MORSE CUTTING TOOLS

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2016 CATALOG

New & Expanded

DRILLS

REAMERS

COUNTERSINKS, CENTER DRILLS & SPOTTING DRILLS

TAPS

END MILLS

TOOL BITS

MISCELLANEOUS

MORSE CUTTING TOOLS

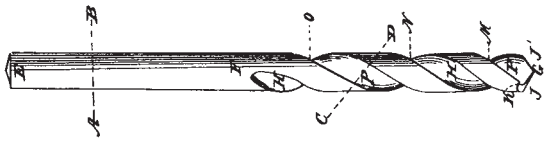
MORSE CUTTING TOOLS 150 Years

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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MISCELLANEOUS

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SHEAR*DRILL*™
High Performance Drills

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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.

SHEAR*DRILL*™
3xD Non-Coolant Through High Performance Drills

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

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WITHOUT COOLANT HOLES
Drilling up to 3xD

List No. 5600 Non-Coolant Through

SIZE								
FRACTIONAL	WIRE GAGE	LETTER	METRIC	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.
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				.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

SHEAR*DRILL*™
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 enablling higher speeds and chip loads.

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

COOLANT THROUGH DRILLS			
Drill and Shank Diameter Tolerances			
Diameter Range		Drill Dia. m7	Shank Dia. h6
INCH	.1182 - .2362	+.00016 / + .00063	+.000 / -.00031
METRIC (mm)	> 3.0 - 6.0	+.004 / +.016	+.000 / -.008
INCH	.2363 - .3937	+.00024 / +.00083	+.000 / -.00035
METRIC (mm)	> 6.0 - 10.0	+.006 / +.021	+.000 / -.009
INCH	.3938 - .7087	+.00027 / + .00098	+.000 / -.00043
METRIC (mm)	> 10.0 - 18.0	+.007 / + .025	+.000 / -.011
INCH	.7088 - .7874	+.00031 / +.00114	+.000 / -.00051
METRIC (mm)	> 18.0 - 20.0	+.008 / +.029	+.000 / -.013

Speeds & Feeds: Page 11

List No. 5601 Short Length Coolant Through

COOLANT-THROUGH

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

(continued)

SHEAR*DRILL*™
Coolant-Through 3xD Short Length High Performance Drills

Premium Submicron Carbide

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140° Self-Centering High Performance Point

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

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

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

(continued)

List No. 5601 Short Length Coolant Through

COOLANT-THROUGH

SIZE				DEC.	SHANK	FLUTE		EDP
FRACTIONAL	WIRE GAGE	LETTER	METRIC	EQUIV.	DIA.	LENGTH	OAL	NO.
21/64				.3281	10	47	89	98764
		Q		.3320	10	47	89	98765
			8.5	.3346	10	47	89	98766
			9.0	.3543	10	47	89	98767
23/64				.3594	10	47	89	98768
		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
9/16				.5625	16	65	115	98787
			14.5	.5709	16	65	115	98788
			15.0	.5906	16	65	115	98789
5/8				.6250	16	65	115	98790
			16.0	.6299	16	65	115	98791
3/4				.7500	20	79	131	98792

SHEAR*DRILL*™
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 enablling higher speeds and chip loads.

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

COOLANT THROUGH DRILLS			
Drill and Shank Diameter Tolerances			
Diameter Range		Drill Dia. m7	Shank Dia. h6
INCH	.1182 - .2362	+.00016 / + .00063	+.000 / -.00031
METRIC (mm)	> 3.0 - 6.0	+.004 / +.016	+.000 / -.008
INCH	.2363 - .3937	+.00024 / +.00083	+.000 / -.00035
METRIC (mm)	> 6.0 - 10.0	+.006 / +.021	+.000 / -.009
INCH	.3938 - .7087	+.00027 / + .00098	+.000 / -.00043
METRIC (mm)	> 10.0 - 18.0	+.007 / + .025	+.000 / -.011
INCH	.7088 - .7874	+.00031 / +.00114	+.000 / -.00051
METRIC (mm)	> 18.0 - 20.0	+.008 / +.029	+.000 / -.013

List No. 5602 Long Length Coolant Through

COOLANT-THROUGH

SIZE				DEC.	SHANK	FLUTE		EDP
FRACTIONAL	WIRE GAGE	LETTER	METRIC	EQUIV.	DIA.	LENGTH	OAL	NO.
5/32				.1562	6	36	74	98793
			4.0	.1575	6	36	74	98794
	21			.1590	6	36	74	98795
			4.2	.1654	6	36	74	98796
			4.5	.1772	6	36	74	98797
3/16				.1875	6	36	74	98798
			4.8	.1890	6	44	82	98799
			5.0	.1969	6	44	82	98800
	3			.2130	6	44	82	98801
			5.5	.2165	6	44	82	98802
7/32				.2188	6	44	82	98803
	2			.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
1/4				.2500	8	53	91	98809
			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
			7.0	.2756	8	53	91	98815
		J		.2770	8	53	91	98816
9/32				.2812	8	53	91	98817
			7.5	.2953	8	53	91	98818
19/64				.2969	8	53	91	98819
5/16				.3125	8	53	91	98820
			8.0	.3150	8	53	91	98821
			8.2	.3228	10	61	103	98822

(continued)

SHEAR*DRILL*™
Coolant-Through 5xD Long Length High Performance Drills

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

Technical Information: See Page 10

Recommended Speeds & Feeds: See Page 11

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Speeds & Feeds: Page 11

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

SIZE				DEC.	SHANK	FLUTE		EDP
FRACTIONAL	WIRE GAGE	LETTER	METRIC	EQUIV.	DIA.	LENGTH	OAL	NO.
21/64				.3281	10	61	103	98823
		Q		.3320	10	61	103	98824
			8.5	.3346	10	61	103	98825
			9.0	.3543	10	61	103	98826
23/64				.3594	10	61	103	98827
		U		.3680	10	61	103	98828
			9.5	.3740	10	61	103	98829
3/8				.3750	10	61	103	98830
			10.0	.3937	10	61	103	98831
13/32				.4062	12	71	118	98832
			10.5	.4134	12	71	118	98833
27/64				.4219	12	71	118	98834
			11.0	.4331	12	71	118	98835
7/16				.4375	12	71	118	98836
			11.5	.4528	12	71	118	98837
15/32				.4688	12	71	118	98838
			12.0	.4724	12	71	118	98839
			12.5	.4921	14	77	124	98840
1/2				.5000	14	77	124	98841
			13.0	.5118	14	77	124	98842
			13.5	.5315	14	77	124	98843
			14.0	.5512	14	77	124	98844
9/16				.5625	16	83	133	98845
			14.5	.5709	16	83	133	98846
			15.0	.5906	16	83	133	98847
5/8				.6250	16	83	133	98848
			16.0	.6299	16	83	133	98849
3/4				.7500	20	101	153	98850

SHEAR*DRILL*™
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 ±.001. When drilling more than 3XD the drill may require a reduction in speed.
7. Coolant – **SHEAR*DRILL*™** 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

SHEAR*DRILL*™

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, Martenistic, 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.

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

Short flute length and short overall length for maximum rigidity

Foret à haut rendement

Broca de alto rendimiento

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

Speeds & Feeds: Page 25

Size				Dec.	Flute Length	OAL	List No. 1360 Bright Finish	List No. 1360G TiN Coated	List No. 1360T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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

Short flute length and short overall length for maximum rigidity

Foret à haut rendement

Broca de alto rendimiento

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

Size				Dec.	Flute Length	OAL	List No. 1360 Bright Finish	List No. 1360G TiN Coated	List No. 1360T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	EDP No.	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

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

Short flute length and short overall length for maximum rigidity

Foret à haut rendement | Broca de alto rendimiento

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

Speeds & Feeds: Page 25

Size				Dec.	Flute Length	OAL	List No. 1360 Bright Finish	List No. 1360G TiN Coated	List No. 1360T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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	—	—	—	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

Short flute length and short overall length for maximum rigidity

Foret à haut rendement | Broca de alto rendimiento

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

Size				Dec.	Flute Length	OAL	List No. 1360 Bright Finish	List No. 1360G TiN Coated	List No. 1360T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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

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.

Jobber Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

Foret à haut rendement | Broca de alto rendimiento

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.

Speeds & Feeds: Page 25

Size				Dec.	Flute Length	OAL	List No. 1361 Bright Finish	List No. 1361G TiN Coated	List No. 1361T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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

Foret à haut rendement Broca de alto rendimiento

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.

Size				Dec.	Flute Length	OAL	List No. 1361 Bright Finish	List No. 1361G TiN Coated	List No. 1361T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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

Foret à haut rendement Broca de alto rendimiento

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.

Speeds & Feeds: Page 25

Size				Dec.	Flute Length	OAL	List No. 1361 Bright Finish	List No. 1361G TiN Coated	List No. 1361T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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	—	—	—	0.2500	63	101	12455	91765	60265
—	—	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

Foret à haut rendement Broca de alto rendimiento

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

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

Size				Dec.	Flute Length	OAL	List No. 1361 Bright Finish	List No. 1361G TiN Coated	List No. 1361T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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

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.

Foret à haut rendement Broca de alto rendimiento

Speeds & Feeds: Page 25

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

Size				Dec.	Flute Length	OAL	List No. 1362 Bright Finish	List No. 1362G TiN Coated	List No. 1362T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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.

Foret à haut rendement **Broca de alto rendimiento**

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

Size				Dec.	Flute Length	OAL	List No. 1362 Bright Finish	List No. 1362G TiN Coated	List No. 1362T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	EDP No.	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

Taper Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

Foret à haut rendement Broca de alto rendimiento

Speeds & Feeds: Page 25

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

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

Size				Dec.	Flute Length	OAL	List No. 1362 Bright Finish	List No. 1362G TiN Coated	List No. 1362T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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	—	—	—	0.2500	97	148	12665	91985	60485
—	—	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

Foret à haut rendement **Broca de alto rendimiento**

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

Size				Dec.	Flute Length	OAL	List No. 1362 Bright Finish	List No. 1362G TiN Coated	List No. 1362T TiALN Coated
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	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
—	—	—	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
—	—	—	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
—	—	—	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
—	—	—	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
—	—	—	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

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

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 1 1/16″ – 1 each

Letter Sizes
A thru V – 12 each
W thru Z – 6 each
Wire Gage Sizes
#1 thru #80 – 12 each

Foret court Broca Uso Multiple

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**

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1330, 1332, 1340 EDP NO.	1330B, 1332B, 1340B EDP NO.	1330G EDP NO.
	80	.0135	1/8	3/4	11351	11551	—
	79	.0145	1/8	3/4	11352	11552	—
1/64		.0156	3/16	3/4	11353	11553	—
	78	.0160	3/16	7/8	11354	11554	—
	77	.0180	3/16	7/8	11355	11555	—
	76	.0200	3/16	7/8	11356	11556	—
	75	.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	—
1/32		.0312	1/2	1 3/8	11365	11565	—
	67	.0320	1/2	1 3/8	11366	11566	—
	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	11/16	1 5/8	11372	11572	—
	60	.0400	11/16	1 5/8	11373	11573	91373
	59	.0410	11/16	1 5/8	11374	11574	91374
	58	.0420	11/16	1 5/8	11375	11575	91375
	57	.0430	3/4	1 3/4	11376	11576	91376
	56	.0465	3/4	1 3/4	11377	11577	91377
3/64		.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
1/16		.0625	7/8	1 7/8	11382	11582	91382
	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)

Foret court | Broca Uso Multiple

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

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1330, 1332, 1340 EDP NO.	1330B, 1332B, 1340B EDP NO.	1330G EDP NO.
	48	.0760	1	2	11387	11587	91387
5/64		.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
	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
3/32		.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
	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
	31	.1200	1 5/8	2 3/4	11407	11607	91407
1/8		.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
9/64		.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
	23	.1540	2	3 1/8	11417	11617	91417
5/32		.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
	19	.1660	2 1/8	3 1/4	11422	11622	91422
	18	.1695	2 1/8	3 1/4	11423	11623	91423
11/64		.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
	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
3/16		.1875	2 5/16	3 1/2	11430	11630	91430
	12	.1890	2 5/16	3 1/2	11431	11631	91431
	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
13/64		.2031	2 7/16	3 5/8	11437	11637	91437
	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
7/32		.2187	2 1/2	3 3/4	11442	11642	91442
	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)

Foret court Broca Uso Multiple

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

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

Aircraft Type A Jobber Length Drills

Foret court — Broca Uso Multiple

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 FRACTIONAL	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
	31	.1200	1 5/8	2 3/4	14611
1/8		.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
	23	.1540	2	3 1/8	14621
5/32		.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
	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
3/16		.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
	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

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	2	.2210	2 5/8	3 7/8	14647
	1	.2280	2 5/8	3 7/8	14648
	A	.2340	2 5/8	3 7/8	14671
15/64		.2344	2 5/8	3 7/8	14650
	B	.2380	2 3/4	4	14672
	C	.2420	2 3/4	4	14674
	D	.2460	2 3/4	4	14676
1/4	E	.2500	2 3/4	4	14678
	F	.2570	2 7/8	4 1/8	14679
	G	.2610	2 7/8	4 1/8	14681
17/64		.2656	2 7/8	4 1/8	14658
	H	.2660	2 7/8	4 1/8	14682
	I	.2720	2 7/8	4 1/8	14684
	J	.2770	2 7/8	4 1/8	14691
	K	.2810	2 15/16	4 1/4	14692
9/32		.2812	2 15/16	4 1/4	14663
	L	.2900	2 15/16	4 1/4	14693
	M	.2950	3 1/16	4 3/8	14694
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
	O	.3160	3 3/16	4 1/2	14696
	P	.3230	3 5/16	4 5/8	14697
21/64		.3281	3 5/16	4 5/8	14670
	Q	.3320	3 7/16	4 3/4	14698
	R	.3390	3 7/16	4 3/4	14699
11/32		.3437	3 7/16	4 3/4	14673
	S	.3480	3 1/2	4 7/8	14700
	T	.3580	3 1/2	4 7/8	14701
23/64		.3594	3 1/2	4 7/8	14675
	U	.3680	3 5/8	5	14702
3/8		.3750	3 5/8	5	14677
	V	.3770	3 5/8	5	14703
	W	.3860	3 3/4	5 1/8	14704
25/64		.3906	3 3/4	5 1/8	14680
	X	.3970	3 3/4	5 1/8	14705
	Y	.4040	3 7/8	5 1/4	14706
13/32		.4062	3 7/8	5 1/4	14683
	Z	.4130	3 7/8	5 1/4	14707
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

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.

Foret court Broca Uso Multiple

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.
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

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 5/8	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.

Foret court Broca Uso Multiple

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 FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	80	.0135	1/8	3/4	14301*
	79	.0145	1/8	3/4	14302*
1/64		.0156	3/16	3/4	14303*
	78	.0160	3/16	7/8	14304*
	77	.0180	3/16	7/8	14305*
	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*
	69	.0292	1/2	1 3/8	14313*
	68	.0310	1/2	1 3/8	14314*
1/32		.0312	1/2	1 3/8	14315*
	67	.0320	1/2	1 3/8	14316*
	66	.0330	1/2	1 3/8	14317*

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	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	11/16	1 5/8	14322*
	60	.0400	11/16	1 5/8	14323*
	59	.0410	11/16	1 5/8	14324*
	58	.0420	11/16	1 5/8	14325*
	57	.0430	3/4	1 3/4	14326*
	56	.0465	3/4	1 3/4	14327*
3/64		.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*
1/16		.0625	7/8	1 7/8	14451
	52	.0635	7/8	1 7/8	14452
	51	.0670	1	2	14453

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

(continued)

Aircraft Type B Jobber Length Drills (continued)

List No. 1385

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

Foret court **Broca Uso Multiple**

SIZE FRACTIONAL	LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	A	.2340	2 5/8	3 7/8	14514
15/64		.2344	2 5/8	3 7/8	14515
	B	.2380	2 3/4	4	14516
	C	.2420	2 3/4	4	14517
	D	.2460	2 3/4	4	14518
1/4	E	.2500	2 3/4	4	14519
	F	.2570	2 7/8	4 1/8	14521
	G	.2610	2 7/8	4 1/8	14522
17/64		.2656	2 7/8	4 1/8	14523
	H	.2660	2 7/8	4 1/8	14524
	I	.2720	2 7/8	4 1/8	14525
	J	.2770	2 7/8	4 1/8	14526
	K	.2810	2 15/16	4 1/4	14527
9/32		.2812	2 15/16	4 1/4	14528
	L	.2900	2 15/16	4 1/4	14529
	M	.2950	3 1/16	4 3/8	14530
19/64		.2969	3 1/16	4 3/8	14531
	N	.3020	3 1/16	4 3/8	14532
5/16		.3125	3 3/16	4 1/2	14533
	O	.3160	3 3/16	4 1/2	14534
	P	.3230	3 5/16	4 5/8	14535
21/64		.3281	3 5/16	4 5/8	14536
	Q	.3320	3 7/16	4 3/4	14537
	R	.3390	3 7/16	4 3/4	14538
11/32		.3437	3 7/16	4 3/4	14539
	S	.3480	3 1/2	4 7/8	14540
	T	.3580	3 1/2	4 7/8	14541
23/64		.3594	3 1/2	4 7/8	14542
	U	.3680	3 5/8	5	14543
3/8		.3750	3 5/8	5	14544
	V	.3770	3 5/8	5	14545
	W	.3860	3 3/4	5 1/8	14546
25/64		.3906	3 3/4	5 1/8	14547
	X	.3970	3 3/4	5 1/8	14548
	Y	.4040	3 7/8	5 1/4	14549
13/32		.4062	3 7/8	5 1/4	14550
	Z	.4130	3 7/8	5 1/4	14551
27/64		.4219	3 15/16	5 3/8	14552
7/16		.4375	4 1/16	5 1/2	14553
29/64		.4531	4 3/16	5 5/8	14554
15/32		.4687	4 5/16	5 3/4	14555
31/64		.4844	4 3/8	5 7/8	14556
1/2		.5000	4 1/2	6	14557

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 specifc machining application.**

Automotive Series Jobber Length Drills

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

Designed for drilling a wide variety of materials, this drill will perform well under many different operating conditions. Tanged shank allows use with ASA split sleeve drivers.

Foret court Broca Uso Multiple

List No. 1330A – Tanged Shank

STANDARD PACKAGE **Fractional Sizes**
1/8″ thru 3/8″ — 12 each
25/64″ thru 1/2″ — 6 each
35/64″ thru 11/16″ — 1 each

Letter Sizes
12 each

Wire Gage Sizes
12 each

Metric Sizes
12 each

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

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

* Available While Supplies Last

Metric Sizes - Tanged Shank

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
3.30 mm	.1299	44	73	12171*
3.40 mm	.1339	44	73	12172*
6.10 mm	.2402	70	102	12175*

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
7.40 mm	.2913	78	111	12178*
9.00 mm	.3543	89	124	12180*

* Available While Supplies Last

TOOL COATING SERVICE

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

TiN — Titanium Nitride	**TiCN** — Titanium Carbonite
TiALN — Titanium Aluminum Nitride	**ALTiN** — Aluminum Titanium Nitride
CrN — Chromium Nitride	**CrC** — Chromium Carbide

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.

Foret court — Broca Uso Multiple

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

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	77	.0180	3/16	7/8	11954*
	75	.0210	1/4	1	11956*
	71	.0260	3/8	1 1/4	11960*
	69	.0292	1/2	1 3/8	11962*
	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*
	56	.0465	3/4	1 3/4	11976*
1/16		.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
	42	.0935	1 1/4	2 1/4	11993
3/32		.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
	36	.1065	1 7/16	2 1/2	12000
7/64		.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
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

Decimal Equivalent Pocket Chart
List No. 1005

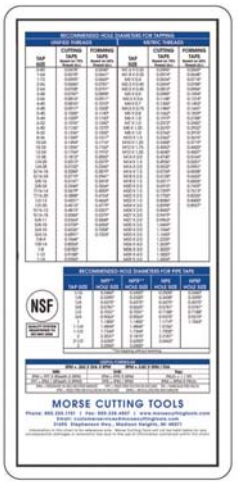
Tableau décimal **Tabla de medidas decimales**

NEW LOOK! LARGER SIZE! Decimal Equivalents.
Tap Drill Sizes for inch, metric and pipe threads.
Size: 3⅜" × 7", Printed on plastic

Pack of 50
EDP No. 20412

Pack of 100
EDP No. 20413

Front



Back

Metric Jobber Length Drills

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

Foret court **Broca Uso Multiple**

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.
.15	.0059	1.5	1/16	19	3/4	12893*
.16	.0063	1.5	1/16	19	3/4	12894*
.34	.0134	4	5/32	19	3/4	13000*
.48	.0181	5	3/16	20	25/32	12855*
.50	.0197	6	1/4	22	7/8	13004
.55	.0217	7	9/32	24	15/16	13005
.60	.0236	7	9/32	24	15/16	13006
.65	.0265	8	5/16	26	1-1/32	13007
.70	.0276	9	11/32	28	1-3/32	13008
.75	.0295	9	11/32	28	1-3/32	13009
.80	.0315	10	13/32	30	1-3/16	13010
.85	.0335	10	13/32	30	1-3/16	13011
.90	.0354	11	7/16	32	1-1/4	13012
.95	.0374	11	7/16	32	1-1/4	13013
1.00	.0394	12	15/32	34	1-11/32	13014
1.05	.0413	12	15/32	34	1-11/32	13015
1.10	.0433	14	9/16	36	1-7/16	13016
1.15	.0453	14	9/16	36	1-7/16	13017
1.20	.0472	16	5/8	38	1-1/2	13018
1.25	.0492	16	5/8	38	1-1/2	13019
1.30	.0512	16	5/8	38	1-1/2	13020
1.35	.0531	18	11/16	40	1-9/16	13021

SIZE MM	DEC. EQUIV.	FLUTE LENGTH MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.
1.40	.0551	18	11/16	40	1-9/16	13022
1.45	.0571	18	11/16	40	1-9/16	13023
1.50	.0591	18	11/16	40	1-9/16	13024
1.55	.0610	20	25/32	43	1-11/16	13025
1.60	.0630	20	25/32	43	1-11/16	13026
1.65	.0650	20	25/32	43	1-11/16	13027
1.70	.0669	20	25/32	43	1-11/16	13028
1.75	.0689	22	7/8	46	1-13/16	13029
1.80	.0709	22	7/8	46	1-13/16	13030
1.85	.0728	22	7/8	46	1-13/16	13031
1.90	.0748	22	7/8	46	1-13/16	13032
1.95	.0768	24	15/16	49	1-15/16	13033
2.00	.0787	24	15/16	49	1-15/16	13034
2.05	.0807	24	15/16	49	1-15/16	13035
2.10	.0827	24	15/16	49	1-15/16	13036
2.15	.0846	27	1-1/16	53	2-3/32	13037
2.20	.0866	27	1-1/16	53	2-3/32	13038
2.25	.0886	27	1-1/16	53	2-3/32	13039
2.30	.0906	27	1-1/16	53	2-3/32	13040
2.35	.0925	27	1-1/16	53	2-3/32	13041
2.40	.0945	30	1-3/16	57	2-1/4	13042
2.45	.0965	30	1-3/16	57	2-1/4	13043

* Available While Supplies Last

(continued)

Metric Jobber Length Drills (continued)

List No. 1333

Foret court **Broca Uso Multiple**

SIZE MM	DEC. EQUIV.	FLUTE LENGTH MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.
2.50	.0984	30	1-3/16	57	2-1/4	13044
2.60	.1024	30	1-3/16	57	2-1/4	13045
2.70	.1063	33	1-5/16	61	2-13/32	13046
2.75	.1083	33	1-5/16	61	2-13/32	13047
2.80	.1102	33	1-5/16	61	2-13/32	13048
2.90	.1142	33	1-5/16	61	2-13/32	13049
3.00	.1181	33	1-5/16	61	2-13/32	13050
3.10	.1220	36	1-7/16	65	2-9/16	13051
3.20	.1260	36	1-7/16	65	2-9/16	13052
3.25	.1280	36	1-7/16	65	2-9/16	13053
3.30	.1299	36	1-7/16	65	2-9/16	13054
3.40	.1339	39	1-17/32	70	2-3/4	13055
3.50	.1378	39	1-17/32	70	2-3/4	13056
3.60	.1417	39	1-17/32	70	2-3/4	13057
3.70	.1457	39	1-17/32	70	2-3/4	13058
3.75	.1476	39	1-17/32	70	2-3/4	13059
3.80	.1496	43	1-11/16	75	2-15/16	13060
3.90	.1535	43	1-11/16	75	2-15/16	13061
4.00	.1575	43	1-11/16	75	2-15/16	13062
4.10	.1614	43	1-11/16	75	2-15/16	13063
4.20	.1654	43	1-11/16	75	2-15/16	13064
4.25	.1673	43	1-11/16	75	2-15/16	13065
4.30	.1693	47	1-27/32	80	3-5/32	13066
4.40	.1732	47	1-27/32	80	3-5/32	13067
4.50	.1772	47	1-27/32	80	3-5/32	13068
4.60	.1811	47	1-27/32	80	3-5/32	13069
4.70	.1850	47	1-27/32	80	3-5/32	13070
4.75	.1870	47	1-27/32	80	3-5/32	13071
4.80	.1890	52	2-1/16	86	3-3/8	13072
4.90	.1929	52	2-1/16	86	3-3/8	13073
5.00	.1968	52	2-1/16	86	3-3/8	13074
5.10	.2008	52	2-1/16	86	3-3/8	13075
5.20	.2047	52	2-1/16	86	3-3/8	13076
5.25	.2067	52	2-1/16	86	3-3/8	13077
5.30	.2087	52	2-1/16	86	3-3/8	13078
5.40	.2126	57	2-1/4	93	3-21/32	13079
5.50	.2165	57	2-1/4	93	3-21/32	13080
5.60	.2205	57	2-1/4	93	3-21/32	13081
5.70	.2244	57	2-1/4	93	3-21/32	13082
5.75	.2264	57	2-1/4	93	3-21/32	13083
5.80	.2283	57	2-1/4	93	3-21/32	13084
5.90	.2323	57	2-1/4	93	3-21/32	13085
6.00	.2362	57	2-1/4	93	3-21/32	13086
6.10	.2402	63	2-15/32	101	3-31/32	13087
6.20	.2441	63	2-15/32	101	3-31/32	13088
6.25	.2461	63	2-15/32	101	3-31/32	13089
6.30	.2480	63	2-15/32	101	3-31/32	13090
6.40	.2520	63	2-15/32	101	3-31/32	13091
6.50	.2559	63	2-15/32	101	3-31/32	13092
6.60	.2598	63	2-15/32	101	3-31/32	13093
6.70	.2638	63	2-15/32	101	3-31/32	13094
6.75	.2657	69	2-23/32	109	4-9/32	13095
6.80	.2677	69	2-23/32	109	4-9/32	13096
6.90	.2717	69	2-23/32	109	4-9/32	13097
7.00	.2756	69	2-23/32	109	4-9/32	13098
7.10	.2795	69	2-23/32	109	4-9/32	13099
7.20	.2835	69	2-23/32	109	4-9/32	13100
7.25	.2854	69	2-23/32	109	4-9/32	13101
7.30	.2874	69	2-23/32	109	4-9/32	13102
7.40	.2913	69	2-23/32	109	4-9/32	13103
7.50	.2953	69	2-23/32	109	4-9/32	13104
7.60	.2992	75	2-15/16	117	4-19/32	13105
7.70	.3031	75	2-15/16	117	4-19/32	13106
7.75	.3051	75	2-15/16	117	4-19/32	13107
7.80	.3071	75	2-15/16	117	4-19/32	13108
7.90	.3110	75	2-15/16	117	4-19/32	13109
8.00	.3150	75	2-15/16	117	4-19/32	13110
8.10	.3189	75	2-15/16	117	4-19/32	13111
8.20	.3228	75	2-15/16	117	4-19/32	13112
8.25	.3248	75	2-15/16	117	4-19/32	13113
8.30	.3268	75	2-15/16	117	4-19/32	13114
8.40	.3307	75	2-15/16	117	4-19/32	13115
8.50	.3346	75	2-15/16	117	4-19/32	13116
8.60	.3386	81	3-3/16	125	4-29/32	13117
8.70	.3425	81	3-3/16	125	4-29/32	13118
8.75	.3445	81	3-3/16	125	4-29/32	13119
8.80	.3465	81	3-3/16	125	4-29/32	13120
8.90	.3504	81	3-3/16	125	4-29/32	13121
9.00	.3543	81	3-3/16	125	4-29/32	13122
9.10	.3583	81	3-3/16	125	4-29/32	13123
9.20	.3622	81	3-3/16	125	4-29/32	13124
9.25	.3642	81	3-3/16	125	4-29/32	13125
9.30	.3661	81	3-3/16	125	4-29/32	13126
9.40	.3701	81	3-3/16	125	4-29/32	13127
9.50	.3740	81	3-3/16	125	4-29/32	13128
9.60	.3780	87	3-7/16	133	5-1/4	13129
9.70	.3819	87	3-7/16	133	5-1/4	13130
9.75	.3839	87	3-7/16	133	5-1/4	13131
9.80	.3898	87	3-7/16	133	5-1/4	13132
9.90	.3998	87	3-7/16	133	5-1/4	13133
10.00	.3937	87	3-7/16	133	5-1/4	13134
10.20	.4016	87	3-7/16	133	5-1/4	12858
10.30	.4055	87	3-7/16	133	5-1/4	12859
10.50	.4134	87	3-7/16	133	5-1/4	13135
10.80	.4252	94	3-11/16	142	5-19/32	12863
11.00	.4331	94	3-11/16	142	5-19/32	13136
11.20	.4409	94	3-11/16	142	5-19/32	12866
11.50	.4528	94	3-11/16	142	5-19/32	13137
11.80	.4646	94	3-11/16	142	5-19/32	12871
12.00	.4724	101	3-31/32	151	5-15/16	13138
12.20	.4803	101	3-31/32	151	5-15/16	12874
12.50	.4921	101	3-31/32	151	5-15/16	13139
13.00	.5118	101	3-31/32	151	5-15/16	13140
13.50	.5315	108	4-1/4	160	6-5/16	12881
14.00	.5512	108	4-1/4	160	6-5/16	12882
14.50	.5709	114	4-1/2	169	6-5/8	12883
15.00	.5906	114	4-1/2	169	6-5/8	12884
15.50	.6102	120	4-3/4	178	7	12885
16.00	.6299	120	4-3/4	178	7	12886
16.50	.6496	125	4-29/32	184	7-1/4	12887
17.00	.6693	125	4-29/32	184	7-1/4	12888
17.50	.6890	130	5-3/32	191	7-17/32	12890

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.

Foret court Broca Uso Multiple

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

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1344 EDP NO.	1363, 1364 EDP NO.
	60	.0400	1 1/16	1 5/8	14023	14172
	59	.0410	1 1/16	1 5/8	14024	14173
	58	.0420	1 1/16	1 5/8	14025	14174
	57	.0430	3/4	1 3/4	14026	14175
	56	.0465	3/4	1 3/4	14027	14176
	55	.0520	7/8	1 7/8	14028	14178
	54	.0550	7/8	1 7/8	14029	14179
	53	.0595	7/8	1 7/8	14030	14180
1/16		.0625	7/8	1 7/8	14031	14181
	52	.0635	7/8	1 7/8	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

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	Foret court 1344 EDP NO.	Broca Uso Multiple 1363, 1364 EDP NO.
	26	.1470	1⅞	3	14063	14213
	25	.1495	1⅞	3	14064	14214
	24	.1520	2	3⅛	14065	14215
	23	.1540	2	3⅛	14066	14216
5/32		.1562	2	3⅛	14067	14217
	22	.1570	2	3⅛	14068	14218
	21	.1590	2⅛	3¼	14069	14219
	20	.1610	2⅛	3¼	14070	14220
	19	.1660	2⅛	3¼	14071	14221
	18	.1695	2⅛	3¼	14072	14222
11/64		.1719	2⅛	3¼	14073	14223
	17	.1730	2 3/16	3⅜	14074	14224
	16	.1770	2 3/16	3⅜	14075	14225
	15	.1800	2 3/16	3⅜	14076	14226
	14	.1820	2 3/16	3⅜	14077	14227
	13	.1850	2 5/16	3½	14078	14228
3/16		.1875	2 5/16	3½	14079	14229
	12	.1890	2 5/16	3½	14080	14230
	11	.1910	2 5/16	3½	14081	14231
	10	.1935	2 7/16	3⅝	14082	14232
	9	.1960	2 7/16	3⅝	14083	14233
	8	.1990	2 7/16	3⅝	14084	14234
	7	.2010	2 7/16	3⅝	14085	14235
13/64		.2031	2 7/16	3⅝	14086	14236
	6	.2040	2½	3¾	14087	14237
	5	.2055	2½	3¾	14088	14238
	4	.2090	2½	3¾	14089	14239
	3	.2130	2½	3¾	14090	14240
7/32		.2187	2½	3¾	14091	14241
	2	.2210	2⅝	3⅞	14092	14242
	1	.2280	2⅝	3⅞	14093	14243
15/64		.2344	2⅝	3⅞	14095	14245
¼		.2500	2¾	4	14099	14249
17/64		.2656	2⅞	4⅛	14103	14253
9/32		.2812	2 15/16	4¼	14108	14258
19/64		.2969	3 1/16	4⅜	14111	14261
5/16		.3125	3 3/16	4½	14113	14263
21/64		.3281	3 5/16	4⅝	14116	14266
11/32		.3437	3 7/16	4¾	14119	14269
23/64		.3593	3½	4⅞	14122	14272
⅜		.3750	3⅝	5	14124	14274
25/64		.3906	3¾	5⅛	14127	14277
13/32		.4062	3⅞	5¼	14130	14280
27/64		.4219	3 15/16	5⅜	14132	14282
7/16		.4375	4 1/16	5½	14133	14283
29/64		.4531	4 3/16	5⅝	14134	14284
15/32		.4687	4 5/16	5¾	14135	14285
31/64		.4844	4⅜	5⅞	14136	14286
½		.5000	4½	6	14137	14287

Parabolic Flute Jobber Length Drills

Straight Shank – High Speed Steel
135° Split Point

Foret à goujure parabolique Broca parabólica

List No. 1355 — Bright Finish

List No. 1355G — TiN Coated

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.

