1/4	6	8-1/2	6	45158	45258	45358

\* Available while supplies last

### TOOL COATING SERVICE

Tool Coatings enhance cutting tool performance for increased productivity and lower overall tooling cost.

**TiN** — Titanium Nitride  
**TiAlN** — Titanium Aluminum Nitride  
**CrN** — Chromium Nitride

**TiCN** — Titanium Carbonitride  
**AlTiN** — Aluminum Titanium Nitride  
**CrC** — Chromium Carbide

# M42 Cobalt Coarse Pitch Center Cutting Roughing End Mills

## Center Cutting

**Roughing** end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 4611 — Regular Length

List No. 4612 — Medium & Long Length

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

**STANDARD PACKAGE** All sizes — 1 each



### List No. 4611 - Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
						EDP NO.	EDP NO.	EDP NO.	EDP NO.
3/16	.1875	3/8	1/2	2-3/8	4	45413	—	—	45419
1/4	.2500	3/8	5/8	2-7/16	4	45414	—	—	45420
5/16	.3125	3/8	3/4	2-1/2	4	45415	—	—	45421
3/8	.3750	3/8	3/4	2-1/2	4	45416	—	—	45422
7/16	.4375	3/8	1	2-11/16	4	45417	—	—	45423
1/2	.5000	1/2	1-1/4	3-1/4	4	44910	44921	44932	45425
5/8	.6250	5/8	1-5/8	3-3/4	4	44911	44922	44933	45426
3/4	.7500	3/4	1-5/8	3-7/8	4	44912	44923	44934	45427
7/8	.8750	3/4	1-5/8	4-1/8	5	44913	44924	44935	45428
1	1.0000	1	2	4-1/2	5	44914	44925	44936	45429
1-1/4	1.2500	1-1/4	2	4-1/2	6	44915	44926	44937	45430
1-1/2	1.5000	1-1/4	2	4-1/2	6	44916	44927	44938	45431

### List No. 4612 - Medium & Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
						EDP NO.	EDP NO.	EDP NO.	EDP NO.
3/8	.3750	3/8	1-1/2	3-1/4	4	45418	—	—	45424
1/2	.5000	1/2	2	4	4	44943	44952	44961	45432
5/8	.6250	5/8	2-1/2	4-5/8	4	44944	44953	44962	45433
3/4	.7500	3/4	3	5-1/4	4	44945	44954	44963	45434
1	1.0000	1	3	5-1/2	5	44946	44955	44964	45435
1	1.0000	1	4	6-1/2	5	44947	44956	44965	45436
1-1/4	1.2500	1-1/4	3	5-1/2	6	44948	44957	44966	45437
1-1/4	1.2500	1-1/4	4	6-1/2	6	44949	44958	44967	45438
1-1/2	1.5000	1-1/4	3	5-1/2	6	44950	44959	44968	45439
1-1/2	1.5000	1-1/4	4	6-1/2	6	44951	44960	44969	45440

## TOOL COATING SERVICE

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish. **PLEASE INQUIRE.**

**TiN** — Titanium Nitride

**TiCN** — Titanium Carbonitride

**TiAlN** — Titanium Aluminum Nitride

**AlTiN** — Aluminum Titanium Nitride

**CrN** — Chromium Nitride

**CrC** — Chromium Carbide

**DLC** — Amorphous Diamond-Like Carbon

# M42 Cobalt Fine Pitch Center Cutting Roughing End Mills



## Center Cutting

**Roughing** end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Fine Pitch** is recommended for difficult-to-machine, high tensile strength, abrasive and harder materials up to 40 Rc. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 4613 — Regular Length

List No. 4614 — Medium & Long Length

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

**STANDARD PACKAGE** All sizes — 1 each



## List No. 4613 - Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
						EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/4	.2500	3/8	5/8	2-7/16	4	45441	—	—	45443
3/8	.3750	3/8	3/4	2-1/2	4	45442	—	—	45444
1/2	.5000	1/2	1-1/4	3-1/4	4	44970	44981	45050	45445
5/8	.6250	5/8	1-5/8	3-3/4	4	44971	44982	45051	45446
3/4	.7500	3/4	1-5/8	3-7/8	4	44972	44983	45052	45447
7/8	.8750	3/4	1-7/8	4-1/8	5	44973	44984	45053	45448
1	1.0000	1	2	4-1/2	5	44974	44985	45054	45449
1-1/4	1.2500	1-1/4	2	4-1/2	6	44975	44986	45055	45450
1-1/2	1.5000	1-1/4	2	4-1/2	6	44976	44987	45056	45451

## List No. 4614 - Medium & Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
						EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/2	.5000	1/2	2	4	4	45061	45070	45079	45452
5/8	.6250	5/8	2-1/2	4-5/8	4	45062	45071	45080	45453
3/4	.7500	3/4	3	5-1/4	4	45063	45072	45081	45454
1	1.0000	1	3	5-1/2	5	45064	45073	45082	45455
1	1.0000	1	4	6-1/2	5	45065	45074	45083	45456
1-1/4	1.2500	1-1/4	3	5-1/2	6	45066	45075	45084	45457
1-1/4	1.2500	1-1/4	4	6-1/2	6	45067	45076	45085	45458
1-1/2	1.5000	1-1/4	3	5-1/2	6	45068	45077	45086	45459
1-1/2	1.5000	1-1/4	4	6-1/2	6	45069	45078	45087	45460

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# M42 Cobalt Coarse Pitch Roughing End Mills

**Roughing** end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys.

### Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
1/4	.2500	3/8	5/8	2-7/16	3	44496
5/16	.3125	3/8	3/4	2-1/2	3	44497
3/8	.3750	3/8	3/4	2-1/2	4	44498
1/2	.5000	1/2	1-1/4	3-1/4	4	44501
5/8	.6250	5/8	1-5/8	3-3/4	4	44502
3/4	.7500	5/8	1-5/8	3-7/8	4	44635
3/4	.7500	3/4	1-5/8	3-7/8	4	44503
7/8	.8750	3/4	1-7/8	4-1/8	5	44636
1	1.0000	3/4	2	4-1/4	5	44500
1	1.0000	1	2	4-1/2	5	44505
1-1/8	1.1250	1	2	4-1/2	6	44638
1-1/4	1.2500	1-1/4	2	4-1/2	6	44508
1-1/4	1.2500	3/4	2	4-1/2	6	44639
1-1/2	1.5000	1-1/4	2	4-1/2	6	44511

# M42 Cobalt Fine Pitch Roughing End Mills

**Roughing** end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Fine Pitch** is recommended for difficult-to-machine, high tensile strength, abrasive and harder materials up to 40 Rc.

### Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
1/4	.2500	3/8	5/8	2-7/16	4	44650
5/16	.3125	3/8	3/4	2-1/2	4	44651
3/8	.3750	3/8	3/4	2-1/2	4	44652
7/16	.4375	3/8	1	2-11/16	4	44653
1/2	.5000	1/2	1-1/4	3-1/4	4	44654
9/16	.5625	1/2	1-3/8	3-3/8	4	44655
5/8	.6250	5/8	1-5/8	3-3/4	4	44656
3/4	.7500	3/4	1-5/8	3-7/8	4	44658
7/8	.8750	3/4	1-7/8	4-1/8	5	44659
7/8	.8750	7/8	1-7/8	4-1/8	5	44660
1	1.0000	3/4	2	4-1/4	5	44661
1	1.0000	1	2	4-1/2	5	44662
1-1/4	1.2500	3/4	2	4-1/2	6	44664
1-1/4	1.2500	1-1/4	2	4-1/2	6	44665
1-1/2	1.5000	1-1/4	2	4-1/2	6	44667
2	2.0000	1-1/4	2	4-1/2	8	44670



List No. 4594

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**STANDARD PACKAGE** All sizes — 1 each



### Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
1/2	.5000	1/2	2	4	4	44499
5/8	.6250	5/8	2-1/2	4-5/8	4	44643
3/4	.7500	3/4	3	5-1/4	4	44504
1	1.0000	1	4	6-1/2	5	44507
1-1/4	1.2500	1-1/4	4	6-1/2	6	44510
1-1/2	1.5000	1-1/4	4	6-1/2	6	44513
1-3/4	1.7500	1-1/4	4	6-1/2	6	44644
2	2.0000	1-1/4	4	6-1/2	6	44645
2	2.0000	2	4	7-3/4	8	44516
2	2.0000	2	6	9-3/4	8	44517

End Mills with 2" dia. shanks are provided with a dual drive shank.



List No. 4596

**Cobalt** offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

**STANDARD PACKAGE** All sizes — 1 each



### Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
1/2	.5000	1/2	2	4	4	44671
5/8	.6250	5/8	2-1/2	4-5/8	4	44672
3/4	.7500	3/4	3	5-1/4	4	44673
1	1.0000	1	4	6-1/2	5	44675

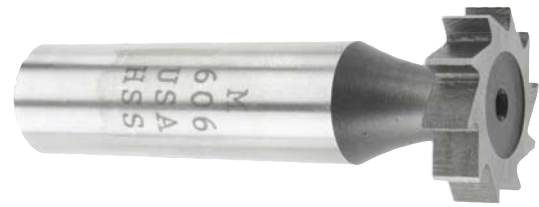
Tool Coatings Also Available



# Woodruff Keyseat Cutters

High Speed Steel — 1/2" Dia. Shank

Woodruff Keyseat cutters are designed for cutting keyways and keyseats in a wide variety of materials.



END MILLS

STANDARD PACKAGE All sizes — 1 each.



List No. 1917 — Straight Tooth

AMERICAN STANDARD NO.	DIA.	WIDTH	OAL	EDP NO.
202	1/4	1/16	2-1/16	40526
202½	5/16	1/16	2-1/16	40527
302½	5/16	3/32	2-3/32	40528
203	3/8	1/16	2-1/16	40529
303	3/8	3/32	2-3/32	40530
403	3/8	1/8	2-1/8	40531
204	1/2	1/16	2-1/16	40532
304	1/2	3/32	2-3/32	40533
305	5/8	3/32	2-3/32	40534
404	1/2	1/8	2-1/8	40535
405	5/8	1/8	2-1/8	40536
406	3/4	1/8	2-1/8	40537
505	5/8	5/32	2-5/32	40538
605	5/8	3/16	2-3/16	40539
506	3/4	5/32	2-5/32	40540
806	3/4	1/4	2-1/4	40541
507	7/8	5/32	2-5/32	40542
606	3/4	3/16	2-3/16	40543
607	7/8	3/16	2-3/16	40544
707	7/8	7/32	2-7/32	40545

AMERICAN STANDARD NO.	DIA.	WIDTH	OAL	EDP NO.
608	1	3/16	2-3/16	40546
708	1	7/32	2-7/32	40547
1208	1	3/8	2-3/8	40548
609	1-1/8	3/16	2-3/16	40549
807	7/8	1/4	2-1/4	40550
808	1	1/4	2-1/4	40551
709	1-1/8	7/32	2-7/32	40552
809	1-1/8	1/4	2-1/4	40553
610	1-1/4	3/16	2-3/16	40554
710	1-1/4	7/32	2-7/32	40555
810	1-1/4	1/4	2-1/4	40556
811	1-3/8	1/4	2-1/4	40557
812	1-1/2	1/4	2-1/4	40558
1008	1	5/16	2-5/16	40559
1010	1-1/4	5/16	2-5/16	40561
1012	1-1/2	5/16	2-5/16	40563
1210	1-1/4	3/8	2-3/8	40564
1211	1-3/8	3/8	2-3/8	40565
1212	1-1/2	3/8	2-3/8	40566

## TOOL COATINGS

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish.

### TiN - Titanium Nitride

A good general purpose coating for a wide range of ferrous materials. Not recommended for non-ferrous materials. Has higher heat resistance than TiCN coating.

### TiCN - Titanium Carbonitride

Enhanced toughness, hardness & wear resistance for aggressive speeds & feeds. Recommended for difficult-to-machine, gummy & abrasive materials where moderate cutting temperatures are generated.

### TiALN - Titanium Aluminum Nitride

### ALTiN - Aluminum Titanium Nitride

Excellent all around coatings featuring high heat resistance. Recommended for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. ALTiN has higher AL content for increased hardness & heat resistance.

### CrN - Chromium Nitride

### CrC - Chromium Carbide

Especially recommended for titanium and non-ferrous materials including aluminum, copper & brass. CrC has slightly higher hardness than CrN. These coatings resist adhesion of the material being machined and resist chipping and cracking.

### DLC - Amorphous Diamond-Like Carbon

A thin carbon based amorphous (non-crystalline) coating featuring very high hardness & low coefficient of friction. Recommended for graphite and some non-ferrous materials. Typically used on solid carbide tools.

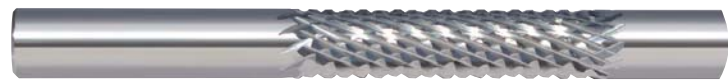
**BURRS**

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**Solid Carbide  
Piloted Die Trimmer**

Micrograin Carbide  
Right Hand Cut



List No. 5939

**TOLERANCES**  
Pilot Length +.0000 / -.0005  
Shank Dia. +.0000 / -.0005

**Double Cut** for rapid stock removal and improved operator control.

**Non-Cutting Pilot** permits removal of excess welding or fill material without damage to the die area beyond the repair area.

Recommended for ferrous materials including mold and die steels up to 60Rc hardness.

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life.

DIA.	SHANK DIA.	LENGTH OF CUT	PILOT LENGTH	OAL	EDP NO.
1/8	1/8	1	1/2	2-1/2	59045
1/8	1/8	1	1/2	3	59046
3/16	3/16	1	1/2	2-1/2	59047
1/4	1/4	1	1/2	2-1/2	59048
1/4	1/4	1	1/2	3	59049
3/8	3/8	1	1/2	2-1/2	59050
1/2	1/2	1	1/2	2-1/2	59051

# Carbide Burrs 1/4" Shank



## Single Cut

General Purpose. Recommended for steel, cast iron, ferrous materials. Offers good stock removal and smooth workpiece finish.

List No. 5970  
Single Cut



## Double Cut

Most popular style. For rapid stock removal in tough applications. Design reduces the pulling action, reduces size of chips, ensures rapid stock removal.