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

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1355 BRIGHT EDP NO.	1355G 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
	48	.0760	1	2	13325	93325
5/64		.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
	44	.0860	1 1/8	2 1/8	13321	93321
	43	.0890	1 1/4	2 1/4	13320	93320
	42	.0935	1 1/4	2 1/4	13319	93319
3/32		.0938	1 1/4	2 1/4	13332	93332
	41	.0960	1 3/8	2 3/8	13318	93318
	40	.0980	1 3/8	2 3/8	13317	93317
	39	.0995	1 3/8	2 3/8	13316	93316
	38	.1015	1 7/16	2 1/2	13315	93315
	37	.1040	1 7/16	2 1/2	13314	93314
	36	.1065	1 7/16	2 1/2	13313	93313
7/64		.1094	1 1/2	2 5/8	13333	93333
	35	.1100	1 1/2	2 5/8	13312	93312
	34	.1110	1 1/2	2 5/8	13311	93311
	33	.1130	1 1/2	2 5/8	13310	93310
	32	.1160	1 5/8	2 3/4	13309	93309
	31	.1200	1 5/8	2 3/4	13308	93308
1/8		.1250	1 5/8	2 3/4	13334	93334
	30	.1285	1 5/8	2 3/4	13307	93307
	29	.1360	1 3/4	2 7/8	13306	93306
	28	.1405	1 3/4	2 7/8	13305	93305
9/64		.1406	1 3/4	2 7/8	13335	93335
	27	.1440	1 7/8	3	13304	93304
	26	.1470	1 7/8	3	13303	93303
	25	.1495	1 7/8	3	13302	93302
	24	.1520	2	3 1/8	13301	93301
	23	.1540	2	3 1/8	13300	93300
5/32		.1562	2	3 1/8	13336	93336
	22	.1570	2	3 1/8	13299	93299
	21	.1590	2 1/8	3 1/4	13298	93298
	20	.1610	2 1/8	3 1/4	13297	93297
	19	.1660	2 1/8	3 1/4	13296	93296
	18	.1695	2 1/8	3 1/4	13295	93295
11/64		.1719	2 1/8	3 1/4	13337	93337

(continued)

Parabolic Flute Jobber Length Drills (continued)

List Nos. 1355 and 1355G

Foret à goujure parabolique **Broca parabólica**

SIZE FRACTIONAL	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 — Diamond Like Carbon

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/-.0005
1/4" or larger +0/-.0007

Foret brut | Blancos de brocas

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 FRACTIONAL	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*
	73	.0240	1 1/8	15459*
	71	.0260	1 1/4	15461*
	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
9/64		.1406	2 7/8	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*
13/32		.4062	5 1/4	15581
	Z	.4130	5 1/4	15582*
27/64		.4219	5 3/8	15583
7/16		.4375	5 1/2	15584
29/64		.4531	5 5/8	15585
15/32		.4687	5 3/4	15586
31/64		.4844	5 7/8	15587
1/2		.5000	6	15588

*Available While Supplies Last

Metric – Cobalt – Aircraft Type J Jobber Length Drills

Foret au cobalt Broca de cobalto

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 MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.
.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
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

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

Foret au cobalt — Broca de cobalto

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 FRACTIONAL	LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED EDP NO.	ALTiN EDP NO.
		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
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
	A		.2340	2-5/8	3-7/8	17173	93821
15/64			.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)

Cobalt — Jobber Length Drills (continued)

SIZE FRACTIONAL	SIZE LETTER	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED EDP NO.	ALTiN 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
	R		.3390	3-7/16	4-3/4	17197	93844
11/32			.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
	U		.3680	3-5/8	5	17202	93849
3/8			.3750	3-5/8	5	17203	93850
	V		.3770	3-5/8	5	17204	93851

SIZE FRACTIONAL	SIZE LETTER	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED EDP NO.	ALTiN EDP NO.
	W		.3860	3-3/4	5-1/8	17205	93852
25/64			.3906	3-3/4	5-1/8	17206	93853
	X		.3970	3-3/4	5-1/8	17207	93854
	Y		.4040	3-7/8	5-1/4	17208	93855
13/32			.4062	3-7/8	5-1/4	17209	93856
	Z		.4130	3-7/8	5-1/4	17210	93857
27/64			.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

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.

Foret à pointe au carbure Broca con punta de carburo

List No. 5330

118˚ Point

STANDARD PACKAGE All sizes — 1 each

SIZE FRACTIONAL	SIZE LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/8			.1250	1 5/8	2 3/4	50358
		30	.1285	1 5/8	2 3/4	50359*
		29	.1360	1 3/4	2 7/8	50360*
		28	.1405	1 3/4	2 7/8	50361*
9/64			.1406	1 3/4	2 7/8	50362
		26	.1470	1 7/8	3	50364*
		25	.1495	1 7/8	3	50365*
		24	.1520	2	3 1/8	50366*
		23	.1540	2	3 1/8	50367*
5/32			.1562	2	3 1/8	50368
		22	.1570	2	3 1/8	50369*
		20	.1610	2 1/8	3 1/4	50371*
11/64			.1719	2 1/8	3 1/4	50374
		16	.1770	2 3/16	3 3/8	50376*
		15	.1800	2 3/16	3 3/8	50377*
		13	.1850	2 5/16	3 1/2	50379*
3/16			.1875	2 5/16	3 1/2	50380
		12	.1890	2 5/16	3 1/2	50381*
		10	.1935	2 7/16	3 5/8	50383*
13/64			.2031	2 7/16	3 5/8	50387
		6	.2040	2 1/2	3 3/4	50388*
		4	.2090	2 1/2	3 3/4	50390*
		3	.2130	2 1/2	3 3/4	50391*
7/32			.2187	2 1/2	3 3/4	50392
		2	.2210	2 5/8	3 7/8	50393*
	A		.2340	2 5/8	3 7/8	50395*
15/64			.2344	2 5/8	3 7/8	50396
	B		.2380	2 3/4	4	50397*
	C		.2420	2 3/4	4	50398*
	D		.2460	2 3/4	4	50399*
1/4	E		.2500	2 3/4	4	50401
17/64			.2656	2 7/8	4 1/8	50404

SIZE FRACTIONAL	SIZE LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	J	.2770	2 7/8	4 1/8	50407*
	K	.2810	2 15/16	4 1/4	50408*
9/32		.2812	2 15/16	4 1/4	50409
	L	.2900	2 15/16	4 1/4	50410*
	M	.2950	3 1/16	4 3/8	50411*
19/64		.2969	3 1/16	4 3/8	50412
	N	.3020	3 1/16	4 3/8	50413*
5/16		.3125	3 3/16	4 1/2	50414
21/64		.3281	3 5/16	4 5/8	50417
	Q	.3320	3 7/16	4 3/4	50418*
	R	.3390	3 7/16	4 3/4	50419*
11/32		.3437	3 7/16	4 3/4	50420
	S	.3480	3 1/2	4 7/8	50421*
	T	.3580	3 1/2	4 7/8	50422*
23/64		.3594	3 1/2	4 7/8	50423
3/8		.3750	3 5/8	5	50425
	V	.3770	3 5/8	5	50426*
	W	.3860	3 3/4	5 1/8	50427*
25/64		.3906	3 3/4	5 1/8	50428
	X	.3970	3 3/4	5 1/8	50429*
	Y	.4040	3 7/8	5 1/4	50430*
13/32		.4062	3 7/8	5 1/4	50431
	Z	.4130	3 7/8	5 1/4	50432*
27/64		.4219	3 15/16	5 3/8	50433
7/16		.4375	4 1/16	5 1/2	50434
29/64		.4531	4 3/16	5 5/8	50435
15/32		.4687	4 5/16	5 3/4	50436
31/64		.4844	4 3/8	5 7/8	50437
1/2		.5000	4 1/2	6	50438

* Available While Supplies Last

Solid Carbide Screw Machine Length Drills

For Tough Drilling Applications

Foret au carbure Broca de carburo

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.

Titanium Aluminum Nitride (TiALN) 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 - TiALN 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 83

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED EDP NO.	5375T TiALN 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
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

Tool Coatings Also Available

(continued)

Solid Carbide Screw Machine Length Drills

For Tough Drilling Applications

Foret au carbure

Broca de carburo

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.

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

List No. 5375 - Uncoated

List No. 5375T - TiALN 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

(continued)

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED EDP NO.	5375T TiALN EDP NO.
7	.2010	1-3/16	2-1/4	50920	92290
13/64	.2031	1-3/16	2-1/4	50921	92291
6	.2040	1-1/4	2-3/8	50922	92292
5	.2055	1-1/4	2-3/8	50923	92293
4	.2090	1-1/4	2-3/8	50924	92294
3	.2130	1-1/4	2-3/8	50925	92295
5.5 mm	.2165	32 mm	60 mm	54838	93018
7/32	.2188	1-1/4	2-3/8	50926	92296
2	.2210	1-5/16	2-7/16	50927	92297
1	.2280	1-5/16	2-7/16	50928	92298
A	.2340	1-5/16	2-7/16	50929	92299
15/64	.2344	1-5/16	2-7/16	50930	92300
6.0 mm	.2362	33 mm	62 mm	54839	93019
B	.2380	1-3/8	2-1/2	50931	92301
C	.2420	1-3/8	2-1/2	50932	92302
D	.2460	1-3/8	2-1/2	50933	92303
1/4 (E)	.2500	1-3/8	2-1/2	50934	92304
6.5 mm	.2559	35 mm	64 mm	54840	93020
F	.2570	1-7/16	2-5/8	50935	92305
G	.2610	1-7/16	2-5/8	50936	92306
17/64	.2656	1-7/16	2-5/8	50937	92307
H	.2660	1-1/2	2-11/16	50938	92308
I	.2720	1-1/2	2-11/16	50939	92309
7.0 mm	.2756	38 mm	68 mm	54841	93021
J	.2770	1-1/2	2-11/16	50940	92310
K	.2810	1-1/2	2-11/16	50941	92311
9/32	.2812	1-1/2	2-11/16	50942	92312
L	.2900	1-9/16	2-3/4	50943	92313
M	.2950	1-9/16	2-3/4	50944	92314
7.5 mm	.2953	40 mm	70 mm	54842	93022
19/64	.2969	1-9/16	2-3/4	50945	92315
N	.3020	1-5/8	2-13/16	50946	92316
5/16	.3125	1-5/8	2-13/16	50947	92317
8.0 mm	.3150	41 mm	72 mm	54843	93023
O	.3160	1-11/16	2-15/16	50948	92318
P	.3230	1-11/16	2-15/16	50949	92319
21/64	.3281	1-11/16	2-15/16	50950	92320

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED EDP NO.	5375T TiALN EDP NO.
Q	.3320	1-11/16	3	50951	92321
8.5 mm	.3346	43 mm	76 mm	54844	93024
R	.3390	1-11/16	3	50952	92322
11/32	.3438	1-11/16	3	50953	92323
S	.3480	1-3/4	3-1/16	50954	92324
9.0 mm	.3543	45 mm	78 mm	54845	93025
T	.3580	1-3/4	3-1/16	50955	92325
23/64	.3594	1-3/4	3-1/16	50956	92326
U	.3680	1-13/16	3-1/8	50957	92327
9.5 mm	.3740	46 mm	79 mm	54846	93026
3/8	.3750	1-13/16	3-1/8	50958	92328
V	.3770	1-7/8	3-1/4	50959	92329
W	.3860	1-7/8	3-1/4	50960	92330
25/64	.3906	1-7/8	3-1/4	50961	92331
10.0 mm	.3937	48 mm	83 mm	54847	93027
X	.3970	1-15/16	3-5/16	50962	92332
Y	.4040	1-15/16	3-5/16	50963	92333
13/32	.4062	1-15/16	3-5/16	50964	92334
Z	.4130	2	3-3/8	50965	92335
10.5 mm	.4134	51 mm	86 mm	54848	93028
27/64	.4219	2	3-3/8	50966	92336
11.0 mm	.4331	51 mm	86 mm	54849	93029
7/16	.4375	2-1/16	3-7/16	50967	92337
11.5 mm	.4528	52 mm	88 mm	54850	93030
29/64	.4531	2-1/8	3-9/16	50968	92338
15/32	.4688	2-1/8	3-5/8	50969	92339
12.0 mm	.4724	54 mm	92 mm	54851	93031
31/64	.4844	2-3/16	3-11/16	50970	92340
12.5 mm	.4921	56 mm	94 mm	54852	93032
1/2	.5000	2-1/4	3-3/4	50971	92341
33/64	.5156	2-3/8	3-7/8	54853	93033
17/32	.5312	2-3/8	3-7/8	54854	93034
35/64	.5469	2-3/8	3-7/8	54855	93035
9/16	.5625	2-1/2	4	54856	93036
5/8	.6250	2-3/4	4-1/4	54857	93037
11/16	.6875	3	4-5/8	54858	93038
3/4	.7500	3-1/8	5	54859	93039

Tool Coatings Also Available

Solid Carbide Standard Length Drills

Foret au carbure Broca de carburo

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.

Titanium Aluminum Nitride (TiALN) 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 - TiALN Coated

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

25° Helix Angle

Speeds & Feeds: Page 83

TOLERANCES
All sizes +.0000/-.0005

STANDARD PACKAGE
All sizes — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T TiALN EDP NO.
80	.0135	3/16	1-1/4	51000	—
79	.0145	3/16	1-1/4	51001	—
1/64	.0156	3/16	1-1/4	51002	—
78	.0160	3/16	1-1/4	51003	—
77	.0180	3/16	1-1/4	51004	—
76	.0200	1/4	1-1/4	51005	—
75	.0210	1/4	1-1/4	51006	—
74	.0225	1/4	1-1/4	51007	—
73	.0240	1/4	1-1/4	51008	—
72	.0250	5/16	1-1/4	51009	—
71	.0260	5/16	1-1/4	51010	—
70	.0280	5/16	1-1/4	51011	—
69	.0292	5/16	1-1/4	51012	—
68	.0310	5/16	1-1/4	51013	—
1/32	.0312	5/16	1-1/4	51014	92090
67	.0320	5/16	1-1/4	51015	—
66	.0330	5/16	1-1/4	51016	—
65	.0350	5/8	1-3/8	51017	—
64	.0360	5/8	1-3/8	51018	—
63	.0370	5/8	1-3/8	51019	—
62	.0380	5/8	1-3/8	51020	—
61	.0390	5/8	1-3/8	51021	—
1.00 mm	.0394	5/8	1-1/2	51022	92091
60	.0400	3/4	1-1/2	51023	—
59	.0410	3/4	1-1/2	51024	—
58	.0420	3/4	1-1/2	51025	—
57	.0430	3/4	1-1/2	51026	—
56	.0465	3/4	1-1/2	51027	92092
3/64	.0469	3/4	1-1/2	51028	92093
55	.0520	3/4	1-1/2	51029	92094
54	.0550	3/4	1-1/2	51030	92095
1.50 mm	.0591	3/4	1-1/2	50977	92096
53	.0595	3/4	1-1/2	51031	92097
1/16	.0625	3/4	1-1/2	51032	92098
52	.0635	3/4	1-1/2	51033	92099
51	.0670	3/4	1-1/2	51034	92100
50	.0700	7/8	1-3/4	51035	92101
49	.0730	7/8	1-3/4	51036	92102
48	.0760	7/8	1-3/4	51037	92103
5/64	.0781	7/8	1-3/4	51038	92104

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T TiALN EDP NO.
47	.0785	7/8	1-3/4	51039	92105
2.00 mm	.0787	7/8	1-3/4	50978	92106
46	.0810	7/8	1-3/4	51040	92107
45	.0820	7/8	1-3/4	51041	92108
44	.0860	1	2	51042	92109
43	.0890	1	2	51043	92110
42	.0935	1	2	51044	92111
3/32	.0938	1	2	51045	92112
41	.0960	1	2	51046	92113
40	.0980	1	2	51047	92114
2.50 mm	.0984	1	2	50979	92115
39	.0995	1-1/4	2-1/4	51048	92116
38	.1015	1-1/4	2-1/4	51049	92117
37	.1040	1-1/4	2-1/4	51050	92118
36	.1065	1-1/4	2-1/4	51051	92119
7/64	.1094	1-1/4	2-1/4	51052	92120
35	.1100	1-1/4	2-1/4	51053	92121
34	.1110	1-1/4	2-1/4	51054	92122
33	.1130	1-1/4	2-1/4	51055	92123
32	.1160	1-1/4	2-1/4	51056	92124
3.00 mm	.1181	1-1/4	2-1/4	50980	92125
31	.1200	1-1/4	2-1/4	51057	92126
1/8	.1250	1-1/4	2-1/4	51058	92127
30	.1285	1-1/4	2-1/4	51059	92128
29	.1360	1-3/8	2-1/2	51060	92129
3.50 mm	.1378	1-3/8	2-1/2	50981	92130
28	.1405	1-3/8	2-1/2	51061	92131
9/64	.1406	1-3/8	2-1/2	51062	92132
27	.1440	1-3/8	2-1/2	51063	92133
26	.1470	1-3/8	2-1/2	51064	92134
25	.1495	1-3/8	2-1/2	51065	92135
24	.1520	1-3/8	2-1/2	51066	92136
23	.1540	1-3/8	2-1/2	51067	92137
5/32	.1562	1-3/8	2-1/2	51068	92138
22	.1570	1-3/8	2-1/2	51069	92139
4.00 mm	.1575	1-3/8	2-1/2	50982	92140
21	.1590	1-3/8	2-1/2	51070	92141
20	.1610	1-3/8	2-1/2	51071	92142
19	.1660	1-5/8	2-3/4	51072	92143
18	.1695	1-5/8	2-3/4	51073	92144

Tool Coatings Also Available

(continued)

Solid Carbide Standard Length Drills

Foret au carbure | Broca de carburo

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.

Titanium Aluminum Nitride (TiALN) 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 - TiALN 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 TiALN EDP NO.
11/64	.1719	1-5/8	2-3/4	51074	92145
17	.1730	1-5/8	2-3/4	51075	92146
16	.1770	1-5/8	2-3/4	51076	92147
4.50 mm	.1772	1-5/8	2-3/4	50983	92148
15	.1800	1-5/8	2-3/4	51077	92149
14	.1820	1-5/8	2-3/4	51078	92150
13	.1850	1-5/8	2-3/4	51079	92151
3/16	.1875	1-5/8	2-3/4	51080	92152
12	.1890	1-5/8	2-3/4	51081	92153
11	.1910	1-5/8	2-3/4	51082	92154
10	.1935	1-5/8	2-3/4	51083	92155
9	.1960	1-3/4	3	51084	92156
5.00 mm	.1969	1-3/4	3	50984	92157
8	.1990	1-3/4	3	51085	92158
7	.2010	1-3/4	3	51086	92159
13/64	.2031	1-3/4	3	51087	92160
6	.2040	1-3/4	3	51088	92161
5	.2055	1-3/4	3	51089	92162
4	.2090	1-3/4	3	51090	92163
3	.2130	1-3/4	3	51091	92164
5.50 mm	.2165	1-3/4	3	50985	92165
7/32	.2188	1-3/4	3	51092	92166
2	.2210	1-3/4	3	51093	92167
1	.2280	1-3/4	3	51094	92168
A	.2340	2	3-1/4	51095	92169
15/64	.2344	2	3-1/4	51096	92170
6.00 mm	.2362	2	3-1/4	50986	92171
B	.2380	2	3-1/4	51097	92172
C	.2420	2	3-1/4	51098	92173
D	.2460	2	3-1/4	51099	92174
1/4 (E)	.2500	2	3-1/4	51100	92175
6.50 mm	.2559	2	3-1/4	50987	92176
F	.2570	2	3-1/4	51102	92177
G	.2610	2-1/8	3-1/2	51103	92178
17/64	.2656	2-1/8	3-1/2	51104	92179
H	.2660	2-1/8	3-1/2	51105	92180
I	.2720	2-1/8	3-1/2	51106	92181
7.00 mm	.2756	2-1/8	3-1/2	50988	92182
J	.2770	2-1/8	3-1/2	51107	92183
K	.2810	2-1/8	3-1/2	51108	92184
9/32	.2812	2-1/8	3-1/2	51109	92185
L	.2900	2-1/8	3-1/2	51110	92186
M	.2950	2-3/8	3-3/4	51111	92187
7.50 mm	.2953	2-3/8	3-3/4	50989	92188
19/64	.2969	2-3/8	3-3/4	51112	92189
N	.3020	2-3/8	3-3/4	51113	92190
5/16	.3125	2-3/8	3-3/4	51114	92191
8.00 mm	.3150	2-3/8	3-3/4	50990	92192
O	.3160	2-3/8	3-3/4	51115	92193
P	.3230	2-3/8	3-3/4	51116	92194
21/64	.3281	2-1/2	4	51117	92195
Q	.3320	2-1/2	4	51118	92196
8.50 mm	.3346	2-1/2	4	50991	92197
R	.3390	2-1/2	4	51119	92198
11/32	.3438	2-1/2	4	51120	92199
S	.3480	2-1/2	4	51121	92200
9.00 mm	.3543	2-1/2	4	50992	92201
T	.3580	2-3/4	4-1/4	51122	92202
23/64	.3594	2-3/4	4-1/4	51123	92203
U	.3680	2-3/4	4-1/4	51124	92204
9.50 mm	.3740	2-3/4	4-1/4	50993	92205
3/8	.3750	2-3/4	4-1/4	51125	92206
V	.3770	2-3/4	4-1/4	51126	92207
W	.3860	2-7/8	4-1/2	51127	92208
25/64	.3906	2-7/8	4-1/2	51128	92209
10.00 mm	.3937	2-7/8	4-1/2	50994	92210
X	.3970	2-7/8	4-1/2	51129	92211
Y	.4040	2-7/8	4-1/2	51130	92212
13/32	.4062	2-7/8	4-1/2	51131	92213
Z	.4130	2-7/8	4-1/2	51132	92214
10.50 mm	.4134	2-7/8	4-1/2	50995	92215
27/64	.4219	2-7/8	4-1/2	51133	92216
11.00 mm	.4331	2-7/8	4-1/2	50996	92217
7/16	.4375	2-7/8	4-1/2	51134	92218
11.50 mm	.4528	3	4-3/4	50997	92219
29/64	.4531	3	4-3/4	51135	92220
15/32	.4688	3	4-3/4	51136	92221
12.00 mm	.4724	3	4-3/4	50998	92222
31/64	.4844	3	4-3/4	51137	92223
12.50 mm	.4921	3	4-3/4	50999	92224
1/2	.5000	3	4-3/4	51138	92225

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.

Titanium Aluminum Nitride (TiALN) 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.

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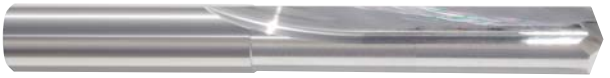


List No. 5376 - Uncoated

List No. 5376T - TiALN Coated

2-Flute – 140° Notch Point

TOLERANCES
All sizes +.0000/-.0005

STANDARD PACKAGE
All sizes — 1 each

Speeds & Feeds: Page 83

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED EDP NO.	5376T TiALN EDP NO.
1/32	.0312	1/2	1-1/2	50720	92660
#65	.0350	1/2	1-1/2	54860	93040
#64	.0360	1/2	1-1/2	54861	93041
#63	.0370	1/2	1-1/2	54862	93042
#62	.0380	1/2	1-1/2	54863	93043
#61	.0390	1/2	1-1/2	54864	93044
1.0 MM	.0394	1/2	1-1/2	50721	92661
#60	.0400	1/2	1-1/2	54865	93045
#59	.0410	1/2	1-1/2	54866	93046
#58	.0420	1/2	1-1/2	54867	93047
#57	.0430	1/2	1-1/2	54868	93048
56	.0465	1/2	1-1/2	50722	92662
3/64	.0469	1/2	1-1/2	50723	92663
55	.0520	1/2	1-1/2	50724	92664
54	.0550	1/2	1-1/2	50725	92665
1.5 MM	.0591	1/2	1-1/2	50726	92666
53	.0595	1/2	1-1/2	50727	92667
1/16	.0625	5/8	1-5/8	50728	92668
52	.0635	11/16	1-11/16	50729	92669
51	.0670	11/16	1-11/16	50730	92670
50	.0700	11/16	1-11/16	50731	92671
49	.0730	11/16	1-11/16	50732	92672
48	.0760	11/16	1-11/16	50733	92673
5/64	.0781	11/16	1-11/16	50734	92674
47	.0785	3/4	1-3/4	50735	92675
2.0 MM	.0787	3/4	1-3/4	50736	92676
46	.0810	3/4	1-3/4	50737	92677
45	.0820	3/4	1-3/4	50738	92678
44	.0860	3/4	1-3/4	50739	92679
43	.0890	3/4	1-3/4	50740	92680
42	.0935	3/4	1-3/4	50741	92681
3/32	.0938	3/4	1-3/4	50742	92682
41	.0960	13/16	1-13/16	50743	92683
40	.0980	13/16	1-13/16	50744	92684
2.5 MM	.0984	13/16	1-13/16	50745	92685
39	.0995	13/16	1-13/16	50746	92686
38	.1015	13/16	1-13/16	50747	92687
37	.1040	13/16	1-13/16	50748	92688
36	.1065	13/16	1-13/16	50749	92689
7/64	.1094	13/16	1-13/16	50750	92690

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED EDP NO.	5376T TiALN EDP NO.
35	.1100	7/8	1-7/8	50751	92691
34	.1110	7/8	1-7/8	50752	92692
33	.1130	7/8	1-7/8	50753	92693
32	.1160	7/8	1-7/8	50754	92694
3.0 MM	.1181	7/8	1-7/8	50755	92695
31	.1200	7/8	1-7/8	50756	92696
1/8	.1250	7/8	1-7/8	50757	92697
30	.1285	15/16	1-15/16	50758	92698
29	.1360	15/16	1-15/16	50759	92699
3.5 MM	.1378	15/16	1-15/16	50760	92700
28	.1405	15/16	1-15/16	50761	92701
9/64	.1406	15/16	1-15/16	50762	92702
27	.1440	1	2-1/16	50763	92703
26	.1470	1	2-1/16	50764	92704
25	.1495	1	2-1/16	50765	92705
24	.1520	1	2-1/16	50766	92706
23	.1540	1	2-1/16	50767	92707
5/32	.1562	1	2-1/16	50768	92708
22	.1570	1-1/16	2-1/8	50769	92709
4.0 MM	.1575	1-1/16	2-1/8	50770	92710
21	.1590	1-1/16	2-1/8	50771	92711
20	.1610	1-1/16	2-1/8	50772	92712
19	.1660	1-1/16	2-1/8	50773	92713
18	.1695	1-1/16	2-1/8	50774	92714
11/64	.1719	1-1/16	2-1/8	50775	92715
17	.1730	1-1/8	2-3/16	50776	92716
16	.1770	1-1/8	2-3/16	50777	92717
4.5 MM	.1772	1-1/8	2-3/16	50778	92718
15	.1800	1-1/8	2-3/16	50779	92719
14	.1820	1-1/8	2-3/16	50780	92720
13	.1850	1-1/8	2-3/16	50781	92721
3/16	.1875	1-1/8	2-3/16	50782	92722
12	.1890	1-3/16	2-1/4	50783	92723
11	.1910	1-3/16	2-1/4	50784	92724
10	.1935	1-3/16	2-1/4	50785	92725
9	.1960	1-3/16	2-1/4	50786	92726
5.0 MM	.1969	1-3/16	2-1/4	50787	92727
8	.1990	1-3/16	2-1/4	50788	92728
7	.2010	1-3/16	2-1/4	50789	92729

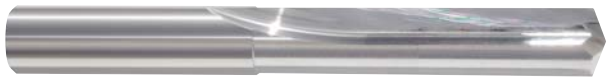
Tool Coatings Also Available

(continued)

Solid Carbide Straight Flute Drills

For Hardened & Abrasive Materials

Foret au carbure | Broca de carburo



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.

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

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

Tool Coatings Also Available

Solid Carbide Spade Drills

Foret à langue d'aspic au carbure Broca tipo espada de carburo

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

List No. 5377

118° Point – Heavy Duty Web

TOLERANCES
All sizes +.0000/-.0005

STANDARD PACKAGE
All sizes — 1 each

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

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.

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 constuction 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
13/64†	.2031	3	52013*
7/32	.2188	3½	52014
1/4	.2500	4	52016
19/64	.2969	4	52019*
5/16	.3125	4	52020
11/32	.3438	4	52022
3/8	.3750	4	52024
7/16	.4375	4½	52028
15/32	.4688	4½	52030*
1/2	.5000	5	52032

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

*** Available While Supplies Last**

Foret en acier dur **Broca de acero duro**

List No. 5423

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

STANDARD PACKAGE All sizes — 1 each

List No. 5423

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	SHANK DIA.	EDP NO.
3/16	.1875	1½	3½	11/64	52112
7/32	.2188	1¾	3¾	13/64	52114
1/4	.2500	2	4	7/32	52116
9/32	.2812	2¼	4¼	1/4	52118
5/16	.3125	2½	4½	17/64	52120
11/32	.3438	2¾	4¾	19/64	52122
3/8	.3750	3	5	21/64	52124
7/16	.4375	3	5½	25/64	52128
1/2	.5000	3½	6	29/64	52132
9/16	.5625	3½	6	17/32	52136
19/32	.5938	4	7	9/16	52138*
5/8	.6250	4	7	19/32	52140
3/4	.7500	4¾	8	23/32	52148

Carbide Tipped Glass and Tile Drills

Excellent wear resistance for drilling glass, tile, porcelain, ceramic and other hard fragile materials without chipping or cracking the material. Extra long carbide tip for many regrinds.

Foret pour le verre et la tuile **Broca para vidrio y azulejos**

List No. 5467 — Spear Point

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	OAL	SHANK DIA.	EDP NO.
1/8	.1250	2½	7/64	53551
3/16	.1875	2½	5/32	53552
1/4	.2500	2½	7/32	53553
5/16	.3125	3	1/4	53554
3/8	.3750	3½	5/16	53555
7/16	.4375	3½	3/8	53556
1/2	.5000	3½	7/16	53557
9/16	.5625	4	1/2	53558
5/8	.6250	4	9/16	53559

TOOL COATING SERVICE

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

TiN — Titanium Nitride	**TiCN —** Titanium Carbonite
TiALN — Titanium Aluminum Nitride	**ALTiN —** Aluminum Titanium Nitride
CrN — Chromium Nitride	**CrC —** Chromium Carbide

Screw Machine Length Drills

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

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.