List No. 5970  
Double Cut



STANDARD PACKAGE All sizes — 1 each

## Cylinder Shape No End Cut



## Cylinder Shape Radius End



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SA-11	1/8	1/2	59715	59500
SA-12	1/8	5/8	59816	59501
SA-13	5/32	5/8	59817	59502
SA-14	3/16	5/8	59818	59503
SA-1	1/4	5/8	59716	59504
SA-1L	1/4	1	59717	59505
SA-2	5/16	3/4	59718	59506
SA-3	3/8	3/4	59719	59507
SA-3L	3/8	1	59720	59508
SA-3X	3/8	1-1/2	59819	59509
SA-4	7/16	1	59820	59510
SA-5	1/2	1	59721	59511
SA-6	5/8	1	59722	59512
SA-15	3/4	1/2	59821	59513
SA-16	3/4	3/4	59723	59516
SA-7	3/4	1	59822	59517
SA-8	7/8	1	59823	59518
SA-9	1	1	59824	59519

TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SC-11	1/8	1/2	59724	59536
SC-12	1/8	5/8	59843	59537
SC-13	5/32	5/8	59844	59538
SC-14	3/16	5/8	59845	59539
SC-1	1/4	5/8	59846	59540
SC-1L	1/4	1	59725	59541
SC-2	5/16	3/4	59726	59542
SC-3	3/8	3/4	59847	59543
SC-3L	3/8	1	59727	59544
SC-3X	3/8	1-1/2	59848	59545
SC-4	7/16	1	59849	59546
SC-5	1/2	1	59728	59547
SC-6	5/8	1	59729	59548
SC-15	3/4	1/2	59850	59550
SC-16	3/4	3/4	59730	59549
SC-7	3/4	1	59851	59551
SC-9	1	1	59852	59552

## Cylinder Shape End Cut



## Ball Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SB-11	1/8	1/2	59825	59875
SB-12	1/8	5/8	59826	59876
SB-13	5/32	5/8	59827	59877
SB-14	3/16	5/8	59828	59878
SB-1	1/4	5/8	59829	59879
SB-1L	1/4	1	59830	59880
SB-2	5/16	3/4	59831	59881
SB-3	3/8	3/4	59832	59882
SB-3L	3/8	1	59833	59883
SB-3X	3/8	1-1/2	59834	59884
SB-4	7/16	1	59835	59885
SB-5	1/2	1	59836	59886
SB-6	5/8	1	59837	59887
SB-15	3/4	1/2	59838	59888
SB-16	3/4	3/4	59839	59889
SB-7	3/4	1	59840	59890
SB-8	7/8	1	59841	59891
SB-9	1	1	59842	59892

TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SD-11	1/8	3/32	59731	59554
SD-14	3/16	1/8	59732	59555
SD-1	1/4	7/32	59733	59556
SD-2	5/16	1/4	59734	59557
SD-3	3/8	5/16	59735	59558
SD-4	7/16	3/8	59853	59559
SD-5	1/2	7/16	59736	59560
SD-6	5/8	9/16	59737	59561
SD-7	3/4	11/16	59738	59562
SD-9	1	15/16	59854	59563

(continued)

# Carbide Burrs 1/4" Shank (continued)

List No. 5970



## Oval Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SE-11	3/16	5/16	59739	59564
SE-1	1/4	3/8	59740	59565
SE-3	3/8	5/8	59741	59566
SE-5	1/2	7/8	59742	59567
SE-6	5/8	1	59743	59568
SE-7	3/4	1	59744	59569

## 60° Cone Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SJ-1	1/4	3/16	59861	59793
SJ-3	3/8	5/16	59862	59794
SJ-5	1/2	7/16	59863	59795
SJ-6	5/8	9/16	59864	59796
SJ-7	3/4	11/16	59865	59797
SJ-9	1	15/16	59866	59798

## Tree Shape Radius End



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SF-11	1/8	1/2	59855	59570
SF-1	1/4	5/8	59745	59571
SF-3	3/8	3/4	59746	59572
SF-4	7/16	1	59856	59573
SF-13	1/2	3/4	59857	59575
SF-5	1/2	1	59747	59574
SF-6	5/8	1	59748	59576
SF-7	3/4	1	59514	59515
SF-14	3/4	1-1/4	59749	59578
SF-15	3/4	1-1/2	59859	59579

## 90° Cone Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SK-1	1/4	1/8	59867	59800
SK-3	3/8	3/16	59868	59801
SK-5	1/2	1/4	59869	59802
SK-6	5/8	5/16	59870	59803
SK-7	3/4	3/8	59871	59804
SK-9	1	1/2	59872	59805

## Tree Shape Pointed End



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SG-1	1/4	5/8	59750	59580
SG-2	5/16	3/4	59751	59581
SG-3	3/8	3/4	59752	59582
SG-13	1/2	3/4	59753	59583
SG-5	1/2	1	59754	59584
SG-6	5/8	1	59755	59585
SG-7	3/4	1	59756	59586
SG-15	3/4	1-1/2	59860	59587

## Taper Shape Radius End

14° Included Angle



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SL-1	1/4	5/8	59757	59605
SL-2	5/16	7/8	59758	59606
SL-3	3/8	1-1/16	59759	59607
SL-4	1/2	1-1/8	59760	59608
SL-5	5/8	1-3/16	59873	59609
SL-6	5/8	1-5/16	59761	59610
SL-7	3/4	1-1/2	59762	59611

## Flame Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGL. CUT	DBL. CUT
SH-1	1/4	5/8	59774	59780
SH-2	5/16	3/4	59775	59781
SH-5	1/2	1-1/4	59776	59782
SH-6	5/8	1-7/16	59777	59783
SH-7	3/4	1-5/8	59778	59784

## Cone Shape



TOOL NO.	DIA.	INCL. ANGLE	LENGTH OF CUT	EDP NO.	
				SINGL. CUT	DBL. CUT
SM-1	1/4	22°	1/2	59763	59612
SM-2	1/4	14°	3/4	59764	59613
SM-3	1/4	10°	1	59765	59614
SM-4	3/8	28°	5/8	59766	59615
SM-5	1/2	28°	7/8	59767	59616
SM-6	5/8	31°	1	59768	59617

## Inverted Cone Shape



TOOL NO.	DIA.	INCL. ANGLE	LENGTH OF CUT	EDP NO.	
				SINGL. CUT	DBL. CUT
SN-1	1/4	10°	5/16	59769	59618
SN-2	3/8	13°	3/8	59770	59619
SN-4	1/2	28°	1/2	59771	59620
SN-6	5/8	18°	3/4	59772	59621
SN-7	3/4	30°	5/8	59773	59622

# Long Shank Carbide Burrs 1/4" × 6" Long Steel Shank



## Single Cut

General Purpose. Recommended for steel, cast iron, ferrous materials. Offers good stock removal and smooth workpiece finish.

List No. 5970  
Single Cut



## Double Cut

Most popular style for rapid stock removal in tough applications. Design reduces the pulling action, reduces size of chips, ensures rapid stock removal.

List No. 5970  
Double Cut



STANDARD PACKAGE All sizes — 1 each

## 6" Long Steel Shank for Hard to Reach Areas

### Cylinder Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
SA-1L6	1/4	1/2	59655	59925
SA-3L6	3/8	3/4	59656	59926
SA-5L6	1/2	1	59657	59927

### Tree Shape Radius End



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
SF-1L6	1/4	1/2	59667	59937
SF-3L6	3/8	3/4	59668	59938
SF-5L6	1/2	1	59669	59939

### Cylinder Shape Radius End



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
SC-1L6	1/4	1/2	59658	59928
SC-3L6	3/8	3/4	59659	59929
SC-5L6	1/2	1	59660	59930

### Tree Shape Pointed End



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
SG-1L6	1/4	1/2	59670	59940
SG-3L6	3/8	3/4	59671	59941
SG-5L6	1/2	1	59672	59942

### Ball Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
SD-1L6	1/4	7/32	59661	59931
SD-3L6	3/8	5/16	59662	59932
SD-5L6	1/2	7/16	59663	59933

### Flame Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
SH-2L6	5/16	3/4	59673	59943
SH-5L6	1/2	1-1/4	59674	59944

### Oval Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
SE-1L6	1/4	3/8	59664	59934
SE-3L6	3/8	5/8	59665	59935
SE-5L6	1/2	7/8	59666	59936

### Taper Shape Radius End — 14°



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
SL-1L6	1/4	5/8	59675	59945
SL-3L6	3/8	1-1/16	59676	59946
SL-4L6	1/2	1-1/8	59677	59947

# Carbide Burrs - 1/8" Shank



**Single Cut**

General Purpose. Recommended for steel, cast iron, ferrous materials. Offers good stock removal and smooth workpiece finish.

**Double Cut**

Most popular style for rapid stock removal in tough applications. Design reduces the pulling action, reduces size of chips, ensures rapid stock removal.

**List 5970  
STANDARD  
PACKAGE**

All sizes — 1 each

TOOL SHAPE	TOOL NO.	DIA.	LENGTH OF CUT	OAL	EDP NO.		
					SINGL. CUT	DBL. CUT	
Cylindrical - No End Cut	SA-41	1/16	1/4	1-1/2	59527	59713	
	SA-42	3/32	7/16	1-1/2	59528	59691	
	SA-43	1/8	9/16	1-1/2	59529	59690	
	SA-43L2	1/8	9/16	2	59530	59533	
	SA-43L3	1/8	9/16	3	59531	59534	
	SA-53	3/16	1/2	2	59532	59535	
	SA-51	1/4	1/2	2	59678	59553	
Cylindrical - End Cut	SB-41	1/16	1/4	1-1/2	59577	59703	
	SB-42	3/32	7/16	1-1/2	59588	59592	
	SB-43	1/8	9/16	1-1/2	59589	59714	
	SB-43L2	1/8	9/16	2	59590	59593	
	SB-43L3	1/8	9/16	3	59591	59594	
	SB-51	1/4	3/16	1-11/16	59679	59595	
	SB-51A	1/4	1/2	2	59975	59976	
Cylindrical - Ball Nose	SC-41	3/32	7/16	1-1/2	59596	59693	
	SC-42	1/8	9/16	1-1/2	59597	59692	
	SC-42L2	1/8	9/16	2	59598	59602	
	SC-42L3	1/8	9/16	3	59599	59603	
	SC-52	5/32	1/2	2	59600	59604	
	SC-53	3/16	1/2	2	59601	59688	
	SC-51	1/4	1/2	2	59680	59623	
Ball	SD-41	3/32	3/32	1-1/2	59624	59894	
	SD-42	1/8	1/8	1-1/2	59654	59694	
	SD-42L2	1/8	1/8	2	59705	59787	
	SD-42L3	1/8	1/8	3	59779	59788	
	SD-52	5/32	5/32	1-21/32	59785	59789	
	SD-53	3/16	5/32	1-21/32	59786	59689	
	SD-51	1/4	7/32	1-23/32	59681	59790	
Oval	SE-41	1/8	7/32	1-1/2	59791	59695	
	SE-41L2	1/8	7/32	2	59792	59808	
	SE-41L3	1/8	7/32	3	59799	59809	
	SE-53	3/16	9/32	1-25/32	59806	59858	
	SE-51	1/4	3/8	1-7/8	59682	59874	
Tree - Radius End	SF-41	1/8	1/4	1-1/2	59902	59696	
	SF-42	1/8	1/2	1-1/2	59904	59895	
	SF-42L2	1/8	1/2	2	59906	59912	
	SF-42L3	1/8	1/2	3	59908	59914	
	SF-53	3/16	1/2	2	59910	59896	
	SF-51	1/4	1/2	2	59683	59916	
Tree - Pointed End	SG-41	1/8	1/4	1-1/2	59920	59697	
	SG-43	1/8	3/8	1-1/2	59921	59897	
	SG-44	1/8	1/2	1-1/2	59922	59898	
	SG-44L2	1/8	1/2	2	59923	59948	
	SG-44L3	1/8	1/2	3	59924	59949	
	SG-51	1/4	1/2	2	59684	59950	

(continued)

# Carbide Burrs - 1/8" Shank

(continued)



BURRS

TOOL SHAPE	TOOL NO.	DIA.	LENGTH OF CUT	OAL	EDP NO.		Image
					SNGL. CUT	DBL. CUT	
Flame	SH-41	1/8	1/4	1-1/2	59951	59700	
60° Cone * Double End	SJ-42 *	1/8	3/32	1-1/2	59952	59698	
90° Cone * Double End	SK-42 *	1/8	1/16	1-1/2	59953	59702	
Taper - Radius End ** 8° Incl. Angle *** 14° Incl. Angle	SL-41 **	1/8	3/8	1-1/2	59954	59699	
	SL-42 **	1/8	1/2	1-1/2	59955	59893	
	SL-42L2 **	1/8	1/2	2	59956	59959	
	SL-42L3 **	1/8	1/2	3	59957	59960	
	SL-53 ***	3/16	1/2	2	59958	59961	
Cone	SM-41	1/8	11/32	1-1/2	59962	59968	
	SM-42	1/8	7/16	1-1/2	59963	59899	
	SM-42L2	1/8	7/16	2	59964	59969	
	SM-42L3	1/8	7/16	3	59965	59970	
	SM-43	1/8	5/8	1-1/2	59966	59900	
	SM-53	3/16	1/2	2	59967	59971	
	SM-51	1/4	1/2	2	59685	59972	
Inverted Cone - 10° Incl. Angle	SN-42	1/8	3/16	1-1/2	59973	59701	
	SN-51	1/4	1/4	1-3/4	59686	59974	

## Carbide Burr Sets — Double Cut

List 5970



Supplied in a premium hardwood case.

EDP	SET NO.	SHANK DIA.	PIECES PER SET	INCLUDES
59901	C-150	1/8	9	SA-42, SA-43, SC-42, SC-41, SF-42, SG-42, SM-43, SE-41, SD-42
59711	C-100	1/8	12	SA-43, SA-42, SC-42, SC-41, SD-42, SE-41, SF-41, SG-41, SJ-42, SL-41, SH-41, SN-42
59903	C-350	1/8	6	SA-51, SC-51, SF-51, SG-51, SM-51, SD-51
59687	C-300	1/8	9	SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51
59913	C-600	1/4	8	SA-1, SA-5, SC-1, SC-3, SC-5, SF-5, SL-3, SL-4
59905	C-400	1/4	8	SA-1, SC-1, SF-1, SG-1, SM-2, SE-1, SL-1, SD-1
59911	C-550	1/4	8	SA-5, SC-1, SC-3, SD-3, SE-5, SH-5, SK-5, SG-1
59918	C-725	1/4	8	SA-5, SC-3, SC-5, SD-5, SF-3, SF-5, SG-3, SL-4
59909	C-500	1/4	8	SA-5, SC-5, SD-5, SE-5, SG-5, SM-5, SL-4, SH-5
59907	C-450	1/4	8	SA-5, SC-5, SF-5, SG-5, SM-5, SE-5, SL-4, SD-5
59915	C-650	1/4	8	SB-1, SC-3, SD-2, SE-5, SF-5, SL-4, SG-3, SM-5
59917	C-700	1/4	9	SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SF-1, SF-3, SF-5
59712	C-200	1/4	12	SA-1, SA-14, SC-1, SC-14, SD-1, SE-1, SF-1, SG-1, SK-1, SL-1, SH-1, SN-1
59919	C-750	1/4	16	SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SD-3, SD-5, SE-3, SF-1, SF-3, SF-5, SG-1, SG-3, SL-3, SL-4

## RECOMMENDED CUTTING SPEEDS

BURR DIAMETER	R.P.M.
1/16	55000-85000
3/32	50000-60000
1/8	35000-65000
3/16	30000-55000
1/4	25000-50000
5/16	18000-38000

BURR DIAMETER	R.P.M.
3/8	17000-38000
7/16	13000-37000
1/2	14000-36000
5/8	11000-23000
3/4	8000-19000
1	7000-18000

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

Increase speeds for softer non-ferrous materials.  
Decrease speeds for harder ferrous materials.

# Carbide Burrs For Non-Ferrous Materials



## 1/4" Shank

NF Burrs are designed for use on aluminum, non-ferrous metals, soft steel, reinforced plastics, and other soft materials. High flute design for easy chip flow and fast stock removal. Provides excellent work finish with minimum loading when cutting soft, sticky metals.

## List 5970

**STANDARD PACKAGE**

All sizes — 1 each



### Cylinder Shape No End Cut



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.
SA-1-NF	1/4	5/8	59625
SA-3-NF	3/8	3/4	59626
SA-5-NF	1/2	1	59627
SA-6-NF	5/8	1	59628
SA-7-NF	3/4	1	59629
SA-7-NF 3/8	3/4	1	59810*

### Oval Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.
SE-3-NF	3/8	5/8	59640
SE-5-NF	1/2	7/8	59641
SE-6-NF	5/8	1	59642
SE-7-NF	3/4	1	59643
SE-7-NF 3/8	3/4	1	59813*

### Cylinder Shape End Cut



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.
SB-1-NF	1/4	5/8	59522
SB-3-NF	3/8	3/4	59523
SB-5-NF	1/2	1	59524
SB-6-NF	5/8	1	59525
SB-7-NF	3/4	1	59526

### Tree Shape Radius End



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.
SF-1-NF	1/4	5/8	59644
SF-3-NF	3/8	3/4	59645
SF-5-NF	1/2	1	59646
SF-6-NF	5/8	1	59647
SF-7-NF	3/4	1	59520
SF-14-NF	3/4	1-1/4	59648
SF-14-NF 3/8	3/4	1-1/4	59814*

### Cylinder Shape Radius End



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.
SC-1-NF	1/4	5/8	59630
SC-3-NF	3/8	3/4	59631
SC-5-NF	1/2	1	59632
SC-6-NF	5/8	1	59633
SC-7-NF	3/4	1	59634
SC-7-NF 3/8	3/4	1	59811*

### Taper Shape Radius End 14° Included Angle



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.
SL-1-NF	1/4	5/8	59521
SL-3-NF	3/8	1-1/16	59649
SL-4-NF	1/2	1-1/8	59650
SL-5-NF	5/8	1-3/16	59651
SL-6-NF	5/8	1-5/16	59652
SL-7-NF	3/4	1-1/2	59653
SL-7-NF 3/8	3/4	1-1/2	59815*

### Ball Shape



TOOL NO.	DIA.	LENGTH OF CUT	EDP NO.
SD-1-NF	1/4	7/32	59635
SD-3-NF	3/8	5/16	59636
SD-5-NF	1/2	7/16	59637
SD-6-NF	5/8	9/16	59638
SD-7-NF	3/4	11/16	59639
SD-7-NF 3/8	3/4	11/16	59812*

**For Aluminum, Non-Ferrous Metals, Soft Steel, Reinforced Plastics and other Soft Materials.**

\* 3/8" Shank Diameter. Available While Supplies Last.