SHANK DIAMETERS	Drill Size	Shank Diameter
	Up to 1″	Same as drill dia.
	Over 1″ to 1¼″	1″
	Over 1¼″ to 1½″	1¼″
	Over 1½″	1½″

Foret série extra-courte — Broca extra corta

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

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

STANDARD PACKAGE

Fractional Sizes
1/16″ thru 3/8″ — 12 each
25/64″ thru 1/2″ — 6 each
All other sizes — 1 each

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

Wire Gages
#1 thru #60 — 12 each

SIZE FRACTIONAL	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	1 11/16	15111	—
	51	.0670	11/16	1 11/16	15112	—
	50	.0700	11/16	1 11/16	15113	—
	49	.0730	11/16	1 11/16	15114	—
	48	.0760	11/16	1 11/16	15115	—
5/64		.0781	11/16	1 11/16	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	1 13/16	15124	—
	40	.0980	13/16	1 13/16	15125	95125
	39	.0995	13/16	1 13/16	15126	95126
	38	.1015	13/16	1 13/16	15127	95127
	37	.1040	13/16	1 13/16	15128	95128
	36	.1065	13/16	1 13/16	15129	95129
7/64		.1094	13/16	1 13/16	15130	95130
	35	.1100	⅞	1⅞	15131	95131
	34	.1110	⅞	1⅞	15132	95132
	33	.1130	⅞	1⅞	15133	95133
	32	.1160	⅞	1⅞	15134	95134
	31	.1200	⅞	1⅞	15135	95135
1/8		.1250	⅞	1⅞	15136	95136
	30	.1285	15/16	1 15/16	15137	95137
	29	.1360	15/16	1 15/16	15138	95138
	28	.1405	15/16	1 15/16	15139	95139
9/64		.1406	15/16	1 15/16	15140	95140
	27	.1440	1	2 1/16	15141	95141
	26	.1470	1	2 1/16	15142	95142
	25	.1495	1	2 1/16	15143	95143

(continued)

Screw Machine Length Drills (continued)

List Nos. 1435, 1436

Foret série extra-courte **Broca extra corta**

SIZE FRACTIONAL	LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	BRIGHT EDP NO.	TiN COAT EDP NO.
		24	.1520	1	2 1/16	15144	95144
		23	.1540	1	2 1/16	15145	95145
5/32			.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
		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
11/64			.1719	1 1/16	2 1/8	15152	95152
		17	.1730	1 1/8	2 3/16	15153	95153
		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
3/16			.1875	1 1/8	2 3/16	15158	95158
		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
13/64			.2031	1 3/16	2 1/4	15165	95165
		6	.2040	1 1/4	2 3/8	15166	95166
		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
7/32			.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	—
15/64			.2344	1 5/16	2 7/16	15174	95174
	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	—
1/4	E		.2500	1 3/8	2 1/2	15178	95178
	F		.2570	1 7/16	2 5/8	15180	—
	G		.2610	1 7/16	2 5/8	15181	—
17/64			.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	—
	J		.2770	1 1/2	2 11/16	15185	—
	K		.2810	1 1/2	2 11/16	15186	—
9/32			.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
	N		.3020	1 5/8	2 13/16	15191	—
5/16			.3125	1 5/8	2 13/16	15192	95192
	O		.3160	1 11/16	2 15/16	15193	—
	P		.3230	1 11/16	2 15/16	15194	—
21/64			.3281	1 11/16	2 15/16	15195	95195
	Q		.3320	1 11/16	3	15196	—
	R		.3390	1 11/16	3	15197	—
11/32			.3437	1 11/16	3	15198	95198
	S		.3480	1 3/4	3 1/16	15199	—
	T		.3580	1 3/4	3 1/16	15200	—
23/64			.3594	1 3/4	3 1/16	15201	95201
	U		.3680	1 13/16	3 1/8	15202	—
3/8			.3750	1 13/16	3 1/8	15203	95203
	V		.3770	1 7/8	3 1/4	15204	—
	W		.3860	1 7/8	3 1/4	15205	—
25/64			.3906	1 7/8	3 1/4	15206	95206

(continued)

Screw Machine Length Drills (continued)

List Nos. 1435, 1436

Foret série extra-courte **Broca extra corta**

SIZE FRACTIONAL	SIZE LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	BRIGHT EDP NO.	TiN COAT EDP NO.
	X	.3970	1 15/16	3 5/16	15207	—
	Y	.4040	1 15/16	3 5/16	15208	—
13/32		.4062	1 15/16	3 5/16	15209	95209
	Z	.4130	2	3 3/8	15210	—
27/64		.4219	2	3 3/8	15211	95211
7/16		.4375	2 1/16	3 7/16	15212	95212
29/64		.4531	2 1/8	3 9/16	15213	95213
15/32		.4687	2 1/8	3 5/8	15214	95214
31/64		.4844	2 3/16	3 11/16	15215	95215
1/2		.5000	2 1/4	3 3/4	15216	95216
33/64		.5156	2 3/8	3 7/8	15217	—
17/32		.5313	2 3/8	3 7/8	15218	—
35/64		.5469	2 1/2	4	15219	—
9/16		.5625	2 1/2	4	15220	—
37/64		.5781	2 5/8	4 1/8	15221	—
19/32		.5938	2 5/8	4 1/8	15222	—
39/64		.6094	2 3/4	4 1/4	15223	—
5/8		.6250	2 3/4	4 1/4	15224	—
41/64		.6406	2 7/8	4 1/2	15225	—
21/32		.6562	2 7/8	4 1/2	15226	—
43/64		.6719	2 7/8	4 5/8	15227	—
11/16		.6875	2 7/8	4 5/8	15228	—
45/64		.7031	3	4 3/4	15229	—
23/32		.7188	3	4 3/4	15230	—
47/64		.7344	3 1/8	5	15231	—
3/4		.7500	3 1/8	5	15232	—
49/64		.7657	3 1/4	5 1/8	15233	—
25/32		.7812	3 1/4	5 1/8	15234	—
51/64		.7969	3 3/8	5 1/4	15235	—
13/16		.8125	3 3/8	5 1/4	15236	—
53/64		.8281	3 1/2	5 3/8	15237	—
27/32		.8438	3 1/2	5 3/8	15238	—
55/64		.8594	3 1/2	5 1/2	15239	—
7/8		.8750	3 1/2	5 1/2	15240	—
57/64		.8906	3 5/8	5 5/8	15241	—
29/32		.9062	3 5/8	5 5/8	15242	—
59/64		.9219	3 3/4	5 3/4	15243	—
15/16		.9375	3 3/4	5 3/4	15244	—
61/64		.9531	3 7/8	5 7/8	15245	—
31/32		.9688	3 7/8	5 7/8	15246	—
63/64		.9844	4	6	15247	—
1		1.0000	4	6	15248	—
1 1/16		1.0625	4	6 1/4	15249	—
1 1/8		1.1250	4	6 3/8	15250	—
1 3/16		1.1875	4 1/4	6 5/8	15251	—
1 1/4		1.2500	4 3/8	6 3/4	15252	—
1 5/16		1.3125	4 3/8	7	15253	—
1 3/8		1.3750	4 1/2	7 1/8	15254	—
1 7/16		1.4375	4 3/4	7 3/8	15255	—
1 1/2		1.5000	4 7/8	7 1/2	15256	—
1 9/16		1.5625	4 7/8	7 3/4	15257	—
1 5/8		1.6250	4 7/8	7 3/4	15258	—
1 11/16		1.6875	5 1/8	8	15259	—
1 3/4		1.7500	5 1/8	8	15260	—
1 13/16		1.8125	5 3/8	8 1/4	15261	—
1 7/8		1.8750	5 3/8	8 1/4	15262	—
1 15/16		1.9375	5 5/8	8 1/2	15263	—
2		2.0000	5 5/8	8 1/2	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.

Foret série extra-courte Broca extra corta

List No. 1398
NAS-907, Type C

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 FRACTIONAL	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
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
	A	.2340	1 5/16	2 7/16	14953
15/64		.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 FRACTIONAL	LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	N	.3020	1 5/8	2 13/16	14972
5/16		.3125	1 5/8	2 13/16	14973
	O	.3160	1 11/16	2 15/16	14974
	P	.3230	1 11/16	2 15/16	14975
21/64		.3281	1 11/16	2 15/16	14976
	Q	.3320	1 11/16	3	14977
	R	.3390	1 11/16	3	14978
11/32		.3437	1 11/16	3	14979
	S	.3480	1 3/4	3 1/16	14980
	T	.3580	1 3/4	3 1/16	14981
23/64		.3594	1 3/4	3 1/16	14982
	U	.3680	1 13/16	3 1/8	14983
3/8		.3750	1 13/16	3 1/8	14984

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

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.

Foret au cobalt Broca de cobalto

Uncoated
List No. 2435

ALTiN Coated
List No. 2435T

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

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

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

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

(continued)

Cobalt Screw Machine Length Drills (continued)

FRACTIONAL	SIZE LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	UNCOATED EDP NO.	ALTiN EDP NO.
		34	.1110	7/8	1-7/8	13179	93666
		33	.1130	7/8	1-7/8	13180	93667
		32	.1160	7/8	1-7/8	13181	93668
		31	.1200	7/8	1-7/8	13182	93669
1/8			.1250	7/8	1-7/8	13183	93670
		30	.1285	15/16	1-15/16	13184	93671
		29	.1360	15/16	1-15/16	13185	93672
		28	.1405	15/16	1-15/16	13186	93673
9/64			.1406	15/16	1-15/16	13187	93674
		27	.1440	1	2-1/16	13188	93675
		26	.1470	1	2-1/16	13189	93676
		25	.1495	1	2-1/16	13190	93677
		24	.1520	1	2-1/16	13191	93678
		23	.1540	1	2-1/16	13192	93679
5/32			.1562	1	2-1/16	13193	93680
		22	.1570	1-1/16	2-1/8	13194	93681
		21	.1590	1-1/16	2-1/8	13195	93682
		20	.1610	1-1/16	2-1/8	13196	93683
		19	.1660	1-1/16	2-1/8	13197	93684
		18	.1695	1-1/16	2-1/8	13198	93685
11/64			.1719	1-1/16	2-1/8	13199	93686
		17	.1730	1-1/8	2-3/16	13200	93687
		16	.1770	1-1/8	2-3/16	13201	93688
		15	.1800	1-1/8	2-3/16	13202	93689
		14	.1820	1-1/8	2-3/16	13203	93690
		13	.1850	1-1/8	2-3/16	13204	93691
3/16			.1875	1-1/8	2-3/16	13205	93692
		12	.1890	1-3/16	2-1/4	13206	93693
		11	.1910	1-3/16	2-1/4	13207	93694
		10	.1935	1-3/16	2-1/4	13208	93695
		9	.1960	1-3/16	2-1/4	13209	93696
		8	.1990	1-3/16	2-1/4	13210	93697
		7	.2010	1-3/16	2-1/4	13211	93698
13/64			.2031	1-3/16	2-1/4	13212	93699
		6	.2040	1-1/4	2-3/8	13213	93700
		5	.2055	1-1/4	2-3/8	13214	93701
		4	.2090	1-1/4	2-3/8	13215	93702
		3	.2130	1-1/4	2-3/8	13216	93703
7/32			.2188	1-1/4	2-3/8	13217	93704
		2	.2210	1-5/16	2-7/16	13218	93705
		1	.2280	1-5/16	2-7/16	13219	93706
	A		.2340	1-5/16	2-7/16	13220	93707
15/64			.2344	1-5/16	2-7/16	13221	93708
	B		.2380	1-3/8	2-1/2	13222	93709
	C		.2420	1-3/8	2-1/2	13223	93710
	D		.2460	1-3/8	2-1/2	13224	93711
1/4	E		.2500	1-3/8	2-1/2	13225	93712
	F		.2570	1-7/16	2-5/8	13226	93713
	G		.2610	1-7/16	2-5/8	13227	93714
17/64			.2656	1-7/16	2-5/8	13228	93715
	H		.2660	1-1/2	2-11/16	13229	93716
	I		.2720	1-1/2	2-11/16	13230	93717
	J		.2770	1-1/2	2-11/16	13231	93718
	K		.2810	1-1/2	2-11/16	13232	93719
9/32			.2812	1-1/2	2-11/16	13233	93720
	L		.2900	1-9/16	2-3/4	13234	93721
	M		.2950	1-9/16	2-3/4	13235	93722
19/64			.2969	1-9/16	2-3/4	13236	93723
	N		.3020	1-5/8	2-13/16	13237	93724
5/16			.3125	1-5/8	2-13/16	13238	93725
	O		.3160	1-11/16	2-15/16	13239	93726
	P		.3230	1-11/16	2-15/16	13240	93727
21/64			.3281	1-11/16	2-15/16	13241	93728
	Q		.3320	1-11/16	3	13242	93729
	R		.3390	1-11/16	3	13243	93730
11/32			.3437	1-11/16	3	13244	93731
	S		.3480	1-3/4	3-1/16	13245	93732
	T		.3580	1-3/4	3-1/16	13246	93733
23/64			.3594	1-3/4	3-1/16	13247	93734
	U		.3680	1-13/16	3-1/8	13248	93735
3/8			.3750	1-13/16	3-1/8	13249	93736
	V		.3770	1-7/8	3-1/4	13250	93737
	W		.3860	1-7/8	3-1/4	13251	93738
25/64			.3906	1-7/8	3-1/4	13252	93739
	X		.3970	1-15/16	3-5/16	13253	93740
	Y		.4040	1-15/16	3-5/16	13254	93741
13/32			.4062	1-15/16	3-5/16	13255	93742
	Z		.4130	2	3-3/8	13256	93743
27/64			.4219	2	3-3/8	13257	93744
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

List No. 1424*
3-Flat Shank for positive hold

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 1424* EDP NO.	LIST 1424S EDP NO.
33/64	.5156	3⅛	6	17031	—	19031
17/32	.5312	3⅛	6	17032	—	19032
35/64	.5469	3⅛	6	17033	—	19033
9/16	.5625	3⅛	6	17034	—	19034
37/64	.5781	3⅛	6	17035	—	19035
19/32	.5938	3⅛	6	17036	—	19036
39/64	.6094	3⅛	6	17037	15077*	19037
5/8	.6250	3⅛	6	17038	—	19038
41/64	.6406	3⅛	6	17039	—	19039
21/32	.6562	3⅛	6	17040	—	19040
43/64	.6719	3⅛	6	17041	15079*	19041
11/16	.6875	3⅛	6	17042	—	19042
45/64	.7031	3⅛	6	17043	—	19043
23/32	.7188	3⅛	6	17044	—	19044
47/64	.7344	3⅛	6	17045	—	19045
3/4	.7500	3⅛	6	17046	—	19046
49/64	.7656	3⅛	6	17047	—	19047
25/32	.7812	3⅛	6	17048	—	19048
51/64	.7969	3⅛	6	17049	—	19049
13/16	.8125	3⅛	6	17050	—	19050
53/64	.8281	3⅛	6	17051	15084*	19051
27/32	.8438	3⅛	6	17052	—	19052
55/64	.8594	3⅛	6	17053	—	19053
7/8	.8750	3⅛	6	17054	—	19054
57/64	.8902	3⅛	6	17055	—	19055
29/32	.9062	3⅛	6	17056	15066*	19056
59/64	.9219	3⅛	6	17057	—	19057
15/16	.9375	3⅛	6	17058	15067*	19058
61/64	.9531	3⅛	6	17059	15088*	19059
31/32	.9688	3⅛	6	17060	—	19060
63/64	.9844	3⅛	6	17061	—	19061
1	1.0000	3⅛	6	17062	—	19062
1 1/64	1.0156	3⅛	6	17063	—	19063
1 1/32	1.0312	3⅛	6	17064	15095*	19064
1 3/64	1.0469	3⅛	6	17065	—	—
1 1/16	1.0625	3⅛	6	17066	15070*	19065
1 5/64	1.0781	3⅛	6	17067	—	—
1 3/32	1.0937	3⅛	6	17068	—	19066
1 7/64	1.1094	3⅛	6	17069	—	—
1 1/8	1.1250	3⅛	6	17070	—	19067
1 9/64	1.1406	3⅛	6	17071	—	—
1 5/32	1.1562	3⅛	6	17072	—	19068
1 11/64	1.1719	3⅛	6	17073	—	—
1 3/16	1.1875	3⅛	6	17074	15072*	19069
1 13/64	1.2031	3⅛	6	17075	—	—
1 7/32	1.2188	3⅛	6	17076	—	19070
1 15/64	1.2344	3⅛	6	17077	—	—
1 1/4	1.2500	3⅛	6	17078	—	19071
1 17/64	1.2656	3⅛	6	17079	—	—
1 9/32	1.2812	3⅛	6	17080	—	—
1 19/64	1.2969	3⅛	6	17081	—	—
1 5/16	1.3125	3⅛	6	17082	—	19072

*Available While Supplies Last

(continued)

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

List No. 1424, 1424R, 1424S

Foret à tige réduite — Broca de zanco reducido

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	LIST 1424R EDP NO.	LIST 1424* 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	15092*	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

*Available While Supplies Last

Cobalt 1/2" Reduced Shank Silver & Deming Drills

130° Helical Point

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.

STANDARD PACKAGE All sizes — 1 each

Foret au cobalt — Broca de cobalto

List No. 2424

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
25/32	.7812	3 1/8	6	15273*
27/32	.8437	3 1/8	6	15275*
7/8	.8750	3 1/8	6	15276*
15/16	.9375	3 1/8	6	15278*

*Available While Supplies Last

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.

Foret aléseur — Broca sacanúcleos

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

1/4″ Reduced Shank Metalworking Drills

118° Notched Point — High Speed Steel
Bright Finish

Regularly furnished with 118° notched points for use in sheet metal, metal or wood, with portable drills having 1/4″ chucks.

Screw machine length for enhanced rigidity, self-centering.

STANDARD PACKAGE 1/4″ thru 3/8″ — 12 each
13/32″ thru 1/2″ — 6 each

Foret à tige réduite Broca de zanco reducido

List No. 1414

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/4	.2500	1 3/8	2 1/2	15021*
9/32	.2812	1 1/4	2 11/16	15022*
11/32	.3438	1 9/16	3	15024*
13/32	.4062	1 7/8	3 5/16	15026*
15/32	.4688	2 1/8	3 5/8	15028*

*** Available While Supplies Last**

3/8″ Reduced Shank Jobber Length Drills

118° Point – High Speed Steel
Black Oxide Treated

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

Foret à tige réduite Broca de zanco reducido

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

Morse® Plastic Wall Chart

Tableau mural Tabla mural

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 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

Taper Length Drills

Foret long Broca cónica larga

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

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1314, 1322 EDP NO.
	60	.0400	1⅛	2¼	11051
	59	.0410	1⅛	2¼	11052
	58	.0420	1⅛	2¼	11053
	57	.0430	1⅛	2¼	11054
	56	.0465	1⅛	2¼	11055
3/64		.0469	1⅛	2¼	10553
	55	.0520	1¾	3	11056
	54	.0550	1¾	3	11057
	53	.0595	1¾	3	11058
1/16		.0625	1¾	3	10554
	52	.0635	2	3¾	11059
	51	.0670	2	3¾	11060
	50	.0700	2	3¾	11061
	49	.0730	2	3¾	11062
	48	.0760	2	3¾	11063
5/64		.0781	2	3¾	10555
	47	.0785	2¼	4¼	11064
	46	.0810	2¼	4¼	11065
	45	.0820	2¼	4¼	11066
	44	.0860	2¼	4¼	11067
	43	.0890	2¼	4¼	11068
	42	.0935	2¼	4¼	11069
3/32		.0938	2¼	4¼	10556
	41	.0960	2½	4⅝	11070
	40	.0980	2½	4⅝	11071
	39	.0995	2½	4⅝	11072
	38	.1015	2½	4⅝	11073
	37	.1040	2½	4⅝	11074
	36	.1065	2½	4⅝	11075
7/64		.1094	2½	4⅝	10557
	35	.1100	2¾	5⅛	11076
	34	.1110	2¾	5⅛	11077
	33	.1130	2¾	5⅛	11078
	32	.1160	2¾	5⅛	11079
	31	.1200	2¾	5⅛	11080
1/8		.1250	2¾	5⅛	10558
	30	.1285	3	5⅜	11081
	29	.1360	3	5⅜	11082
	28	.1405	3	5⅜	11083
9/64		.1406	3	5⅜	10559
	27	.1440	3	5⅜	11084
	26	.1470	3	5⅜	11085
	25	.1495	3	5⅜	11086

(continued)

Taper Length Drills (continued)

Foret long — Broca cónica larga

List No. 1314, 1322

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1314, 1322 EDP NO.
	24	.1520	3	5⅜	11087
	23	.1540	3	5⅜	11088
5/32		.1562	3	5⅜	10560
	22	.1570	3⅜	5¾	11089
	21	.1590	3⅜	5¾	11090
	20	.1610	3⅜	5¾	11091
	19	.1660	3⅜	5¾	11092
	18	.1695	3⅜	5¾	11093
11/64		.1719	3⅜	5¾	10561
	17	.1730	3⅜	5¾	11094
	16	.1770	3⅜	5¾	11095
	15	.1800	3⅜	5¾	11096
	14	.1820	3⅜	5¾	11097
	13	.1850	3⅜	5¾	11098
3/16		.1875	3⅜	5¾	10562
	12	.1890	3⅝	6	11099
	11	.1910	3⅝	6	11100
	10	.1935	3⅝	6	11101
	9	.1960	3⅝	6	11102
	8	.1990	3⅝	6	11103
	7	.2010	3⅝	6	11104
13/64		.2031	3⅝	6	10563
	6	.2040	3⅝	6	11105
	5	.2055	3⅝	6	11106
	4	.2090	3⅝	6	11107
	3	.2130	3⅝	6	11108
7/32		.2188	3⅝	6	10564
	2	.2210	3¾	6⅛	11109
	1	.2280	3¾	6⅛	11110
15/64		.2344	3¾	6⅛	10565
1/4		.2500	3¾	6⅛	10566
17/64		.2656	3⅞	6¼	10567
9/32		.2812	3⅞	6¼	10568
19/64		.2969	4	6⅜	10569
5/16		.3125	4	6⅜	10570
21/64		.3281	4⅛	6½	10571
11/32		.3438	4⅛	6½	10572
23/64		.3594	4¼	6¾	10573
3/8		.3750	4¼	6¾	10574
25/64		.3906	4⅜	7	10575
13/32		.4062	4⅜	7	10576
27/64		.4219	4⅝	7¼	10577
7/16		.4375	4⅝	7¼	10578
29/64		.4531	4¾	7½	10579
15/32		.4688	4¾	7½	10580
31/64		.4844	4¾	7¾	10581
1/2		.5000	4¾	7¾	10582
33/64		.5156	4¾	8	10583
17/32		.5312	4¾	8	10584
35/64		.5469	4⅞	8¼	10585
9/16		.5625	4⅞	8¼	10586
37/64		.5781	4⅞	8¾	10587
19/32		.5938	4⅞	8¾	10588
39/64		.6094	4⅞	8¾	10589
5/8		.6250	4⅞	8¾	10590
41/64		.6406	5⅛	9	10591

(continued)

Taper Length Drills (continued)

Foret long — Broca cónica larga

List No. 1314

SIZE FRACTIONAL	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 FRACTIONAL	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
1 5/8	1.6250	9 7/8	15 5/8	10640*

*Available While Supplies Last

Coolant Hole Drills

Foret à trou de refroidissement

Broca con orificios de refrigeración

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 PACKAGE All Sizes — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
9/16	.5625	5 3/8	8 1/4	16313*
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	1.0000	7 3/16	11	16341*
1 1/32	1.0312	7 5/16	11 1/8	16342*
1 1/16	1.0625	7 3/8	11 1/4	16343*

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1 3/32	1.0938	7 5/8	11 1/2	16344*
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.

Foret long — Broca cónica larga

List No. 1314A – Tanged Shank

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

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/8	.1250	2 3/4	5 1/8	10808
9/64	.1406	3	5 3/8	10809
5/32	.1562	3	5 3/8	10810
11/64	.1719	3 3/8	5 3/4	10811
3/16	.1875	3 3/8	5 3/4	10812
13/64	.2031	3 5/8	6	10813
7/32	.2187	3 5/8	6	10814
15/64	.2344	3 3/4	6 1/8	10815
1/4	.2500	3 3/4	6 1/8	10816
17/64	.2656	3 7/8	6 1/4	10817
9/32	.2812	3 7/8	6 1/4	10818
19/64	.2969	4	6 3/8	10819
5/16	.3125	4	6 3/8	10820
21/64	.3281	4 1/8	6 1/2	10821
11/32	.3437	4 1/8	6 1/2	10822
23/64	.3594	4 1/4	6 3/4	10823
3/8	.3750	4 1/4	6 3/4	10824
25/64	.3906	4 3/8	7	10825
13/32	.4062	4 3/8	7	10826
27/64	.4219	4 5/8	7 1/4	10827
7/16	.4375	4 5/8	7 1/4	10828
29/64	.4531	4 3/4	7 1/2	10829
15/32	.4687	4 3/4	7 1/2	10830
31/64	.4844	4 3/4	7 3/4	10831
1/2	.5000	4 3/4	7 3/4	10832
33/64	.5156	4 3/4	8	10833*
17/32	.5312	4 3/4	8	10834
19/32	.5937	4 7/8	8 3/4	10838
39/64	.6094	4 7/8	8 3/4	10839
5/8	.6250	4 7/8	8 3/4	10840
43/64	.6719	5 3/8	9 1/4	10843*
11/16	.6875	5 3/8	9 1/4	10844*

* Available While Supplies Last

Heavy Duty Taper Length Drills

Straight Shank — High Speed Steel
118° 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.

Foret long — Broca cónica larga

List No. 1320 – Tanged Shank

STANDARD PACKAGE 1/8″ thru 15/64″ — 12 each
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.
1/8	1/8	1	.1250	3 3/8	5 1/8	11008
9/64	9/64	1	.1406	3 5/8	5 3/8	11009*
5/32	5/32	1	.1562	3 3/4	5 3/8	11010
3/16	3/16	1	.1875	4 1/8	5 3/4	11012
13/64	13/64	1	.2031	4 3/8	6	11013
7/32	7/32	1	.2188	4 3/8	6	11014
15/64	15/64	1	.2344	4 13/16	6 1/8	11015
1/4	1/4	1	.2500	4 13/16	6 1/8	11016
9/32	9/32	1	.2812	5	6 1/4	11018*
19/64	19/64	1	.2969	5 1/8	6 3/8	11019*
5/16	5/16	1	.3125	5 1/8	6 3/8	11020
11/32	11/32	2	.3438	5 1/4	6 1/2	11022*
3/8	3/8	2	.3750	5 3/8	6 3/4	11024
25/64	25/64	2	.3906	5 5/8	7	11025
13/32	13/32	2	.4062	5 5/8	7	11026
7/16	7/16	2	.4375	5 11/16	7 1/4	11028
29/64	29/64	2	.4531	5 3/4	7 1/2	11029*
15/32	15/32	2	.4688	5 3/4	7 1/2	11030*
31/64	31/64	2	.4844	5 3/4	7 3/4	11031
1/2	1/2	2	.5000	5 3/4	7 3/4	11032
33/64	1/2	2	.5156	6	8	11033
17/32	1/2	2	.5312	6	8	11034
37/64	1/2	2	.5781	6 1/2	8 3/4	11037
19/32	1/2	2	.5938	6 1/2	8 3/4	11038*
5/8	1/2	2	.6250	6 1/2	8 3/4	11040*
11/16	5/8	3	.6875	6 7/8	9 1/4	11042*
3/4	3/4	3	.7500	7 3/8	9 3/4	11044*

* Available While Supplies Last

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. Shanks are the same diameter as the drill body. Recommended for drilling a wide range of materials.

Foret long Broca cónica larga

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 MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.
1.70	.0669	–	2	–	3-3/4	17403*
1.85	.0728	–	2	–	3-3/4	17406*
1.90	.0748	–	2	–	3-3/4	17407*
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
3.20	.1260	–	3	–	5-3/8	17426*
3.60	.1417	–	3	–	5-3/8	17430*
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*
4.80	.1890	–	3-5/8	–	6	17442*
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†
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*
13.50	.5315	–	4-3/4	–	8	17488*
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†

*Available While Supplies Last
†Replenishment to DIN 338 Lengths

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.**

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.

Foret long Broca cónica larga

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

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	60	.0400	1⅛	2¼	11201
	59	.0410	1⅛	2¼	11202
	58	.0420	1⅛	2¼	11203
	57	.0430	1⅛	2¼	11204
	56	.0465	1⅛	2¼	11205
	55	.0520	1¾	3	11206
	54	.0550	1¾	3	11207
	53	.0595	1¾	3	11208
1/16		.0625	1¾	3	11209
	52	.0635	2	3¾	11210
	51	.0670	2	3¾	11211
	50	.0700	2	3¾	11212
	49	.0730	2	3¾	11213
	48	.0760	2	3¾	11214
5/64		.0781	2	3¾	11215
	47	.0785	2¼	4¼	11216
	46	.0810	2¼	4¼	11217
	45	.0820	2¼	4¼	11218
	44	.0860	2¼	4¼	11219
	43	.0890	2¼	4¼	11220
	42	.0935	2¼	4¼	11221
3/32		.0937	2¼	4¼	11222
	41	.0960	2½	4⅝	11223
	40	.0980	2½	4⅝	11224
	39	.0995	2½	4⅝	11225
	38	.1015	2½	4⅝	11226
	37	.1040	2½	4⅝	11227
	36	.1065	2½	4⅝	11228
7/64		.1094	2½	4⅝	11229
	35	.1100	2¾	5⅛	11230
	34	.1110	2¾	5⅛	11231
	33	.1130	2¾	5⅛	11232
	32	.1160	2¾	5⅛	11233
	31	.1200	2¾	5⅛	11234
1/8		.1250	2¾	5⅛	11235
	30	.1285	3	5⅜	11236
	29	.1360	3	5⅜	11237
	28	.1405	3	5⅜	11238
9/64		.1406	3	5⅜	11239
	27	.1440	3	5⅜	11240
	26	.1470	3	5⅜	11241
	25	.1495	3	5⅜	11242
	24	.1520	3	5⅜	11243
	23	.1540	3	5⅜	11244
5/32		.1562	3	5⅜	11245

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
	22	.1570	3⅜	5¾	11246
	21	.1590	3⅜	5¾	11247
	20	.1610	3⅜	5¾	11248
	19	.1660	3⅜	5¾	11249
	18	.1695	3⅜	5¾	11250
11/64		.1719	3⅜	5¾	11251
	17	.1730	3⅜	5¾	11252
	16	.1770	3⅜	5¾	11253
	15	.1800	3⅜	5¾	11254
	14	.1820	3⅜	5¾	11255
	13	.1850	3⅜	5¾	11256
3/16		.1875	3⅜	5¾	11257
	12	.1890	3⅝	6	11258
	11	.1910	3⅝	6	11259
	10	.1935	3⅝	6	11260
	9	.1960	3⅝	6	11261
	8	.1990	3⅝	6	11262
	7	.2010	3⅝	6	11263
13/64		.2031	3⅝	6	11264
	6	.2040	3⅝	6	11265
	5	.2055	3⅝	6	11266
	4	.2090	3⅝	6	11267
	3	.2130	3⅝	6	11268
7/32		.2187	3⅝	6	11269
	2	.2210	3¾	6⅛	11270
	1	.2280	3¾	6⅛	11271
15/64		.2344	3¾	6⅛	11272
1/4		.2500	3¾	6⅛	11273
17/64		.2656	3⅞	6¼	11274
9/32		.2812	3⅞	6¼	11275
19/64		.2969	4	6⅜	11276
5/16		.3125	4	6⅜	11277
21/64		.3281	4⅛	6½	11278
11/32		.3437	4⅛	6½	11279
23/64		.3594	4¼	6¾	11280
3/8		.3750	4¼	6¾	11281
25/64		.3906	4⅜	7	11282
13/32		.4062	4⅜	7	11283
27/64		.4219	4⅝	7¼	11284
7/16		.4375	4⅝	7¼	11285
29/64		.4531	4¾	7½	11286
15/32		.4687	4¾	7½	11287
31/64		.4844	4¾	7¾	11288
1/2		.5000	4¾	7¾	11289

Cobalt Heavy Duty Taper Length Drills

Foret au cobalt Broca de cobalto

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
3/32″ thru 1/2″ — 135° Split Point
Over 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

SIZE FRACTIONAL	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
	20	.1610	3 3/8	5 3/4	10870*
11/64		.1719	3 3/8	5 3/4	10708
	15	.1800	3 3/8	5 3/4	10865*
	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
	6	.2040	3 5/8	6	10856*
	5	.2055	3 5/8	6	10855*
7/32		.2188	3 5/8	6	10711
	2	.2210	3 3/4	6 1/8	10852*
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

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.

Foret à goujure parabolique Broca parabólica

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

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1356 EDP NO.	1356G EDP NO.
1/16		.0625	1 3/4	3	13385	93385
5/64		.0781	2	3 3/4	13386	93386
3/32		.0938	2 1/4	4 1/4	13387	93387
	40	.0980	2 1/2	4 5/8	13461	93461
	39	.0995	2 1/2	4 5/8	13460	93460
	38	.1015	2 1/2	4 5/8	13459	93459
	37	.1040	2 1/2	4 5/8	13458	93458
	36	.1065	2 1/2	4 5/8	13457	93457
7/64		.1094	2 1/2	4 5/8	13388	93388
	35	.1100	2 3/4	5 1/8	13456	93456
	34	.1110	2 3/4	5 1/8	13455	93455
	33	.1130	2 3/4	5 1/8	13454	93454
	32	.1160	2 3/4	5 1/8	13453	93453
	31	.1200	2 3/4	5 1/8	13452	93452
1/8		.1250	3 3/8	5 1/8	13389	93389
	30	.1285	3	5 3/8	13451	93451
	29	.1360	3	5 3/8	13450	93450
	28	.1405	3	5 3/8	13449	93449
9/64		.1406	3 3/8	5 3/8	13390	93390
	27	.1440	3	5 3/8	13448	93448
	26	.1470	3	5 3/8	13447	93447
	25	.1495	3	5 3/8	13446	93446
	24	.1520	3	5 3/8	13445	93445
	23	.1540	3	5 3/8	13444	93444
5/32		.1562	3 3/4	5 3/8	13391	93391
	22	.1570	3 3/8	5 3/4	13443	93443
	21	.1590	3 3/8	5 3/4	13442	93442
	20	.1610	3 3/8	5 3/4	13441	93441
	19	.1660	3 3/8	5 3/4	13440	93440
	18	.1695	3 3/8	5 3/4	13439	93439
11/64		.1719	4 1/8	5 3/4	13392	93392
	17	.1730	3 3/8	5 3/4	13438	93438
	16	.1770	3 3/8	5 3/4	13437	93437
	15	.1800	3 3/8	5 3/4	13436	93436
	14	.1820	3 3/8	5 3/4	13435	93435
	13	.1850	3 3/8	5 3/4	13434	93434
3/16		.1875	4 1/8	5 3/4	13393	93393
	12	.1890	3 5/8	6	13433	93433
	11	.1910	3 5/8	6	13432	93432
	10	.1935	3 5/8	6	13431	93431
	9	.1960	3 5/8	6	13430	93430
	8	.1990	3 5/8	6	13429	93429
	7	.2010	3 5/8	6	13428	93428
13/64		.2031	4 3/8	6	13394	93394
	6	.2040	3 5/8	6	13427	93427

(continued)

Parabolic Flute Taper Length Drills (continued)

List No. 1356, 1356G **Foret à goujure parabolique** **Broca parabólica**

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1356 EDP NO.	1356G EDP NO.
	5	.2055	3 5/8	6	13426	93426
	4	.2090	3 5/8	6	13425	93425
	3	.2130	3 5/8	6	13424	93424
7/32		.2188	4 3/8	6	13395	93395
	2	.2210	3 3/4	6 1/8	13423	93423
	1	.2280	3 3/4	6 1/8	13422	93422
15/64		.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

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.