<b>CARBIDE TIPPED TOOL BITS - PREMIUM GRADE</b>	<b>PAGE NO.</b>
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<b>STEEL TOOL BITS</b>	
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Square . . . . .	.352

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

# Square Tool Bits

**STANDARD PACKAGE** 3/16 thru 3/8 — 10 each  
7/16 thru 1/2 — 5 each  
5/8 thru 1 — 1 each



## OR-BIT™ M2 Square Tool Bits



**For General Purpose Applications**  
High Speed Steel — M2

**M2 - High Speed Steel** is recommended for general purpose use in a wide range of materials. It has excellent toughness and shock resistance for interrupted cuts and is relatively easy to grind.

### List No. 4202S — Square M2 HSS

SIZE	OAL	EDP NO.	SIZE	OAL	EDP NO.
3/16	2-1/2	28014	1/2	4	28022
1/4	2-1/2	28015	5/8	4-1/2	28024
5/16	2-1/2	28017	3/4	5	28025
3/8	3	28019	1	7	28026
7/16	3-1/2	28021			

## OR-BIT™ T15 Cobalt Square Tool Bits



**For Toughest Applications**  
Premium Cobalt Steel — T15

**T15 - Cobalt Steel** offers the best wear resistance and high heat resistance for abrasive and difficult materials that generate higher cutting temperatures. It's toughness is adequate for most applications where a rigid setup is used..

### List No. 4215S — Square T15 Cobalt

SIZE	OAL	EDP NO.	SIZE	OAL	EDP NO.
3/16	2-1/2	28101	1/2	4	28106
1/4	2-1/2	28102	5/8	4-1/2	28108
5/16	2-1/2	28103	3/4	5	28109
3/8	3	28104	1	7	28111

## OR-BIT™ M42 Cobalt Tool Bits

**For Heavy Duty Applications**  
Premium Cobalt Steel - M-42

**STANDARD PACKAGE** 3/16" thru 3/8" — 10 each  
7/16" thru 1/2" — 5 each  
5/8" thru 1" — 1 each

**M42 - Cobalt Steel** features excellent wear and highest heat resistance and is recommended for difficult materials that generate higher cutting temperatures and for longer tool life.



### List No. 4226S — Square

SIZE	OAL	EDP NO.	SIZE	OAL	EDP NO.
3/16	2-1/2	28301	1/2	4	28306
1/4	2-1/2	28302	5/8	4-1/2	28308
5/16	2-1/2	28303	3/4	5	28309
3/8	3	28304	7/8	6	28310
7/16	3-1/2	28305	1	7	28311

### List No. 4226F — Rectangular

SIZE				SIZE			
WIDTH	HEIGHT	OAL	EDP NO.	WIDTH	HEIGHT	OAL	EDP NO.
1/4	1/2	4	28352	3/8	3/4	6	28377
3/8	1/2	4	28356	1/2	3/4	6	28379
3/8	5/8	4	28375	1/2	1	8	28361
3/8	5/8	6	28376	3/4	1	6	28380

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

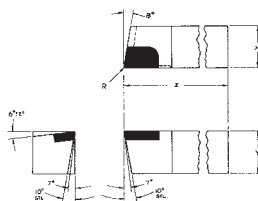
# Styles AR & AL 0° Lead Angle Turning Tools

Premium Carbide Tipped

For turning to a square shoulder

**STANDARD PACKAGE** A4-A10 — 10 each  
A12 — 5 each A16-A44 — 1 each

List No. 4110



**GRADE 883E = C2**  
For use in cast iron and non-ferrous materials

**GRADE 370E = C5**  
For use in steel and steel alloys

## Style AR – Right Hand

TOOL NO.	SHANK SIZE			NOSE RAD.	GRADE 883E	GRADE 370E
	W	H	L		EDP NO.	EDP NO.
AR-4	1/4	1/4	2	1/64	70102	70103
AR-5	5/16	5/16	2-1/4	1/64	70108	70109
AR-6	3/8	3/8	2-1/2	1/64	70114	70115
AR-7	7/16	7/16	3	1/32	70120	70121
AR-8	1/2	1/2	3-1/2	1/32	70126	70127
AR-10	5/8	5/8	4	1/32	70132	70133
AR-12	3/4	3/4	4-1/2	1/32	70138	70139
AR-16	1	1	7	1/32	70144	70145
AR-20	1-1/4	1-1/4	8	1/32	70150*	—

## Style AL – Left Hand

TOOL NO.	SHANK SIZE			NOSE RAD.	GRADE 883E	GRADE 370E
	W	H	L		EDP NO.	EDP NO.
AL-4	1/4	1/4	2	1/64	70202	70203
AL-5	5/16	5/16	2-1/4	1/64	70208	70209
AL-6	3/8	3/8	2-1/2	1/64	70214	70215
AL-7	7/16	7/16	3	1/32	70220	70221
AL-8	1/2	1/2	3-1/2	1/32	70226	70227
AL-10	5/8	5/8	4	1/32	70232	70233
AL-12	3/4	3/4	4-1/2	1/32	70238	70239
AL-16	1	1	7	1/32	70244	70245

\*Available While Supplies Last



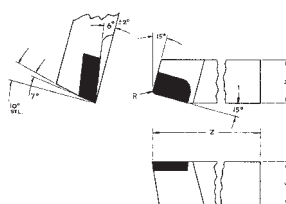
# Styles BR & BL 15° Lead Angle Turning Tools

Premium Carbide Tipped

For turning when a square shoulder is not required and for interrupted cuts.

**STANDARD PACKAGE** B4-B10 — 10 each  
B12 — 5 each B16-B20 — 1 each

List No. 4120



**GRADE 883E = C2**  
For use in cast iron and non-ferrous materials

**GRADE 370E = C5**  
For use in steel and steel alloys

## Style BR – Right Hand

TOOL NO.	SHANK SIZE			NOSE RAD.	GRADE 883E	GRADE 370E
	W	H	L		EDP NO.	EDP NO.
BR-4	1/4	1/4	2	1/64	70302	70303
BR-5	5/16	5/16	2-1/4	1/64	70308	70309
BR-6	3/8	3/8	2-1/2	1/64	70314	70315
BR-7	7/16	7/16	3	1/32	70320	70321
BR-8	1/2	1/2	3-1/2	1/32	70326	70327
BR-10	5/8	5/8	4	1/32	70332	70333
BR-12	3/4	3/4	4-1/2	1/32	70338	70339
BR-16	1	1	7	1/32	70344	70345
BR-20	1-1/4	1-1/4	8	1/32	70350*	—

## Style BL – Left Hand

TOOL NO.	SHANK SIZE			NOSE RAD.	GRADE 883E	GRADE 370E
	W	H	L		EDP NO.	EDP NO.
BL-4	1/4	1/4	2	1/64	70402	70403
BL-5	5/16	5/16	2-1/4	1/64	70408	70409
BL-6	3/8	3/8	2-1/2	1/64	70414	70415
BL-7	7/16	7/16	3	1/32	70420	70421
BL-8	1/2	1/2	3-1/2	1/32	70426	70427
BL-10	5/8	5/8	4	1/32	70432	70433
BL-12	3/4	3/4	4-1/2	1/32	70438	70439
BL-16	1	1	7	1/32	70444	70445
BL-20	1-1/4	1-1/4	8	1/32	70450*	70451*

# Style C Square Nose Tools

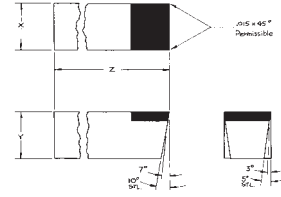
Premium Carbide Tipped

For chamfering, facing, turning and for making special tool forms

**STANDARD PACKAGE** C4-C10 — 10 each C16 — 1 each  
C12 — 5 each



List No. 4130



TOOL NO.	SHANK SIZE			GRADE 883E	GRADE 370E
	W	H	L	EDP NO.	EDP NO.
C-4	1/4	1/4	2	70502	70503
C-5	5/16	5/16	2 1/4	70508	70509
C-6	3/8	3/8	2 1/2	70514	70515
C-7	7/16	7/16	3	70520	70521
C-8	1/2	1/2	3 1/2	70526	70527
C-10	5/8	5/8	4	70532	70533
C-12	3/4	3/4	4 1/2	70538	70539
C-16	1	1	7	70544	70545

**GRADE 883E = C2**  
For use in cast iron and non-ferrous materials

**GRADE 370E = C5**  
For use in steel and steel alloys



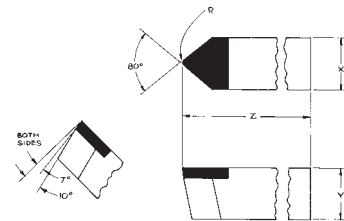
# Style D 80° Included Angle Tools

Premium Carbide Tipped

For under cutting and for ID and OD chamfering

**STANDARD PACKAGE** D4-D10 — 10 each  
D12 — 5 each  
D16 — 1 each

List No. 4140



TOOL NO.	SHANK SIZE			NOSE RAD.	GRADE 883E	GRADE 370E
	W	H	L		EDP NO.	EDP NO.
D-4	1/4	1/4	2	1/64	70602	70603
D-5	5/16	5/16	2 1/4	1/64	70608	70609
D-6	3/8	3/8	2 1/2	1/64	70614	70615
D-7	7/16	7/16	3	1/32	70620	70621
D-8	1/2	1/2	3 1/2	1/32	70626	70627
D-10	5/8	5/8	4	1/32	70632	70633
D-12	3/4	3/4	4 1/2	1/32	70638	70639
D-16	1	1	7	1/32	70644	70645

**GRADE 883E = C2**  
For use in cast iron and non-ferrous materials

**GRADE 370E = C5**  
For use in steel and steel alloys

# Style E 60° Included Angle Threading Tools

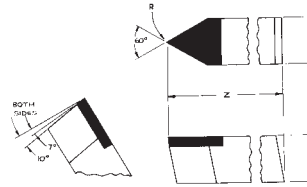
Premium Carbide Tipped

For standard 60° threading, boring, V-grooving and other applications

**STANDARD PACKAGE** E4-E10 — 10 each  
E12 — 5 each



List No. 4150



**GRADE 883E = C2**  
For use in cast iron and non-ferrous materials

**GRADE 370E = C5**  
For use in steel and steel alloys

TOOL NO.	SHANK SIZE			GRADE 883E	GRADE 370E
	W	H	L	EDP NO.	EDP NO.
E-4	1/4	1/4	2	70701	70702
E-5	5/16	5/16	2 1/4	70705	70706
E-6	3/8	3/8	2 1/2	70709	70710
E-8	1/2	1/2	3 1/2	70713	70714
E-10	5/8	5/8	4	70717	70718
E-12	3/4	3/4	4 1/2	70721	70722



# Styles ER & EL 60° Included Angle Offset Threading Tools

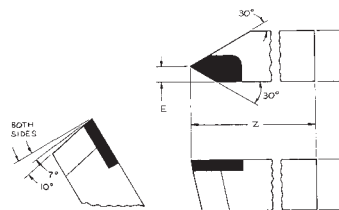
Premium Carbide Tipped

Offset for standard 60° threading, boring, V-grooving and other applications

**STANDARD PACKAGE** E4-E8 — 10 each  
E10-E12 — 5 each



List No. 4160



**GRADE 883E = C2**  
For use in cast iron and non-ferrous materials

**GRADE 370E = C5**  
For use in steel and steel alloys

## Style ER – Right Hand

TOOL NO.	SHANK SIZE			GRADE 883E	GRADE 370E
	W	H	L	EDP NO.	EDP NO.
ER-4	1/4	1/4	2	70801	70802
ER-5	5/16	5/16	2 1/4	70804	70805
ER-6	3/8	3/8	2 1/2	70807	70808
ER-8	1/2	1/2	3 1/2	70810	70811
ER-10	5/8	5/8	4	70813	70814
ER-12	3/4	3/4	4 1/2	70815	70816

## Style EL – Left Hand

TOOL NO.	SHANK SIZE			GRADE 883E	GRADE 370E
	W	H	L	EDP NO.	EDP NO.
EL-4	1/4	1/4	2	70853	70854
EL-5	5/16	5/16	2 1/4	70855	70856
EL-6	3/8	3/8	2 1/2	70857	70858
EL-8	1/2	1/2	3 1/2	70860	70861
EL-10	5/8	5/8	4	70863	70864
EL-12	3/4	3/4	4 1/2	70865	70866

# Styles CTR & CTL Cut-Off Tools

Premium Carbide Tipped

For bar stock cut-off applications

Style CTR – Right Hand

Style CTL – Left Hand

**GRADE 883E = C2**  
For use in cast iron  
and non-ferrous  
materials

**GRADE 370E = C5**  
For use in steel  
and steel alloys



List No. 4190

TOOL NO.	INDUSTRY NO.	W	SHANK SIZE		STD. PKG. QTY.	TIP WIDTH	GRADE 883E	GRADE 370E
			H	L			EDP NO.	EDP NO.
CTR-11	CTR-111	1/2	1	5	5	1/8	71101	71102
CTR-22	CTR-122	1/2	1	5	5	3/16	71104	71105
CTR-33	CTR-121	1/2	1	5	5	1/4	71107	71108
CTR-44	CTR-120	1/2	1	5	5	5/16	71110	71111
CTR-55	CTR-130	5/8	1 1/4	5	2	3/8	71113	71114
CTL-11	CTL-111	1/2	1	5	5	1/8	71151	71152
CTL-22	CTL-122	1/2	1	5	5	3/16	71154	71155
CTL-33	CTL-121	1/2	1	5	5	1/4	71157	71158
CTL-44	CTL-120	1/2	1	5	5	5/16	71160	71161
CTL-55	CTL-130	5/8	1 1/4	5	2	3/8	71163	71164



# Types T & C S.A. Series Swiss Automatic Tools

Carbide Tipped  
Grade C2 Carbide  
Left Hand



List No. 4100 — Type T  
For Turning



List No. 4100 — Type C  
For Cut-Off and Forming

**Grade C2**  
For use in cast iron  
and non-ferrous  
materials.

SHANK SIZE	STD. PKG. QTY.	TYPE T					TYPE C					
		TOOL NO.	CARBIDE SIZE			EDP NO.	TOOL NO.	CARBIDE SIZE			EDP NO.	
SQ.	LENGTH		T	W	L		T	W	L			
1/4	6	10	SA6T	3/32	1/8	1 1/4	70001	SA6C	1/8	3/32	1 1/4	70021
3/32	6	10	SA7T	3/32	1/8	1 1/4	70002	SA7C	1/8	3/32	1 1/4	70022
5/16	6	10	SA8T	3/32	3/16	1 1/4	70003	SA8C	1/8	3/32	1 1/4	70023
3/8	6	10	SA9T	3/32	3/16	1 1/4	70004	SA9C	1/8	3/32	1 1/4	70024
13/32	6	10	SA10T	3/32	3/16	1 1/4	70005	SA10C	1/8	3/32	1 1/4	70025
7/16	6	10	SA11T	1/8	1/4	1	70006	SA11C	3/32	1/8	1 1/4	70026
15/32	6	10	SA11.5T	1/8	1/4	1	70007	SA11.5C	3/32	1/8	1 1/4	70027
1/2	6	10	SA12T	1/8	1/4	1	70008	SA12C	3/32	1/8	1 1/4	70028

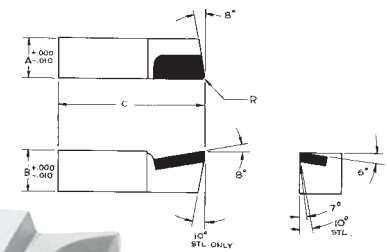
# Types TSA, TSC & TSE Square Shank Boring Tools

Premium Carbide Tipped

STANDARD PACKAGE 10 each

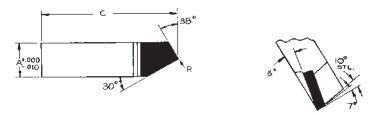
**GRADE 883E = C2**  
For use in cast iron and non-ferrous materials

**GRADE 370E = C5**  
For use in steel and steel alloys

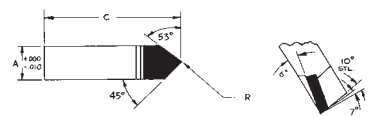


List No. 4200 — Type TSA

TOOL NO.	SHANK SIZE			NOSE RAD.	GRADE 883E	GRADE 370E
	W	H	L		EDP NO.	EDP NO.
TSA-5	5/16	5/16	1 1/2	1/64	72081	72082
TSA-6	3/8	3/8	1 3/4	1/64	72085	72086
TSA-8	1/2	1/2	2 1/2	1/32	72089	72090
TSC-5	5/16	5/16	1 1/2	1/64	72101	72102
TSC-6	3/8	3/8	1 3/4	1/64	72105	72106
TSC-8	1/2	1/2	2 1/2	1/32	72109	72110
TSE-5	5/16	5/16	1 1/2	1/64	72121	72122
TSE-6	3/8	3/8	1 3/4	1/64	72125	72126
TSE-8	1/2	1/2	2 1/2	1/32	72129	72130



List No. 4200 — Type TSC



List No. 4200 — Type TSE



# Types TRG, TRC & TRE Round Shank Boring Tools

Premium Carbide Tipped

**GRADE 883E = C2**  
For use in cast iron and non-ferrous materials

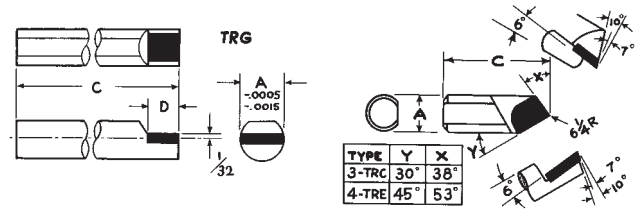
**GRADE 370E = C5**  
For use in steel and steel alloys



List No. 4200 Type TRG



List No. 4200 Types TRC & TRE



TOOL NO.	SHANK SIZE			STD. PKG. QTY.	GRADE 883E	GRADE 370E
	A DIA.	C LENGTH	D TIP		EDP NO.	EDP NO.
TRG-5	5/16	1 1/2	7/32	10	72001	72002
TRG-6	3/8	1 3/4	1/4	10	72004	72005
TRG-8	1/2	2 1/2	1 1/32	10	72007	72008

TOOL NO.	SHANK SIZE			STD. PKG. QTY.	GRADE 883E	GRADE 370E
	A DIA.	C LENGTH	X		EDP NO.	EDP NO.
TRC-5	.312	1 1/2	10	72041	72042	
TRC-6	.3745	1 3/4	10	72045	72046	
TRC-8	.4995	2 1/2	10	72049	72050	
TRE-5	.312	1 1/2	10	72061	72062	
TRE-6	.3745	1 3/4	10	72065	72066	
TRE-8	.4995	2 1/2	10	72069	72070	

# Standard Grade Carbide Tipped Tool Bits

## Styles AR & AL 0° Lead Angle Turning Tools

Carbide Tipped

For turning to a square shoulder



List No. 4111

<b>Grade C2</b> For use in cast iron and non-ferrous materials
<b>Grade C5</b> For roughing cuts in steel and steel alloys
<b>Grade C6</b> For general purpose use in steel and steel alloys

### Style AR - Right Hand

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
AR4	10	73102	73103	73104
AR5	10	73107	73108	73109
AR6	10	73112	73113	73114
AR7	10	73117	73118	73119
AR8	10	73122	73123	73124
AR10	10	73127	73128	73129
AR12	5	73130	73131	73132
AR16	1	73133	73134	73135
AR20	1	73136*	73137*	73138*

### Style AL - Left Hand

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
AL4	10	73202	73203	73204
AL5	10	73207	73208	73209
AL6	10	73212	73213	73214
AL7	10	73217	73218	73219
AL8	10	73222	73223	73224
AL10	10	73227	73228	73229
AL12	5	73230	73231	73232
AL16	1	73233	73234	73235
AL20	1	73236*	73237*	73238*

\*Available While Supplies Last



## Styles BR & BL 15° Lead Angle Turning Tools

Carbide Tipped

For turning when a square shoulder is not required and for interrupted cuts.



List No. 4121

<b>Grade C2</b> For use in cast iron and non-ferrous materials
<b>Grade C5</b> For roughing cuts in steel and steel alloys
<b>Grade C6</b> For general purpose use in steel and steel alloys

### Style BR - Right Hand

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
BR4	10	73302	73303	73304
BR5	10	73307	73308	73309
BR6	10	73312	73313	73314
BR7	10	73317	73318	73319
BR8	10	73322	73323	73324
BR10	10	73327	73328	73329
BR12	5	73330	73331	73332
BR16	1	73333	73334	73335
BR20	1	73336*	73337*	73338*

### Style BL - Left Hand

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
BL4	10	73402	73403	73404
BL5	10	73407	73408	73409
BL6	10	73412	73413	73414
BL7	10	73417	73418	73419
BL8	10	73422	73423	73424
BL10	10	73427	73428	73429
BL12	5	73430	73431	73432
BL16	1	73433	73434	73435
BL20	1	73436*	73437*	73438*

\*Available While Supplies Last

See Premium Grade Series For Complete Dimensions.



# Standard Grade Carbide Tipped Tool Bits

## Style C Square Nose Tools

Carbide Tipped

For chamfering, facing, turning and for making special tool forms



List No. 4131

<b>Grade C2</b> For use in cast iron and non-ferrous materials
<b>Grade C5</b> For roughing cuts in steel and steel alloys
<b>Grade C6</b> For general purpose use in steel and steel alloys

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
C4	10	73502	73503	73504
C5	10	73507	73508	73509
C6	10	73512	73513	73514
C7	10	73517	73518	73519
C8	10	73522	73523	73524

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
C10	10	73527	73528	73529
C12	5	73531	73532	73533
C16	1	73534	73535	73536
C44	1	—	73538*	73539*

\* Available while supplies last

## Style D 80° Included Angle Tools

Carbide Tipped

For under cutting and for ID and OD chamfering



List No. 4141

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
D4	10	73602	73603	73604
D5	10	73607	73608	73609
D6	10	73612	73613	73614
D7	10	73617	73618	73619

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
D8	10	73622	73623	73624
D10	10	73626	73627	73628
D12	5	73629	73630	73631
D16	1	73632	73633	73634

## Style E 60° Included Angle Threading Tools

Carbide Tipped

For standard 60° threading, boring, V-grooving and other applications



List No. 4151

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
E4	10	73702	73703	73704
E5	10	73707	73708	73709
E6	10	73712	73713	73714

TOOL NO.	STD. PKG. QTY	GRADE	GRADE	GRADE
		C2	C5	C6
E8	10	73717	73718	73719
E10	10	73722	73723	73724
E12	10	73725	73726	73727

See Premium Grade Series For Complete Dimensions.

# Standard Grade Carbide Tipped Tool Bits



## Styles CTR & CTL Cut-Off Tools

Carbide Tipped  
For bar stock cut-off applications



List No. 4191

<b>Grade C2</b> For use in cast iron and non-ferrous materials
<b>Grade C5</b> For roughing cuts in steel and steel alloys

### Style CTR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE	GRADE
		C2	C5
CTR11	5	74102	74103
CTR22	5	74107	74108
CTR33	5	74112	74113
CTR55	2	74116	74117

### Style CTL – Left Hand

TOOL NO.	STD. PKG. QTY	GRADE	GRADE
		C2	C5
CTL11	5	74152	74153
CTL22	5	74157	74158
CTL33	5	74162	74163
CTL44	5	74164*	—
CTL55	2	74166	74167

\*Available While Supplies Last

See Premium Grade Series For Complete Dimensions.

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## Morse Taper Drill Sleeves

For adapting Morse Taper shank tools to machine spindles having larger Morse Taper holes.

Regularly furnished soft with accurately finished Morse taper hole and shank.

**STANDARD PACKAGE** All sizes — 1 each



List No. 0202 Carbon Steel

SIZE	MORSE TAPER		OAL	EDP NO.
	HOLE	SHANK		
1 to 2	1	2	3 <sup>9</sup> / <sub>16</sub>	20031
1 to 3	1	3	3 <sup>15</sup> / <sub>16</sub>	20032
1 to 4	1	4	4 <sup>7</sup> / <sub>8</sub>	20033
1 to 5	1	5	6 <sup>1</sup> / <sub>8</sub>	20034
2 to 3	2	3	4 <sup>7</sup> / <sub>16</sub>	20035
2 to 4	2	4	4 <sup>7</sup> / <sub>8</sub>	20036
2 to 5	2	5	6 <sup>1</sup> / <sub>8</sub>	20037
3 to 4	3	4	5 <sup>3</sup> / <sub>8</sub>	20038
3 to 5	3	5	6 <sup>1</sup> / <sub>8</sub>	20039
4 to 5	4	5	6 <sup>5</sup> / <sub>8</sub>	20040
4 to 6	4	6	8 <sup>5</sup> / <sub>8</sub>	20041
5 to 6	5	6	8 <sup>5</sup> / <sub>8</sub>	20042

## Morse Taper Extension Sockets

Use as either an extension socket or to adapt a Morse Taper shank tool to a machine spindle whose Morse Taper hole is smaller than the shank of the tool.

Regularly furnished soft with accurately finished Morse Taper hole and shank.

**STANDARD PACKAGE** All sizes — 1 each



List No. 0201 Carbon Steel

SIZE	MORSE TAPER		OAL	EDP NO.
	HOLE	SHANK		
1 to 2	1	2	6 <sup>3</sup> / <sub>16</sub>	20011
1 to 3	1	3	6 <sup>15</sup> / <sub>16</sub>	20012
2 to 2	2	2	6 <sup>13</sup> / <sub>16</sub>	20014
2 to 3	2	3	7 <sup>9</sup> / <sub>16</sub>	20015
2 to 4	2	4	8 <sup>9</sup> / <sub>16</sub>	20016
3 to 2	3	2	7 <sup>3</sup> / <sub>4</sub>	20017
3 to 3	3	3	8 <sup>1</sup> / <sub>2</sub>	20018
3 to 4	3	4	8 <sup>1</sup> / <sub>2</sub>	20019
3 to 5	3	5	10 <sup>3</sup> / <sub>4</sub>	20020
4 to 3	4	3	9 <sup>7</sup> / <sub>16</sub>	20021
4 to 4	4	4	10 <sup>7</sup> / <sub>16</sub>	20022
4 to 5	4	5	11 <sup>11</sup> / <sub>16</sub>	20023
5 to 4	5	4	11 <sup>13</sup> / <sub>16</sub>	20024
5 to 5	5	5	13 <sup>1</sup> / <sub>16</sub>	20025
5 to 6	5	6	15 <sup>3</sup> / <sub>8</sub>	20026*

\* Available While Supplies Last

## Drill Drifts

For removal of sleeves, sockets, or taper shank cutting tools from spindles or tool holders.

Size #1 for removal of #1 Morse Taper Tools

Size #2 for removal of #2 Morse Taper Tools

Size #3 for removal of #3 Morse Taper Tools

Size #4 for Tools #4 Morse Taper and larger Tools



List No. 0210

**STANDARD PACKAGE**

All sizes — 1 each

SIZE	EDP NO.
1	20051
2	20052
3	20053
4	20054

# Screw Extractors

For removing broken bolts, screws or studs without damage to the threaded hole.

Furnished with a left-hand spiral. Carbon steel.



**STANDARD PACKAGE** Sizes 1 thru 3 — 12 each  
 Sizes 4 & 5 — 6 each  
 Sizes 6 and over — 1 each

**List No. 0773**

SCREW EXTRACTOR NUMBER	DIAMETER		OAL	DRILL SIZE TO USE	FOR EXTRACTING		EDP. NO.
	SMALL END	LARGE END			BOLT AND SCREW SIZE	STANDARD PIPE SIZE	
1	1/16	1/8	2	5/64	3/16 - 1/4		20201
2	3/32	13/64	2 3/8	7/64	1/4 - 5/16		20202
3	1/8	1/4	2 11/16	5/32	5/16 - 7/16		20203
4	3/16	11/32	3	1/4	7/16 - 9/16		20204
5	1/4	7/16	3 3/8	17/64	9/16 - 3/4	1/8 - 1/4	20205
6	3/8	19/32	3 3/4	13/32	3/4 - 1	3/8	20206
7	1/2	25/32	4 1/8	17/32	1 - 1 3/8	1/2	20207
8	3/4	1 1/32	4 3/8	13/16	1 3/8 - 1 3/4	3/4	20208
9	1	1 9/32	4 5/8	1 1/16	1 3/4 - 2 1/8	1	20209
10	1 1/4	1 9/16	5	1 5/16	2 1/8 - 2 1/2	1 1/4	20210
11	1 1/2	1 7/8	5 5/8	1 9/16	2 1/2 - 3	1 1/2	20211
12	1 7/8	2 5/16	6 1/4	1 15/16	3 - 3 1/2	2	20212

## Screw Extractor Sets

For removing broken bolts, screws or studs without damage to the threaded hole.

Furnished with a left-hand spiral. Carbon steel.



EDP NO. 20217		EDP NO. 20218	
SET NO. 62		SET NO. 68	
EXTRACTOR NUMBER	SIZE RANGE	EXTRACTOR NUMBER	SIZE RANGE
1	3/16 to 1/4	6	3/4 to 1
2	1/4 to 5/16	7	1 to 1 3/8
3	5/16 to 7/16	8	1 3/8 to 1 3/4
4	7/16 to 9/16	9	1 3/4 to 2 1/8
5	9/16 to 3/4		

In Plastic Pouch                      In Vinyl Pouch



List No. 7300

## Combination Screw Extractor and Drill Set

In Metal Case - Screw Machine Length Drills

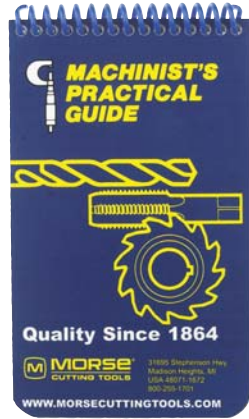
SET NO. 64		
EXTRACTOR NUMBER	DRILL SIZE	EDP NO.
1	5/64	20219
2	7/64	
3	5/32	
4	1/4	
5	17/64	



List No. 7301

## Machinist's Practical Guide

The original concept of a pocket size manual covering a wide range of practical information for the machinist, tool maker, engineer and student. End mills, cutters, drills, reamers, taps and tool bits are some of the cutting tool areas covered. Tool steels, tapers, speeds, feeds, cutting fluids, and a wealth of additional useful information is found in this complete 108-page handbook. Fits handily into shop coats, tool boxes, desk drawers, etc.



## Machinist's Guide for Taps

Taps and screw threads play a very important part in "holding the world together by a thread." This booklet contains all the needed information for correct tapping work. Included are thread forms and dimensions, fits and limits, hole preparation and size, type of taps, speeds and lubricants, tap sharpening and troubleshooting hints.



## Machinist's Guide for Carbide Tooling

Carbide and its many applications is fully explained in this handy booklet. Complete coverage is given from the introduction and manufacture of carbide to its present major position in the cutting tools field. Included are design, application, geometrics, troubleshooting, speeds and feeds.