Aircraft Extension Drills

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

Foret pour la perforation de longs trous pour l'aviation

Broca extra larga para la industria aeronáutica

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

List No. 1390 — **6″ Overall Length**
List No. 1391 — **12″ Overall Length**

NAS 907, Type B

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

SIZE FRACTIONAL	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
	53*	.0595	7/8	16666	16782
1/16		.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
	42	.0935	1 1/4	16655	16771
3/32		.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
	36	.1065	1 7/16	16649	16765
7/64		.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
	28	.1405	1 3/4	16641	16757
9/64		.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

Foret pour la perforation de longs trous pour l'aviation

Broca extra larga para la industria aeronáutica

FRACTIONAL	SIZE LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	1390 EDP NO.	1391 EDP NO.
		19	.1660	2 1/8	16632	16748
		18	.1695	2 1/8	16631	16747
11/64			.1719	2 1/8	16608	16708
		17	.1730	2 3/16	16630	16746
		16	.1770	2 3/16	16629	16745
		15	.1800	2 3/16	16628	16744
		14	.1820	2 3/16	16627	16743
		13	.1850	2 5/16	16626	16742
3/16			.1875	2 5/16	16609	16709
		12	.1890	2 5/16	16625	16741
		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
13/64			.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
7/32			.2187	2 1/2	16611	16711
		2	.2210	2 5/8	16615	16731
		1	.2280	2 5/8	16614	16730
	A*		.2340	2 5/8	—	16790
15/64			.2344	2 5/8	16612	16712
	B*		.2380	2 3/4	—	16791
1/4	E		.2500	2 3/4	16613	16713
17/64			.2656	2 7/8	16584	16714
	H*		.2660	2 7/8	—	16796
	J*		.2770	2 7/8	—	16798
	K*		.2810	2 15/16	—	16799
9/32			.2812	2 15/16	16585	16715
	L*		.2900	2 15/16	16684	16800
	M*		.2950	3 1/16	—	16801
19/64			.2969	3 1/16	16586	16716
5/16			.3125	3 3/16	16587	16717
	P*		.3230	3 5/16	—	16804
21/64			.3281	3 5/16	16588	16718
11/32			.3437	3 7/16	16589	16719
	S*		.3480	3 1/2	—	16807
	T*		.3580	3 1/2	—	16808
23/64			.3594	3 1/2	16590	16720
3/8			.3750	3 5/8	16591	16721
	V*		.3770	3 5/8	16694	16810
25/64			.3906	3 3/4	16592	16722
	X*		.3970	3 3/4	16696	—
13/32			.4062	3 7/8	16593	16723
	Z*		.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

Foret extra-long Broca extra larga

Straight Shank — High Speed Steel
118° Notch Point

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

List No. 1315 - Bright Finish

STANDARD PACKAGE All sizes — 1 each

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
13/32	.4062	10660
7/16	.4375	10964
15/32	.4688	10663

SIZE	DEC. EQUIV.	EDP NO.
1/2	.5000	10972
39/64	.6094	10304*
1 3/16	1.1875	10998*

*Available While Supplies Last

Double End Body Drills

Foret double | Broca de doble extremo punta

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	15010
1/8	.1250	9/16	1 7/8	15011
9/64	.1406	9/16	1 15/16	15012
5/32	.1562	9/16	2 1/16	15013
3/16	.1897	9/16	2 1/16	15014

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

DRILL-MILL™

Fraise de forage | Broca de fresado

M42 8% Cobalt

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

M42 8% 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	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
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.**

Taper Shank Drills

Foret à queue conique Broca con zanco cónico

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 5/8	9 1/2	10045
23/32	2	.7188	5 5/8	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
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 3/16	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)

Standard Morse Taper Shank Drills — List No. 1302 (continued)

Foret à queue conique — Broca con zanco cónico

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
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
2 9/16	5	2.5625	11 7/8	19 1/2	10125

Alternate Morse Taper Shank Drills — List No. 1302

Foret à queue conique — Broca con zanco cónico

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
3/8	2	.3750	3 1/2	7 3/8	10201*
33/64	1	.5156	4 5/8	8	10210*
9/16	1	.5625	4 7/8	8 1/4	10213*
41/64	3	.6406	5 1/8	9 3/4	10214*
45/64	3	.7031	5 5/8	10 1/4	10218*
27/32	2	.8438	6 1/8	10	10227*
7/8	2	.8750	6 1/8	10	10229
1 3/32	3	1.0938	6 7/8	11 1/2	10236*
1 13/64	3	1.2031	7 1/2	12 1/8	10243*
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 19/32	4	1.5938	9 7/8	15 1/2	10252*
1 41/64	4	1.6406	10 1/8	15 3/4	10255*
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

Decimal Equivalent Pocket Chart
List No. 1005

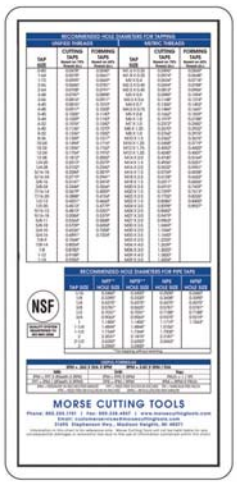
Tableau décimal — Tabla de medidas decimales

NEW LOOK! LARGER SIZE! Decimal Equivalents.
Tap Drill Sizes for inch, metric and pipe threads.
Size: 3⅜" × 7", Printed on plastic

Pack of 50
EDP No. 20412

Pack of 100
EDP No. 20413

Front



Back

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.

Foret de maçonnerie Broca de mamposteria

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

Carbide Tipped Extra Length Masonry Drills

Foret de maçonnerie Broca de mamposteria

List No. 5466 High Helix

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	SHANK DIA.	OVERALL LENGTH 13″ FLUTE LENGTH 8″ EDP NO.	OVERALL LENGTH 18″ FLUTE LENGTH 14″ EDP NO.
1/4	.2500	1/4	53501*	—
5/16	.3125	1/4	53502*	—
7/16	.4375	1/4	53504*	—
9/16	.5625	3/8	—	53526*
5/8	.6250	1/2	—	53527*
11/16	.6875	1/2	—	53528*
3/4	.7500	1/2	53509*	53529*
7/8	.8750	1/2	53510*	53530*
1	1.0000	1/2	53511*	53531*

* Available While Supplies Last

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.

Ensemble de tarauds et de forets Juegos de machuelos y brocas

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
¼-20	#7	¼-28	#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
½-13	27/64	½-20	29/64	M12 x 1.75	Y

Jeu de forets Juego de brocas

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)

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

SET NO.	PIECES PER SET	SIZE RANGE	8040 EDP NO.	8040R EDP NO.
33F	33	½" to 1" by 64ths	18111	—
33R			—	18112

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)

SET NO.	PIECES PER SET	SIZE RANGE	8040 EDP NO.	8040R EDP NO.
20HD	8	9/16-5/8-11/16-¾	18110	—
20HR		13/16-7/8-15/16-1	—	18109

Morse Drill Sets

Jeu de forets Juego de brocas

Jobber Length

High Speed Steel — 118° Point
General Purpose

SET NO.	PIECES PER SET	SIZE RANGE	BRIGHT EDP NO.	TREATED EDP NO.
2HD	21	1/16 to 3/8 by 64ths	18143	18100
5HD	29	1/16 to 1/2 by 64ths	18144	18101
6HD	15	1/16 to 1/2 by 32nds	18145	18102
8HD	60	Nos. 1 to 60	18146	18103
15HD	26	A to Z	18147	18104
22HD	13	1/16 to 1/4 by 64ths	18148	18105
24HD	20	Nos. 61 to 80	—	18106
26HD	25	1.0mm to 13.0mm by .5mms	—	18107
28HD	13	1.0mm to 7.0mm by .5mms	—	18108

List No. 8030
In Plastic Indexed Case

TiN Coated Jobber Length

High Speed Steel — 118° Point
General Purpose

SET NO.	PIECES PER SET	SIZE RANGE	TiN COAT EDP NO.
5HG	29	1/16 to 1/2 by 64ths	18183

List No. 8030
In Plastic Indexed Case

Left Hand Jobber Length

High Speed Steel — 118° Point
General Purpose
Bright Finish

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.
5LD	29	1/16 to 1/2 by 64ths	18005

List No. 8020
In Plastic Indexed Case

3-in-1 Combination Jobber Length

High Speed Steel — 118° Point

SET NO.	PCS. PER SET	SIZE RANGE	BRIGHT EDP NO.	TREATED EDP NO.
69HD	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

Jeu de forets Juego de brocas

3/8″ Reduced Shank Jobber Length

High Speed Steel – 118° Point
Black Oxide Treated

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.
5HT	29	1⁄16 to 1⁄2 by 64ths	18400
6HT	15	1⁄16 to 1⁄2 by 32nds	18401

List No. 8035
In Plastic Indexed Case

Heavy Duty Jobber Length

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

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.
5HS	29	1⁄16 to 1⁄2 by 64ths	18172
8HS	60	Nos. 1 to 60	18174

List No. 8080
In Plastic Indexed Case

Ambore™ Heavy Duty Jobber Length

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

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.
5GS	29	1⁄16 to 1⁄2 by 64ths	18182

List No. 8080
In Plastic Indexed Case

Cobalt Heavy Duty Jobber Length

135° Split Point — NAS 907, Type J

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.
5CD	29	1⁄16 to 1⁄2 by 64ths	18166
6CD	15	1⁄16 to 1⁄2 by 32nds	18167
8CD	60	Nos.1 to 60	18168
15CD	26	A to Z	18169

List No. 8070
In Plastic Indexed Case

Morse Drill Sets

Jeu de forets Juego de brocas

Taper Length

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

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.
5TL	29	1⁄16 to 1⁄2 by 64ths	18184

List No. 8095— In Metal Indexed Case

Screw Machine Length

High Speed Steel — Bright Finish
118° Point

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.
5SM	29	1⁄16 to 1⁄2 by 64ths	18177
6SM	15	1⁄16 to 1⁄2 by 32nds	18178
22SM	13	1⁄16 to 1⁄4 by 64ths	18181

List No. 8090 — In Metal Indexed Case

Drill Counter Display

Présentoir de forets Exhibidor de brocas

Drill Counter Display

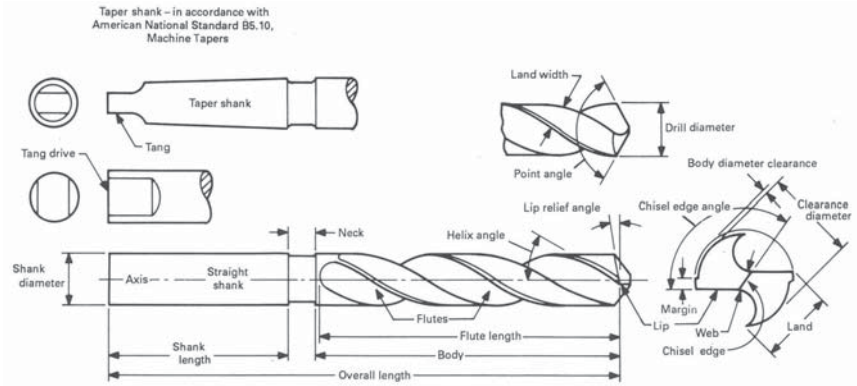
- All steel welded outer shell with a clear, hinged polycarbonate front for high visibility and shatterproof durability.
- Lockable with own set of two keys.
- Steel drill gauge on top assures correct sizing of drills.
- All compartments display drills vertically to use less counter space and are rounded 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

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.

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"
Low Carbon Steel 1018, 12L12, 1108, 1213	≤120	110	0.0030	0.0040	0.0080	0.0100	0.0110
Low & Medium Carbon Steel 1018, 1551, 11L44	120 - 250	65	0.0040	0.0060	0.0110	0.0130	0.0140
Medium Carbon and Alloyed Steel 1040, 1140, 4340, 8640	≤250	60	0.0030	0.0040	0.0080	0.0100	0.0110
Tool and Die Steels P20, A2, D2, H12	≤250	50	0.0030	0.0040	0.0080	0.0100	0.0110
Tool and Die Steels P20, A2, D2, H12	250 - 350	35	0.0020	0.0030	0.0060	0.0070	0.0080
Free Machining Stainless Steels 303, 410, 416, 440F	≤250	60	0.0040	0.0060	0.0110	0.0130	0.0140
Moderate Machining Stainless Steels 304, 316	≤300	45	0.0020	0.0030	0.0060	0.0070	0.0080
Difficult Machining Stainless Steels 17-4PH, 316L, AM350	≤300	20	0.0020	0.0030	0.0060	0.0070	0.0080
Cast Iron Soft Gray	≤160	105	0.0040	0.0060	0.0110	0.0130	0.0140
Cast Iron Gray	160 - 260	90	0.0040	0.0060	0.0110	0.0130	0.0140
Cast Iron Ductile	250	80	0.0030	0.0040	0.0080	0.0100	0.0110
Cast Iron Malleable	250 - 330	55	0.0020	0.0030	0.0060	0.0070	0.0080
Titanium Alloys Commercially Pure 99.0	110 - 170	90	0.0030	0.0040	0.0080	0.0100	0.0110
Titanium Alloys Ti-6Ai-4V, ASTM B367 Grades C-3, C-4	≤250	50	0.0030	0.0040	0.0080	0.0100	0.0110
High Temperature Alloys Inconel, Hastelloy, Waspaloy	≤150	50	0.0030	0.0040	0.0080	0.0100	0.0110
High Temperature Alloys Inconel, Hastelloy, Waspaloy	150 - 250	20	0.0010	0.0020	0.0045	0.0060	0.0070
Aluminum Alloys 2025, 6061, A140, 514.0	≤150	325	0.0040	0.0060	0.0110	0.0130	0.0140
Copper Alloys Brass and Bronze	≤200	80	0.0040	0.0060	0.0110	0.0130	0.0140
Composites & Plastics	≤128	175	0.0020	0.0030	0.0060	0.0070	0.0080
Magnesium Alloys 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.

Tool Coatings Also Available

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.

REAMERS

TOOL COATING SERVICE	
Tool Coatings enhance cutting tool performance for increased productivity and lower overall tooling cost.	
TiN — Titanium Nitride	**TiCN —** Titanium Carbonite
TiALN — Titanium Aluminum Nitride	**ALTiN —** Aluminum Titanium Nitride
CrN — Chromium Nitride	**CrC —** Chromium Carbide

Straight Shank Chucking Reamers

High Speed Steel
Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials

Alésoir machine | Rima de máquina

List No. 1655

Diameter Tolerances
up to ½" — +.0002/-0
over ½" to ⅝" — +.0003/-0
over ⅝" to 1½" — +.0001/+.0004

STANDARD PACKAGE All sizes – 1 each

Decimal Sizes: Pages 90-93
Dowel Pin Sizes: Page 94
Metric Sizes: Pages 88-89

SIZE FRACTIONAL	WIRE GAGE AND DECIMAL	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
	#60	.0400	.0390	½	2½	4	22101
	59	.0410	.0390	½	2½	4	22102
	58	.0420	.0390	½	2½	4	22103
	57	.0430	.0390	½	2½	4	22104
	56	.0465	.0455	½	2½	4	22105
3/64		.0469	.0455	½	2½	4	22106
	55	.0520	.0510	½	2½	4	22107
	54	.0550	.0510	½	2½	4	22108
	53	.0595	.0585	½	2½	4	22109
1/16		.0625	.0585	½	2½	4	22110
	52	.0635	.0585	½	2½	4	22111
	51	.0670	.0660	¾	3	4	22112
	50	.0700	.0660	¾	3	4	22113
	49	.0730	.0660	¾	3	4	22114
	48	.0760	.0720	¾	3	4	22115
5/64		.0781	.0720	¾	3	4	22116
	47	.0785	.0720	¾	3	4	22117
	46	.0810	.0771	¾	3	4	22118
	45	.0820	.0771	¾	3	4	22119
	44	.0860	.0810	¾	3	4	22120
	43	.0890	.0810	¾	3	4	22121
	42	.0935	.0880	¾	3	4	22122
3/32		.0938	.0880	¾	3	4	22123
	41	.0960	.0928	⅞	3½	4	22124
	40	.0980	.0928	⅞	3½	4	22125
	39	.0995	.0928	⅞	3½	4	22126
	38	.1015	.0950	⅞	3½	4	22127
	37	.1040	.0950	⅞	3½	4	22128
	36	.1065	.1030	⅞	3½	4	22129
7/64		.1094	.1030	⅞	3½	4	22130
	35	.1100	.1030	⅞	3½	4	22131
	34	.1110	.1055	⅞	3½	4	22132
	33	.1130	.1055	⅞	3½	4	22133
	32	.1160	.1120	⅞	3½	4	22134
	31	.1200	.1120	⅞	3½	4	22135
	.1240	.1240	.1190	⅞	3½	4	22136
1/8		.1250	.1190	⅞	3½	4	22137
	.1260	.1260	.1190	⅞	3½	4	22138
	30	.1285	.1190	⅞	3½	4	22139
	29	.1360	.1275	1	4	4	22140
	28	.1405	.1350	1	4	4	22141
9/64		.1406	.1350	1	4	4	22142
	27	.1440	.1350	1	4	4	22143
	26	.1470	.1430	1	4	4	22144
	25	.1495	.1430	1	4	4	22145
	24	.1520	.1460	1	4	4	22146
	23	.1540	.1460	1	4	4	22147
5/32		.1562	.1510	1	4	6	22148
	22	.1570	.1510	1	4	6	22149

(continued)

Straight Shank Chucking Reamers (continued)

List No. 1655 — **Alésoir machine** — **Rima de máquina**

FRACTIONAL	SIZE LETTER	WIRE GAGE AND DECIMAL	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
		#21	.1590	.1530	1⅛	4½	6	22150
		20	.1610	.1530	1⅛	4½	6	22151
		19	.1660	.1595	1⅛	4½	6	22152
		18	.1695	.1595	1⅛	4½	6	22153
11/64			.1719	.1645	1⅛	4½	6	22154
		17	.1730	.1645	1⅛	4½	6	22155
		16	.1770	.1704	1⅛	4½	6	22156
		15	.1800	.1755	1⅛	4½	6	22157
		14	.1820	.1755	1⅛	4½	6	22158
		13	.1850	.1805	1⅛	4½	6	22159
		.1865	.1865	.1805	1⅛	4½	6	22160
3/16			.1875	.1805	1⅛	4½	6	22161
		.1885	.1885	.1805	1⅛	4½	6	22162
		12	.1890	.1805	1⅛	4½	6	22163
		11	.1910	.1860	1¼	5	6	22164
		10	.1935	.1895	1¼	5	6	22165
		9	.1960	.1895	1¼	5	6	22166
		8	.1990	.1895	1¼	5	6	22167
		7	.2010	.1895	1¼	5	6	22168
13/64			.2031	.1945	1¼	5	6	22169
		6	.2040	.1945	1¼	5	6	22170
		5	.2055	.2016	1¼	5	6	22171
		4	.2090	.2016	1¼	5	6	22172
		3	.2130	.2075	1¼	5	6	22173
7/32			.2187	.2075	1¼	5	6	22174
		2	.2210	.2173	1½	6	6	22175
		1	.2280	.2173	1½	6	6	22176
	A		.2340	.2265	1½	6	6	22177
15/64			.2344	.2265	1½	6	6	22178
	B		.2380	.2329	1½	6	6	22179
	C		.2420	.2329	1½	6	6	22180
	D		.2460	.2329	1½	6	6	22181
		.2490	.2490	.2405	1½	6	6	22182
¼	E		.2500	.2405	1½	6	6	22183
		.2510	.2510	.2405	1½	6	6	22185
	F		.2570	.2485	1½	6	6	22186
	G		.2610	.2485	1½	6	6	22187
17/64			.2656	.2485	1½	6	6	22188
	H		.2660	.2485	1½	6	6	22189
	I		.2720	.2485	1½	6	6	22190
	J		.2770	.2485	1½	6	6	22191
	K		.2810	.2485	1½	6	6	22192
9/32			.2812	.2485	1½	6	6	22193
	L		.2900	.2792	1½	6	6	22194
	M		.2950	.2792	1½	6	6	22195
19/64			.2969	.2792	1½	6	6	22196
	N		.3020	.2792	1½	6	6	22197
		.3115	.3115	.2792	1½	6	6	22198
5/16			.3125	.2792	1½	6	6	22199
		.3135	.3135	.2792	1½	6	6	22200
	O		.3160	.2792	1½	6	6	22201
	P		.3230	.2792	1½	6	6	22202
21/64			.3281	.2792	1½	6	6	22203
	Q		.3320	.2792	1½	6	6	22204
	R		.3390	.2792	1½	6	6	22205
11/32			.3437	.2792	1½	6	6	22206
	S		.3480	.3105	1¾	7	6	22207
	T		.3580	.3105	1¾	7	6	22208
23/64			.3594	.3105	1¾	7	6	22209

(continued)

Straight Shank Chucking Reamers (continued)

List No. 1655

Alésoir machine **Rima de máquina**

Decimal Sizes: Pages 90-93
Dowel Pin Sizes: Page 94
Metric Sizes: Pages 88-89

FRACTIONAL	SIZE LETTER	DECIMAL	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
	U		.3680	.3105	1¾	7	6	22210
		.3740	.3740	.3105	1¾	7	6	22211
3/8			.3750	.3105	1¾	7	6	22212
		.3760	.3760	.3105	1¾	7	6	22213
	V		.3770	.3105	1¾	7	6	22214
	W		.3860	.3105	1¾	7	6	22215
25/64			.3906	.3105	1¾	7	6	22216
	X		.3970	.3105	1¾	7	6	22217
	Y		.4040	.3105	1¾	7	6	22218
13/32			.4062	.3105	1¾	7	6	22219
	Z		.4130	.3730	1¾	7	6	22220
27/64			.4219	.3730	1¾	7	6	22221
		.4365	.4365	.3730	1¾	7	6	22222
7/16			.4375	.3730	1¾	7	6	22223
		.4385	.4385	.3730	1¾	7	6	22224
29/64			.4531	.3730	1¾	7	6	22225
15/32			.4688	.3730	1¾	7	6	22226
31/64			.4844	.4355	2	8	6	22227
		.4990	.4990	.4355	2	8	6	22228
1/2			.5000	.4355	2	8	6	22229
		.5010	.5010	.4355	2	8	6	22230
17/32			.5312	.4355	2	8	6	22231
9/16			.5625	.4355	2	8	8	22232
19/32			.5937	.4355	2	8	8	22233
5/8			.6250	.5615	2¼	9	8	22234
21/32			.6562	.5615	2¼	9	8	22235
11/16			.6875	.5615	2¼	9	8	22236
23/32			.7187	.5615	2¼	9	8	22237
3/4			.7500	.6240	2½	9½	8	22238
25/32			.7812	.6240	2½	9½	8	22239
13/16			.8125	.6240	2½	9½	8	22240
27/32			.8437	.6240	2½	9½	8	22241
7/8			.8750	.7490	2⅝	10	8	22242
29/32			.9062	.7490	2⅝	10	8	22243
15/16			.9375	.7490	2⅝	10	8	22244
31/32			.9687	.7490	2⅝	10	8	22245
1			1.0000	.8740	2¾	10½	8	22246
1 1/16			1.0625	.8740	2¾	10½	8	22247
1 1/8			1.1250	.8740	2⅞	11	10	22248
1 3/16			1.1875	.9990	2⅞	11	10	22249
1 1/4			1.2500	.9990	3	11½	10	22250
1 3/8			1.3750	.9990	3¼	12	10	22251
1 1/2			1.5000	1.2490	3½	12½	10	22252

Straight Shank Chucking Reamer Sets

High Speed Steel — Straight Flute
Right Hand Cut

SET NO.	PCS. PER SET	SIZE RANGE	EDP NO.
501	29	1/16 to ½ by 64ths	22301
502	26	A to Z	22302
503	60	Nos. 1 to 60	22303

Jeu d'alésoirs **Juego de rimas**

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.

Alésoir machine Rima de máquina

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 PACKAGE All sizes — 1 each

MM SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1.0	.0394	.0394	½	2½	4	22350
1.5	.0591	.0510	½	2½	4	22351
2.0	.0787	.0720	¾	3	4	22352
2.5	.0984	.0928	⅞	3½	4	22353
3.0	.1181	.1120	⅞	3½	4	22354
3.5	.1378	.1350	1	4	4	22355
4.0	.1575	.1510	1	4	6	22356
4.5	.1772	.1704	1⅛	4½	6	22357
5.0	.1969	.1895	1¼	5	6	22358
5.5	.2165	.2075	1¼	5	6	22359
6.0	.2362	.2265	1½	6	6	22360
6.5	.2559	.2405	1½	6	6	22361
7.0	.2756	.2485	1½	6	6	22362
7.5	.2953	.2792	1½	6	6	22363
8.0	.3150	.2792	1½	6	6	22364
8.5	.3346	.2792	1½	6	6	22365
9.0	.3543	.3105	1¾	7	6	22366
9.5	.3740	.3105	1¾	7	6	22367
10.0	.3937	.3105	1¾	7	6	22368
10.5	.4134	.3730	1¾	7	6	22369
11.0	.4331	.3730	1¾	7	6	22370
11.5	.4528	.3730	1¾	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	2¼	9	8	22379
16.0	.6299	.5615	2¼	9	8	22380
16.5	.6496	.5615	2¼	9	8	22381
17.0	.6693	.5615	2¼	9	8	22382
17.5	.6890	.5615	2¼	9	8	22383
18.0	.7087	.5615	2¼	9	8	22384
18.5	.7283	.6240	2½	9	8	22385
19.0	.7480	.6240	2½	9	8	22386
19.5	.7677	.6240	2½	9	8	22387
20.0	.7874	.6240	2½	9	8	22388
20.5	.8071	.6240	2½	9	8	22389
21.0	.8268	.6240	2½	9½	8	22390
21.5	.8465	.7490	2⅝	10	8	22391
22.0	.8661	.7490	2⅝	10	8	22392
22.5	.8858	.7490	2⅝	10	8	22393
23.0	.9055	.7490	2⅝	10	8	22394
23.5	.9252	.7490	2⅝	10	8	22395
24.0	.9449	.7490	2⅝	10	8	22396
24.5	.9646	.7490	2⅝	10	8	22397
25.0	.9843	.8740	2¾	10½	8	22398

Metric Straight Shank Chucking Reamer Sets

High Speed Steel Straight Flute – Right Hand Cut

Jeu d'alésoirs Juego de rimas

List No. 1655M

Over and Under Size Set
In Plastic Pouch

SIZES			PCS.	EDP NO.
.1565	.2766	.3927		
.1585	.3140	.3947		
.2352	.3160	.4714	14	23304
.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

Cobalt Straight Shank Chucking Reamers

Alésoir au cobalt Rima de cobalto

Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials. **M42 8% 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 ½" (including 12.5 mm) — +.0002/-0
over ½" to ⅝" — +.0003/-0
over ⅝" to 1½" — +.0001/+.0004

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1/16	.0625	.0585	½	2½	4	22400
5/64	.0781	.0720	¾	3	4	22401
3/32	.0938	.0880	¾	3	4	22402
7/64	.1094	.1030	⅞	3½	4	22403
1/8	.1250	.1190	⅞	3½	4	22404
9/64	.1406	.1350	1	4	4	22405
5/32	.1562	.1510	1	4	6	22406
11/64	.1719	.1645	1⅛	4½	6	22407
3/16	.1875	.1805	1⅛	4½	6	22408
13/64	.2031	.1945	1¼	5	6	22409
7/32	.2188	.2075	1¼	5	6	22410
15/64	.2344	.2265	1½	6	6	22411
1/4	.2500	.2405	1½	6	6	22413
17/64	.2656	.2485	1½	6	6	22415
9/32	.2812	.2485	1½	6	6	22416
19/64	.2969	.2792	1½	6	6	22417
5/16	.3125	.2792	1½	6	6	22419
21/64	.3281	.2792	1½	6	6	22421
11/32	.3438	.2792	1½	6	6	22422
23/64	.3594	.3105	1¼	7	6	22423
3/8	.3750	.3105	1¾	7	6	22425
25/64	.3906	.3105	1¾	7	6	22427
13/32	.4062	.3105	1¾	7	6	22428
27/64	.4219	.3730	1¾	7	6	22429
7/16	.4375	.3730	1¾	7	6	22431
29/64	.4531	.3730	1¾	7	6	22433
15/32	.4688	.3730	1¾	7	6	22434
31/64	.4844	.4355	2	8	6	22435
1/2	.5000	.4355	2	8	6	22437
17/32	.5312	.4355	2	8	6	22440
9/16	.5625	.4355	2	8	8	22443
19/32	.5938	.4355	2	8	8	22445
5/8	.6250	.5615	2¼	9	8	22448
21/32	.6562	.5615	2¼	9	8	22451
11/16	.6875	.5615	2¼	9	8	22454
23/32	.7188	.5615	2¼	9	8	22457
3/4	.7500	.6240	2½	9½	8	22460
25/32	.7812	.6240	2½	9½	8	22463
13/16	.8125	.6240	2½	9½	8	22466
27/32	.8438	.6240	2½	9½	8	22469
7/8	.8750	.7490	2⅝	10	8	22472
29/32	.9062	.7490	2⅝	10	8	22475
15/16	.9375	.7490	2⅝	10	8	22478
31/32	.9688	.7490	2⅝	10	8	22481
1	1.000	.8740	2¾	10½	8	22484

List 2655M — Cobalt Metric Sizes

MM SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
1.0	.0394	.0394	½	2½	4	22515
1.5	.0591	.0510	½	2½	4	22516
2.0	.0787	.0720	¾	3	4	22517
2.5	.0984	.0928	⅞	3½	4	22518
3.0	.1181	.1120	⅞	3½	4	22519
3.5	.1378	.1350	1	4	4	22520
4.0	.1575	.1510	1	4	6	22521
4.5	.1772	.1704	1⅛	4½	6	22522
5.0	.1969	.1895	1¼	5	6	22523
5.5	.2165	.2075	1¼	5	6	22524
6.0	.2362	.2265	1½	6	6	22525
6.5	.2559	.2405	1½	6	6	22526
7.0	.2756	.2485	1½	6	6	22527
7.5	.2953	.2792	1½	6	6	22528
8.0	.3150	.2792	1½	6	6	22529
8.5	.3346	.2792	1½	6	6	22530
9.0	.3543	.3105	1¾	7	6	22531
9.5	.3740	.3105	1¾	7	6	22532
10.0	.3937	.3105	1¾	7	6	22533
10.5	.4134	.3730	1¾	7	6	22534
11.0	.4331	.3730	1¾	7	6	22535
11.5	.4528	.3730	1¾	7	6	22536
12.0	.4724	.4355	2	8	6	22537
12.5	.4921	.4355	2	8	6	22538

TOOL COATING SERVICE

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

TiN — Titanium Nitride	**TiCN —** Titanium Carbonite
TiALN — Titanium Aluminum Nitride	**ALTiN —** Aluminum Titanium Nitride
CrN — Chromium 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.