GUIDES	LIST NO.	DISPLAY BOX OF 50 (1 BOX) EDP. NO.	INDIVIDUAL COPIES EDP. NO.
Machinist's Practical Guide	1001	20401	20402
Machinist's Guide for Taps	1002	20403	20404
Machinist's Guide for Carbide Tooling	1004	20407	20408

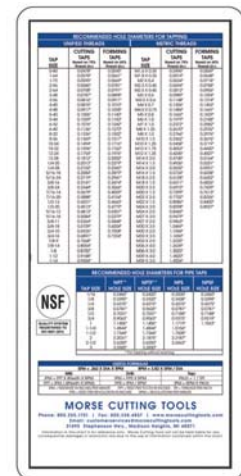
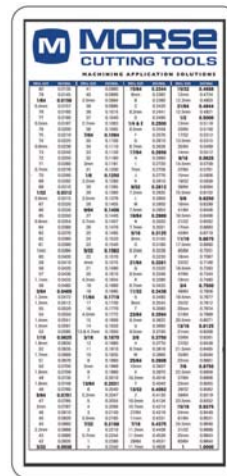
## Morse® Plastic Wall Chart



NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents, Tap Drill Sizes for inch, metric and pipe threads. 24" x 36" printed on heavy duty .023" gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 EDP No. 01650

## Decimal Equivalent Pocket Chart List No. 1005



Front

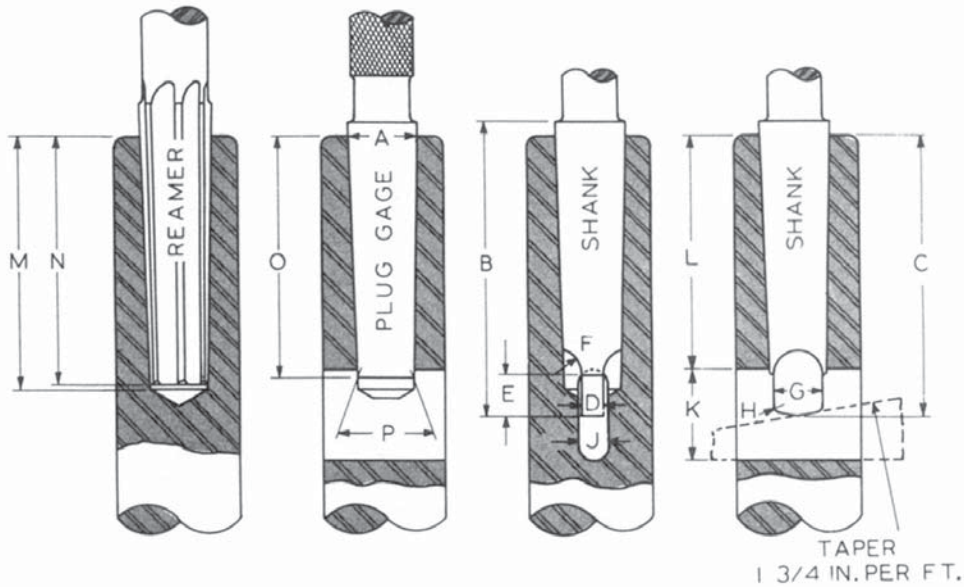
Back

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3 3/8" x 7", Printed on plastic

Pack of 50  
EDP No. 20412

Pack of 100  
EDP No. 20413

# Morse Taper Dimensions



NUMBER OF TAPER	DIA. OF PLUG AT SMALL END	DIA. AT END OF SOCKET	SHANK		DEPTH OF DRILLED HOLE	DEPTH OF REAMED HOLE	STANDARD PLUG DEPTH	TANG			TANG SLOT			END OF SOCKET TO TANG SLOT	TAPER PER INCH	TAPER PER FOOT	
			ENTIRE LENGTH	DEPTH				THICKNESS	LENGTH	RADIUS	DIAMETER	RADIUS	WIDTH				LENGTH
	P	A	B	C	M	N	O	D	E	F	G	H	J	K	L		
0	.25200	.35610	2 <sup>1</sup> / <sub>32</sub>	2 <sup>7</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>32</sub>	2	0.156	1/4	5/32	1 <sup>5</sup> / <sub>64</sub>	3/64	0.172	9/16	1 <sup>15</sup> / <sub>16</sub>	.052050	.62460
1	.36900	.47500	2 <sup>9</sup> / <sub>16</sub>	2 <sup>7</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>16</sub>	2 <sup>5</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>8</sub>	.203	3/8	3/16	1 <sup>1</sup> / <sub>32</sub>	3/64	0.218	3/4	2 <sup>1</sup> / <sub>16</sub>	.049882	.59858
2	.57200	.70000	3 <sup>1</sup> / <sub>8</sub>	2 <sup>15</sup> / <sub>16</sub>	2 <sup>2</sup> / <sub>32</sub>	2 <sup>39</sup> / <sub>64</sub>	2 <sup>9</sup> / <sub>16</sub>	0.250	7/16	1/4	1 <sup>7</sup> / <sub>32</sub>	1/16	0.266	7/8	2 <sup>1</sup> / <sub>2</sub>	.049951	.59941
3	.77800	.93800	3 <sup>7</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>16</sub>	0.312	9/16	9/32	2 <sup>3</sup> / <sub>32</sub>	5/64	0.328	1 <sup>3</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>16</sub>	.050195	.60235
4	1.02000	1.23100	4 <sup>7</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>16</sub>	0.469	5/8	5/16	3 <sup>1</sup> / <sub>32</sub>	3/32	0.484	1 <sup>1</sup> / <sub>4</sub>	3 <sup>7</sup> / <sub>8</sub>	.051938	.62326
4 <sup>1</sup> / <sub>2</sub>	1.26600	1.50000	5 <sup>5</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>	4 <sup>9</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	0.562	1 <sup>1</sup> / <sub>16</sub>	3/8	1 <sup>13</sup> / <sub>64</sub>	1/8	0.578	1 <sup>3</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>16</sub>	.052000	.62400
5	1.47500	1.74800	6 <sup>1</sup> / <sub>8</sub>	5 <sup>7</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>4</sub>	5 <sup>3</sup> / <sub>16</sub>	0.625	3/4	3/8	1 <sup>13</sup> / <sub>32</sub>	1/8	0.656	1 <sup>1</sup> / <sub>2</sub>	4 <sup>15</sup> / <sub>16</sub>	.052626	.63151
6	2.11600	2.49400	8 <sup>9</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>4</sub>	7 <sup>13</sup> / <sub>32</sub>	7 <sup>2</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>4</sub>	0.750	1 <sup>1</sup> / <sub>8</sub>	1/2	2	5/32	0.781	1 <sup>3</sup> / <sub>4</sub>	7	.052138	.62565
7	2.75000	3.27000	11 <sup>5</sup> / <sub>8</sub>	11 <sup>1</sup> / <sub>4</sub>	10 <sup>5</sup> / <sub>32</sub>	10 <sup>5</sup> / <sub>64</sub>	10	1.125	1 <sup>3</sup> / <sub>8</sub>	3/4	2 <sup>5</sup> / <sub>8</sub>	3/16	1.156	2 <sup>5</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>2</sub>	.052000	.62400

The undercut shown on the tang having diameter G, and length E, may be eliminated at the option of the manufacturer provided the tang is heat-treated to a minimum Rockwell of C30 with 150Kg load.

TOLERANCES ON RATE OF TAPER, all sizes 0.0002 per foot. This tolerance may be applied on shanks only in the direction which increases the rate of taper and on sockets only in the direction which decreases the rate of taper.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

## TOOL HOLDERS

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**Precision Ground  
CNC Tool Holders  
for a Wide Range  
of Applications**

# End Mill Holders CAT40 and CAT50 V-Flange Shank



Runout: .0002"

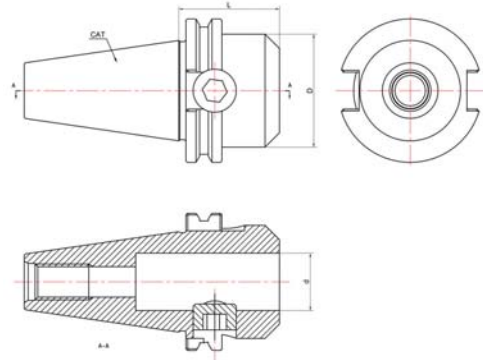
Taper Shank Tolerance: AT3 or Better

Balancing: CAT40 = G2.5 at 20,000 RPM  
CAT50 = G6.3 at 15,000 RPM

Coolant: Form AD — Central Coolant Through the Spindle

List No. 1013 - End Mill Holders - CAT40

List No. 1014 - End Mill Holders - CAT50



## List No. 1013 - End Mill Holders - CAT40

TAPER	(d) HOLE DIA.	(L) GAGE LENGTH	(D) NOSE DIA.	EDP NO.
CAT40	1/8	1.38	.69	19925
CAT40	1/8	4.50	.69	19926
CAT40	3/16	1.38	.69	19927
CAT40	3/16	2.50	.69	19928
CAT40	3/16	4.50	.69	19929
CAT40	3/16	6.00	.69	19930
CAT40	1/4	1.38	.78	19931
CAT40	1/4	2.50	.78	19932
CAT40	1/4	4.50	.78	19933
CAT40	1/4	6.00	.78	19934
CAT40	5/16	1.38	.88	19935
CAT40	5/16	4.50	.88	19936
CAT40	3/8	1.38	1.00	19937
CAT40	3/8	2.50	1.00	19938
CAT40	3/8	4.50	1.00	19939
CAT40	3/8	6.50	1.00	19940
CAT40	3/8	8.00	1.00	19941
CAT40	7/16	1.75	1.13	19942
CAT40	7/16	4.50	1.13	19943
CAT40	1/2	1.75	1.25	19944
CAT40	1/2	2.62	1.25	19945
CAT40	1/2	4.62	1.25	19946
CAT40	1/2	6.62	1.25	19947
CAT40	1/2	8.00	1.25	19948
CAT40	5/8	1.75	1.50	19949
CAT40	5/8	3.75	1.50	19950
CAT40	5/8	5.75	1.50	19951
CAT40	5/8	8.00	1.50	19952

TAPER	(d) HOLE DIA.	(L) GAGE LENGTH	(D) NOSE DIA.	EDP NO.
CAT40	3/4	1.75	1.75	19953
CAT40	3/4	3.75	1.75	19954
CAT40	3/4	5.75	1.75	19955
CAT40	3/4	8.00	1.75	19956
CAT40	7/8	3.50	1.88	19957
CAT40	7/8	4.00	1.88	19958
CAT40	7/8	6.00	1.88	19959
CAT40	1	1.75	2.00	19960
CAT40	1	4.00	2.00	19961
CAT40	1	6.00	2.00	19962
CAT40	1	8.00	2.00	19963
CAT40	1-1/4	2.00	2.50	19964
CAT40	1-1/4	4.25	2.50	19965
CAT40	1-1/4	6.25	2.50	19966
CAT40	1-1/4	8.00	2.50	19967
CAT40	1-1/2	4.62	2.50	19968
CAT40	1-1/2	6.62	2.50	19969
CAT40	1-1/2	8.00	2.50	19970
CAT50	3/16	2.50	.69	19975
CAT50	3/16	4.50	.69	19976
CAT50	1/4	2.50	.78	19977
CAT50	1/4	4.50	.78	19978
CAT50	1/4	6.00	.78	19979
CAT50	5/16	4.50	.88	19980

(continued)





**List No. 1014 - End Mill Holders - CAT50**

TAPER	(d) HOLE DIA.	(L) GAGE LENGTH	(D) NOSE DIA.	EDP NO.
CAT50	3/8	2.50	1.00	19981
CAT50	3/8	4.50	1.00	19982
CAT50	3/8	6.50	1.00	19983
CAT50	3/8	8.00	1.00	19984
CAT50	7/16	2.50	1.13	19985
CAT50	7/16	4.50	1.13	19986
CAT50	1/2	2.62	1.25	19987
CAT50	1/2	4.62	1.25	19988
CAT50	1/2	6.62	1.25	19989
CAT50	1/2	8.00	1.25	19990
CAT50	5/8	3.75	1.50	19991
CAT50	5/8	5.75	1.50	19992
CAT50	5/8	8.00	1.50	19993
CAT50	3/4	3.75	1.75	19994
CAT50	3/4	5.75	1.75	19995
CAT50	3/4	8.00	1.75	19996

TAPER	(d) HOLE DIA.	(L) GAGE LENGTH	(D) NOSE DIA.	EDP NO.
CAT50	7/8	4.00	1.88	19997
CAT50	7/8	6.00	1.88	19998
CAT50	1	4.00	2.00	19999
CAT50	1	6.00	2.00	20000
CAT50	1	8.00	2.00	20001
CAT50	1-1/4	4.25	2.50	20002
CAT50	1-1/4	6.25	2.50	20003
CAT50	1-1/4	8.00	2.50	20004
CAT50	1-1/2	4.62	2.50	20005
CAT50	1-1/2	6.62	2.50	20006
CAT50	1-1/2	8.00	2.50	20007
CAT50	2	5.62	3.75	20008
CAT50	2	8.00	3.75	20009

**Shell Mill Holders  
CAT40 and CAT50  
V-Flange Shank**



Runout: .0002"

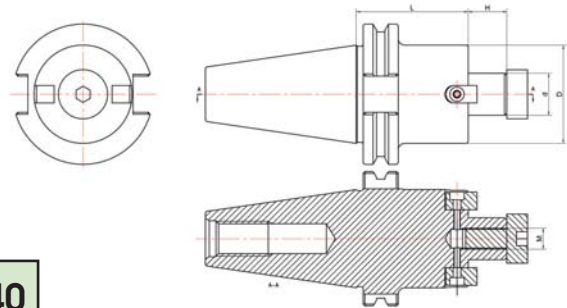
Taper Shank Tolerance: AT3 or Better

Balancing: G6.3 at 15,000 RPM

Coolant: Central Coolant

List No. 1011 - Shell Mill Holders - CAT40

List No. 1012 - Shell Mill Holders - CAT50



**List No. 1011 - Shell Mill Holders - CAT40**

TAPER	(d) PILOT DIA.	(L) GAGE LENGTH	EDP NO.
CAT40	1/2	1.38	19900
CAT40	3/4	1.38	19901
CAT40	3/4	3.50	19902
CAT40	1	2.06	19903
CAT40	1	4.00	19904

TAPER	(d) PILOT DIA.	(L) GAGE LENGTH	EDP NO.
CAT40	1-1/4	2.12	19905
CAT40	1-1/4	4.00	19906
CAT40	1-1/2	2.41	19907
CAT40	1-1/2	4.00	19908

(continued)



List No. 1012 - Shell Mill Holders - **CAT50**

TAPER	(d) PILOT DIA.	(L) GAGE LENGTH	EDP NO.
CAT50	1/2	1.38	19910
CAT50	1/2	3.50	19911
CAT50	3/4	1.38	19912
CAT50	3/4	3.50	19913
CAT50	3/4	6.00	19914
CAT50	1	2.06	19915
CAT50	1	4.00	19916
CAT50	1	6.00	19917

TAPER	(d) PILOT DIA.	(L) GAGE LENGTH	EDP NO.
CAT50	1-1/4	2.12	19918
CAT50	1-1/4	4.00	19919
CAT50	1-1/4	6.00	19920
CAT50	1-1/2	2.41	19921
CAT50	1-1/2	4.00	19922
CAT50	1-1/2	6.00	19923

**ER Collet Chucks  
CAT40 and CAT50  
V-Flange Shank**



List No. 1009 - ER Collet Chucks - CAT40

List No. 1010 - ER Collet Chucks - CAT50

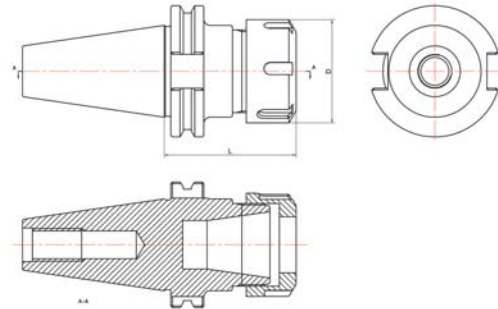
Runout: .0001" on Clamping Length under 4"  
Runout: .0002" on Clamping Length over 5"

Taper Shank Tolerance: AT3 or Better

Balancing: G2.5 at 25,000 RPM

Coolant: Form AD —

Central Coolant Through the Spindle



List No. 1009  
Collet Chucks - **CAT40**

TAPER	COLLET TYPE	(L) GAGE LENGTH	(D) NUT DIA.	EDP NO.
CAT40	ER11	2.50	0.75	19855
CAT40	ER11	4.00	0.75	19856
CAT40	ER11	6.00	0.75	19857
CAT40	ER16	2.50	1.26	19858
CAT40	ER16	4.00	1.26	19859
CAT40	ER16	5.00	1.26	19860
CAT40	ER16	6.00	1.26	19861
CAT40	ER16	8.00	1.26	19862
CAT40	ER20	2.50	1.38	19863
CAT40	ER20	4.00	1.38	19864
CAT40	ER20	6.00	1.38	19865
CAT40	ER20	8.00	1.38	19866
CAT40	ER25	2.50	1.66	19867
CAT40	ER25	4.00	1.66	19868
CAT40	ER25	6.00	1.66	19869
CAT40	ER25	8.00	1.66	19870
CAT40	ER32	2.75	1.97	19871
CAT40	ER32	4.00	1.97	19872
CAT40	ER32	6.00	1.97	19873
CAT40	ER32	8.00	1.97	19874
CAT40	ER40	3.00	2.48	19875
CAT40	ER40	6.00	2.48	19876
CAT40	ER40	8.00	2.48	19877

List No. 1010  
Collet Chucks - **CAT50**

TAPER	COLLET TYPE	(L) GAGE LENGTH	(D) NUT DIA.	EDP NO.
CAT50	ER16	4.00	1.26	19880
CAT50	ER16	6.00	1.26	19881
CAT50	ER16	8.00	1.26	19882
CAT50	ER20	4.00	1.38	19883
CAT50	ER20	6.00	1.38	19884
CAT50	ER20	8.00	1.38	19885
CAT50	ER25	4.00	1.66	19886
CAT50	ER25	6.00	1.66	19887
CAT50	ER25	8.00	1.66	19888
CAT50	ER32	4.00	1.97	19889
CAT50	ER32	6.00	1.97	19890
CAT50	ER32	8.00	1.97	19891
CAT50	ER32	12.00	1.97	19892
CAT50	ER40	4.00	2.48	19893
CAT50	ER40	6.00	2.48	19894
CAT50	ER40	8.00	2.48	19895



# ER Collets

## Inch Sizes

ER spring collets are the only clamping collet system for combined milling, drilling, reaming and boring

ER collets concentricity guaranteed to .0004" T.I.R.

Clamping Range:

All ER11 collets, and ER16 sizes under 1/8" = 0.02"

All other types collapse 0.039"



List No. 1015

See List 1017 for Ultra Precision Collets

STANDARD PACKAGE All sizes — 1 each

Shank	Range (Inch)	ER 11	ER 16	ER 20	ER 25	ER 32	ER 40
1/16	0.0430" - 0.0620"	26104	26111	-	26137	-	-
3/32	0.0740" - 0.0937"	26105	26112	26123	26138	-	-
1/8	0.0856" - 0.1250"	26106	26113	26124	26139	26156	26179
5/32	0.1250" - 0.1562"	26107	26114	26125	26140	26157	26180
3/16	0.1480" - 0.1870"	26108	26115	26126	26141	26158	26181
7/32	0.1880" - 0.2185"	26109	26116	26127	26142	26159	26182
1/4	0.2106" - 0.2500"	26110	26117	26128	26143	26160	26183
9/32	0.2500" - 0.2810"	-	26118	26129	26144	26161	26184
5/16	0.2728" - 0.3122"	-	26119	26130	26145	26162	26185
11/32	0.3043" - 0.3437"	-	26120	26131	26146	26163	26186
3/8	0.3356" - 0.3750"	-	26121	26132	26147	26164	26187
13/32	0.3750" - 0.4059"	-	26122	26133	26148	26165	26188
7/16	0.3980" - 0.4374"	-	-	26134	26149	26166	26189
15/32	0.4290" - 0.4690"	-	-	26135	26150	26167	26190
1/2	0.4610" - 0.5000"	-	-	26136	26151	26168	26191
17/32	0.4917" - 0.5311"	-	-	-	26152	26169	26192
9/16	0.5228" - 0.5622"	-	-	-	26153	26170	26193
19/32	0.5780" - 0.5940"	-	-	-	26154	26171	26194
5/8	0.5856" - 0.6250"	-	-	-	26155	26172	26195
21/32	0.6165" - 0.6559"	-	-	-	-	26173	26196
11/16	0.6480" - 0.6874"	-	-	-	-	26174	26197
23/32	0.6880" - 0.7190"	-	-	-	-	26175	26198
3/4	0.7110" - 0.7500"	-	-	-	-	26176	26199
25/32	0.7417" - 0.7811"	-	-	-	-	26177	26200
13/16	0.7728" - 0.8122"	-	-	-	-	26178	26201
27/32	0.8043" - 0.8437"	-	-	-	-	-	26202
7/8	0.8354" - 0.8748"	-	-	-	-	-	26203
29/32	0.8750" - 0.9060"	-	-	-	-	-	26204
15/16	0.8976" - 0.9370"	-	-	-	-	-	26205
31/32	0.9291" - 0.9685"	-	-	-	-	-	26206
1	0.9610" - 1.000"	-	-	-	-	-	26207



## ER Collets

## Metric Sizes

ER spring collets are the only clamping collet system for combined milling, drilling, reaming and boring

ER collets concentricity guaranteed to .0004" T.I.R.

Clamping Range:

All ER11 collets, and ER16 sizes under 2.5 under = 0.5mm

All other types collapse 1mm



List No. 1016

STANDARD  
PACKAGE

All sizes — 1 each

Shank	Range (MM)	ER 11	ER 16	ER 20	ER 25	ER 32	ER 40
1.0mm	0.5 - 1mm	26208	26221	26240	-	-	-
1.5mm	1 - 1.5mm	26209	26222	-	-	-	-
2.0mm	1.5 - 2mm	26210	26223	26241	26253	-	-
2.5mm	2 - 2.5mm	26211	26224	-	-	-	-
3.0mm	2 - 3mm	26212	26225	26242	26254	26268	-
3.5mm	2.5 - 3.5mm	26213	26226	-	-	-	-
4.0mm	3 - 4mm	26214	26227	26243	26255	26269	26286
4.5mm	3.5-4.5mm	26215	26228	-	-	-	-
5.0mm	4 - 5mm	26216	26229	26244	26256	26270	26287
5.5mm	4.5 - 5.5mm	26217	26230	-	-	-	-
6.0mm	5 - 6mm	26218	26231	26245	26257	26271	26288
6.5mm	5.5 - 6.5mm	26219	26232	-	-	-	-
7.0mm	6 - 7mm	26220	26233	26246	26258	26272	26289
7.5mm	6.5 - 7.5mm	-	26234	-	-	-	-
8.0mm	7 - 8mm	-	26235	26247	26259	26273	26290
8.5mm	7.5 - 8.5mm	-	26236	-	-	-	-
9.0mm	8 - 9mm	-	26237	26248	26260	26274	26291
9.5mm	8.5 - 9.5mm	-	26238	-	-	-	-
10.0mm	9 - 10mm	-	26239	26249	26261	26275	26292
11.0mm	10 - 11mm	-	-	26250	26262	26276	26293
12.0mm	11 - 12mm	-	-	26251	26263	26277	26294
13.0mm	12 - 13mm	-	-	26252	26264	26278	26295
14.0mm	13 - 14mm	-	-	-	26265	26279	26296
15.0mm	14 - 15mm	-	-	-	26266	26280	26297
16.0mm	15 - 16mm	-	-	-	26267	26281	26298
17.0mm	16 - 17mm	-	-	-	-	26282	26299
18.0mm	17 - 18mm	-	-	-	-	26283	26300
19.0mm	18 - 19mm	-	-	-	-	26284	26301
20.0mm	19 - 20mm	-	-	-	-	26285	26302
21.0mm	20 - 21mm	-	-	-	-	-	26303
22.0mm	21 - 22mm	-	-	-	-	-	26304
23.0mm	22 - 23mm	-	-	-	-	-	26305
24.0mm	23 - 24mm	-	-	-	-	-	26306
25.0mm	24 - 25mm	-	-	-	-	-	26307
26.0mm	25 - 26mm	-	-	-	-	-	26308



# Ultra Precision ER Collets

## Inch Sizes

Made with high quality bearing steel and heat treated for high flexibility and long life

Ultra Precision collets concentricity guaranteed to .0002" T.I.R

Clamping Range:

ER16 sizes under 1/8" = 0.02"

All other types collapse 0.039"

List No. 1017

STANDARD PACKAGE All sizes — 1 each



COLLETS

Shank	Range (Inch)	ER 16	ER 20	ER 25	ER 32	ER 40
1/16	0.0430" - 0.0620"	26321	-	26347	-	-
3/32	0.0740" - 0.0937"	26322	26333	26348	-	-
1/8	0.0856" - 0.1250"	26323	26334	26349	26366	26389
5/32	0.1250" - 0.1562"	26324	26335	26350	26367	26390
3/16	0.1480" - 0.1870"	26325	26336	26351	26368	26391
7/32	0.1880" - 0.2185"	26326	26337	26352	26369	26392
1/4	0.2106" - 0.2500"	26327	26338	26353	26370	26393
9/32	0.2500" - 0.2810"	26328	26339	26354	26371	26394
5/16	0.2728" - 0.3122"	26329	26340	26355	26372	26395
11/32	0.3043" - 0.3437"	26330	26341	26356	26373	26396
3/8	0.3356" - 0.3750"	26331	26342	26357	26374	26397
13/32	0.3750" - 0.4059"	26332	26343	26358	26375	26398
7/16	0.3980" - 0.4374"	-	26344	26359	26376	26399
15/32	0.4290" - 0.4690"	-	26345	26360	26377	26400
1/2	0.4610" - 0.5000"	-	26346	26361	26378	26401
17/32	0.4917" - 0.5311"	-	-	26362	26379	26402
9/16	0.5228" - 0.5622"	-	-	26363	26380	26403
19/32	0.5780" - 0.5940"	-	-	26364	26381	26404
5/8	0.5856" - 0.6250"	-	-	26365	26382	26405
21/32	0.6165" - 0.6559"	-	-	-	26383	26406
11/16	0.6480" - 0.6874"	-	-	-	26384	26407
23/32	0.6880" - 0.7190"	-	-	-	26385	26408
3/4	0.7110" - 0.7500"	-	-	-	26386	26409
25/32	0.7417" - 0.7811"	-	-	-	26387	26410
13/16	0.7728" - 0.8122"	-	-	-	26388	26411
27/32	0.8043" - 0.8437"	-	-	-	-	26412
7/8	0.8354" - 0.8748"	-	-	-	-	26413
29/32	0.8750" - 0.9060"	-	-	-	-	26414
15/16	0.8976" - 0.9370"	-	-	-	-	26415
31/32	0.9291" - 0.9685"	-	-	-	-	26416
1	0.9610" - 1.000"	-	-	-	-	26417



## Coolant Sealed ER Collets

## Inch Sizes

Pressure resistance tested to 1000 psi.

Sealed for coolant-through applications

No plugs, or discs are required

Preferred use with round shank tools only, no weldon flats

List No. 1018

STANDARD PACKAGE All sizes — 1 each



Shank	ER 16	ER 20	ER 25	ER 32	ER 40
1/8	26423	26433	26446	26463	26486
5/32	26424	26434	26447	26464	26487
3/16	26425	26435	26448	26465	26488
7/32	26426	26436	26449	26466	26489
1/4	26427	26437	26450	26467	26490
9/32	26428	26438	26451	26468	26491
5/16	26429	26439	26452	26469	26492
11/32	26430	26440	26453	26470	26493
3/8	26431	26441	26454	26471	26494
13/32	26432	26442	26455	26472	26495
7/16	-	26443	26456	26473	26496
15/32	-	26444	26457	26474	26497
1/2	-	26445	26458	26475	26498
17/32	-	-	26459	26476	26499
9/16	-	-	26460	26477	26500
19/32	-	-	26461	26478	26501
5/8	-	-	26462	26479	26502
21/32	-	-	-	26480	26503
11/16	-	-	-	26481	26504
23/32	-	-	-	26482	26505
3/4	-	-	-	26483	26506
25/32	-	-	-	26484	26507
13/16	-	-	-	26485	26508
27/32	-	-	-	-	26509
7/8	-	-	-	-	26510
29/32	-	-	-	-	26511
15/16	-	-	-	-	26512
31/32	-	-	-	-	26513
1	-	-	-	-	26514

## Coolant Sealed ER Collets

## Metric Sizes

Pressure resistance tested to 1000 psi.

Sealed for coolant-through applications

No plugs, or discs are required

Preferred use with round shank tools only, no weldon flats

List No. 1019

STANDARD PACKAGE All sizes — 1 each



Shank	ER 16	ER 20	ER 25	ER 32	ER 40
3.0mm	26515	26530	26541	26555	-
3.5mm	26516	-	-	-	-
4.0mm	26517	26531	26542	26556	26573
4.5mm	26518	-	-	-	-
5.0mm	26519	26532	26543	26557	26574
5.5mm	26520	-	-	-	-
6.0mm	26521	26533	26544	26558	26575
6.5mm	26522	-	-	-	-
7.0mm	26523	26534	26545	26559	26576
7.5mm	26524	-	-	-	-
8.0mm	26525	26535	26546	26560	26577
8.5mm	26526	-	-	-	-
9.0mm	26527	26536	26547	26561	26578

(continued)



# Coolant Sealed ER Collets

Metric Sizes (continued)

Shank	ER 16	ER 20	ER 25	ER 32	ER 40
9.5mm	26528	-	-	-	-
10.0mm	26529	26537	26548	26562	26579
11.0mm	-	26538	26549	26563	26580
12.0mm	-	26539	26550	26564	26581
13.0mm	-	26540	26551	26565	26582
14.0mm	-	-	26552	26566	26583
15.0mm	-	-	26553	26567	26584
16.0mm	-	-	26554	26568	26585
17.0mm	-	-	-	26569	26586
18.0mm	-	-	-	26570	26587
19.0mm	-	-	-	26571	26588
20.0mm	-	-	-	26572	26589
21.0mm	-	-	-	-	26590
22.0mm	-	-	-	-	26591
23.0mm	-	-	-	-	26592
24.0mm	-	-	-	-	26593
25.0mm	-	-	-	-	26594
26.0mm	-	-	-	-	26595

## Inch & Metric ER Collets

ER spring collets are the only clamping collet system for combined milling, drilling, reaming and boring.  
ER collets concentricity guaranteed to .0004" T.I.R.

List No. 1020



### Inch Sets

Size	No. Pcs	Size Range	Set Includes	EDP No.
ER11	7	1/16 to 1/4 by 1/32nds	1/16, 3/32, 1/8, 5/32, 3/16, 7/32, 1/4	26309
ER16	12	1/16 to 13/32 by 1/32nds	1/16, 3/32, 1/8, 5/32, 3/16, 7/32, 1/4, 9/32, 5/16, 11/32, 3/8, 13/32	26310
ER20	8	3/32, 1/8 to 1/2 by 1/16ths	3/32, 1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2	26311
ER25	10	3/32, 1/8 to 5/8 by 1/16ths	3/32, 1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8	26312
ER32	12	1/8 to 13/16 by 1/16ths	1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16	26313
ER40	15	1/8 to 1 by 1/16ths	1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1	26314

### Metric Sets

Size	No. Pcs	Size Range	Set Includes	EDP No.
ER11	13	1mm to 7mm by 0.5mm	1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm	26315
ER16	10	1mm to 10mm by 1mm	1, 2, 3, 4, 5, 6, 7, 8, 9, 10mm	26316
ER20	12	2mm to 13mm by 1mm	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13mm	26317
ER25	15	2mm to 16mm by 1mm	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15mm	26318
ER32	18	3mm to 20mm by 1mm	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20mm	26319
ER40	23	4mm to 26 mm by 1mm	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26mm	26320

## Ultra Precision ER Collets

Made with high quality bearing steel and heat treated for high flexibility and long life

Ultra Precision collets concentricity guaranteed to .0002" T.I.R.