Alésoir machine | Rima de máquina

List No. 1655H

Diameter Tolerances
up to .5000 — +.0002/-0
.5005 to .6250 — +.0003/-0
.6255 to 1.0030 — +.0001/+.0004

STANDARD PACKAGE All sizes – 1 each

Over / Under Sizes: Pages 85-87
Dowel Pin Sizes: Page 94

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

(continued)

Decimal Size Chucking Reamers (continued)

List No. 1655H

Alésoir machine **Rima de máquina**

DEC. SIZE	EDP NO.
.1380	29182
.1385	29183
.1390	29184
.1395	29185
.1400	29186
.1410	29187
.1415	29188
.1420	29189
.1425	29190
.1430	29191
.1435	29192
.1445	29193
.1450	29194
.1455	29195
.1460	29196
.1465	29197
.1475	29198
.1480	29199
.1485	29200
.1490	29201
.1500	29202
.1505	29203
.1510	29204
.1515	29205
.1525	29206
.1530	29207
.1535	29208
.1545	29209
.1550	29210
.1555	29211
.1560	29212
.1565	29213
.1580	29214
.1585	29215
.1595	29216
.1600	29217
.1605	29218
.1615	29220
.1620	29221
.1625	29222
.1630	29223
.1635	29224
.1640	29225
.1645	29226
.1650	29227
.1655	29228
.1665	29229
.1670	29230
.1675	29231
.1680	29232

DEC. SIZE	EDP NO.
.1685	29233
.1690	29234
.1700	29235
.1705	29236
.1710	29237
.1715	29238
.1720	29239
.1725	29240
.1735	29241
.1740	29242
.1745	29243
.1750	29244
.1755	29245
.1760	29246
.1765	29247
.1775	29248
.1780	29249
.1785	29250
.1790	29251
.1795	29252
.1805	29253
.1810	29254
.1815	29255
.1825	29256
.1830	29257
.1835	29258
.1840	29259
.1845	29260
.1860	29261
.1880	29262
.1895	29263
.1900	29264
.1905	29265
.1915	29266
.1920	29267
.1925	29268
.1930	29269
.1940	29270
.1945	29271
.1950	29272
.1955	29273
.1965	29274
.1970	29275
.1975	29276
.1980	29277
.1985	29278
.1995	29279
.2000	29280
.2005	29281
.2015	29282

DEC. SIZE	EDP NO.
.2020	29283
.2025	29284
.2030	29285
.2035	29286
.2045	29287
.2050	29288
.2060	29289
.2065	29290
.2070	29291
.2075	29292
.2080	29293
.2085	29294
.2095	29295
.2100	29296
.2105	29297
.2110	29298
.2115	29299
.2120	29300
.2125	29301
.2135	29302
.2140	29303
.2145	29304
.2150	29305
.2155	29306
.2160	29307
.2170	29308
.2175	29309
.2180	29310
.2185	29311
.2190	29312
.2195	29313
.2200	29314
.2205	29315
.2215	29316
.2220	29317
.2225	29318
.2230	29319
.2235	29320
.2240	29321
.2245	29322
.2250	29323
.2255	29324
.2260	29325
.2265	29326
.2270	29327
.2275	29328
.2285	29329
.2290	29330
.2295	29331
.2300	29332

DEC. SIZE	EDP NO.
.2305	29333
.2310	29334
.2315	29335
.2320	29336
.2325	29337
.2330	29338
.2335	29339
.2345	29340
.2350	29341
.2355	29342
.2360	29343
.2365	29344
.2370	29345
.2375	29346
.2385	29347
.2390	29348
.2395	29349
.2400	29350
.2405	29351
.2410	29352
.2415	29353
.2425	29354
.2430	29355
.2435	29356
.2440	29357
.2445	29358
.2450	29359
.2455	29360
.2465	29361
.2470	29362
.2475	29363
.2485	29364
.2505	29365
.2515	29366
.2520	29367
.2525	29368
.2530	29369
.2535	29370
.2540	29371
.2545	29372
.2550	29373
.2555	29374
.2560	29375
.2565	29376
.2575	29377
.2580	29378
.2585	29379
.2590	29380
.2595	29381
.2600	29382

DEC. SIZE	EDP NO.
.2605	29383
.2615	29384
.2620	29385
.2625	29386
.2630	29387
.2635	29388
.2640	29389
.2645	29390
.2650	29391
.2655	29392
.2665	29393
.2670	29394
.2675	29395
.2680	29396
.2685	29397
.2690	29398
.2695	29399
.2700	29400
.2705	29401
.2710	29402
.2715	29403
.2725	29404
.2730	29405
.2735	29406
.2740	29407
.2745	29408
.2750	29409
.2755	29410
.2760	29411
.2765	29412
.2775	29413
.2780	29414
.2785	29415
.2790	29416
.2795	29417
.2800	29418
.2805	29419
.2815	29420
.2820	29421
.2825	29422
.2830	29423
.2835	29424
.2840	29425
.2845	29426
.2850	29427
.2855	29428
.2860	29429
.2865	29430
.2870	29431
.2875	29432
.2880	29433

(continued)

Decimal Size Chucking Reamers (continued)

List No. 1655H

Alésoir machine — Rima de máquina

Over / Under Sizes: Pages 85-87
Dowel Pin Sizes: Page 94

DEC. SIZE	EDP NO.
.2885	29434
.2890	29435
.2895	29436
.2905	29437
.2910	29438
.2915	29439
.2920	29440
.2925	29441
.2930	29442
.2935	29443
.2940	29444
.2945	29445
.2955	29446
.2960	29447
.2965	29448
.2970	29449
.2975	29450
.2980	29451
.2985	29452
.2990	29453
.2995	29454
.3000	29455
.3005	29456
.3010	29457
.3015	29458
.3025	29459
.3030	29460
.3035	29461
.3040	29462
.3045	29463
.3050	29464
.3055	29465
.3060	29466
.3065	29467
.3070	29468
.3075	29469
.3080	29470
.3085	29471
.3090	29472
.3095	29473
.3100	29474
.3110	29475
.3130	29476
.3140	29478
.3145	29479
.3155	29480
.3165	29481
.3170	29482
.3175	29483
.3180	29484

DEC. SIZE	EDP NO.
.3185	29485
.3190	29486
.3195	29487
.3200	29488
.3205	29489
.3210	29490
.3215	29491
.3220	29492
.3225	29493
.3235	29494
.3240	29495
.3245	29496
.3250	29497
.3255	29498
.3260	29499
.3265	29500
.3270	29501
.3275	29502
.3280	29503
.3285	29504
.3290	29505
.3295	29506
.3300	29507
.3305	29508
.3310	29509
.3315	29510
.3325	29511
.3330	29512
.3335	29513
.3340	29514
.3345	29515
.3350	29516
.3355	29517
.3360	29518
.3365	29519
.3370	29520
.3375	29521
.3380	29522
.3385	29523
.3395	29524
.3400	29525
.3405	29526
.3410	29527
.3415	29528
.3420	29529
.3425	29530
.3430	29531
.3435	29532
.3440	29533
.3445	29534

DEC. SIZE	EDP NO.
.3450	29535
.3455	29536
.3460	29537
.3465	29538
.3470	29539
.3475	29540
.3485	29541
.3490	29542
.3495	29543
.3500	29544
.3505	29545
.3510	29546
.3515	29547
.3520	29548
.3525	29549
.3530	29550
.3535	29551
.3540	29552
.3545	29553
.3550	29554
.3555	29555
.3560	29556
.3565	29557
.3570	29558
.3575	29559
.3585	29560
.3590	29561
.3595	29562
.3600	29563
.3605	29564
.3610	29565
.3615	29566
.3620	29567
.3625	29568
.3630	29569
.3635	29570
.3640	29571
.3645	29572
.3650	29573
.3655	29574
.3660	29575
.3665	29576
.3670	29577
.3675	29578
.3685	29579
.3690	29580
.3695	29581
.3700	29582
.3705	29583
.3710	29584

DEC. SIZE	EDP NO.
.3715	29585
.3720	29586
.3725	29587
.3735	29588
.3755	29589
.3765	29590
.3775	29591
.3780	29592
.3785	29593
.3790	29594
.3795	29595
.3800	29596
.3805	29597
.3810	29598
.3815	29599
.3820	29600
.3825	29601
.3830	29602
.3835	29603
.3840	29604
.3845	29605
.3850	29606
.3855	29607
.3865	29608
.3870	29609
.3875	29610
.3880	29611
.3885	29612
.3890	29613
.3895	29614
.3900	29615
.3905	29616
.3910	29617
.3915	29618
.3920	29619
.3925	29620
.3930	29621
.3935	29622
.3940	29623
.3945	29624
.3950	29625
.3955	29626
.3960	29627
.3965	29628
.3975	29629
.3980	29630
.3985	29631
.3990	29632
.3995	29633
.4000	29634

DEC. SIZE	EDP NO.
.4005	29635
.4010	29636
.4015	29637
.4020	29638
.4025	29639
.4030	29640
.4035	29641
.4045	29642
.4050	29643
.4055	29644
.4060	29645
.4065	29646
.4070	29647
.4075	29648
.4080	29649
.4085	29650
.4090	29651
.4095	29652
.4100	29653
.4105	29654
.4110	29655
.4115	29656
.4120	29657
.4125	29658
.4135	29659
.4140	29660
.4145	29661
.4150	29662
.4155	29663
.4160	29664
.4165	29665
.4170	29666
.4175	29667
.4180	29668
.4185	29669
.4190	29670
.4195	29671
.4200	29672
.4205	29673
.4210	29674
.4215	29675
.4220	29676
.4225	29677
.4230	29678
.4235	29679
.4240	29680
.4245	29681
.4250	29682
.4255	29683
.4260	29684
.4265	29685
.4270	29686

(continued)

Decimal Size Chucking Reamers (continued)

List No. 1655H

Alésoir machine — Rima de máquina

DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.	DEC. SIZE	EDP NO.
.4275	29687	.4550	29737	.4800	29787	.5600	29837	.8105	29885
.4280	29688	.4555	29738	.4805	29788	.5605	29838	.8110	29886
.4285	29689	.4560	29739	.4810	29789	.5610	29839	.8115	29887
.4290	29690	.4565	29740	.4815	29790	.5615	29932	.8120	29888
.4295	29691	.4570	29741	.4820	29791	.5620	29840	.8130	29889
.4300	29692	.4575	29742	.4825	29792	.5630	29841	.8135	29890
.4305	29693	.4580	29743	.4830	29793	.5635	29933	.8140	29891
.4310	29694	.4585	29744	.4835	29794	.5640	29842	.8145	29892
.4315	29695	.4590	29745	.4840	29795	.5645	29843	.8150	29893
.4320	29696	.4595	29746	.4845	29796	.5650	29844	.8155	29894
.4325	29697	.4600	29747	.4850	29797	.5655	29845	.8720	29895
.4330	29698	.4605	29748	.4855	29798	.6220	29846	.8725	29896
.4335	29699	.4610	29749	.4860	29799	.6225	29847	.8730	29897
.4340	29700	.4615	29750	.4865	29800	.6230	29848	.8735	29898
.4345	29701	.4620	29751	.4870	29801	.6235	29849	.8740	29899
.4350	29702	.4625	29752	.4875	29802	.6240	29850	.8745	29900
.4360	29703	.4630	29753	.4880	29803	.6245	29851	.8755	29901
.4380	29704	.4635	29754	.4885	29804	.6255	29852	.8760	29902
.4390	29705	.4640	29755	.4890	29805	.6260	29853	.8765	29903
.4395	29706	.4645	29756	.4895	29806	.6265	29854	.8770	29904
.4400	29707	.4650	29757	.4900	29807	.6270	29855	.8775	29905
.4405	29708	.4655	29758	.4905	29808	.6275	29856	.8780	29906
.4410	29709	.4660	29759	.4910	29809	.6280	29857	.9340	29907
.4415	29710	.4665	29760	.4915	29810	.6845	29858	.9345	29908
.4420	29711	.4670	29761	.4920	29811	.6850	29859	.9350	29909
.4425	29712	.4675	29762	.4925	29812	.6855	29860	.9355	29910
.4430	29713	.4680	29763	.4930	29813	.6860	29861	.9360	29911
.4435	29714	.4685	29764	.4935	29814	.6865	29862	.9365	29912
.4440	29715	.4690	29765	.4940	29815	.6870	29863	.9370	29913
.4445	29716	.4695	29766	.4945	29816	.6880	29864	.9380	29914
.4450	29717	.4700	29767	.4950	29817	.6885	29865	.9385	29915
.4455	29718	.4705	29768	.4955	29818	.6890	29866	.9390	29916
.4460	29719	.4710	29769	.4960	29819	.6895	29867	.9395	29917
.4465	29720	.4715	29770	.4965	29820	.6900	29868	.9400	29918
.4470	29721	.4720	29771	.4970	29821	.6905	29869	.9405	29919
.4475	29722	.4725	29772	.4975	29822	.7470	29870	.9970	29920
.4480	29723	.4730	29773	.4985	29823	.7475	29871	.9975	29921
.4485	29724	.4735	29774	.5005	29824	.7485	29872	.9980	29922
.4490	29725	.4740	29775	.5015	29825	.7490	29873	.9985	29923
.4495	29726	.4745	29776	.5020	29826	.7495	29874	.9990	29924
.4500	29727	.4750	29777	.5025	29827	.7505	29875	.9995	29925
.4505	29728	.4755	29778	.5030	29828	.7510	29876	1.0005	29926
.4510	29729	.4760	29779	.5035	29829	.7515	29877	1.0010	29927
.4515	29730	.4765	29780	.5040	29830	.7520	29878	1.0015	29928
.4520	29731	.4770	29781	.5045	29831	.7525	29879	1.0020	29929
.4525	29732	.4775	29782	.5050	29832	.7530	29880	1.0025	29930
.4530	29733	.4780	29783	.5060	29833	.7540	29881	1.0030	29931
.4535	29734	.4785	29784	.5070	29834	.7550	29882		
.4540	29735	.4790	29785	.5090	29835	.8095	29883		
.4545	29736	.4795	29786	.5100	29836	.8100	29884		

Intermediate Size Straight Shank Chucking Reamers

High Speed Steel
Straight Flute – Right Hand Cut

Alésoir machine — Rima de máquina

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

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.

Alésoir machine — Rima de máquina

List No. 1655D

STANDARD PACKAGE All sizes – 1 each

DIAMETER TOLERANCES +.0000, -.0002

Over / Under Sizes: Pages 85-87
Decimal Sizes: Pages 90-93

DECIMAL SIZE	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
.1230	⅞	3½	4	21561
.1247	⅞	3½	4	21562
.1855	1⅛	4½	6	21563
.1870	1⅛	4½	6	21564
.2480	1½	6	6	21565
.2495	1½	6	6	21566
.3105	1½	6	6	21567

DECIMAL SIZE	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
.3120	1½	6	6	21568
.3730	1¾	7	6	21569
.3745	1¾	7	6	21570
.4355	1¾	7	6	21571
.4370	1¾	7	6	21572
.4980	2	8	6	21573
.4995	2	8	6	21574

Reamer Terminology

Machine Chucking Reamer — Used primarily in machines such as turret lathes, transfer lines, numerical control, etc. for production reaming.

Hand Reamer — Used primarily by hand utilizing wrench and driven by the square. Excellent for tool and die work, machine and repair shop. May be machine driven in some cases.

Shank — The part of the reamer which is held and driven.

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

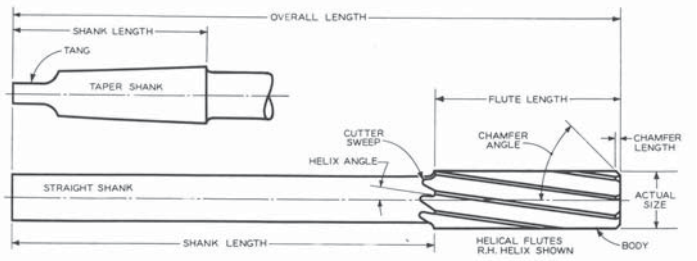
Diameter — The diameter over the body of the reamer measured at the point.

Chamfer — The leading cutting edge of the reamer, usually 45°.

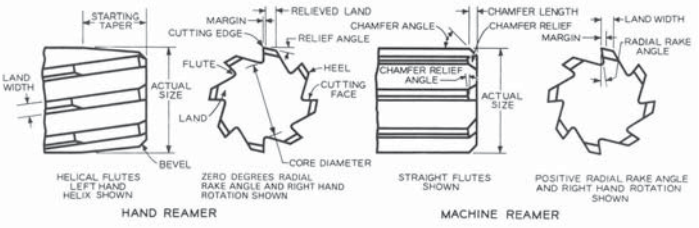
Clearance — The relief on the outside diameter of the reamer, usually running to a theoretically sharp edge or cylindrical margin as the material to be reamed dictates.

Flutes — Helical or straight grooves cut or formed in the body of the reamer to permit chip flow and form lands for proper clearance.

Overall Length — The length from the extreme end of the shank to the extreme end of the body section. Does not include conical point when used as in structural reamers.



CHUCKING REAMER, STRAIGHT AND TAPER SHANK



HAND REAMER — MACHINE REAMER

MORSE CUTTING TOOLS

800.255.1701

Carbide Tipped Straight Shank Chucking Reamers

Alésoir à pointe au carbure Rima con punta de carburo

Straight Flute — Right Hand Cut

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.

List No. 5655

STANDARD PACKAGE All sizes — 1 each

Tools are furnished to a +.0003 -.0000 diameter tolerance.

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
13/64	.2031	11/64	1 1/8	4 1/2	4	55213*
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
29/64	.4531	3/8	1 3/4	7	4	55229*
15/32	.4688	3/8	1 3/4	7	4	55230
31/64	.4844	7/16	2	8	6	55231*
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
19/32	.5938	7/16	2	8	6	55238*
5/8	.6250	9/16	2 1/4	9	6	55240
21/32	.6562	9/16	2 1/4	9	6	55242*
11/16	.6875	9/16	2 1/4	9	6	55244
45/64	.7031	9/16	2 1/4	9	6	55245*
23/32	.7187	9/16	2 1/4	9	6	55246*
47/64	.7344	5/8	2 1/2	9 1/2	6	55247*
3/4	.7500	5/8	2 1/2	9 1/2	6	55248
55/64	.8594	3/4	2 5/8	10	6	55255*
7/8	.8750	3/4	2 5/8	10	6	55256
57/64	.8906	3/4	2 5/8	10	6	55257*
15/16	.9375	3/4	2 5/8	10	8	55260*
1	1.0000	7/8	2 3/4	10 1/2	8	55264
1 5/16	1.3125	1	3	11 1/2	8	55320*
1 1/2	1.5000	1 1/4	3 1/2	12 1/2	8	55332*

*** Available While Supplies Last**

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 — Diamond Like Carbon

Expansion Straight Shank Chucking Reamers

Alésoir expansible en bout Rima de expansión

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.

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.

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.
3/8	.3750	5/16	3/4	7	6	22901
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
1/2	.5000	7/16	1	8	6	22905
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
3/4	.7500	5/8	1 3/8	9 1/2	6	22913
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	1.0000	7/8	1 5/8	10 1/2	8	22921
1 1/16	1.0625	7/8	1 5/8	10 1/2	8	22922
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

Carbide Tipped Expansion Straight Shank Chucking Reamers

Alésoir à pointe au carbure Rima con punta de carburo

Straight Flute — Right Hand Cut

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.

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

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 11/16	1.6875	1 1/4	2 1/8	12 1/2	8	56039*
1 7/8	1.8750	1 1/4	2 1/8	12 1/2	8	56041*
1 15/16	1.9375	1 1/4	2 1/8	12 1/2	8	56042*

* Available While Supplies Last

Right Hand Helix Straight Shank Chucking Reamers

Alésoir machine — Rima de máquina

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.

List No. 1653

45° Chamfer for reaming of most materials

STANDARD PACKAGE All sizes — 1 each

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
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

Alésoir machine — Rima de máquina

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

List No. 1656

45° Chamfer for reaming of most materials.

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
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.

Alésoir expansible en bout Rima de expansión

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*
3/4	.7500	2	1 3/8	9 1/2	6	22961
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 1/4	1.2500	4	1 7/8	11 1/2	8	22969
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.

Alésoir machine Rima de máquina

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/+.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

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.

Alésoir au carbure | Rima de carburo

List No. 5661

STANDARD PACKAGE All sizes — 1 each

TOLERANCES
.0280" – .2500" – +.0000/+.0002
.2501" and up – +.0000/+.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
	.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
	.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

(continued)

Tool Coatings Also Available

SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2
.0420"-.0650"	3/8	1-1/2
.0655"-.0810"	1/2	1-3/4

SIZE RANGE	FLUTE LENGTH	OAL
.0815"-.0965"	1/2	2
.0970"-.1300"	5/8	2-1/4
.1305"-.1605"	3/4	2-1/2

SIZE RANGE	FLUTE LENGTH	OAL
.1610"-.1915"	7/8	2-3/4
.1920"-.2555"	1	3
.2559"-.3165"	1-1/8	3-1/4

SIZE RANGE	FLUTE LENGTH	OAL
.3170"-.4160"	1-1/4	3-1/2
.4170"-.4780"	1-3/8	4
.4790"-.5625"	1-1/2	4
.5905"-.7510"	1-3/4	4

Solid Carbide Straight Shank Chucking Reamers

(continued)

Alésoir au carbure — Rima de carburo

List No. 5661
STANDARD PACKAGE All sizes — 1 each

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
	.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
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
.0280"-.0415"	1/4	1-1/2
.0420"-.0650"	3/8	1-1/2
.0655"-.0810"	1/2	1-3/4

SIZE RANGE	FLUTE LENGTH	OAL
.0815"-.0965"	1/2	2
.0970"-.1300"	5/8	2-1/4
.1305"-.1605"	3/4	2-1/2

SIZE RANGE	FLUTE LENGTH	OAL
.1610"-.1915"	7/8	2-3/4
.1920"-.2555"	1	3
.2559"-.3165"	1-1/8	3-1/4

SIZE RANGE	FLUTE LENGTH	OAL
.3170"-.4160"	1-1/4	3-1/2
.4170"-.4780"	1-3/8	4
.4790"-.5625"	1-1/2	4
.5905"-.7510"	1-3/4	4

Solid Carbide Straight Shank Chucking Reamers

(continued)

Alésoir au carbure — Rima de carburo

List No. 5661

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. SIZE	EDP NO.
	.1625	54232
	.1630	54233
	.1635	54234
	.1640	54235
	.1645	54236
	.1650	54237
	.1655	54238
19	.1660	54239
	.1665	54240
	.1670	54241
	.1675	54242
	.1680	54243
	.1685	54244
	.1690	54245
18	.1695	54246
	.1700	54247
	.1705	54248
	.1710	54249
	.1715	54250
11/64	.1719	54251
	.1720	54252
	.1725	54253
17	.1730	54254
	.1735	54255
	.1740	54256
	.1745	54257
	.1750	54258
	.1755	54259
	.1760	54260
	.1765	54261
16	.1770	54262
4.5 mm	.1772	54263
	.1775	54264
	.1780	54265
	.1785	54266
	.1790	54267
	.1795	54268
15	.1800	54269
	.1805	54270
	.1810	54271
	.1814	54272
	.1815	54273
14	.1820	54274
	.1825	54275
	.1830	54276
	.1835	54277
	.1840	54278
	.1845	54279
13	.1850	54280
.1855 D/P	.1855	54281
	.1860	54282
.1865 U/S	.1865	54283
	.1867	54744
.1870 D/P	.1870	54284
	.1872	54285
3/16	.1875	54286
	.1877	54745
	.1880	54287
.1885 O/S	.1885	54288
12	.1890	54289
	.1895	54290
	.1900	54291
	.1905	54292
11	.1910	54293
	.1915	54294
	.1920	54295
	.1925	54296
	.1930	54297
10	.1935	54298
	.1940	54299
	.1945	54300
	.1950	54301
	.1955	54302
9	.1960	54303
	.1965	54304
5.0 mm	.1969	54305
	.1970	54306
	.1975	54307
	.1980	54308
	.1985	54309
8	.1990	54310
	.1995	54311
	.2000	54312
	.2005	54313
7	.2010	54314
	.2015	54315
	.2020	54316
	.2025	54317
	.2030	54318
13/64	.2031	54319
	.2035	54320
6	.2040	54321
	.2045	54322
	.2050	54323
5	.2055	54324
	.2060	54325
	.2065	54326
	.2070	54327
	.2075	54328
	.2080	54329
	.2085	54330
4	.2090	54331
	.2095	54332
	.2100	54333
	.2105	54334
	.2110	54335
	.2115	54336
	.2120	54337
	.2125	54338
3	.2130	54339
	.2135	54340
	.2140	54341
	.2145	54342
	.2150	54343
	.2155	54344
	.2160	54345
5.5 mm	.2165	54346
	.2170	54347
	.2175	54348
	.2177	54349
	.2180	54350
	.2185	54351
7/32	.2188	54352
	.2190	54353
	.2195	54354
	.2200	54355
	.2205	54356
2	.2210	54357
	.2215	54358
	.2220	54359
	.2225	54360
	.2230	54361
	.2235	54362
	.2240	54363
	.2245	54364
	.2250	54365
	.2255	54366
	.2260	54367
	.2265	54368
	.2270	54369
	.2275	54370
1	.2280	54371
	.2285	54372
	.2290	54373
	.2295	54374
	.2300	54375
	.2305	54376
	.2310	54377
	.2315	54378
	.2320	54379
	.2325	54380
	.2330	54381
	.2335	54382
A	.2340	54383
15/64	.2344	54384
	.2345	54385
	.2350	54386
	.2355	54387
	.2360	54388
6.0 mm	.2362	54389
	.2365	54390
	.2370	54391
	.2375	54392
B	.2380	54393

(continued)

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

Solid Carbide Straight Shank Chucking Reamers

(continued)

Alésoir au carbure — Rima de carburo

List No. 5661

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. SIZE	EDP NO.
	.2385	54394
	.2390	54395
	.2395	54396
	.2400	54397
	.2405	54398
	.2410	54399
	.2415	54400
C	.2420	54401
	.2425	54402
	.2430	54403
	.2435	54404
	.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
1/4 (E)	.2500	54417
	.2502	54747
	.2505	54418
.2510 O/S	.2510	54419
	.2515	54420
	.2520	54421
	.2525	54422
	.2530	54423
	.2535	54424
	.2540	54425
	.2545	54426
	.2550	54427
	.2555	54748
6.5 mm	.2559	54428
	.2560	54429
	.2565	54430
F	.2570	54431
	.2575	54432
	.2580	54433
	.2590	54434
	.2600	54435
G	.2610	54436
	.2620	54437
	.2630	54438
	.2635	54439
	.2640	54440
	.2650	54441
	.2655	54749
17/64	.2656	54442
H	.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
7.0 mm	.2756	54453
	.2760	54454
	.2765	54751
J	.2770	54455
	.2780	54456
	.2785	54752
	.2790	54457
	.2800	54458
	.2805	54753
K	.2810	54459
9/32	.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
7.5 mm	.2953	54476
	.2960	54477
19/64	.2969	54478
	.2970	54479
	.2980	54480
	.2990	54481
	.3000	54482
	.3010	54483
N	.3020	54484
	.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
	.3145	54754
8.0 mm	.3150	54501
	.3155	54755
O	.3160	54502
	.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	54513
	.3280	54514
21/64	.3281	54515
	.3290	54516
	.3300	54517
	.3310	54518
Q	.3320	54519
	.3330	54520
	.3340	54521
8.5 mm	.3346	54522
	.3350	54523
	.3360	54524
	.3365	54762
	.3370	54525
	.3380	54526
R	.3390	54527
	.3400	54528
	.3410	54529
	.3420	54530
	.3430	54531
11/32	.3438	54532
	.3440	54533
	.3450	54534
	.3460	54535
	.3465	54763
	.3470	54536
S	.3480	54537
	.3490	54538
	.3500	54539
	.3510	54540
	.3520	54541
	.3530	54542
	.3540	54543
9.0 mm	.3543	54544
	.3550	54545
	.3560	54546
	.3570	54547
T	.3580	54548
	.3590	54549
23/64	.3594	54550
	.3600	54551
	.3610	54552
	.3620	54553
	.3630	54554
	.3640	54555

(continued)

SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2
.0420"-.0650"	3/8	1-1/2
.0655"-.0810"	1/2	1-3/4

SIZE RANGE	FLUTE LENGTH	OAL
.0815"-.0965"	1/2	2
.0970"-.1300"	5/8	2-1/4
.1305"-.1605"	3/4	2-1/2

SIZE RANGE	FLUTE LENGTH	OAL
.1610"-.1915"	7/8	2-3/4
.1920"-.2555"	1	3
.2559"-.3165"	1-1/8	3-1/4

SIZE RANGE	FLUTE LENGTH	OAL
.3170"-.4160"	1-1/4	3-1/2
.4170"-.4780"	1-3/8	4
.4790"-.5625"	1-1/2	4
.5905"-.7510"	1-3/4	4

Solid Carbide Straight Shank Chucking Reamers

(continued)

Alésoir au carbure — Rima de carburo

List No. 5661

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. SIZE	EDP NO.
	.3650	54556
	.3660	54557
	.3670	54558
	.3675	54764
U	.3680	54559
	.3690	54560
	.3700	54561
	.3710	54562
	.3720	54563
.3730 D/P	.3730	54564
	.3735	54765
9.5 mm	.3740	54565
.3745 D/P	.3745	54566
3/8	.3750	54567
	.3755	54568
.3760 O/S	.3760	54569
	.3765	54570
V	.3770	54571
	.3780	54572
	.3790	54573
	.3795	54766
	.3800	54574
	.3810	54575
	.3820	54576
	.3830	54577
	.3840	54578
	.3850	54579
W	.3860	54580
	.3870	54581
	.3880	54582
	.3890	54583
	.3900	54584
25/64	.3906	54585
	.3910	54586
	.3920	54587
	.3930	54588
10.0 mm	.3937	54589
	.3940	54590
	.3950	54591
	.3960	54592
X	.3970	54593
	.3980	54594
	.3990	54595
	.4000	54596
	.4010	54597
	.4020	54598
	.4030	54599
Y	.4040	54600
	.4050	54601
	.4060	54602
13/32	.4062	54603
	.4070	54604
	.4080	54605
	.4090	54606
	.4100	54607
	.4110	54608
	.4120	54609
Z	.4130	54610
10.5 mm	.4134	54611
	.4140	54612
	.4150	54613
	.4160	54614
	.4170	54615
	.4180	54616
	.4190	54617
	.4200	54618
	.4210	54619
27/64	.4219	54620
	.4230	54621
	.4240	54622
	.4250	54623
	.4260	54624
	.4270	54625
	.4280	54626
	.4290	54627
	.4300	54628
	.4310	54629
	.4320	54630
	.4330	54631
11.0 mm	.4331	54632
	.4340	54633
	.4350	54634
.4355 D/P	.4355	54635
	.4360	54636
.4365 U/S	.4365	54637
.4370 D/P	.4370	54638
7/16	.4375	54639
	.4380	54640
.4385 O/S	.4385	54641
	.4390	54642
	.4400	54643
	.4410	54644
	.4420	54645
	.4430	54646
	.4440	54647
	.4450	54648
	.4460	54649
	.4470	54650
	.4480	54651
	.4490	54652
	.4500	54653
	.4510	54654
	.4520	54655
11.5 mm	.4528	54656
	.4530	54657
29/64	.4531	54658
	.4540	54659
	.4550	54660
	.4560	54661
	.4570	54662
	.4580	54663
	.4590	54664
	.4600	54665
	.4610	54666
	.4620	54667
	.4630	54668
	.4640	54669
	.4650	54670
	.4660	54671
	.4670	54672
	.4680	54673
15/32	.4688	54674
	.4690	54675
	.4700	54676
	.4710	54677
	.4720	54678
12.0 mm	.4724	54679
	.4730	54680
	.4740	54681
	.4750	54682
	.4760	54683
	.4770	54684
	.4780	54685
	.4790	54686
	.4800	54687
	.4805	54688
	.4810	54689
	.4820	54690
	.4830	54691
	.4840	54692
31/64	.4844	54693
	.4850	54694
	.4860	54695
	.4870	54696
	.4880	54697
	.4890	54698
	.4900	54699
	.4910	54700
12.5 mm	.4921	54701
	.4930	54702
	.4940	54703
	.4950	54704
	.4960	54705
	.4970	54706
.4980 D/P	.4980	54707
.4990 U/S	.4990	54708
.4995 D/P	.4995	54709
1/2	.5000	54710
	.5005	54711
.5010 O/S	.5010	54712
	.5015	54713
	.5020	54714
	.5030	54715
	.5040	54716
	.5050	54717
13.0 mm	.5118	54718
14.0 mm	.5512	54719
9/16	.5625	54720
15.0 mm	.5905	54721
	.6235	54722
	.6240	54723
	.6245	54724
5/8	.6250	54725
	.6255	54726
	.6260	54727
	.6270	54728
16.0 mm	.6299	54729
	.6310	54730
	.7490	54731
	.7495	54732
3/4	.7500	54733
	.7505	54734
	.7510	54735

SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2
.0420"-.0650"	3/8	1-1/2
.0655"-.0810"	1/2	1-3/4

SIZE RANGE	FLUTE LENGTH	OAL
.0815"-.0965"	1/2	2
.0970"-.1300"	5/8	2-1/4
.1305"-.1605"	3/4	2-1/2

SIZE RANGE	FLUTE LENGTH	OAL
.1610"-.1915"	7/8	2-3/4
.1920"-.2555"	1	3
.2559"-.3165"	1-1/8	3-1/4

SIZE RANGE	FLUTE LENGTH	OAL
.3170"-.4160"	1-1/4	3-1/2
.4170"-.4780"	1-3/8	4
.4790"-.5625"	1-1/2	4
.5905"-.7510"	1-3/4	4

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 ½" — +.0002/-0
over ½" to ⅝" — +.0003/-0
over ⅝" to 1½" — +.0001/+.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 7/8	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

Alésoir à main — Rima de mano

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
9/32	.2812	2 1/8	4 1/4	6	21292*
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 7/8	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 1/8	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.

Alésoir de chaudronnerie — Rima estructural

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 3/4	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.

Alésoir conique Rima conica

List No. 1636 - Straight Shank

STANDARD PACKAGE All sizes — 1 each

DIA. OF REAMER LARGE END	DIA. OF REAMER SMALL END	MORSE TAPER NO.	FLUTE LENGTH	OAL	SHANK DIA.	EDP NO.
.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	1⅛	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.

Alésoir de construction Rima de construcción

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	3⅝	5¼	5	21000
7/16	.4375	7/16	.1645	3⅝	5¼	5	21001
½	.5000	½	.2340	4⅜	6	5	21002
9/16	.5625	½	.2920	5	6⅝	5	21003
5/8	.6250	½	.3520	5	6⅝	5	21004
11/16	.6875	½	.4140	5⅜	7	5	21005
¾	.7500	½	.4770	5⅜	7	5	21006
13/16	.8125	½	.5400	5⅝	7¼	5	21009
7/8	.8750	½	.6020	5⅝	7¼	5	21007
15/16	.9375	½	.6450	5⅝	7¼	5	21010
1	1.0000	½	.7270	5⅝	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	3⅝	5¼	5	21100
7/16	.4375	7/16	.1645	3⅝	5¼	5	21101
½	.5000	½	.2340	4⅜	6	5	21102
9/16	.5625	½	.2920	5	6⅝	5	21103
5/8	.6250	½	.3520	5	6⅝	5	21104
11/16	.6875	½	.4140	5⅜	7	5	21105
¾	.7500	½	.4770	5⅜	7	5	21106
13/16	.8125	½	.5400	5⅝	7¼	5	21109
7/8	.8750	½	.6020	5⅝	7¼	5	21107
15/16	.9375	½	.6450	5⅝	7¼	5	21110
1	1.0000	½	.7270	5⅝	7¼	5	21108

Taper Pin Reamers

High Speed Steel – Straight Shank
Right Hand Cut
1/4″ Taper Per Foot

Alésoir conique à goupilles Rima para agujeros cónicos

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

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

SIZE	SHANK DIA.	DIA. SMALL END	DIA. LARGE END	FLUTE LENGTH	OAL	1680 EDP NO.	NO. OF FLUTES	1683 EDP NO.	NO. OF FLUTES	1684 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	6	22626	4	22656	6
10	5/8	.5799	.7219	6 13/16	9 5/16	22597	6	22627	4	22657	6

Taper Pipe Reamers

High Speed Steel — Right Hand Cut
Left Hand Helical Flute

Fraise à tuyau Rima de tubería

List No. 2116

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

STANDARD PACKAGE All sizes —1 each

SIZE	DIA. LARGE END	DIA. SMALL END	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO
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

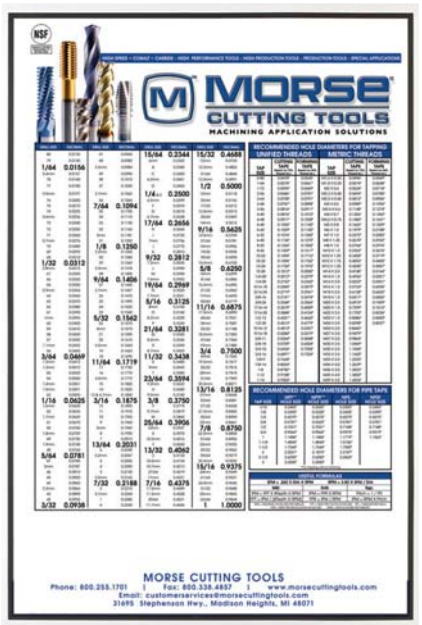
BURRS

CARBIDE BURRS — PAGE NO.

TECHNICAL DATA

Morse® Plastic Wall Chart

Tableau mural **Tabla mural**

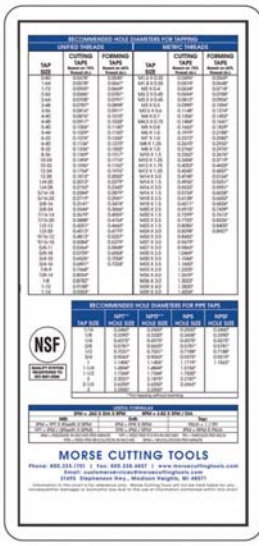


NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 36″ printed on heavy duty .023″ gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 **EDP No. 01650**

Decimal Equivalent Pocket Chart
List No. 1005

Tableau décimal **Tabla de medidas decimales**



Front **Back**

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜″ × 7″, Printed on plastic

Pack of 50 **EDP No. 20412**

Pack of 100 **EDP No. 20413**

Carbide Burrs
1/4″ Shank

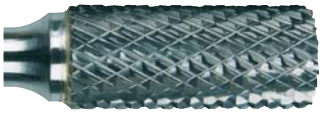
Fraise rotative au carbure | Rebabeador de carburo

Single Cut
General Purpose—Recommended for steel, cast iron, ferrous materials. Offers good stock removal and smooth workpiece finish.