List No. 1021



### Inch Sets

Size	No. Pcs	Size Range	Set Includes	EDP No.
ER16	12	1/16 to 13/32 by 1/32nds	1/16, 3/32, 1/8, 5/32, 3/16, 7/32, 1/4, 9/32, 5/16, 11/32, 3/8, 13/32	26418
ER20	8	3/32, 1/8 to 1/2 by 1/16ths	3/32, 1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2	26419
ER25	10	3/32, 1/8 to 5/8 by 1/16ths	3/32, 1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8	26420
ER32	12	1/8 to 13/16 by 1/16ths	1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16	26421
ER40	15	1/8 to 1 by 1/16ths	1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1	26422



# Retention Knobs

## Precision Ground

Made from 8620 Alloy Steel

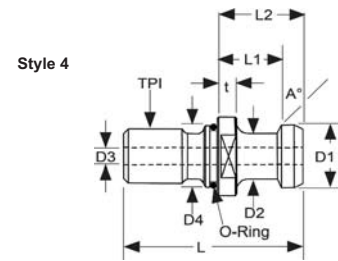
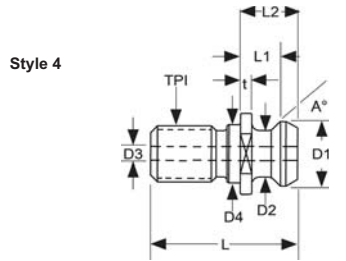
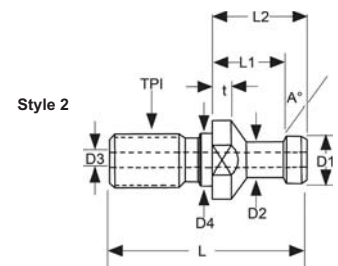
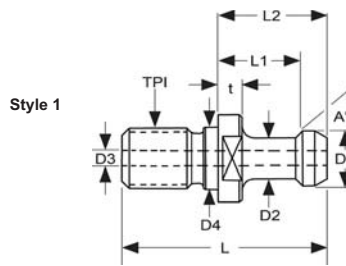
Hardened to 56-60HRC

Black Oxided coating for rust protection

All contact surfaces are precision ground

List No. 1022 - CAT40 Toolholder Size

List No. 1023 - CAT50 Toolholder Size



### List No. 1022 - CAT40 Toolholder Size

For Use With	Thru Coolant	Style	Threads (TPI)	Angle (A)	Knob Dia. (D1)	Neck Dia. (D2)	Hole Dia. (D3)	Pilot Dia. (D4)	Overall Length (L)	Bottom of Flange to Bottom of Knob Distance (L1)	Flange Thickness (t)	Bottom of Flange to Top of Knob Distance (L2)	EDP NO.
MAZAK, FADAL, DMG, HURCO	NA	4	5/8-11	45°	0.740	0.490	NA	0.636	1.620	0.440	0.120	0.640	26596
FADAL, DMG, HURCO	Coolant	4	5/8-11	45°	0.740	0.490	0.281	0.636	1.620	0.440	0.120	0.640	26597
MORI SEIKI, OKK, KIRA	NA	1	5/8-11	90°	0.589	0.392	NA	0.636	2.250	0.988	0.234	1.264	26598
BRIDGEPORT, LEADWELL	NA	1	5/8-11	45°	0.589	0.392	NA	0.636	2.250	0.988	0.124	1.264	26599
HAAS, CHEVALIER, FEELER, FRYER, JOHNFORD	NA	1	5/8-11	45°	0.589	0.392	NA	0.636	2.250	0.988	0.234	1.264	26600
HAAS, CHEVALIER, FEELER, FRYER, JOHNFORD	Coolant	1	5/8-11	45°	0.589	0.392	0.200	0.636	2.250	0.988	0.234	1.264	26601
MAKINO, MITSUBISHI, ENSHU, HITACHI, KIRA, OKUMA, MILLTRONICS	NA	1	5/8-11	60°	0.589	0.392	NA	0.636	2.250	0.988	0.234	1.264	26602
MAZAK, FADAL, DMG, HURCO	Coolant	4	5/8-11	45°	0.740	0.490	0.280	0.641	1.620	0.440	0.120	0.640	26603
MAKINO	Coolant	5	5/8-11	15°	0.746	0.549	0.236	0.641	2.008	0.792	0.276	1.028	26604
MORI SEIKI	Coolant	2	5/8-11	15°	0.747	0.548	0.281	0.641	2.004	0.787	0.157	1.024	26605
KITAMURA, DOOSAN, HYUNDAI KIA	Coolant	2	5/8-11	15°	0.747	0.549	0.281	0.641	2.004	0.787	0.157	1.024	26606

### List No. 1023 - CAT50 Toolholder Size

For Use With	Thru Coolant	Style	Threads (TPI)	Angle (A)	Knob Dia. (D1)	Neck Dia. (D2)	Hole Dia. (D3)	Pilot Dia. (D4)	Overall Length (L)	Bottom of Flange to Bottom of Knob Distance (L1)	Flange Thickness (t)	Bottom of Flange to Top of Knob Distance (L2)	EDP NO.
MAZAK, DMG, G&L, HURCO, FADAL, WALTER GRINDERS	NA	4	1-8	45°	1.140	0.820	NA	1.026	2.575	0.700	0.200	1.000	26607
MAZAK, DMG, G&L, HURCO, FADAL	Coolant	4	1-8	45°	1.140	0.820	0.468	1.026	2.575	0.700	0.200	1.000	26608
OKK	Coolant	1	1-8	90°	0.903	0.668	0.250	1.026	3.350	1.384	0.392	1.778	26609
OKUMA, HITACHI, SNK, TOSHIBA	Coolant	1	1-8	60°	0.903	0.668	0.335	1.026	3.355	1.384	0.392	1.778	26610
OKUMA, HITACHI, SNK, TOSHIBA	NA	1	1-8	60°	0.903	0.668	NA	1.026	3.355	1.384	0.392	1.778	26611
HAAS, MILLTRONICS, VIPER, ENSHU, AWEA	Coolant	1	1-8	45°	0.903	0.668	0.312	1.026	3.355	1.384	0.392	1.778	26612
HAAS, MILLTRONICS, VIPER, ENSHU, AWEA	NA	1	1-8	45°	0.903	0.668	NA	1.026	3.355	1.384	0.392	1.778	26613
DOOSAN, HYUNDAI KIA	Coolant	1	1-8	45°	0.903	0.668	0.390	1.026	3.355	1.384	0.392	1.778	26614
TOYODA	Coolant	1	1-8	45°	0.903	0.668	0.236	1.030	3.353	1.384	0.400	1.778	26615
MORI SEIKI, OKK, YANG	NA	1	1-8	90°	0.903	0.668	NA	1.026	3.350	1.384	0.392	1.778	26616
MAKINO	Coolant	1	1-8	45°	0.903	0.668	0.236	1.026	3.353	1.384	0.392	1.778	26617







# COOLANT DRIVEN SPINDLE SPEEDERS



MSP-2000 Spindle  
(High Pressure Coolant)  
& Display Monitor

MSP-1000 Spindle  
& Display Monitor

External Wireless RPM Display Monitor  
and Collets  
**ORDERED SEPARATELY**

Produce the High RPM's Required for Small Diameter Tools  
on Machines with Limited RPM.



# MSP-1000 Spindle

### Machine Requirements

- Coolant flow through the main CNC machine spindle.\*
- Coolant Pressure\*: Min. 290 PSI / Max. 580 PSI
- Minimum Flow Rate: 3.17 Gal/min
- Coolant Filtration Level: Max. 100 µm

### Applications

Milling, Thread Milling, Drilling, Grinding, Chamfering, Engraving and Deburring.

**RPM Range 35,000 - 55,000 RPM**

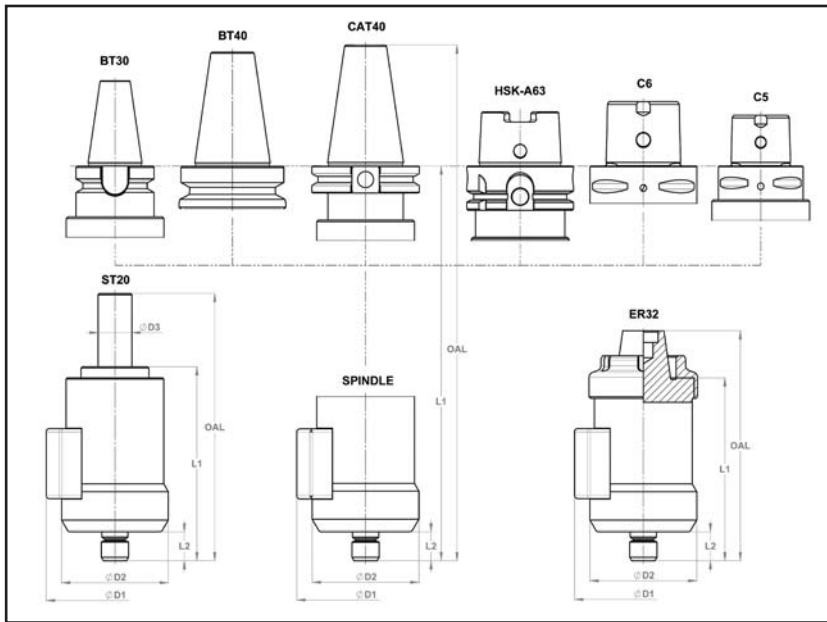
### Onboard Wireless RPM Transmitter

\* Coolant Pressure measured at Main Spindle Outlet.



**INCLUDES:** Spindle, Collet Nut & Wrench, Shaft Lock Key, Allen Key, and Battery in Fitted Case.

**External Wireless RPM Display Monitor and Collets ORDERED SEPARATELY. See Page 378.**



- Robust, compact high-speed spindle powered by coolant or cutting fluid.
- For finishing / semi-finishing operations using small diameter cutting tools.
- Plug & Play - no external feed or pre-installation - ATC / turret mountable.

SHANK	OAL (mm)	L1 (mm)	L2 (mm)	D1 (mm)	D2 (mm)	D3 (mm)	WEIGHT (Kg)	EDP NO.
CAT40	212	141	17	81	63	-	2.0	<a href="#">10782</a>
ER32	136	109	17	81	63	-	1.3	<a href="#">10781</a>
BT30	190	139	17	81	63	-	1.6	<a href="#">10780</a>
HSK A63	173	141	17	81	63	-	1.8	<a href="#">10783</a>
ST20	158	115	17	81	63	20	1.2	<a href="#">10776</a>
C6	157	119	17	81	63	-	1.6	<a href="#">10777</a>
C5	159	129	17	81	63	-	1.5	<a href="#">10778</a>
BT40	190	122	17	81	63	-	1.8	<a href="#">10779</a>

# MSP-2000 (High Pressure Coolant) Spindle

## Machine Requirements

- Coolant flow through the main CNC machine spindle.\*
- Coolant Pressure: Min. 580 PSI / Max. 1020 PSI
- Minimum Flow Rate: 4.23 Gal/min
- Coolant Filtration Level: Max. 100 µm

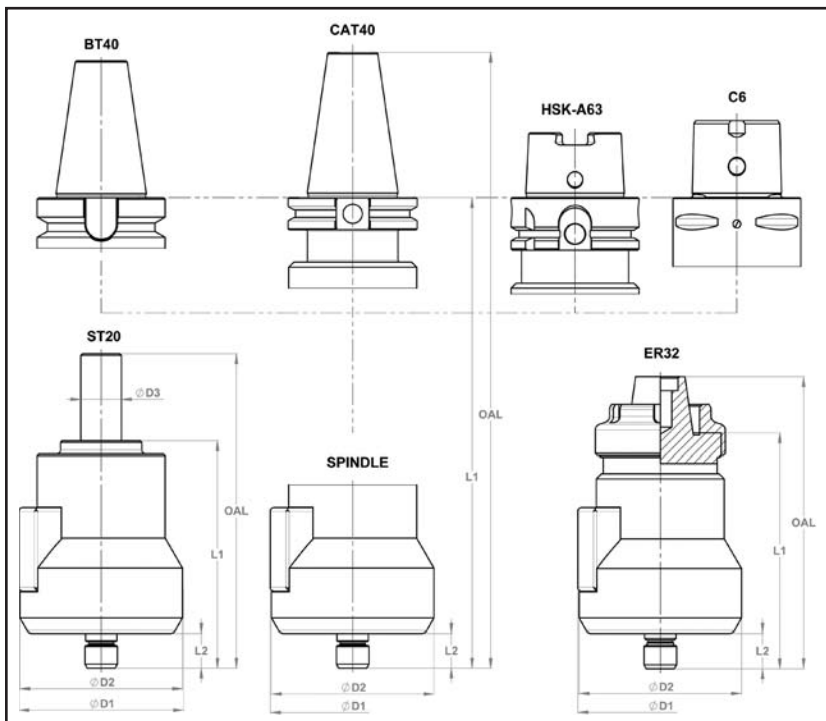
## Applications

Milling, Thread Milling, Drilling, Grinding, Chamfering, Engraving and Deburring.

**RPM Range 25,000 - 45,000 RPM**

## Onboard Wireless RPM Transmitter

\* Coolant Pressure measured at Main Spindle Outlet.



**INCLUDES:** Spindle, Collet Nut & Wrench, Shaft Lock Key, Allen Key, and Battery in Fitted Case.

**External Wireless RPM Display Monitor and Collets ORDERED SEPARATELY. See Page 378.**

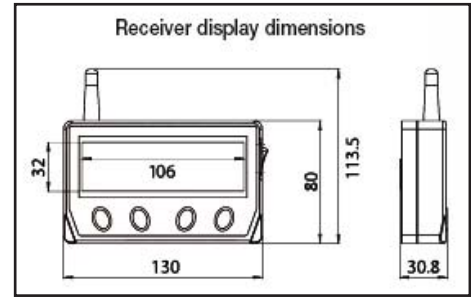
- Robust, compact high-speed spindle powered by coolant or cutting fluid.
- For finishing / semi-finishing operations using small diameter cutting tools.
- Plug & Play - no external feed or pre-installation - ATC / turret mountable.

SHANK	OAL (mm)	L1 (mm)	L2 (mm)	D1 (mm)	D2 (mm)	D3 (mm)	WEIGHT (Kg)	EDP NO.
CAT40	206	118	17	81	80	-	2.3	<a href="#">10774</a>
ER32	144	99	17	81	80	-	1.7	<a href="#">10773</a>
HSK A63	170	121	17	81	80	-	2.0	<a href="#">10772</a>
ST20	155	95	17	81	80	20	1.5	<a href="#">10770</a>
C6	162	107	17	81	80	-	2.0	<a href="#">10771</a>
BT40	183	98	17	81	80	-	1.9	<a href="#">10775</a>

## Wireless RPM Display Monitor

Registers real-time rotational speed of the spindle at idle and working mode.

- 2.4 GHz radio frequency transmission
- Speed monitoring range up to 10 meters
- Externally powered receiver display
- Reads multiple spindle units mounted on one machine



DESCRIPTION	EDP NO.
DISPLAY MONITOR	10784

**INCLUDES** Wireless RPM Display Monitor and AC/DC 5V Power Supply in Fitted Case.


## Collets & Accessories

All Spindle models are supported by specially designed tools and accessories to ensure high accuracy at high speeds.

**Standard clamping accessories may not always be sufficient for best performance at higher RPMs. It is recommended to use:**

- ER11 AA High precision collets
- ER11 Thermal shrink collets

IMAGE	DESCRIPTION	EDP NO.
	<b>ER11 SRK Thermal Shrink Collets</b>	
	ER11 SRK 3mm x 10mm	10785
	ER11 SRK 3mm x 25mm	10787
	ER11 SRK 4mm x 10mm	10786
	ER11 SRK 4mm x 25mm	10788
	ER11 SRK Thermal Shrink Collet Adapter for Induction Heating Device	10789

IMAGE	DESCRIPTION	EDP NO.
	<b>ER11 Grade AA High Precision Spring Collets</b>	
	ER11 AA 2mm-3mm	10790
	ER11 AA 3mm-4mm	10791
	ER11 AA 4mm- 5mm	10792
	ER11 AA 5mm- 6mm	10793

LIST NO.	PAGE NO.	LIST NO.	PAGE NO.	LIST NO.	PAGE NO.	LIST NO.	PAGE NO.
0201	361	1684	124	2116	124, 193	5755	136
0202	361	1697	125	2119	193, 233	5895	291
0210	361	1701	125	2119P	232	5896	281
0773	362	1733	123	2119W	234-235	5900	142-143
0776	139	1734	122	2120	195	5901	144
1001	363	1750	135	2121	195	5902	143
1002	363	1751	135	2123	194, 232-233	5903	272
1004	363	1752	134	2133	194	5904	273
1005	363	1753	134	2146	180	5914	301-302
1007	363	1754	134	2190	202	5915	303-304
1008	376-378	1755	136	2195, M.	202	5916	305-309
1009	368	1766	138	2314	88	5917	309-312
1010	368	1772	139	2322	88	5918	313-314
1011	367	1880	326	2330	72-73	5919	315-316
1012	368	1881	326	2332	72-73	5920	275
1013	366	1882	326	2340	72	5922	276-277
1014	367	1887	327, 335	2345	71	5924	277
1015	369	1888	335	2435	80-81	5926	272
1016	370	1889	336	2655, M.	113, 115	5928	297
1017	371	1890, C.	337	4100	356	5929	297
1018	372	1893, C.	334	4110	353	5930	273
1019	372-373	1894, C.	325	4111	358	5939	344
1020	373	1895	327, 332-333	4120	353	5940	282
1021	373	1895C.	333	4121	358	5941	285
1022	374	1896	323-324, 327	4130	354	5942	292
1023	374	1896C.	324	4131	359	5943	288
1148	204	1897	327-329	4140	354	5944	278
1149	204	1897M	331	4141	359	5946	291
1179	204	1898	318-319, 327	4150	355	5947	281
1190	200	1898M	321	4151	359	5948	284
1195	201	1899	321	4160	355	5949	294
1198	200	1900	330	4190	356	5950	279
1266, M.	203	1901	331	4191	360	5951	289
1267	203	1917	343	4200	357	5952	283
1302	96-97	1920	322	4202S	352	5953	293
1314	84-86	1921	322	4215S	352	5954	278
1314A.	87	1922	322	4226F, S.	352	5955	289
1315	94	1980	95, 322	4550	328-329	5956	282
1317	91	2014	176	4551	330	5957	292
1320	87	2015	183	4552	331	5959	281
1322	84-85	2020	179, 219-220	4553	332	5961	291
1325	89	2021, M.	178	4554	338	5963	284
1330	57-59	2039	187, 227	4555	338	5965	294
1330A.	62	2040	190, 221	4561	334	5967	280
1330L	61	2040M	192, 222	4563	325	5968	290
1332	59	2041	191, 230	4569, C.	333	5969	285
1333	62-63	2041M	192	4570, C.	337	5970	345-350
1340	57-58	2042	192, 231	4571, C.	324	5971	298
1344	64-65	2042A	232	4580	318-319	5972	299
1353	73	2046	174-175, 177, 208-214, 218	4581	323	5973	279
1354	70	2046G.	176	4582	332	5974	283
1355	66-67	2046X.	177	4583	335	5975	287
1356	90-91	2047	184-185, 223-224	4584	320	5976	293
1360	44-47	2047G.	185	4585	321	5977	299
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33734-33736	171	43361-43393	331	50460-50627	137	57108-57132	291
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33754-33757	172	43541-43549	328	50860-50919	34	57183-57190	292
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33824-33825	172	43718-43724	319	52920-52946	255	57948	288
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33849-33850	171	44143-44148	329	53643-53656	25	58138-58139	289
33858-33895	197	44149-44156	328	53657-53675	26	58140	282
33901-33929	171	44157-44161	329	53676-53702	27	58141-58143	289
33930-33967	198	44169-44190	330	53703-53724	24	58144	282
34001-34039	182	44193-44197	334	53725-53766	25	58145	289
34049-34086	196	44199-44214	331	53767-53803	26	58148	282
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34122-34148	182	44274-44306	338	53835-53873	29	58156	282
34149-34186	196	44313-44317	325	53874-53880	30	58158-58162	289
34201-34216	200	44320-44324	334	53883-53936	131	58164	282
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34301-34313	176	44348-44370	324	54232-54393	107	58238-58239	278
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34450-34493	163	44382-44386	319	54556-54735	109	58241	278
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34697-34742	168	44426-44433	328	54767-54784	133	58270-58296	278
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34870-34918	178	44463-44494	327	54838-54859	35	58408-58474	279
34919-34940	177	44496-44517	342	54860-54868	38	58508-58564	289
35240-35295	164	44520-44527	331	54869-54875	39	58608-58664	283
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36281-36304	188	45050-45087	341	56270-56287	257	59151-59201	296
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40526-40566	343	45594-45649	303	56573-56581	299	59520-59526	350
42050-42110	326	45650-45716	304	56582-56588	279	59527-59535	348
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## TERMS OF SALE

These are the terms of sale between Morse Cutting Tools ("Seller") and the entity that is purchasing goods from Seller ("Buyer"). "Buyer" agrees that these terms of sale are applicable to the transactions between "Buyer" and "Seller", and agrees to contract with "Seller" pursuant to these terms.

### ACCEPTANCE OF TERMS OF SALE

No conditions stated by "Buyer" in its offer or acceptance shall be binding on "Seller" if in conflict with, inconsistent with, or in addition to, "Seller" terms. Credit is conditional upon determination by "Seller" each time an order is received. By use of our website you agree to our Legal and Privacy Policies. You certify, represent, and warrant that all purchases made by employees/agents of your organization utilizing your Morse Cutting Tools account number are authorized purchases of your organization. You acknowledge and agree that it is your responsibility to verify and maintain the protection, security, and distribution of your account number, user names, and passwords associated with purchasing via Morse Cutting Tools and morsecuttingtools.com. Furthermore, you expressly agree that all liability relating to password management resides with you and your organization and that under no circumstances, including negligence or misconduct, shall Morse Cutting Tools be liable for any damages that result from the use of our website. You acknowledge that your purchasing rights and privileges may be modified at any time upon notice from Morse Cutting Tools. Orders are accepted on the basis of terms of sale in effect at the time the order is received and approved by the "Seller" at "Seller's" Main Offices. Acceptance of any products delivered hereunder by "Seller" or any of its Affiliates or Assignees shall constitute "Buyer's" agreement to said Terms of Sale as set forth herein or found on our website.

### BACKORDERS

If merchandise is not in stock, it will be placed on backorder for 90 days. Unless we have customer authorization to hold merchandise on backorder longer than 90 days, it will automatically be cancelled and you will be notified.

### CLAIMS

All claims MUST be made within 5 days of receipt. To expedite service please refer to our shipper or invoice number. Damages incurred in commercial shipments must be claimed through the common carrier.

### COMMERCIAL CREDIT ACCOUNT TERMS

Unless otherwise agreed to in writing, upon approved credit, standard terms of payment shall be 1%15 Net 30 Days. A 1-1/2% monthly service charge may be added on invoices not paid when due. Returned checks and electronic payments are subject to \$15.00 charge. If "Buyer" fails to fulfill these terms or if "Seller" at any time has any doubt as to "Buyer's" financial responsibility, "Seller" may demand immediate full payment and decline to make further deliveries. Any indebtedness owing from "Buyer" to "Seller" can be set off and applied by "Seller" and associated companies on any indebtedness at any time from time to time either before or after maturity or demand. "Buyer"/applicant agrees to pay any collection cost incurred to collect delinquent amounts, including attorney's fees.

### CREDIT BALANCE

"Buyer" agrees that any credit balance issued will be applied within one (1) year of its issuance. If not applied or requested within one (1) year, any credit balance remaining will be subject to cancellation, and "Seller" shall have no further liability.

### DAMAGED, LOST or SHORT SHIPMENTS

**UPS:** Notify your local UPS office immediately. Advise us so we can reship the merchandise and place a claim. Keep damaged goods and containers for UPS inspection.

**Truck Shipments:** Shippers are not responsible for merchandise damaged or lost by motor freight carriers. If your shipment is damaged or short, have it noted by the carrier on the delivery receipt. Without this proper notation, you accept it at your own risk.

**Canadian Shipments:** If your shipment is damaged or short, have it noted by the carrier on the delivery receipt. Without this proper notation, you accept it at your own risk. Advise us so we can reship the merchandise and place a claim. Keep damaged goods and containers for Puralator inspection.

### DELIVERY and FREIGHT

**USA:** Internet stock orders accepted by 6:00pm EST will ship same day and are eligible for UPS Next Day Delivery (UPS Red) at 50% off the base rate and we pay the fuel surcharge.\* All orders over \$500 are eligible for free UPS ground\*. All other orders will ship at the selected UPS service and billed at the published rate. We shall not be liable for any injury, loss, damage, or delay in delivery resulting from the handling or use of the goods after or during such delivery. \*Applicable only in the Continental USA, Alaska, Hawaii, US territories and other areas are not eligible for either program.

**CANADA:** Shipments into Canada are freight free. All orders are duty paid, customs cleared, and shipped pre-paid via Puralator. All small packages are shipped via Puralator, with service based on Toronto origin. Large shipments over 150 lbs. are subject to LTL standards. No reference is made to Morse Cutting Tools on the packing slip or shipping label on drop shipments to your customer. In stock orders accepted by 4:00 pm EST will ship same day. Other restrictions may apply. We reserve the right to select other carriers as necessary.

We shall not be liable for any injury, loss, damage, or delay in delivery resulting from the handling or use of the goods after or during such delivery.

### DISCLAIMER OF WARRANTIES

Morse Cutting Tools warrants to original equipment manufacturers, distributors and industrial and commercial use of its products that each new product which 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 Morse Cutting Tools, be returned freight prepaid to the facility designated by a Morse Cutting Tools representative and which, upon inspection, is determined by Morse Cutting Tools 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, machine setup 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 Morse Cutting Tools, 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 constitute the "Buyer's" EXCLUSIVE REMEDY.

**This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular**

### HANDLING CHARGES

**USA:** A \$5.00 handling charge will apply to all orders under \$50.00 net at distributor cost.

**Canada:** A \$5.00 handling charge will apply to all orders under \$100.00 net at distributor cost.

### INDEMNITY

The "Buyer" shall defend and indemnify "Seller", as a result of "Buyer's" negligence, from and against any and all loss of or damage to the merchandise, usual wear and tear excepted; any claim, cause of action, damages, liability, cost or expenses (including attorney's fees) which may arise or be incurred in any manner in favor of any person relating to the merchandise or any part of the merchandise, including by way of example but not of limitation, claims arising out of or incident to the construction, purchase, delivery, installation, ownership, leasing, sale, or return of the merchandise or as a result of its use, maintenance, repair, operation or condition thereof, whether or not any claimed defects in such merchandise are latent or are discoverable; and any claim, cause of action, cost, or expense arising from alleged patent infringement of, for, or as a result of claims for alleged strict liability in tort. The obligations of "Buyer" herein contained shall survive the expiration of the Agreement as to any loss, damages, claims, causes of action liabilities, costs, or expenses.

### INSPECTIONS

Any inspection of goods agreed to by the parties will be made at "Seller's" location, Manufacturer's plant, or other source of supply and must be made before shipment. Any goods not rejected by "Buyer" before shipment will be deemed accepted.

### INVENTORY

We do our best to maintain in stock full and complete inventories of all regular lines. All merchandise subject to prior sale.

### LIMITATION OF DAMAGES

"SELLER'S" AGGREGATE LIABILITY FOR ANY AND ALL CLAIMS ARISING UNDER THESE TERMS OF SALE SHALL NOT EXCEED THE TOTAL AMOUNT PAID FOR THE SPECIFIC GOODS RELATED TO THE CLAIM AGAINST "SELLER."

### LIMITATION OF LIABILITY

IN NO EVENT SHALL "SELLER" BE LIABLE FOR LOSS OF PROFITS, INDIRECT, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY BREACH OF THIS AGREEMENT OR OBLIGATIONS UNDER THIS AGREEMENT, NOR SHALL "SELLER" BE LIABLE FOR ANY DAMAGES CAUSED BY DELAY IN DELIVERY, INSTALLATION, OR FURNISHING OF THE MERCHANDISE OR SERVICES BY ANY MANUFACTURER OF THE MERCHANDISE OR OTHERWISE.

### NOTICE TO SUBSEQUENT PURCHASER OR REPACKER

For imported articles, the requirements of 19 U.S.C. 1304 and 19 CFR part 134 provide that the articles or their containers must be marked in a conspicuous place as legibly, indelibly, and permanently as the nature of the article or container will permit, to indicate to an ultimate purchaser in the United States the English name of the country of origin of the article.

### PRICES

**USA:** All prices are in US dollars. All prices are subject to change without notice. Typographical or similar errors are subject to correction.

**Canada:** All prices are in Canadian dollars. All prices are subject to change without notice. Typographical or similar errors are subject to correction.

### PROMOTIONAL AND ADVERTISING MATERIAL

"Buyer" authorizes "Seller", its affiliates or representatives, to send e-mails or faxes, of any kind, including but not limited to correspondence, promotional and advertising material, to "Buyer" or its affiliates.

### QUOTATIONS

Quotations are valid for 30 days.

### RESPONSIBILITY

The value of a defective product or material sent in error is our only liability. All technical data has been supplied by the manufacturer and is listed only as a convenience. All specifications are subject to change without notice. Photos shown in any of our advertising material, catalog and website are general representations of the various items and may include optional equipment. We do not warrant or represent that the merchandise complies with the provisions of any law, particularly including the Walsh-Healy Public Contracts Act and the Occupational Safety and Health Act of 1970, and regulations promulgated thereunder, unless the manufacturer so warrants.

### RETURNS

Customer must obtain a Returned Goods Authorization ("RGA") Number prior to returning goods. No merchandise will be accepted without an "RGA Number." Unless we have erred, returns must be prepaid and are subject to restocking charge.

No merchandise will be accepted for return which is made up special, discontinued, or which has been held for over 30 days. We reserve the right to determine if the purchaser has abused the item in question. If it cannot be returned to stock, credit will not be given. **Returns not accompanied by a copy of shipper, invoice, or invoice number may not be accepted or subject to restocking charge. Returns due to customer error must be prepaid and are subject to restocking charge.** Any claims for discrepancies in shipment must be made within 5 days of receipt of merchandise. **Items that cannot be returned via UPS:** Call or e-mail customerservice@morsecuttingtools.com for instructions

### SAFETY

"Buyer" will cause each person who receives or uses purchased goods to read and comply with all safety instruction provided by "Seller" and Manufacturer, including all product safety notices, warnings, instructions and training materials, manuals, or other similar safety documentation. "Buyer" will instruct each user in the proper use of the goods and implement and enforce the safety documentation. "Buyer" will be solely responsible for complying with local, state and federal or provincial laws, codes or regulations relating to safety of the workplace where the goods are used. Cutting Tools may shatter when broken. The wearing of eye protection is strongly recommended in the vicinity of their use.

### SALES TAX / GST / HST

**USA:** "Seller" is required to charge state and local tax on items for which sales tax exemption certification have not been provided.

When ordering, please indicate tax exemption and provide certification.

**Canada:** "Seller" is required to charge GST (goods and services tax) / HST (harmonized sales tax) on products shipped to Canada

### TITLE

To secure payment and performance of all "Buyer's" obligations hereunder, whether represented by commercial account or evidenced by notes, judgments or otherwise, "Seller" hereby retains title to the equipment and a security interest herein until payment in full and performance by "Buyer" of said obligations.

**TERMS OF SALE ARE SUBJECT TO CHANGE WITHOUT NOTICE. CURRENT TERMS AVAILABLE AT [WWW.MORSECUTTINGTOOLS.COM/cgl/TERMSOFALE](http://WWW.MORSECUTTINGTOOLS.COM/cgl/TERMSOFALE)**



# MORSE

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## CUTTING TOOLS



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QUALITY SYSTEM  
REGISTERED TO  
ISO 9001:2015