Double Cut
For rapid stock removal in tough applications. Design reduces the pulling action, reduces size of chips, ensures rapid stock removal.

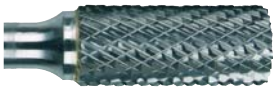
List No. 5970 Single Cut

List No. 5970 Double Cut



STANDARD PACKAGE All sizes — 1 each

Cylinder Shape No End Cut

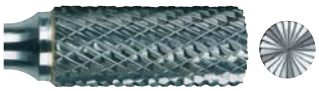


DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/8	SA-11	1/2	59715	59500
1/8	SA-12	5/8	59816	59501
5/32	SA-13	5/8	59817	59502
3/16	SA-14	5/8	59818	59503
1/4	SA-1	5/8	59716	59504
1/4	SA-1L	1	59717	59505
5/16	SA-2	3/4	59718	59506
3/8	SA-3	3/4	59719	59507
3/8	SA-3L	1	59720	59508
3/8	SA-3X	1 1/2	59819	59509
7/16	SA-4	1	59820	59510
1/2	SA-5	1	59721	59511
5/8	SA-6	1	59722	59512
3/4	SA-15	1/2	59821	59513
3/4	SA-16	3/4	59723	59516
3/4	SA-7	1	59822	59517
7/8	SA-8	1	59823	59518
1	SA-9	1	59824	59519

Cylinder Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/8	SC-11	1/2	59724	59536
1/8	SC-12	5/8	59843	59537
5/32	SC-13	5/8	59844	59538
3/16	SC-14	5/8	59845	59539
1/4	SC-1	5/8	59846	59540
1/4	SC-1L	1	59725	59541
5/16	SC-2	3/4	59726	59542
3/8	SC-3	3/4	59847	59543
3/8	SC-3L	1	59727	59544
3/8	SC-3X	1 1/2	59848	59545
7/16	SC-4	1	59849	59546
1/2	SC-5	1	59728	59547
5/8	SC-6	1	59729	59548
3/4	SC-15	1/2	59850	59550
3/4	SC-16	3/4	59730	59549
3/4	SC-7	1	59851	59551
1	SC-9	1	59852	59552

Cylinder Shape End Cut



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/8	SB-11	1/2	59825	59875
1/8	SB-12	5/8	59826	59876
5/32	SB-13	5/8	59827	59877
3/16	SB-14	5/8	59828	59878
1/4	SB-1	5/8	59829	59879
1/4	SB-1L	1	59830	59880
5/16	SB-2	3/4	59831	59881
3/8	SB-3	3/4	59832	59882
3/8	SB-3L	1	59833	59883
3/8	SB-3X	1 1/2	59834	59884
7/16	SB-4	1	59835	59885
1/2	SB-5	1	59836	59886
5/8	SB-6	1	59837	59887
3/4	SB-15	1/2	59838	59888
3/4	SB-16	3/4	59839	59889
3/4	SB-7	1	59840	59890
7/8	SB-8	1	59841	59891
1	SB-9	1	59842	59892

Ball Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/8	SD-11	3/32	59731	59554
3/16	SD-14	1/8	59732	59555
1/4	SD-1	1/4	59733	59556
5/16	SD-2	1/4	59734	59557
3/8	SD-3	5/16	59735	59558
7/16	SD-4	3/8	59853	59559
1/2	SD-5	7/16	59736	59560
5/8	SD-6	9/16	59737	59561
3/4	SD-7	11/16	59738	59562
1	SD-9	15/16	59854	59563

Tool Coatings Also Available

(continued)

Carbide Burrs 1/4″ Shank (continued)

List No. 5970

Fraise rotative au carbure **Rebabeador de carburo**

Oval Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
3/16	SE-11	5/16	59739	59564
1/4	SE-1	3/8	59740	59565
3/8	SE-3	3/4	59741	59566
1/2	SE-5	7/8	59742	59567
5/8	SE-6	1	59743	59568
3/4	SE-7	1	59744	59569

Tree Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/8	SF-11	1/2	59855	59570
1/4	SF-1	5/8	59745	59571
3/8	SF-3	3/4	59746	59572
7/16	SF-4	1	59856	59573
1/2	SF-13	3/4	59857	59575
1/2	SF-5	1	59747	59574
5/8	SF-6	1	59748	59576
3/4	SF-14	1 1/4	59749	59578
3/4	SF-15	1 1/2	59859	59579

Tree Shape Pointed End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/4	SG-1	5/8	59750	59580
5/16	SG-2	3/4	59751	59581
3/8	SG-3	3/4	59752	59582
1/2	SG-13	3/4	59753	59583
1/2	SG-5	1	59754	59584
5/8	SG-6	1	59755	59585
3/4	SG-7	1	59756	59586
3/4	SG-15	1 1/2	59860	59587

Flame Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/4	SH-1	5/8	59774	59780
5/16	SH-2	3/4	59775	59781
1/2	SH-5	1 1/4	59776	59782
5/8	SH-6	1 7/16	59777	59783
3/4	SH-7	1 5/8	59778	59784

60° Cone Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/4	SJ-1	3/16	59861	59793
3/8	SJ-3	5/16	59862	59794
1/2	SJ-5	7/16	59863	59795
5/8	SJ-6	9/16	59864	59796
3/4	SJ-7	11/16	59865	59797
1	SJ-9	15/16	59866	59798

90° Cone Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/4	SK-1	1/8	59867	59800
3/8	SK-3	3/16	59868	59801
1/2	SK-5	1/4	59869	59802
5/8	SK-6	5/16	59870	59803
3/4	SK-7	3/8	59871	59804
1	SK-9	1/2	59872	59805

Taper Shape Radius End

14° Included Angle

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/4	SL-1	5/8	59757	59605
5/16	SL-2	7/8	59758	59606
3/8	SL-3	1 1/16	59759	59607
1/2	SL-4	1 1/8	59760	59608
5/8	SL-5	1 3/16	59873	59609
5/8	SL-6	1 5/16	59761	59610
3/4	SL-7	1 1/2	59762	59611

Cone Shape

DIA.	TOOL NO.	INCL. ANGLE	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/4	SM-1	22°	1/2	59763	59612
1/4	SM-2	14°	3/4	59764	59613
1/4	SM-3	10°	1	59765	59614
3/8	SM-4	28°	5/8	59766	59615
1/2	SM-5	28°	7/8	59767	59616
5/8	SM-6	31°	1	59768	59617

(continued)

Carbide Burrs 1/4″ Shank (continued)

List No. 5970

Fraise rotative au carbure — Rebabeador de carburo

Inverted Cone Shape

DIA.	TOOL NO.	INCL. ANGLE	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT
1/4	SN-1	10°	5/16	59769	59618
3/8	SN-2	13°	3/8	59770	59619
1/2	SN-4	28°	1/2	59771	59620
5/8	SN-6	18°	3/4	59772	59621
3/4	SN-7	30°	5/8	59773	59622

Carbide Burrs For Non-Ferrous Materials

Fraise rotative au carbure — Rebabeador de carburo

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

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
1/4	SA-1-NF	3/4	59625
3/8	SA-3-NF	3/4	59626
1/2	SA-5-NF	1	59627
5/8	SA-6-NF	1	59628
3/4	SA-7-NF	1	59629
3/4	SA-7-NF 3/8	1	59810*

Oval Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
3/8	SE-3-NF	5/8	59640
1/2	SE-5-NF	7/8	59641
5/8	SE-6-NF	1	59642
3/4	SE-7-NF	1	59643
3/4	SE-7-NF 3/8	1	59813*

Cylinder Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
1/4	SC-1-NF	3/4	59630
3/8	SC-3-NF	3/4	59631
1/2	SC-5-NF	1	59632
5/8	SC-6-NF	1	59633
3/4	SC-7-NF	1	59634
3/4	SC-7-NF 3/8	1	59811*

Tree Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
1/4	SF-1-NF	3/4	59644
3/8	SF-3-NF	3/4	59645
1/2	SF-5-NF	1	59646
5/8	SF-6-NF	1	59647
3/4	SF-14-NF	1 1/4	59648
3/4	SF-14-NF 3/8	1 1/4	59814*

Ball Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
1/4	SD-1-NF	3/16	59635
3/8	SD-3-NF	5/16	59636
1/2	SD-5-NF	7/16	59637
5/8	SD-6-NF	9/16	59638
3/4	SD-7-NF	11/16	59639
3/4	SD-7-NF3/8	11/16	59812*

Taper Shape Radius End

14° Included Angle

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
3/8	SL-3-NF	1 1/16	59649
1/2	SL-4-NF	1 1/8	59650
5/8	SL-5-NF	1 3/16	59651
5/8	SL-6-NF	1 5/16	59652
3/4	SL-7-NF	1 1/2	59653
3/4	SF-7-NF3/8	1 1/2	59815*

*Note: Tool No. indicated with 3/8 are furnished with 3/8" shank.

Long Shank Carbide Burrs
1/4″ × 6″ Long Steel Shank

Fraise rotative au carbure Rebabeador de carburo

Single Cut & Double Cut

List 5970

STANDARD PACKAGE All sizes — 1 each

Cylinder Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT
¼	SA-1L6	½	59655	59925
⅜	SA-3L6	¾	59656	59926
½	SA-5L6	1	59657	59927

Tree Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT
¼	SF-1L6	½	59667	59937
⅜	SF-3L6	¾	59668	59938
½	SF-5L6	1	59669	59939

Cylinder Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT
¼	SC-1L6	½	59658	59928
⅜	SC-3L6	¾	59659	59929
½	SC-5L6	1	59660	59930

Tree Shape Pointed End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT
¼	SG-1L6	½	59670	59940
⅜	SG-3L6	¾	59671	59941
½	SG-5L6	1	59672	59942

Ball Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT
¼	SD-1L6	3/16	59661	59931
⅜	SD-3L6	5/16	59662	59932
½	SD-5L6	7/16	59663	59933

Flame Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT
5/16	SH-2L6	¾	59673	59943
½	SH-5L6	⅞	59674	59944

Oval Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT
¼	SE-1L6	⅜	59664	59934
⅜	SE-3L6	⅝	59665	59935
½	SE-5L6	⅞	59666	59936

Taper Shape Radius End — 14°

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT
¼	SL-1L6	⅜	59675	59945
⅜	SL-3L6	⅝	59676	59946
½	SL-4L6	⅞	59677	59947

Carbide Burrs
1/4″ Dia. – 1/8″ Steel Shank

Fraise rotative au carbure Rebabeador de carburo

Single Cut

List 5970

STANDARD PACKAGE All sizes — 1 each

EDP NO.	59678	59679	59680	59681	59682	59683	59684	59685	59686
TOOL NO.	SA-51	SB-51	SC-51	SD-51	SE-51	SF-51	SG-51	SM-51	SN-51
LOC	½	¼	½	¼	⅜	½	½	½	¼

Carbide Burrs – 1/8″ Shank

Double Cut

Fraise rotative au carbure **Rebabeador de carburo**

List 5970
STANDARD PACKAGE All sizes — 1 each

EDP NO.	59688	59689	59713	59690	59691	59692	59693	59694	59695	59696	59697	59698	59699	59700	59701	59702	59703	59714
TOOL NO.	SC-53	SD-53	SA-41	SA-43	SA-42	SC-42	SC-41	SD-42	SE-41	SF-41	SG-41	SJ-42	SL-41	SH-41	SN-42	SK-42	SB-41	SB-43
DIA.	3/16	3/16	1/16	1/8	3/32	1/8	3/32	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/16	1/8
L.O.C.	1/2	5/32	1/4	5/8	1/2	5/8	1/2	1/8	3/16	1/4	1/4	3/16	13/32	3/16	1/8	1/8	1/4	5/8

EDP NO.	59893	59894	59895	59896	59897	59898	59899	59900
TOOL NO.	SL-42	SD-41	SF-42	SF-53	SG-43	SG-44	SM-42	SM-43
DIA.	1/8	3/32	1/8	3/16	1/8	1/8	1/8	1/8
L.O.C.	1/2	3/32	1/2	1/2	3/8	1/2	7/16	5/8

Tool Coatings Also Available

Decimal Equivalent Pocket Chart

List No. 1005

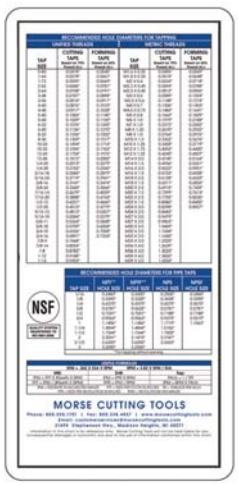
Tableau décimal **Tabla de medidas decimales**

NEW LOOK! LARGER SIZE! Decimal Equivalents.
Tap Drill Sizes for inch, metric and pipe threads.
Size: 3⅜″ × 7″, Printed on plastic

Pack of 50
EDP No. 20412

Pack of 100
EDP No. 20413

Front



Back

Carbide Burr Sets — Double Cut

List 5970

Jeu de fraises rotatives au carbure **Conjunto de rebabadores de carburo**

Supplied in a premium hardwood case.

EDP	SET NO.	SHANK DIA.	INCLUDES
59687	C-300	⅛	SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51
59711	C-100	⅛	SA-43, SA-42, SC-42, SC-41, SD-42, SE-41, SF-41, SG-41, SJ-42, SL-41, SH-41, SN-42
59901	C-150	⅛	SA-42, SA-43, SC-42, SC-41, SF-42, SG-42, SM-43, SE-41, SD-42
59712	C-200	¼	SA-1, SA-14, SC-1, SC-14, SD-1, SE-1, SF-1, SG-1, SK-1, SL-1, SH-1, SN-1
59903	C-350	⅛	SA-51, SC-51, SF-51, SG-51, SM-51, SD-51
59905	C-400	¼	SA-1, SC-1, SF-1, SG-1, SM-2, SE-1, SL-1, SD-1
59907	C-450	¼	SA-5, SC-5, SF-5, SG-5, SM-5, SE-5, SL-4, SD-5
59909	C-500	¼	SA-5, SC-5, SD-5, SE-5, SG-5, SM-5, SL-4, SH-5
59911	C-550	¼	SA-5, SC-1, SC-3, SD-3, SE-5, SH-5, SK-5, SG-1
59913	C-600	¼	SA-1, SA-5, SC-1, SC-3, SC-5, SF-5, SL-3, SL-4
59915	C-650	¼	SB-1, SC-3, SD-2, SE-5, SF-5, SL-4, SG-3, SM-5
59917	C-700	¼	SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SF-1, SF-3, SF-5
59918	C-725	¼	SA-5, SC-3, SC-5, SD-5, SF-3, SF-5, SG-3, SL-4
59919	C-750	¼	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

Carbide Burrs Application Data

STYLE OF CUT	MATERIAL			
	ALUMINUM	BRASS, COPPER	CAST IRON	PLASTICS
Single		☆	☆	
Double		☆	☆	
NF Style	☆			☆

STYLE OF CUT	MATERIAL		
	STEEL-UP TO 40-60 Rc	TITANIUM	ZINC
Single	☆	☆	
Double	☆	☆	
NF Style			☆

RECOMMENDED CUTTING SPEEDS

BURR DIAMETER	R.P.M.
1/16	55000-85000
3/32	50000-60000
⅛	35000-65000
3/16	30000-55000
¼	25000-50000
5/16	18000-38000
⅜	17000-38000
7/16	13000-37000
½	14000-36000
⅝	11000-23000
¾	8000-19000
1	7000-18000

Increase speeds for softer non-ferrous materials.
Decrease speeds for harder ferrous materials.

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.

Single Cut

General Purpose. Recommended for steel, cast iron, ferrous materials. Offers good stock removal and smooth workpiece finish.

Non-Ferrous Cut

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.

COUNTERBORES
COUNTERSINKS
CENTER DRILLS
SPOTTING DRILLS

M42 8% Cobalt Zero Flute Countersink & Deburring Tools

Fraise au cobalt — Avellanador de cobalto

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.

M42 8% 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.

List No. 1753

SIZE	DIA. OF CUT MIN.	DIA. OF CUT MAX.	BODY DIA.	SHANK DIA.	OAL	EDP NO. 60°	EDP NO. 82°	EDP NO. 90°
#0*	.09	.23	¼	¼	1½	25600	25610	25620
#1	.15	.40	7⁄16	¼	2 1⁄32	25601	25611	25621
#2	.19	.52	9⁄16	¼	2	25602	25612	25622
#3	.28	.75	13⁄16	½	2⅝	25603	25613	25623
#4	.46	1.08	1⅛	½	2⅞	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)

Fraise — Avellanador

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

List No. 1752

SIZE	SHANK DIA.	OAL	EDP NO. 60°	EDP NO. 82°	EDP NO. 90°	EDP NO. 100°	EDP NO. 120°
⅛	⅛	1½	25567	25568	25569	25570	25639
¼	¼	2	25571	25572	25573	25574	25640
⅜	¼	2	25575	25576	25577	25578	25641
½	¼	2	25579	25580	25581	25582	25642
⅝	½	2¼	25583	25584	25585	25586	25643
¾	½	2¾	25587	25588	25589	25590	25644
1	½	2¾	25591	25592	25593	25594	25645
1¼	½	3	25630	25631	25632	—	—
1½	¾	3½	25633	25634	25635	—	—
2	¾	3¾	25636	25637	25638	—	—

M42 8% Cobalt Titanium Nitride (TiN) Coated Single Flute Countersinks

Fraise au cobalt — Avellanador de cobalto

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.

M42 8% 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.

List No. 1754

STANDARD PACKAGE All sizes — 1 each

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

Fraise au carbure | Avellanador de carburo

List No. 5752

STANDARD PACKAGE All sizes — 1 each

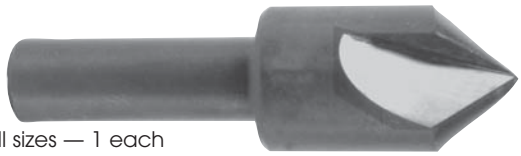
SIZE	SHANK DIA.	OAL	EDP NO. 60°	82°	90°	100°	120°
1/8	1/8	1 1/2	56101	56102	56103	56119	56120
1/4	1/4	2	56104	56105	56106	56121	56122
3/8	1/4	2 1/2	56107	56108	56109	56123	56124
1/2	1/4	2 1/2	56110	56111	56112	56125	56126
3/4	3/8	3	56113	56114	56115	56127	56128
1	1/2	3	56116	56117	56118	56129	56130
1 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

Center Reamers

High Speed Steel – 3-Flute Treated (Black Oxide)

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

Fraise conique une taille à centrer | Escariador para centrar



List No. 1750

STANDARD PACKAGE All sizes — 1 each

SIZE	SHANK DIA.	OAL	EDP NO. 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

STANDARD PACKAGE
All sizes — 1 each

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.

Fraise au carbure | Avellanador de carburo

List No. 5753

SIZE	SHANK DIA.	OAL	EDP NO. 60°	82°	90°	100°	120°
1/8	1/8	1 1/2	56163	56171	56179	56187	56193
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
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	—	—

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

Fraise | Avellanador

List No. 1751

SIZE	SHANK DIA.	SHANK LENGTH	OAL	EDP NO. 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

STANDARD PACKAGE
All sizes — 1 each

Fraise au carbure | Avellanador de carburo

List No. 5755

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 DIA.	OAL	EDP NO. 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 8% Cobalt Titanium Nitride (TiN) Coated Six Flute Chatterless Countersinks

Fraise au cobalt | Avellanador de cobalto

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.

M42 8% 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 DIA.	OAL	EDP NO. 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

Fraise au carbure | Avellanador de carburo

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 DIA.	OAL	EDP NO. 60°	82°	90°	100°	120°
1/8	1/8	1-1/2	56096	56097	56098	56099	56100
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
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	—	—

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

Foret-fraise Combinación de broca y avellanador

List No. 1495 Plain Type

List No. 1498 Bell Type

List No. 1499 Long Plain Type

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. 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

Foret-fraise Combinación de broca y avellanador

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

Foret-fraise au carbure

Combinación de broca y avellanador de carburo

Standard Length

Long Length

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.

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. 5495 Uncoated

List No. 5495T ALTiN Coated

STANDARD PACKAGE All sizes — 1 each

Standard Length

SIZE	DRILL DIA.	BODY DIA.	OAL	60° INCL. ANGLE UNCOATED EDP NO.	60° INCL. ANGLE ALTiN EDP NO.	82° INCL. ANGLE UNCOATED EDP NO.	82° INCL. ANGLE ALTiN EDP NO.	90° INCL. ANGLE UNCOATED EDP NO.	90° INCL. ANGLE ALTiN 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 UNCOATED EDP NO.	60° INCL. ANGLE ALTiN EDP NO.	82° INCL. ANGLE UNCOATED EDP NO.	82° INCL. ANGLE ALTiN EDP NO.	90° INCL. ANGLE UNCOATED EDP NO.	90° INCL. ANGLE ALTiN 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

Foret à centrer | Broca para centrar

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	1¼	10280*
11/64	.1719	1	1½	10282*
13/64	.2031	1	1½	10284*

*Available While Supplies Last

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
3/8	.3750	1	2	16001
½	.5000	1	2	16002
5/8	.6250	1⅛	2¼	16003
¾	.7500	1⅛	2¼	16004
1	1.0000	1¼	2½	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.

Foret à pointer | Broca de puntear

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.
¼	.2500	1	2½	11900	11906
3/8	.3750	1⅛	3⅛	11901	11907
½	.5000	1½	3¾	11902	11908
5/8	.6250	1⅝	4¼	11903	11909
¾	.7500	1¾	5	11904	11910
1	1.0000	1¾	6	11905	11911

Regular Length

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	90° EDP NO.	120° EDP NO.
¼	.2500	1	4	11912	11918
3/8	.3750	1⅛	5	11913	11919
½	.5000	1½	6	11914	11920
5/8	.6250	1⅝	7⅛	11915	11921
¾	.7500	1¾	8	11916	11922
1	1.0000	1¾	8	11917	11923

M42 8% Cobalt NC Spotting Drills

Tool Coatings Also Available

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.

Foret à pointer | Broca de puntear

List No. 1441C

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	82° EDP NO.	90° EDP NO.	120° EDP NO.
¼	.2500	7/8	2-5/8	11936	11941	11946
3/8	.3750	1	3-1/2	11937	11942	11947
½	.5000	1-3/8	4	11938	11943	11948
5/8	.6250	1-3/8	4-1/2	11939	11944	11949
¾	.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.

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.

Foret à pointer Broca de puntear

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 90° EDP NO.	UNCOATED LIST NO. 1440 120° EDP NO.	UNCOATED LIST NO. 1440 140° EDP NO.	ALTIN COATED LIST NO. 1440T 90° EDP NO.	ALTIN COATED LIST NO. 1440T 120° EDP NO.	ALTIN COATED LIST NO. 1440T 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 – 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.

Cap Screw Counterbores

Fraise à lamer | Broca para hacer cajas

High Speed Steel — Straight Shank — 4-Flute

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 SIZE	PILOT TOLERANCE	PILOT DIA.	PILOT LENGTH	CUTTER DIA. FLUTE LENGTH	SHANK DIA.	OAL	EDP NUMBER
.183	4	Standard	.1120	1/8	9/16	.1562	3 7/8	25718
.215	4	+1/32 Over	.1430	1/8	9/16	.1562	3 7/8	25719
.205	5	Standard	.1250	5/32	5/8	.1875	4 1/8	25720
.237	5	+1/32 Over	.1560	5/32	5/8	.1875	4 1/8	25721
.227	6	Standard	.1380	3/16	3/4	.2188	4 5/8	25722
.259	6	+1/32 Over	.1690	3/16	3/4	.2188	4 5/8	25723
.270	8	Standard	.1640	7/32	3/4	.2500	5	25724
.302	8	+1/32 Over	.1950	7/32	3/4	.2500	5	25725
.312	10	Standard	.1900	1/4	7/8	.2812	5 1/4	25726
.344	10	+1/32 Over	.2180	1/4	7/8	.2812	5 1/4	25727
.380	1/4	Standard	.2500	9/32	1	.3125	5 5/8	25741
.412	1/4	+1/32 Over	.2810	9/32	1	.3125	5 5/8	25728
.474	5/16	Standard	.3125	5/16	1	.3750	6 1/8	25742
.504	5/16	+1/32 Over	.3430	5/16	1	.3750	6 1/8	25729
.569	3/8	Standard	.3750	3/8	1 1/4	.5000	6 1/2	25743
.601	3/8	+1/32 Over	.4060	3/8	1 1/4	.5000	6 1/2	25730
.661	7/16	Standard	.4370	7/16	1 1/4	.5000	7	25744
.691	7/16	+1/32 Over	.4680	7/16	1 1/4	.5000	7	25731
.755	1/2	Standard	.5000	1/2	1 1/2	.5000	7 1/2	25745
.787	1/2	+1/32 Over	.5310	1/2	1 1/2	.5000	7 1/2	25732
.943	5/8	Standard	.6250	5/8	1 1/2	.6250	7 5/8	25733
.975	5/8	+1/32 Over	.6560	5/8	1 1/2	.6250	7 5/8	25734
1.131	3/4	Standard	.7500	3/4	1 5/8	.7500	7 3/4	25735
1.163	3/4	+1/32 Over	.7810	3/4	1 5/8	.7500	7 3/4	25736
1.320	7/8	Standard	.8750	7/8	1 7/8	.8750	8	25737
1.352	7/8	+1/32 Over	.9060	7/8	1 7/8	.8750	8	25738
1.508	1	Standard	1.0000	1	2	1.0000	8 1/2	25739
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 SIZE	PILOT DIA.	PILOT LENGTH	CUTTER DIA. FLUTE LENGTH	SHANK DIA.	OAL	EDP NUMBER
.2362	3mm	.1377	5/32	5/8	.1875	4 1/8	25746
.2953	4mm	.1772	7/32	3/4	.2500	5	25747
.3543	5mm	.2165	9/32	1	.3125	5 5/8	25748
.4134	6mm	.2559	5/16	1	.3750	6 1/8	25749
.5315	8mm	.3346	3/8	1 1/4	.5000	6 1/2	25750
.6496	10mm	.4134	7/16	1 1/4	.5000	7	25751
.7283	12mm	.4921	1/2	1 1/2	.5000	7 1/2	25752
.9645	16mm	.6500	5/8	1 1/2	.6250	7 5/8	25754
1.2010	20mm	.8070	7/8	1 7/8	.8750	8	25756
1.4370	24mm	.9650	1	2	1.0000	8 1/2	25758

Interchangeable Pilot Counterbores

Short Series — High Speed Steel

For use with interchangeable pilots (list no. 776). For general purpose counterboring and spot facing.

Fraise à lamer | Broca para hacer cajas

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

TOOL COATING SERVICE

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

TiN — Titanium Nitride	**TiCN —** Titanium Carbonite
TiALN — Titanium Aluminum Nitride	**ALTiN —** Aluminum Titanium Nitride
CrN — Chromium Nitride	**CrC —** Chromium Carbide

Interchangeable Pilots For Counterbores

Carbon Steel

Fraise à lamer avec guide Piloto de broca para hacer cajas

List No. 0776

STANDARD PACKAGE All sizes — 1 each

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

*Available While Supplies Last

Morse® Plastic Wall Chart

Tableau mural Tabla mural

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 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.

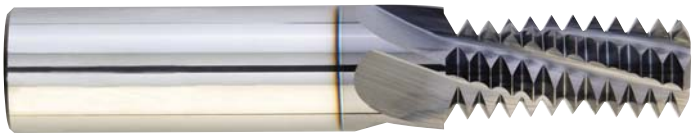
List No. 1007 **EDP No. 01650**

TAPS & DIES

Solid Carbide Thread Mills

ALTiN Coated
10% Micrograin Carbide
20° Helix Angle

Fraise à fileter au carbure Fresa de roscar de carburo



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.

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.

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 128

Solid Carbide Thread Mills

Fraise à fileter au carbure Fresa de roscar de carburo

ALTiN Coated
10% Micrograin Carbide
20° Helix Angle

List No. 5902 Pipe Thread

Pipe Thread

SIZE	SHANK DIA.	CUTTING DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
NPT						
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**
NPTF						
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

Fraise à fileter au carbure Fresa de roscar de carburo

Speeds & Feeds: Page 128

ALTiN Coated
10% Micrograin Carbide

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

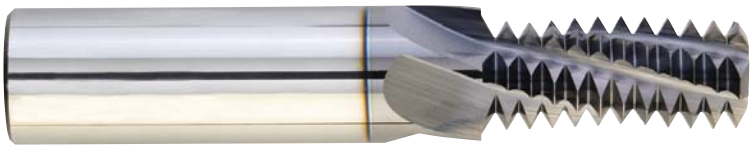
EDP No. 98655

Solid Carbide Thread Mills

Fraise à fileter au carbure

Fresa de roscar de carburo

ALTiN Coated
10% Micrograin Carbide
20° Helix Angle



Metric

List No. 5901 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

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

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

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.

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 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

FOR CAST IRON

Straight Flute / Steam Oxide Over Nitride Finish
Recommended for all types of gray, ductile and malleable cast iron

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.

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 UNC	TPI UNF	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE OVER NITRIDE LIST NO. 2094 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	11/16	7/16	2 23/32	—	30147	—	30148
5/16	—	24	4	11/16	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	15/16	23/32	3 3/8	—	30159	—	30160
1/2	—	20	4	15/16	23/32	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	11/16	7/16	2 23/32	30181
M8	1.25	D5	4	11/16	7/16	2 23/32	30182
M10	1.5	D6	4	3/4	1/2	2 15/16	30183
M12	1.5	D5	4	15/16	23/32	3 3/8	30184
M12	1.75	D6	4	15/16	23/32	3 3/8	30185

Cutting Speeds: Page 144

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

Taraud à haut rendement Machuelo de alto rendimiento

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

	TPI		NO. OF	THREAD	NECK		BRIGHT FINISH LIST NO. 2092					CRN COATED LIST NO. 2092S				
SIZE	UNC	UNF	FLUTES	LENGTH	LENGTH	OAL	H1	H2	H3	H4	H5	H1	H2	H3	H4	H5
4	40	—	2	5/16	1/4	1 7/8	—	30000	—	—	—	—	60700	—	—	—
4	—	48	2	5/16	1/4	1 7/8	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	11/16	7/16	2 23/32	—	—	30017	—	30018	—	—	60717	—	60718
5/16	—	24	3	11/16	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	15/16	23/32	3 3/8	—	—	30029	—	30030	—	—	60729	—	60730
1/2	—	20	3	15/16	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

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	BRIGHT FINISH LIST NO. 2092M EDP NO.	CRN COATED LIST NO. 2092MS 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	11/16	7/16	2 23/32	30054	60754
M8	1.25	D5	3	11/16	7/16	2 23/32	30055	60755
M10	1.5	D6	3	3/4	1/2	2 15/16	30056	60756
M12	1.5	D5	3	15/16	23/32	3 3/8	30057	60757
M12	1.75	D6	3	15/16	23/32	3 3/8	30058	60758

Semi-Interrupted Thread on 3-Flute Taps Only

Spiral Flute
HPT High Performance Taps For Aluminum

Taraud à haut rendement Machuelo de alto rendimiento

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).

CNC Reduced Neck Design

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.

	TPI		NO. OF	THREAD	NECK		BRIGHT FINISH LIST NO. 2093					CRN COATED LIST NO. 2093S				
SIZE	UNC	UNF	FLUTES	LENGTH	LENGTH	OAL	H1	H2	H3	H4	H5	H1	H2	H3	H4	H5
4	40	—	2	15/64	21/64	1 7/8	—	30070	—	—	—	—	60770	—	—	—
4	—	48	2	15/64	21/64	1 7/8	30071	30072	—	—	—	60771	60772	—	—	—
5	40	—	2	15/64	25/64	1 15/16	—	30073	—	—	—	—	60773	—	—	—
6	32	—	2	15/64	29/64	2	—	30074	30075	—	—	—	60774	60775	—	—
6	—	40	2	15/64	29/64	2	—	30076	—	—	—	—	60776	—	—	—
8	32	—	2	15/64	33/64	2 1/8	—	30077	30078	—	—	—	60777	60778	—	—
8	—	36	2	15/64	33/64	2 1/8	—	30079	—	—	—	—	60779	—	—	—
10	24	—	2	11/32	17/32	2 3/8	—	—	30080	—	—	—	—	60780	—	—
10	—	32	2	11/32	17/32	2 3/8	—	30081	30082	—	—	—	60781	60782	—	—
1/4	20	—	2	7/16	9/16	2 1/2	—	—	30083	—	30084	—	—	60783	—	60784
1/4	—	28	2	7/16	9/16	2 1/2	—	—	30085	30086	—	—	—	60785	60786	—
5/16	18	—	2	15/32	21/32	2 23/32	—	—	30087	—	30088	—	—	60787	—	60788
5/16	—	24	2	15/32	21/32	2 23/32	—	—	30089	30090	—	—	—	60789	60790	—
3/8	16	—	2	35/64	45/64	2 15/16	—	—	30091	—	30092	—	—	60791	—	60792
3/8	—	24	2	35/64	45/64	2 15/16	—	—	30093	30094	—	—	—	60793	60794	—
7/16	14	—	3	19/32	27/32	3 5/32	—	—	30095	—	30096	—	—	60795	—	60796
7/16	—	20	3	19/32	27/32	3 5/32	—	—	30097	—	30098	—	—	60797	—	60798
1/2	13	—	3	5/8	1 1/32	3 3/8	—	—	30099	—	30100	—	—	60799	—	60800
1/2	—	20	3	5/8	1 1/32	3 3/8	—	—	30101	—	30102	—	—	60801	—	60802

Semi-Interrupted Thread on 3-Flute Taps Only

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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 EDP NO.	CRN COATED LIST NO. 2093MS EDP NO.
M3	0.5	D3	2	15/64	25/64	1 15/16	30120	60820
M4	0.7	D4	2	15/64	33/64	2 1/8	30121	60821
M5	0.8	D4	2	23/64	17/32	2 3/8	30122	60822
M6	1.0	D5	2	7/16	9/16	2 1/2	30123	60823
M8	1.0	D5	2	15/32	21/32	2 23/32	30124	60824
M8	1.25	D5	2	15/32	21/32	2 23/32	30125	60825
M10	1.5	D6	2	35/64	11/16	2 15/16	30126	60826
M12	1.5	D5	3	5/8	1 1/64	3 3/8	30127	60827
M12	1.75	D6	3	5/8	1 1/64	3 3/8	30128	60828

Semi-Interrupted Thread on 3-Flute Taps Only

Spiral Point
HPT High Performance Taps For Exotic Alloys

Taraud à haut rendement Machuelo de alto rendimiento

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

CNC Reduced Neck Design

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.

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2095 H2	H3	H4	H5	TICN COATED LIST NO. 2095C 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	11/16	7/16	2 23/32	—	30214	—	30215	—	60854	—	60855
5/16	—	24	3	11/16	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	15/16	23/32	3 3/8	—	30226	—	30227	—	60866	—	60867
1/2	—	20	3	15/16	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 EDP NO.	TICN COATED LIST NO. 2095MC 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	11/16	7/16	2 23/32	30264	60904
M8	1.25	D5	3	11/16	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	15/16	23/32	3 3/8	30267	60907
M12	1.75	D6	3	15/16	23/32	3 3/8	30268	60908

Spiral Flute
HPT High Performance Taps For Exotic Alloys

Taraud à haut rendement Machuelo de alto rendimiento

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

CNC Reduced Neck Design

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.

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2096 H2	H3	H4	H5	TICN COATED LIST NO. 2096C H2	H3	H4	H5
4	40	—	3	15/64	21/64	1 7/8	30280	—	—	—	60920	—	—	—
5	40	—	3	15/64	25/64	1 15/16	30281	—	—	—	60921	—	—	—
6	32	—	3	15/64	29/64	2	30282	30283	—	—	60922	60923	—	—
8	32	—	3	15/64	33/64	2 1/8	30284	30285	—	—	60924	60925	—	—
10	24	—	3	23/64	17/32	2 3/8	—	30286	—	—	—	60926	—	—
10	—	32	3	23/64	17/32	2 3/8	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	15/32	21/32	2 23/32	—	30294	—	30295	—	60934	—	60935
5/16	—	24	3	15/32	21/32	2 23/32	—	30296	30297	—	—	60936	60937	—
3/8	16	—	3	35/64	11/16	2 15/16	—	30298	—	30299	—	60938	—	60939
3/8	—	24	3	35/64	11/16	2 15/16	—	30300	30301	—	—	60940	60941	—
7/16	14	—	3	19/32	27/32	3 5/32	—	30302	—	30303	—	60942	—	60943
7/16	—	20	3	19/32	27/32	3 5/32	—	30304	—	30305	—	60944	—	60945
1/2	13	—	3	5/8	1 1/64	3 3/8	—	30306	—	30307	—	60946	—	60947
1/2	—	20	3	5/8	1 1/64	3 3/8	—	30308	—	30309	—	60948	—	60949
9/16	12	—	3	11/16	63/64	3 19/32	—	30310	—	30311	—	60950	—	60951
9/16	—	18	3	11/16	63/64	3 19/32	—	30312	—	30313	—	60952	—	60953
5/8	11	—	3	3/4	1 3/64	3 13/16	—	30314	—	30315	—	60954	—	60955
5/8	—	18	3	3/4	1 3/64	3 13/16	—	30316	—	30317	—	60956	—	60957
3/4	10	—	3	13/16	1 5/32	4 1/4	—	30318	—	30319	—	60958	—	60959
3/4	—	16	3	13/16	1 5/32	4 1/4	—	30320	—	30321	—	60960	—	60961

Metric

Cutting Speeds: Page 144

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 EDP NO.	TICN COATED LIST NO. 2096MC EDP NO.
M3	0.5	D3	3	15/64	25/64	1 15/16	30340	60980
M4	0.7	D4	3	15/64	33/64	2 1/8	30341	60981
M5	0.8	D4	3	23/64	17/32	2 3/8	30342	60982
M6	1.0	D5	3	7/16	9/16	2 1/2	30343	60983
M8	1.0	D5	3	15/32	21/32	2 23/32	30344	60984
M8	1.25	D5	3	15/32	21/32	2 23/32	30345	60985
M10	1.5	D6	3	35/64	11/16	2 15/16	30346	60986
M12	1.5	D5	3	5/8	1 1/64	3 3/8	30347	60987
M12	1.75	D6	3	5/8	1 1/64	3 3/8	30348	60988

Spiral Point - DIN Length
HPT High Performance Taps

Taraud à haut rendement Machuelo de alto rendimiento

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 USCTI 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

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

DIN Length

STANDARD PACKAGE All Sizes — 1 each

CNC Reduced Neck Design

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	Steam Oxide Finish LIST NO. 2088 H2	H3	H4	H5	TiCN Coated LIST NO. 2088C 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

Taraud à haut rendement Machuelo de alto rendimiento

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 USCTI length – provides extra reach in tapping applications

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

List No. 2089 Steam Oxide Finish
List No. 2089C
TiCN - Titanium Carbonitride Coated

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

DIN Length

STANDARD PACKAGE All Sizes — 1 each

CNC Reduced Neck Design

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	Steam Oxide Finish LIST NO. 2089 H2	H3	H4	H5	TiCN Coated LIST NO. 2089C 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

Taraud à haut rendement Machuelo de alto rendimiento

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 UNC	TPI UNF	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2097 H2	H3	H4	H5	TICN COATED LIST NO. 2097C 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	11/16	7/16	2 23/32	—	30374	—	30375	—	61014	—	61015
5/16	—	24	3	11/16	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	15/16	23/32	3 3/8	—	30386	—	30387	—	61026	—	61027
1/2	—	20	3	15/16	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

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 EDP NO.	TICN COATED LIST NO. 2097MC 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	11/16	7/16	2 23/32	30424	61064
M8	1.25	D5	3	11/16	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	15/16	23/32	3 3/8	30427	61067
M12	1.75	D6	3	15/16	23/32	3 3/8	30428	61068

Spiral Flute
HPT High Performance Taps For Hard Materials

Taraud à haut rendement Machuelo de alto rendimiento

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

CNC Reduced Neck Design

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.

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	STEAM OXIDE FINISH LIST NO. 2098 H2	H3	H4	H5	TICN COATED LIST NO. 2098C H2	H3	H4	H5
4	40	—	2	5/16	1/4	1 7/8	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	11/16	7/16	2 23/32	—	30454	—	30455	—	61094	—	61095
5/16	—	24	3	11/16	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	15/16	23/32	3 3/8	—	30466	—	30467	—	61106	—	61107
1/2	—	20	3	15/16	23/32	3 3/8	—	30468	—	30469	—	61108	—	61109
9/16	12	—	4	1	43/64	3 19/32	—	30470	—	30471	—	61110	—	61111
9/16	—	18	4	1	43/64	3 19/32	—	30472	—	30473	—	61112	—	61113
5/8	11	—	4	1 1/8	43/64	3 13/16	—	30474	—	30475	—	61114	—	61115
5/8	—	18	4	1 1/8	43/64	3 13/16	—	30476	—	30477	—	61116	—	61117
3/4	10	—	4	1 7/32	49/64	4 1/4	—	30478	—	30479	—	61118	—	61119
3/4	—	16	4	1 7/32	49/64	4 1/4	—	30480	—	30481	—	61120	—	61121

Cutting Speeds: Page 144

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 LIST NO. 2098M EDP NO.	TICN COATED LIST NO. 2098MC EDP NO.
M3	0.5	D3	2	5/16	5/16	1 15/16	30490	61140
M4	0.7	D4	2	3/8	3/8	2 1/8	30491	61141
M5	0.8	D4	3	1/2	3/8	2 3/8	30492	61142
M6	1.0	D5	3	5/8	3/8	2 1/2	30493	61143
M8	1.0	D5	3	11/16	7/16	2 23/32	30494	61144
M8	1.25	D5	3	11/16	7/16	2 23/32	30495	61145
M10	1.5	D6	3	3/4	1/2	2 15/16	30496	61146
M12	1.5	D5	3	15/16	23/32	3 3/8	30497	61147
M12	1.75	D6	3	15/16	23/32	3 3/8	30498	61148

Spiral Flute
HPT High Performance Taper Pipe Taps

Taraud à haut rendement Machuelo de alto rendimiento

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
2-3½ Thread Chamfer

Extra Length – longer than standard USCTI length — provides extra reach in tapping applications

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

STANDARD PACKAGE All Sizes — 1 each

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.

Cutting Speeds: Page 144

Tool Coatings Also Available

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
1-11½	1 3/4	4½	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
1-11½	1 3/4	4½	5	36247	36257

*Large shank furnished unless otherwise specified.

Thread Forming — DIN Length
HPT High Performance Taps

Premium Powder Metallurgy High Speed Steel
DIN Length, ANSI Shank

Taraud à haut rendement

Machuelo de alto rendimiento

List No. 2106 Bright Finish
List No. 2106G TiN Coated
List No. 2106C TiCN Coated
List No. 2106T TiALN Coated

DIN Length

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 USCTI 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.

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 144

CNC Reduced Neck Design

TAP DRILL SIZES: Page 185

CLASS OF FIT RECOMMENDATIONS: Page 189

Machine Screw — Plug Style

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN 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

DIN Length

Machine Screw — Bottoming Style

Taraud à haut rendement Machuelo de alto rendimiento

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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

Fractional — Plug Style

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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

Taraud à haut rendement

Machuelo de alto rendimiento

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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 EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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 EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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			
					CUTTING TAP			FORMING TAP
			BRN	HRc	SPEED (SFM)	THROUGH HOLE (Use Spiral Point Where Available)	BLIND HOLE (Use Spiral Flute Where Available)	SPEED (SFM)
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; SAIJ 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	–
			320 - 420	34 - 45	3 - 10	Hard Material	Hard Material	–
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.

Spiral Point SHEARTAP™

Premium High Speed Steel Plug Style

Taraud à entrée hélicoïdale

Machuelo con punta en espiral

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

"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

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 184

SIZE	THREAD TYPE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	SURFACE TREATED H2	SURFACE TREATED H3	SURFACE TREATED H4	SURFACE TREATED H5	TIN COATED H2	TIN COATED H3	TIN COATED H4	TIN COATED H5
#4-40	NC	2	.313	.250	1⅞	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	2⅛	34407	34408	—	34409	94407	94408	—	94409
#10-24	NC	3	.500	.375	2⅜	—	34410	—	—	—	94410	—	—
#10-32	NF	3	.500	.375	2⅜	34411	34412	—	34413	94411	94412	—	94413
1/4-20	NC	3	.625	.375	2½	34416	34417	—	34418	94416	94417	—	94418
1/4-28	NF	3	.625	.375	2½	34419	34420	34421	—	94419	94420	94421	—
5/16-18	NC	3	.688	.438	2²³⁄₃₂	—	34422	—	34423	—	94422	—	94423
5/16-24	NF	3	.688	.438	2²³⁄₃₂	—	34424	34425	—	—	94424	94425	—
3/8-16	NC	3	.750	.500	2¹⁵⁄₁₆	—	34426	—	34427	—	94426	—	94427
3/8-24	NF	3	.750	.500	2¹⁵⁄₁₆	—	34428	34429	—	—	94428	94429	—
7/16-14	NC	3	.875	.563	3⅝₃₂	—	34430	—	34431	—	94430	—	94431
7/16-20	NF	3	.875	.563	3⅝₃₂	—	34432	—	34433	—	94432	—	94433
1/2-13	NC	3	.938	.719	3⅜	—	34434	—	34435	—	94434	—	94435
1/2-20	NF	3	.938	.719	3⅜	—	34436	—	34437	—	94436	—	94437
9/16-12	NC	4	1.000	.673	3¹⁹⁄₃₂	—	34438	—	—	—	94438	—	—
9/16-18	NF	4	1.000	.673	3¹⁹⁄₃₂	—	34439	—	—	—	94439	—	—
5/8-11	NC	4	1.125	.673	3¹³⁄₁₆	—	34440	—	—	—	94440	—	—
5/8-18	NF	4	1.125	.673	3¹³⁄₁₆	—	34441	—	—	—	94441	—	—
3/4-10	NC	4	1.219	.766	4¼	—	34444	—	—	—	94444	—	—
3/4-16	NF	4	1.219	.766	4¼	—	34445	—	—	—	94445	—	—
7/8-9	NC	4	1.344	.875	4¹¹⁄₁₆	—	—	34500	—	—	—	94500	—
7/8-14	NF	4	1.344	.875	4¹¹⁄₁₆	—	—	34501	—	—	—	94501	—
1-8	NC	4	1.500	1.000	5⅛	—	—	34502	—	—	—	94502	—
1-12	NF	4	1.500	1.000	5⅛	—	—	34503	—	—	—	94503	—
1⅛-7	NC	4	1.719	.843	5⁷⁄₁₆	—	—	34504	—	—	—	94504	—
1⅛-12	NF	4	1.719	.843	5⁷⁄₁₆	—	—	34505	—	—	—	94505	—
1¼-7	NC	4	1.719	.843	5¾	—	—	34506	—	—	—	94506	—
1¼-12	NF	4	1.719	.843	5¾	—	—	34507	—	—	—	94507	—
1⅜-6	NC	4	2.000	1.000	6¹⁄₁₆	—	—	34508	—	—	—	94508	—
1⅜-12	NF	4	2.000	1.000	6¹⁄₁₆	—	—	34509	—	—	—	94509	—
1½-6	NC	6	2.000	1.000	6⅜	—	—	34510	—	—	—	94510	—
1½-12	NF	6	2.000	1.000	6⅜	—	—	34511	—	—	—	94511	—
1¾-5*	NC	6	2.406	.782	7	—	—	—	34512*	—	—	—	94512*
2-4½*	NC	6	2.688	.874	7⅝	—	—	—	34514*	—	—	—	94514*

*H7 Pitch Dia. Limit (Sizes 1¾-5 and 2-4½)

Spiral Flute SHEARTAP™

Premium High Speed Steel – 48° Helix Angle Semi-Bottoming Style

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

"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

Taraud à gorges hélicoïdales

Machuelo de roscar con gavilanes en espiral

List No. 2091 — Steam Oxide Over Nitride

List No. 2091G — 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

SIZE	THREAD TYPE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	SURFACE TREATED H2	SURFACE TREATED H3	SURFACE TREATED H4	SURFACE TREATED H5	TiN COATED H2	TiN COATED H3	TiN COATED H4	TiN COATED H5
#4-40	NC	3	.236	.327	1⅞	34450	34451	—	—	94450	94451	—	—
#6-32	NC	3	.236	.452	2	34453	34454	—	34455	94453	94454	—	94455
#8-32	NC	3	.236	.514	2⅛	34456	34457	—	34458	94456	94457	—	94458
#10-24	NC	3	.354	.521	2⅜	34459	34460	—	—	94459	94460	—	—
#10-32	NF	3	.354	.521	2⅜	34461	34462	—	34463	94461	94462	—	94463
1/4-20	NC	3	.433	.567	2½	—	34466	—	34467	—	94466	—	94467
1/4-28	NF	3	.433	.567	2½	—	34468	34469	—	—	94468	94469	—
5/16-18	NC	3	.472	.653	2²³⁄₃₂	—	34470	—	34471	—	94470	—	94471
5/16-24	NF	3	.472	.653	2²³⁄₃₂	—	34472	34473	—	—	94472	94473	—
3/8-16	NC	3	.551	.699	2¹⁵⁄₁₆	—	34474	—	34475	—	94474	—	94475
3/8-24	NF	3	.551	.699	2¹⁵⁄₁₆	—	34476	34477	—	—	94476	94477	—
7/16-14	NC	3	.591	.847	3⅝₃₂	—	34478	—	34479	—	94478	—	94479
7/16-20	NF	3	.591	.847	3⅝₃₂	—	34480	—	34481	—	94480	—	94481
1/2-13	NC	3	.630	1.026	3⅜	—	34482	—	34483	—	94482	—	94483
1/2-20	NF	3	.630	1.026	3⅜	—	34484	—	34485	—	94484	—	94485
9/16-12	NC	3	.690	.983	3¹⁹⁄₃₂	—	34486	—	—	—	94486	—	—
9/16-18	NF	3	.690	.983	3¹⁹⁄₃₂	—	34487	—	—	—	94487	—	—
5/8-11	NC	3	.745	1.052	3¹³⁄₁₆	—	34488	—	—	—	94488	—	—
5/8-18	NF	3	.745	1.052	3¹³⁄₁₆	—	34489	—	—	—	94489	—	—
3/4-10	NC	4	.820	1.165	4¼	—	34492	—	—	—	94492	—	—
3/4-16	NF	4	.820	1.165	4¼	—	34493	—	—	—	94493	—	—
7/8-9	NC	4	.911	1.308	4¹¹⁄₁₆	—	—	34520	—	—	—	94520	—
7/8-14	NF	4	.911	1.308	4¹¹⁄₁₆	—	—	34521	—	—	—	94521	—
1-8	NC	4	1.025	1.475	5⅛	—	—	34522	—	—	—	94522	—
1-12	NF	4	1.025	1.475	5⅛	—	—	34523	—	—	—	94523	—
1⅛-7	NC	4	1.143	1.419	5⁷⁄₁₆	—	—	34524	—	—	—	94524	—
1⅛-12	NF	4	1.143	1.419	5⁷⁄₁₆	—	—	34525	—	—	—	94525	—
1¼-7	NC	4	1.143	1.419	5¾	—	—	34526	—	—	—	94526	—
1¼-12	NF	4	1.143	1.419	5¾	—	—	34527	—	—	—	94527	—
1⅜-6	NC	4	1.333	1.667	6¹⁄₁₆	—	—	34528	—	—	—	94528	—
1⅜-12	NF	4	1.333	1.667	6¹⁄₁₆	—	—	34529	—	—	—	94529	—
1½-6	NC	4	1.333	1.667	6⅜	—	—	34530	—	—	—	94530	—
1½-12	NF	4	1.333	1.667	6⅜	—	—	34531	—	—	—	94531	—
1¾-5*	NC	6	1.600	1.588	7	—	—	—	34532*	—	—	—	94532*
2-4½*	NC	6	1.777	1.588	7⅝	—	—	—	34534*	—	—	—	94534*

*H7 Pitch Dia. Limit (Sizes 1¾-5 and 2-4½)

Metric Spiral Point SHEARTAP™

Taraud à entrée hélicoïdale Machuelo con punta en espiral

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 15/16	35240	95240
M3.5	0.6	D4	2	.375	.313	2	35241	95241
M4	0.7	D4	3	.375	.375	2 1/8	35242	95242
M5	0.8	D4	3	.500	.375	2 3/8	35243	95243
M6	1	D5	3	.625	.375	2 1/2	35244	95244
M7	1	D5	3	.688	.438	2 23/32	35245	95245
M8	1	D5	3	.688	.438	2 23/32	35246	95246
M8	1.25	D5	3	.688	.438	2 23/32	35247	95247
M10	1.25	D5	3	.750	.500	2 15/16	35248	95248
M10	1.5	D6	3	.750	.500	2 15/16	35249	95249
M12	1.25	D5	3	.938	.719	3 3/8	35250	95250
M12	1.75	D6	3	.938	.719	3 3/8	35251	95251
M14	1.5	D6	4	1.000	.673	3 19/32	35252	95252
M14	2	D7	4	1.000	.673	3 19/32	35253	95253
M16	1.5	D6	4	1.125	.673	3 13/16	35254	95254
M16	2	D7	4	1.125	.673	3 13/16	35255	95255
M18	1.5	D6	4	1.125	.719	4 1/32	35256	95256
M18	2.5	D7	4	1.125	.719	4 1/32	35257	95257
M20	1.5	D6	4	1.188	.812	4 15/32	35280	95280
M20	2.5	D7	4	1.188	.812	4 15/32	35281	95281
M22	1.5	D6	4	1.188	1.031	4 11/16	35282	95282
M22	2.5	D7	4	1.188	1.031	4 11/16	35283	95283
M24	2	D7	4	1.422	.797	4 29/32	35284	95284
M24	3	D8	4	1.422	.797	4 29/32	35285	95285

STANDARD PACKAGE
M3-M12 – 12 each
M14-M18 – 3 each
M20-M24 – 1 each

Cutting Speeds: Page 184

Metric Spiral Flute SHEARTAP™

Taraud à gorges hélicoïdales

Machuelo de roscar con gavilanes en espiral

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 15/16	35258	95258
M3.5	0.6	D4	3	.236	.452	2	35259	95259
M4	0.7	D4	3	.236	.514	2 1/8	35260	95260
M5	0.8	D4	3	.354	.521	2 3/8	35261	95261
M6	1	D5	3	.433	.567	2 1/2	35262	95262
M7	1	D5	3	.472	.653	2 23/32	35263	95263
M8	1	D5	3	.472	.653	2 23/32	35264	95264
M8	1.25	D5	3	.472	.653	2 23/32	35265	95265
M10	1.25	D5	3	.551	.699	2 15/16	35266	95266
M10	1.5	D6	3	.551	.699	2 15/16	35267	95267
M12	1.25	D5	3	.630	1.026	3 3/8	35268	95268
M12	1.75	D6	3	.630	1.026	3 3/8	35269	95269
M14	1.5	D6	3	.690	.983	3 19/32	35270	95270
M14	2	D7	3	.690	.983	3 19/32	35271	95271
M16	1.5	D6	3	.745	1.052	3 13/16	35272	95272
M16	2	D7	3	.745	1.052	3 13/16	35273	95273
M18	1.5	D6	4	.813	.983	4 1/32	35274	95274
M18	2.5	D7	4	.813	.983	4 1/32	35275	95275
M20	1.5	D6	4	.790	1.210	4 15/32	35290	95290
M20	2.5	D7	4	.790	1.210	4 15/32	35291	95291
M22	1.5	D6	4	.790	1.428	4 11/16	35292	95292
M22	2.5	D7	4	.790	1.428	4 11/16	35293	95293
M24	2	D7	4	.940	1.279	4 29/32	35294	95294
M24	3	D8	4	.940	1.279	4 29/32	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.

Oversize SHEARTAP™

Taraud surdimensionné

Machuelo de roscar extra grande

"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 SURFACE TREATED EDP NO.	Spiral Point TIN COATED EDP NO.	Spiral Flute SURFACE TREATED EDP NO.	Spiral Flute 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
METRIC						
M3 × 0.5		H7	34670	94670	34680	94690
M4 × 0.7		H7	34671	94671	34681	94691
M5 × 0.8		H7	34672	94672	34682	94692
M6 × 1		H11	34673	94673	34683	94693
M8 × 1.25		H11	34674	94674	34684	94694
M10 × 1.5		H11	34675	94675	34685	94695
M12 × 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

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™

Plug Style

Taraud à entrée hélicoïdale

Machuelo con punta en espiral

Cutting Speeds: Page 184

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

SIZE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	PITCH DIA. LIMIT	SURFACE TREATED EDP NO.	TiN COATED EDP NO.
1-1/8-8	4	1.719	.843	5 7/16	H5	34650	94650
1-1/4-8	4	1.719	.843	5 3/4	H5	34651	94651
1-3/8-8	4	2.000	1.000	6 1/16	H5	34652	94652
1-1/2-8	6	2.000	1.000	6 3/8	H5	34653	94653
1-5/8-8	6	2.000	1.187	6 11/16	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 5/16	H6	34656	94656
2-8	6	2.688	.874	7 5/8	H6	34657	94657

Spiral Flute Eight Pitch SHEARTAP™

48° Helix Angle
Semi-Bottoming Style

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

Eight Pitch taps are often required for applications in the power generation industry and general construction.

Taraud à gorges hélicoïdales

Machuelo de roscar con gavilanes en espiral

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 EDP NO.	TiN COATED EDP NO.
1-1/8-8	4	1.143	1.419	5 7/16	H5	34660	94660
1-1/4-8	4	1.143	1.419	5 3/4	H5	34661	94661
1-3/8-8	4	1.333	1.667	6 1/16	H5	34662	94662
1-1/2-8	4	1.333	1.667	6 3/8	H5	34663	94663
1-5/8-8	6	1.333	1.854	6 11/16	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 5/16	H6	34666	94666
2-8	6	1.777	1.588	7 5/8	H6	34667	94667

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.

For tapping through holes. The spiral point forces the chips ahead of the tap.

CNC Reduced Neck Design

TOOL COATINGS

Bright Finish Taps can be Coated for Enhanced Performance & Tool Life

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.**

Size	Thread Type	No. of Flutes	Thread Length	Neck Length	OAL	BRIGHT H2	BRIGHT H3	BRIGHT H4	OXIDE OVER NITRIDE H2	OXIDE OVER NITRIDE H3	OXIDE OVER NITRIDE 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.

CNC Reduced Neck Design

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.**

TOOL COATINGS

Bright Finish Taps can be Coated for Enhanced Performance & Tool Life

Size	Thread Type	No. of Flutes	Thread Length	Neck Length	OAL	BRIGHT H2	BRIGHT H3	BRIGHT H4	OXIDE OVER NITRIDE H2	OXIDE OVER NITRIDE H3	OXIDE OVER NITRIDE 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 EDP NO.	OXIDE OVER NITRIDE 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

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.

TOOL COATINGS

Bright Finish Taps can be Coated for Enhanced Performance & Tool Life

Metric Spiral Flute ONYX TAP

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	BRIGHT EDP NO.	OXIDE OVER NITRIDE 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

Taraud à main — Machuelo de roscar manual

List No. 2068 — Machine Screw

STANDARD PACKAGE All sizes — 12 each
Sets (Taper Plug Bottom)

Bold type indicates standard H limit.

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO. SETS	EDP NO. TAPER	EDP NO. PLUG	EDP NO. BOTTOM
0	—	80	2	H1	5/16	1 5/8	33901	33601	33701	33801
	—	80	2	**H2**	5/16	1 5/8	—	—	33702	33802
1	64	—	2	H1	3/8	1 11/16	33902	33602	33703	33803
	64	—	2	**H2**	3/8	1 11/16	—	—	33704	—
	—	72	2	H1	3/8	1 11/16	33903	33603	33705	33804
	—	72	2	**H2**	3/8	1 11/16	—	—	33706	33805
2	56	—	3	H1	7/16	1 3/4	33904	33604	33707	33806
	56	—	3	**H2**	7/16	1 3/4	—	33605	33708	33807
	—	64	3	**H2**	7/16	1 3/4	33905	33606	33710	33809
3	48	—	3	H1	1/2	1 13/16	—	—	33711	—
	48	—	3	**H2**	1/2	1 13/16	33906	33607	33712	33810
	—	56	3	**H2**	1/2	1 13/16	33907	33608	33714	33812
4	40	—	3	**H2**	9/16	1 7/8	33909	33610	33716	33814
	—	48	3	**H2**	9/16	1 7/8	33910	33611	33719	33816
	—	*36	3	**H2**	9/16	1 7/8	33911	33612	33720	33817
5	40	—	3	H1	5/8	1 15/16	—	—	33721	—
	40	—	3	**H2**	5/8	1 15/16	33912	33613	33722	33818
	—	44	3	**H2**	5/8	1 15/16	33913	33614	33724	33820
6	32	—	3	H1	11/16	2	33914	33615	33726	33821
	32	—	3	H2	11/16	2	33915	33616	33727	33822
	32	—	3	**H3**	11/16	2	33916	33617	33728	33823
	—	40	3	H1	11/16	2	—	—	33731	—
	—	40	3	**H2**	11/16	2	33917	33618	33732	33826
8	32	—	4	H1	3/4	2 1/8	33918	33619	33734	33827
	32	—	4	H2	3/4	2 1/8	33919	33620	33735	33828
	32	—	4	**H3**	3/4	2 1/8	33920	33621	33736	33829
	—	36	4	**H2**	3/4	2 1/8	33921	33622	33742	33835
10	24	—	4	H1	7/8	2 3/8	33922	33623	33743	33836
	24	—	4	H2	7/8	2 3/8	33923	33624	33744	33837
	24	—	4	**H3**	7/8	2 3/8	33924	33625	33745	33838
	—	32	4	H1	7/8	2 3/8	33925	33626	33751	33842
	—	32	4	H2	7/8	2 3/8	33926	33627	33752	33843
	—	32	4	**H3**	7/8	2 3/8	33927	33628	33753	33844
12	24	—	4	**H3**	15/16	2 3/8	33928	33629	33758	33849
	—	28	4	**H3**	15/16	2 3/8	33929	33630	33759	33850

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Optional Flutes Straight Flute Hand Taps

Taraud à main — Machuelo de roscar manual

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 UNC	TPI UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER PLUG	EDP NUMBER BOTTOM
2	56	—	2	**H2**	7/16	1 3/4	**33709**	**33808**
4	40	—	2	**H2**	9/16	1 7/8	**33717**	**33815**
5	40	—	2	**H2**	5/8	1 15/16	**33723**	**33819**
6	32	—	2	H2	11/16	2	**33729**	**33824**
	32	—	2	**H3**	11/16	2	**33730**	**33825**
	—	40	2	**H2**	11/16	2	**33733**	**—**
8	32	—	2	H2	3/4	2 1/8	**33740**	**33833**
	32	—	2	**H3**	3/4	2 1/8	**33741**	**33834**
	32	—	3	H2	3/4	2 1/8	**33738**	**—**
	32	—	3	**H3**	3/4	2 1/8	**33739**	**33832**
10	24	—	2	H2	7/8	2 3/8	**33749**	**33840**
	24	—	2	**H3**	7/8	2 3/8	**33750**	**33841**
	24	—	3	H2	7/8	2 3/8	**33747**	**—**
	24	—	3	**H3**	7/8	2 3/8	**33748**	**33839**
	—	32	2	H2	7/8	2 3/8	**33756**	**33847**
	—	32	2	**H3**	7/8	2 3/8	**33757**	**33848**
	—	32	3	H2	7/8	2 3/8	**33754**	**33845**
	—	32	3	**H3**	7/8	2 3/8	**33755**	**33846**

Surface Treated Straight Flute Hand Taps

Taraud à main — Machuelo de roscar manual

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 UNC	TPI UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER PLUG	EDP NUMBER BOTTOM
6	32	—	3	H3	11/16	2	**32558**	**32573**
	—	40	3	H2	11/16	2	**32559**	**32574**
8	32	—	4	H3	3/4	2 1/8	**32560**	**32575**
	—	36	4	H2	3/4	2 1/8	**32561**	**32576**
10	24	—	4	H3	7/8	2 3/8	**32562**	**32577**
	—	32	4	H3	7/8	2 3/8	**32563**	**32578**

Titanium Nitride (TiN) Coated Straight Flute Hand Taps

Taraud à main

Machuelo de roscar manual

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 UNC	TPI UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER PLUG	EDP NUMBER 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

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

Taraud à main Machuelo de roscar manual

List No. 2046 Fractional

STANDARD PACKAGE
1/4" thru 1/2" — 12 each
9/16" thru 3/4" — 3 each
7/8" thru 1½" — 1 each
Sets (Taper Plug Bottom)

Bold type indicates standard H limit.

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	SETS EDP NO.	EDP NUMBER TAPER	EDP NUMBER PLUG	EDP NUMBER BOTTOM
1/4	20	—	4	H1	1	2 1/2	—	32301	32402	32601
	20	—	4	H2	1	2 1/2	—	32302	32404	32602
	20	—	4	**H3**	1	2 1/2	32701	32303	32407	32605
	20	—	4	H5	1	2 1/2	—	—	32409	—
	—	28	4	H1	1	2 1/2	—	—	32410	32607
	—	28	4	H2	1	2 1/2	—	—	32411	32608
	—	28	4	**H3**	1	2 1/2	32702	32304	32414	32611
	—	28	4	H4	1	2 1/2	—	—	32415	32612
5/16	18	—	4	H2	1 1/8	2 23/32	—	—	32418	32614
	18	—	4	**H3**	1 1/8	2 23/32	32703	32305	32421	32617
	18	—	4	H5	1 1/8	2 23/32	—	—	32422	32618
	—	24	4	H2	1 1/8	2 23/32	—	—	32424	—
	—	24	4	**H3**	1 1/8	2 23/32	32704	32306	32426	32621
	—	24	4	H4	1 1/8	2 23/32	—	—	32427	—
3/8	16	—	4	H1	1 1/4	2 15/16	—	—	32429	—
	16	—	4	H2	1 1/4	2 15/16	—	—	32430	32624
	16	—	4	**H3**	1 1/4	2 15/16	32705	32307	32432	32626
	16	—	4	H5	1 1/4	2 15/16	—	—	32434	32627
	—	24	4	H1	1 1/4	2 15/16	—	—	32435	—
	—	24	4	H2	1 1/4	2 15/16	—	—	32436	32629
	—	24	4	**H3**	1 1/4	2 15/16	32706	32308	32438	32631
	—	24	4	H4	1 1/4	2 15/16	—	—	32439	—
7/16	14	—	4	**H3**	1 7/16	3 5/32	32707	32309	32441	32633
	14	—	4	H5	1 7/16	3 5/32	—	—	32442	32634
	—	20	4	**H3**	1 7/16	3 5/32	32708	32310	32444	32635
	—	20	4	H5	1 7/16	3 5/32	—	—	32445	32636
1/2	13	—	4	H1	1 21/32	3 3/8	—	—	32446	—
	13	—	4	**H3**	1 21/32	3 3/8	32709	32311	32449	32640
	13	—	4	H5	1 21/32	3 3/8	—	—	32450	32641
	—	20	4	H1	1 21/32	3 3/8	—	—	32451	32642
	—	20	4	**H3**	1 21/32	3 3/8	32710	32312	32453	32643
	—	20	4	H5	1 21/32	3 3/8	—	—	32454	—
9/16	12	—	4	**H3**	1 21/32	3 19/32	32711	32313	32455	32644
	12	—	4	H5	1 21/32	3 19/32	—	—	32456	—
	—	18	4	H2	1 21/32	3 19/32	—	—	32457	—
	—	18	4	**H3**	1 21/32	3 19/32	32712	32314	32458	32645
	—	18	4	H5	1 21/32	3 19/32	—	—	32459	—
5/8	11	—	4	H2	1 13/16	3 13/16	—	—	32460	—
	11	—	4	**H3**	1 13/16	3 13/16	32713	32315	32461	32647
	11	—	4	H5	1 13/16	3 13/16	—	—	32462	32648
	—	18	4	H2	1 13/16	3 13/16	—	—	32463	—
	—	18	4	**H3**	1 13/16	3 13/16	32714	32316	32464	32649
	—	18	4	H5	1 13/16	3 13/16	—	—	32465	32650

(continued)

Straight Flute Hand Taps (continued)

List No. 2046 Fractional

Taraud à main — Machuelo de roscar manual

SIZE	TPI UNC	TPI UNF	TPI UNS	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	SETS EDP NO.	EDP NUMBER TAPER	EDP NUMBER PLUG	EDP NUMBER BOTTOM
11/16	—	—	11	4	H3	1 13/16	4 1/32	32715	32317	32466	32651
	—	—	16	4	H3	1 13/16	4 1/32	32716	32318	32467	32652
3/4	10	—	—	4	H3	2	4 1/4	32717	32319	32469	32653
	10	—	—	4	H5	2	4 1/4	—	—	32470	32654
	—	16	—	4	H1	2	4 1/4	—	—	32471	—
	—	16	—	4	H2	2	4 1/4	—	—	32472	—
	—	16	—	4	H3	2	4 1/4	32718	32320	32473	32655
	—	16	—	4	H5	2	4 1/4	—	—	32474	32656
7/8	9	—	—	4	H4	2 7/32	4 11/16	32719	32321	32475	32657
	9	—	—	4	H6	2 7/32	4 11/16	—	—	32476	—
	—	14	—	4	H2	2 7/32	4 11/16	—	—	32477	—
	—	14	—	4	H4	2 7/32	4 11/16	32720	32322	32478	32658
1	8	—	—	4	H4	2 1/2	5 1/8	32721	32323	32480	32659
	8	—	—	4	H6	2 1/2	5 1/8	—	—	32481	—
	—	12	—	4	H4	2 1/2	5 1/8	32722	32324	32482	32660
	—	—	14	4	H4	2 1/2	5 1/8	32723	32325	32484	32661
1 1/8	7	—	—	4	H4	2 9/16	5 7/16	32724	32326	32485	32662
	—	12	—	4	H4	2 9/16	5 7/16	32725	32327	32486	32663
1 1/4	7	—	—	4	H4	2 9/16	5 3/4	32726	32328	32487	32664
	—	12	—	6	H4	2 9/16	5 3/4	32727	32329	32488	32665
1 3/8	6	—	—	4	H4	3	6 1/16	32728	32330	32489	32666
	—	12	—	6	H4	3	6 1/16	32729	32331	32490	32667
1 1/2	6	—	—	4	H4	3	6 3/8	32730	32332	32491	32668
	—	12	—	6	H4	3	6 3/8	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.

Taraud à main — Machuelo de roscar manual

List No. 2046 — Fractional

STANDARD PACKAGE All sizes — 12 each

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER PLUG	EDP NUMBER BOTTOM
1/4	20	—	2	H3	1	2 1/2	32405	32603
	20	—	3	H3	1	2 1/2	32406	32604
	20	—	3	H5	1	2 1/2	32408	32606
	—	28	2	H3	1	2 1/2	32412	32609
	—	28	3	H3	1	2 1/2	32413	32610
5/16	18	—	2	H3	1 1/8	2 23/32	—	32615
	18	—	3	H3	1 1/8	2 23/32	32420	32616
	—	24	3	H3	1 1/8	2 23/32	32425	32620
3/8	16	—	3	H3	1 1/4	2 15/16	32431	32625
	—	24	3	H3	1 1/4	2 15/16	32437	32630
7/16	14	—	3	H3	1 7/16	3 5/32	32440	—
	—	20	3	H3	1 7/16	3 5/32	32443	—
1/2	13	—	3	H3	1 21/32	3 3/8	32448	32639
	—	20	3	H3	1 21/32	3 3/8	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.

Taraud à main — Machuelo de roscar manual

List No. 2046G Fractional

STANDARD PACKAGE ¼ - ½ — 12 each
9/16 - ¾ — 3 each
⅞ - 1 — 1 each

Ground Thread – High Speed Steel

SIZE	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. PLUG	EDP NO. BOTTOM
¼ - 20	H3	1	2½	4	92400	92430
¼ - 28	H3	1	2½	4	92401	92431
5/16 - 18	H3	1⅛	2 23/32	4	92402	92432
5/16 - 24	H3	1⅛	2 23/32	4	92403	92433
⅜ - 16	H3	1¼	2 15/16	4	92404	92434
⅜ - 24	H3	1¼	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
½ - 13	H3	1 21/32	3⅜	4	92408	92438
½ - 20	H3	1 21/32	3⅜	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
⅝ - 11	H3	1 13/16	3 13/16	4	92412	92442
⅝ - 18	H3	1 13/16	3 13/16	4	92413	92443
11/16 - 11	H3	2	4¼	4	92414	92444
11/16 - 16	H3	2	4¼	4	92415	92445
¾ - 10	H3	2	4¼	4	92416	92446
¾ - 16	H3	2	4¼	4	92417	92447
⅞ - 9	H4	2 7/32	4 11/16	4	92418	92448
⅞ - 14	H4	2 7/32	4 11/16	4	92419	92449
1 - 8	H4	2½	5⅛	4	92420	92450
1 - 14	H4	2½	5⅛	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.

Taraud surdimensionné — Machuelo de roscar extra grande

List No. 2014 Machine Screw & Fractional

STANDARD PACKAGE **Machine screw sizes:** 12 each
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	TPI 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	¾	2⅛	4	34223
10	24	—	H11	⅞	2⅜	4	34225
10	—	32	H11	⅞	2⅜	4	34226

List No. 2014 Fractional

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. PLUG
¼	20	—	H11	1	2½	4	34301
5/16	18	—	H11	1⅛	2 23/32	4	34303
⅜	16	—	H11	1¼	2 15/16	4	34305
½	13	—	H11	1 21/32	3⅜	4	34309
⅝	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.

Taraud à main Machuelo de roscar manual

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	EDP NO. PLUG	EDP NO. BOTTOM
1	8	4	H4	2½	5⅛	32323	32480	32659
1⅛	8	4	H5	2⁹⁄₁₆	5⁷⁄₁₆	32334	32508	32501
1¼	8	4	H5	2⁹⁄₁₆	5¾	32336	32509	32502
1⅜	8	4	H5	3	6¹⁄₁₆	32338	32510	32503
1½	8	6	H5	3	6⅜	32340	32511	32504
1⅝	8	6	H6	3³⁄₁₆	6¹¹⁄₁₆	—	32512	32505
1¾	8	6	H6	3³⁄₁₆	7	32344	32513	32506
1⅞	8	6	H6	3⁹⁄₁₆	7⁵⁄₁₆	—	32514	32507
2	8	6	H6	3⁹⁄₁₆	7⅝	32348	32515	32516
2⅛	8	6	H6	3⁹⁄₁₆	8	34919	34925	34933
2¼	8	6	H6	3⁹⁄₁₆	8¼	34920	34926	34934
2⅜	8	6	H6	4	8½	34921	34927	34935
2½	8	6	H6	4	8¾	34922	34928	34936
2⅝	8	6	H8	4	8¾	—	34929	34937
2¾	8	6	H8	4	9¼	34923	34930	34938
2⅞	8	6	H8	4	9¼	—	34931	34939
3	8	6	H8	4⁹⁄₁₆	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.**

Taraud à main Machuelo de roscar manual

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 UNC	TPI UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO. PLUG	EDP NO. BOTTOMING
¼	20	—	4	H3	1	2½	32520	32535
	—	28	4	H3	1	2½	32521	32536
⁵⁄₁₆	18	—	4	H3	1⅛	2²³⁄₃₂	32522	32537
	—	24	4	H3	1⅛	2²³⁄₃₂	32523	32538
⅜	16	—	4	H3	1¼	2¹⁵⁄₁₆	32524	32539
	—	24	4	H3	1¼	2¹⁵⁄₁₆	32525	32540
½	13	—	4	H3	1²¹⁄₃₂	3⅜	32526	32541
	—	20	4	H3	1²¹⁄₃₂	3⅜	32527	32542
⁹⁄₁₆	12	—	4	H3	1²¹⁄₃₂	3¹⁹⁄₃₂	32532	32547
	—	18	4	H3	1²¹⁄₃₂	3¹⁹⁄₃₂	32533	32548
⅝	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.

Taraud à main | Machuelo de roscar manual

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.**

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).

Taraud à main | Machuelo de roscar manual

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)

SIZE	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	SETS EDP NO.	TAPER	EDP NO. PLUG	BOTTOM
M1.6 × 0.35	D3	2	5/16	1 5/8	38200	38141	38016	38116
M1.8 × 0.35	D3	2	3/8	1 11/16	38201	38142	38017	38117
M2 × 0.4	D3	3	7/16	1 3/4	38203	38143	38018	38118
M2.2 × 0.45	D3	3	7/16	1 3/4	38204	38144	38019	38119
M2.5 × 0.45	D3	3	1/2	1 13/16	38205	38145	38001	38101
M3 × 0.5	D3	3	5/8	1 15/16	38206	38146	38002	38102
M3.5 × 0.6	D4	3	11/16	2	38207	38147	38003	38103
M4 × 0.7	D4	4	3/4	2 1/8	38208	38148	38004	38104
M4.5 × 0.75	D4	4	7/8	2 3/8	38209	38149	38005	38105
M5 × 0.8	D4	4	7/8	2 3/8	38210	38150	38006	38106
M6 × 1	D5	4	1	2 1/2	38211	38151	38007	38107
M7 × 1	D5	4	1 1/8	2 23/32	38212	38152	38008	38108
M8 × 1	D5	4	1 1/8	2 23/32	38213	38153	38020	38120
*M8 × 1.25	D5	4	1 1/8	2 23/32	38214	38154	38009	38109
M10 × 1.25	D5	4	1 1/4	2 15/16	38215	38155	38021	38121
*M10 × 1.5	D6	4	1 1/4	2 15/16	38216	38156	38010	38110
M12 × 1.25	D5	4	1 21/32	3 3/8	38217	38157	38022	38122
*M12 × 1.75	D6	4	1 21/32	3 3/8	38218	38158	38011	38111
M14 × 1.5	D6	4	1 21/32	3 19/32	38219	38159	38023	38123
*M14 × 2	D7	4	1 21/32	3 19/32	38220	38160	38012	38112
M16 × 1.5	D6	4	1 13/16	3 13/16	38221	38161	38024	38124
*M16 × 2	D7	4	1 13/16	3 13/16	38222	38162	38013	38113
M18 × 1.5	D6	4	1 13/16	4 1/32	38223	38163	38025	38125
*M18 × 2.5	D7	4	1 13/16	4 1/32	38224	38164	38014	38114
M20 × 1.5	D6	4	2	4 15/32	38225	38165	38026	38126
*M20 × 2.5	D7	4	2	4 15/32	38226	38166	38015	38115
M22 × 1.5	D6	4	2 7/32	4 11/16	38227	38167	38027	38127
*M22 × 2.5	D7	4	2 7/32	4 11/16	38228	38168	38028	38128
M24 × 2	D7	4	2 7/32	4 29/32	38229	38169	38029	38129
*M24 × 3	D8	4	2 7/32	4 29/32	38230	38170	38030	38130
M27 × 2	D7	4	2 1/2	5 1/8	38231	38171	38031	38131
*M27 × 3	D8	4	2 1/2	5 1/8	38232	38172	38032	38132
M30 × 2	D7	4	2 9/16	5 7/16	38233	38173	38033	38133
*M30 × 3.5	D9	4	2 9/16	5 7/16	38234	38174	38034	38134
M33 × 2	D7	6	2 9/16	5 3/4	38238	38178	38038	38138
*M33 × 3.5	D9	4	2 9/16	5 3/4	—	—	38035	—
M36 × 3	D8	4	3	6 1/16	38236	38176	38036	38136
*M36 × 4	D9	4	3	6 1/16	38237	38177	38037	38137

Pitch diameters are those recommended for 6H class of thread.

***Designates course pitch**

Spiral Point Plug Taps

Taraud à entrée hélicoïdale

Machuelo con punta en espiral

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 UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	2070 EDP NO.	2070X EDP NO.
0	—	80	H1	5/16	1 5/8	2	34001	—
	—	80	**H2**	5/16	1 5/8	2	34002	34122
1	64	—	H1	3/8	1 11/16	2	34003	—
	64	—	**H2**	3/8	1 11/16	2	34004	—
	—	72	H1	3/8	1 11/16	2	34005	—
	—	72	**H2**	3/8	1 11/16	2	34006	34126
2	56	—	**H2**	7/16	1 3/4	2	34008	34127
	—	64	**H2**	7/16	1 3/4	2	34010	—
3	48	—	**H2**	1/2	1 13/16	2	34012	34129
	—	56	H1	1/2	1 13/16	2	34013	—
	—	56	**H2**	1/2	1 13/16	2	34014	34131
4	40	—	H1	9/16	1 7/8	2	34015	34132
	40	—	**H2**	9/16	1 7/8	2	34016	34133
	—	48	H1	9/16	1 7/8	2	34017	—
	—	48	**H2**	9/16	1 7/8	2	34018	—
	—	*36	**H2**	9/16	1 7/8	2	34019	34134
5	40	—	H1	5/8	1 15/16	2	34020	—
	40	—	**H2**	5/8	1 15/16	2	34021	34136
	—	44	**H2**	5/8	1 15/16	2	34022	—
6	32	—	H1	11/16	2	2	34023	—
	32	—	H2	11/16	2	2	34024	34137
	32	—	**H3**	11/16	2	2	34025	34138
	—	40	**H2**	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	—	**H3**	3/4	2 1/8	2	34029	34141
	—	36	**H2**	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	—	**H3**	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	**H3**	7/8	2 3/8	2	34036	34146
12	24	—	**H3**	15/16	2 3/8	2	34038	34147
	—	28	**H3**	15/16	2 3/8	2	34039	34148

*UNS

Tool Coatings Also Available

Titanium Nitride (TiN) Coated Spiral Point Plug Taps

Taraud à entrée hélicoïdale

Machuelo con punta en espiral

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	11/16	2	2	92530
6-40	H2	11/16	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	15/16	2 3/8	2	92536
12-28	H3	15/16	2 3/8	2	92537

+.005″ Oversize Spiral Point Plug Taps

Taraud surdimensionné

Machuelo de roscar extra grande

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

PITCH DIA. LIMIT	AMOUNT LARGER THAN BASIC PITCH DIA.
H11	.0050"-.0055"

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.
6	32	—	H11	11/16	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

Taraud à entrée hélicoïdale Machuelo con punta en espiral

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

Bold type indicates standard H limit.

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES STD.	NO. OF FLUTES OPTL.	PITCH DIA. LIMIT	THREAD LENGTH	OAL	2047 EDP NO.	2047X EDP NO.
1/4	20	—	2	—	H1	1	2 1/2	33001	—
	20	—	2	—	H2	1	2 1/2	33002	33055
	20	—	2	—	**H3**	1	2 1/2	33003	33056
	20	—	2	—	H5	1	2 1/2	33004	33057
	20	—	—	3	**H3**	1	2 1/2	33005	—
	20	—	—	3	H5	1	2 1/2	33006	—
1/4	—	28	2	—	H1	1	2 1/2	33007	—
	—	28	2	—	H2	1	2 1/2	33008	33058
	—	28	2	—	**H3**	1	2 1/2	33009	33059
	—	28	2	—	H4	1	2 1/2	33010	33060
	—	28	—	3	H2	1	2 1/2	33011	—
	—	28	—	3	H4	1	2 1/2	33012	—
5/16	18	—	2	—	H1	1 1/8	2 23/32	33013	—
	18	—	2	—	H2	1 1/8	2 23/32	33014	—
	18	—	2	—	**H3**	1 1/8	2 23/32	33015	33061
	18	—	2	—	H5	1 1/8	2 23/32	33016	33062
	18	—	—	3	**H3**	1 1/8	2 23/32	33017	33063
	18	—	—	3	H5	1 1/8	2 23/32	33018	33064
5/16	—	24	2	—	H1	1 1/8	2 23/32	33019	—
	—	24	2	—	H2	1 1/8	2 23/32	33020	33065
	—	24	2	—	**H3**	1 1/8	2 23/32	33021	33066
	—	24	2	—	H4	1 1/8	2 23/32	33022	—
	—	24	—	3	H2	1 1/8	2 23/32	33023	—
	—	24	—	3	H4	1 1/8	2 23/32	33024	33067
3/8	16	—	3	—	H1	1 1/4	2 15/16	33025	—
	16	—	3	—	H2	1 1/4	2 15/16	33026	—
	16	—	3	—	**H3**	1 1/4	2 15/16	33027	33068
	16	—	3	—	H5	1 1/4	2 15/16	33028	33069
3/8	—	24	3	—	H1	1 1/4	2 15/16	33029	—
	—	24	3	—	H2	1 1/4	2 15/16	33030	—
	—	24	3	—	**H3**	1 1/4	2 15/16	33031	33070
	—	24	3	—	H4	1 1/4	2 15/16	33032	—
7/16	14	—	3	—	H2	1 7/16	3 5/32	33033	—
	14	—	3	—	**H3**	1 7/16	3 5/32	33034	33071
	14	—	3	—	H5	1 7/16	3 5/32	33035	33072
7/16	—	20	3	—	**H3**	1 7/16	3 5/32	33036	33073
	—	20	3	—	H5	1 7/16	3 5/32	33037	33074
1/2	13	—	3	—	H2	1 21/32	3 3/8	33039	—
	13	—	3	—	**H3**	1 21/32	3 3/8	33040	33075
	13	—	3	—	H5	1 21/32	3 3/8	33041	33076
1/2	—	20	3	—	H1	1 21/32	3 3/8	33042	—
	—	20	3	—	H2	1 21/32	3 3/8	33043	—
	—	20	3	—	**H3**	1 21/32	3 3/8	33044	33077
	—	20	3	—	H5	1 21/32	3 3/8	33045	33078
5/8	11	—	3	—	**H3**	1 13/16	3 13/16	33046	33079
	11	—	3	—	H5	1 13/16	3 13/16	33047	33080
	—	18	3	—	**H3**	1 13/16	3 13/16	33050	33081
3/4	10	—	3	—	**H3**	2	4 1/4	33048	33082
	10	—	3	—	H5	2	4 1/4	33049	33083
	—	16	3	—	**H3**	2	4 1/4	33052	33084

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.

Taraud à entrée hélicoïdale

Machuelo con punta en espiral

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.
¼-20	H3	1	2½	2	92500
¼-28	H3	1	2½	2	92501
5/16-18	H3	1⅛	2 23/32	2	92502
5/16-24	H3	1⅛	2 23/32	2	92503
⅜-16	H3	1¼	2 15/16	3	92504
⅜-24	H3	1¼	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
½-13	H3	1 21/32	3⅜	3	92508
½-20	H3	1 21/32	3⅜	3	92509
⅝-11	H3	1 13/16	3 13/16	3	92510
⅝-18	H3	1 13/16	3 13/16	3	92511
¾-10	H3	2	4¼	3	92512
¾-16	H3	2	4¼	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.

Taraud à entrée hélicoïdale Machuelo con punta en espiral

List No. 2047 Fractional

List No. 2070 Machine Screw

STANDARD PACKAGE All sizes — 12 each

Ground Thread — High Speed Steel
Bright Finish

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO.
0	—	80	2	H2	5/16	1⅝	34101
2	56	—	2	H2	7/16	1¾	34102
3	48	—	2	H2	½	1 13/16	34103
4	40	—	2	H2	9/16	1⅞	34104
	—	48	2	H2	9/16	1⅞	34105
5	40	—	2	H2	⅝	1 15/16	34106
6	32	—	2	H2	11/16	2	34107
	32	—	2	H3	11/16	2	34108
	—	40	2	H2	11/16	2	34109
8	32	—	2	H2	¾	2⅛	34110
8	32	—	2	H3	¾	2⅛	34111
10	24	—	2	H2	⅞	2⅜	34112
	24	—	2	H3	⅞	2⅜	34113
	—	32	2	H2	⅞	2⅜	34114
	—	32	2	H3	⅞	2⅜	34115
12	24	—	2	H3	15/16	2⅜	34116
¼	20	—	2	H3	1	2½	33101
	—	28	2	H3	1	2½	33102
5/16	18	—	2	H3	1⅛	2 23/32	33103
	—	24	2	H3	1⅛	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 PACKAGE
M1.6 thru M12 — 12 each
M14 thru M16 — 3 each
M18 thru M20 — 1 each

Taraud à entrée hélicoïdale Machuelo con punta en espiral

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 — Diamond Like Carbon

Slow Spiral Spiral Flute Taps

Taraud à gorges hélicoïdales

Machuelo de roscar con gavilanes en espiral

Ground Thread — 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.

List No. 2063 Machine Screw
List No. 2039 Fractional

STANDARD PACKAGE All sizes — 12 each

List No. 2063 Machine Screw

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES STD.	NO. OF FLUTES OPTL.	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
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	11/16	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

List No. 2039 Fractional

SIZE	TPI UNC	TPI UNF	NO. OF FLUTES STD.	NO. OF FLUTES OPTL.	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
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

Taraud à gorges hélicoïdales

Machuelo de roscar con gavilanes en espiral

Ground Thread — 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 Machine Screw & Fractional

STANDARD PACKAGE All sizes — 12 each

Tool Coatings Also Available

List No. 2059 Machine Screw

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	PLUG EDP NO.	BOTTOM EDP NO.
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	11/16	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

*Available While Supplies Last

(continued)

Fast Spiral Spiral Flute Taps (continued)

Taraud à gorges hélicoïdales Machuelo de roscar con gavilanes en espiral

List No. 2059 Fractional

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	PLUG EDP NO.	BOTTOM EDP NO.
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 5/32	3	33314	33364
	—	20	H3	1 7/16	3 5/32	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

Left Hand Straight Flute Hand Taps

Taraud à main Machuelo de roscar manual

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 UNC	TPI UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.
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 15/16	33446	33476
	—	24	4	H3	1 1/4	2 15/16	33447	33477
7/16	14	—	4	H3	1 7/16	3 5/32	33448	33478
	—	20	4	H3	1 7/16	3 5/32	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

Tool Coatings Also Available

** UNS

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.

Taraud façonneur de filets Machuelo formador de roscas

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 ½″ — 12 each
⁹⁄₁₆″ thru ¾″ — 3 each
M3 thru M12 — 12 each
M14 thru M16 — 3 each
M18 thru M24 — 1 each

TAP DRILL SIZES: Page 185
CLASS OF FIT RECOMMENDATIONS: Page 189

Machine Screw

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG BRIGHT EDP NO.	PLUG TiN COATED EDP NO.	BOTTOM BRIGHT EDP NO.	BOTTOM TiN COATED EDP NO.
0	80	—	H2	5⁄16	1 5⁄8	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	11⁄16	2	3	36289	96289	36389	96389
	32	—	H5	11⁄16	2	3	36290	96290	36390	96390
	—	40	H3	11⁄16	2	3	36291	96291	36391	96391
	—	40	H5	11⁄16	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

Thread Forming Taps

Taraud façonneur de filets Machuelo formador de roscas

Fractional

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG BRIGHT EDP NO.	PLUG TiN COATED EDP NO.	BOTTOM BRIGHT EDP NO.	BOTTOM 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	1⅛	2 23/32	4	36314	96314	36414	96414
	18	—	H7	1⅛	2 23/32	4	36315	96315	36415	96415
	—	24	H5	1⅛	2 23/32	4	36316	96316	36416	96416
	—	24	H7	1⅛	2 23/32	4	36317	96317	36417	96417
3/8	16	—	H5	1¼	2 15/16	4	36318	96318	36418	96418
	16	—	H7	1¼	2 15/16	4	36319	96319	36419	96419
	—	24	H5	1¼	2 15/16	4	36320	96320	36420	96420
	—	24	H7	1¼	2 15/16	4	36321	96321	36421	96421
7/16	14	—	H5	1 7/16	3 5/32	4	36322	96322	36422	96422
	14	—	H8	1 7/16	3 5/32	4	36323	96323	36423	96423
	—	20	H5	1 7/16	3 5/32	4	36324	96324	36424	96424
	—	20	H8	1 7/16	3 5/32	4	36325	96325	36425	96425
1/2	13	—	H5	1 21/32	3⅜	4	36326	96326	36426	96426
	13	—	H8	1 21/32	3⅜	4	36327	96327	36427	96427
	—	20	H5	1 21/32	3⅜	4	36328	96328	36428	96428
	—	20	H8	1 21/32	3⅜	4	36329	96329	36429	96429
9/16	12	—	H7	1 21/32	3 19/32	6	36330	96330	36430	96430
	12	—	H10	1 21/32	3 19/32	6	36331	96331	36431	96431
	—	18	H7	1 21/32	3 19/32	6	36332	96332	36432	96432
	—	18	H10	1 21/32	3 19/32	6	36333	96333	36433	96433
5/8	11	—	H7	1 13/16	3 13/16	6	36334	96334	36434	96434
	11	—	H10	1 13/16	3 13/16	6	36335	96335	36435	96435
	—	18	H7	1 13/16	3 13/16	6	36336	96336	36436	96436
	—	18	H10	1 13/16	3 13/16	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

Tool Coatings Also Available

Metric

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG BRIGHT EDP NO.	PLUG TiN COATED EDP NO.	BOTTOM BRIGHT EDP NO.	BOTTOM TiN COATED EDP NO.
M3	0.5	D5	⅝	1 15/16	3	36350	96350	36450	96450
M4	0.7	D6	¾	2⅛	3	36351	96351	36451	96451
M5	0.8	D7	⅞	2⅜	4	36352	96352	36452	96452
M6	1	D8	1	2½	4	36353	96353	36453	96453
M8	1.25	D9	1⅛	2 23/32	4	36354	96354	36454	96454
M10	1.5	D10	1¼	2 15/16	4	36355	96355	36455	96455
M12	1.75	D11	1 21/32	3⅜	4	36356	96356	36456	96456
M14	2	D11	1 21/32	3 19/32	6	36357	96357	36457	96457
M16	2	D12	1 13/16	3 13/16	6	36358	96358	36458	96458
M20	2.5	D12	2	4 15/32	6	36359	96359	36459	96459

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)

List No. 2072
Machine Screw Sizes

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO. PLUG	EDP NO. BOTTOM
2	56	—	H1	3	7/16	1-3/4	34149	34049
	56	—	H2	3	7/16	1-3/4	34150	34050
4	40	—	H1	3	9/16	1-7/8	34151	34051
	40	—	H2	3	9/16	1-7/8	34152	34052
5	40	—	H1	3	5/8	1-15/16	34153	34053
	40	—	H2	3	5/8	1-15/16	34154	34054
6	32	—	H2	3	11/16	2	34155	34055
	32	—	H3	3	11/16	2	34156	34056
	—	40	H1	3	11/16	2	34157	34057
	—	40	H2	3	11/16	2	34158	34058
8	32	—	H2	3	3/4	2-1/8	34159	34059
	32	—	H3	3	3/4	2-1/8	34160	34060
10	24	—	H2	3	7/8	2-3/8	34161	34061
	24	—	H3	3	7/8	2-3/8	34162	34062
	—	32	H2	3	7/8	2-3/8	34163	34063
	—	32	H3	3	7/8	2-3/8	34164	34064
12	24	—	H2	3	15/16	2-3/8	34165	34065
	24	—	H3	3	15/16	2-3/8	34166	34066

List No. 2072
Fractional Sizes

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO. PLUG	EDP NO. BOTTOM
1/4	20	—	H2	3	1	2-1/2	34167	34067
	20	—	H3	3	1	2-1/2	34168	34068
	—	28	H2	3	1	2-1/2	34169	34069
	—	28	H3	3	1	2-1/2	34170	34070
5/16	18	—	H3	4	1-1/8	2-23/32	34171	34071
	18	—	H4	4	1-1/8	2-23/32	34172	34072
	—	24	H2	4	1-1/8	2-23/32	34173	34073
	—	24	H3	4	1-1/8	2-23/32	34174	34074
3/8	16	—	H3	4	1-1/4	2-15/16	34175	34075
	16	—	H4	4	1-1/4	2-15/16	34176	34076
	—	24	H2	4	1-1/4	2-15/16	34177	34077
	—	24	H3	4	1-1/4	2-15/16	34178	34078
7/16	14	—	H3	4	1-7/16	3-5/32	34179	34079
	14	—	H4	4	1-7/16	3-5/32	34180	34080
	—	20	H3	4	1-7/16	3-5/32	34181	34081
	—	20	H4	4	1-7/16	3-5/32	34182	34082
1/2	13	—	H3	4	1-21/32	3-3/8	34183	34083
	13	—	H4	4	1-21/32	3-3/8	34184	34084
	—	20	H3	4	1-21/32	3-3/8	34185	34085
	—	20	H4	4	1-21/32	3-3/8	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)

List No. 2073
Machine Screw Sizes

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO. PLUG
2	56	—	H1	2	7/16	1-3/4	33858
	56	—	H2	2	7/16	1-3/4	33859
4	40	—	H1	2	9/16	1-7/8	33860
	40	—	H2	2	9/16	1-7/8	33861
5	40	—	H1	2	5/8	1-15/16	33862
	40	—	H2	2	5/8	1-15/16	33863
6	32	—	H2	2	11/16	2	33864
	32	—	H3	2	11/16	2	33865
	—	40	H1	2	11/16	2	33866
	—	40	H2	2	11/16	2	33867
8	32	—	H2	2	3/4	2-1/8	33868
	32	—	H3	2	3/4	2-1/8	33869
10	24	—	H2	2	7/8	2-3/8	33870
	24	—	H3	2	7/8	2-3/8	33871
	—	32	H2	2	7/8	2-3/8	33872
	—	32	H3	2	7/8	2-3/8	33873
12	24	—	H2	2	15/16	2-3/8	33874
	24	—	H3	2	15/16	2-3/8	33875

List No. 2073
Fractional Sizes

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO. PLUG
1/4	20	—	H2	2	1	2-1/2	33876
	20	—	H3	2	1	2-1/2	33877
	—	28	H2	2	1	2-1/2	33878
	—	28	H3	2	1	2-1/2	33879
5/16	18	—	H3	3	1-1/8	2-23/32	33880
	18	—	H4	3	1-1/8	2-23/32	33881
	—	24	H2	3	1-1/8	2-23/32	33882
	—	24	H3	3	1-1/8	2-23/32	33883
3/8	16	—	H3	3	1-1/4	2-15/16	33884
	16	—	H4	3	1-1/4	2-15/16	33885
	—	24	H2	3	1-1/4	2-15/16	33886
	—	24	H3	3	1-1/4	2-15/16	33887
7/16	14	—	H3	3	1-7/16	3-5/32	33888
	14	—	H4	3	1-7/16	3-5/32	33889
	—	20	H3	3	1-7/16	3-5/32	33890
	—	20	H4	3	1-7/16	3-5/32	33891
1/2	13	—	H3	3	1-21/32	3-3/8	33892
	13	—	H4	3	1-21/32	3-3/8	33893
	—	20	H3	3	1-21/32	3-3/8	33894
	—	20	H4	3	1-21/32	3-3/8	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)

List No. 2074
Machine Screw Sizes

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO. BOTTOM
2	56	—	H1	2	7/16	1-3/4	33930
	56	—	H2	2	7/16	1-3/4	33931
4	40	—	H1	2	9/16	1-7/8	33932
	40	—	H2	2	9/16	1-7/8	33933
5	40	—	H1	3	5/8	1-15/16	33934
	40	—	H2	3	5/8	1-15/16	33935
6	32	—	H2	3	11/16	2	33936
	32	—	H3	3	11/16	2	33937
	—	40	H1	3	11/16	2	33938
	—	40	H2	3	11/16	2	33939
8	32	—	H2	3	3/4	2-1/8	33940
	32	—	H3	3	3/4	2-1/8	33941
10	24	—	H2	3	7/8	2-3/8	33942
	24	—	H3	3	7/8	2-3/8	33943
	—	32	H2	3	7/8	2-3/8	33944
	—	32	H3	3	7/8	2-3/8	33945
12	24	—	H2	3	15/16	2-3/8	33946
	24	—	H3	3	15/16	2-3/8	33947

List No. 2074
Fractional Sizes

SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO. BOTTOM
1/4	20	—	H2	3	1	2-1/2	33948
	20	—	H3	3	1	2-1/2	33949
	—	28	H2	3	1	2-1/2	33950
	—	28	H3	3	1	2-1/2	33951
5/16	18	—	H3	3	1-1/8	2-23/32	33952
	18	—	H4	3	1-1/8	2-23/32	33953
	—	24	H2	3	1-1/8	2-23/32	33954
	—	24	H3	3	1-1/8	2-23/32	33955
3/8	16	—	H3	3	1-1/4	2-15/16	33956
	16	—	H4	3	1-1/4	2-15/16	33957
	—	24	H2	3	1-1/4	2-15/16	33958
	—	24	H3	3	1-1/4	2-15/16	33959
7/16	14	—	H3	3	1-7/16	3-5/32	33960
	14	—	H4	3	1-7/16	3-5/32	33961
	—	20	H3	3	1-7/16	3-5/32	33962
	—	20	H4	3	1-7/16	3-5/32	33963
1/2	13	—	H3	3	1-21/32	3-3/8	33964
	13	—	H4	3	1-21/32	3-3/8	33965
	—	20	H3	3	1-21/32	3-3/8	33966
	—	20	H4	3	1-21/32	3-3/8	33967

Taper Pipe Reamers

Fraise à tuyau Rima de tubería

High Speed Steel – Left Hand Helical Flute
Right Hand Cut

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

FOR THREAD SIZE	DIAMETER LARGE END	DIAMETER SMALL END	FLUTE LENGTH	OAL	EDP NO.
1/8	.362	.316	3/4	2 1/8	36081
1/4	.472	.406	1 1/16	2 7/16	36082
3/8	.606	.540	1 1/16	2 9/16	36083
1/2	.751	.665	1 3/8	3 1/8	36084
3/4	.962	.876	1 3/8	3 1/4	36085
1	1.212	1.103	1 3/4	3 3/4	36086
1 1/4	1.553	1.444	1 3/4	4	36087
1 1/2	1.793	1.684	1 3/4	4 1/4	36088
2	2.268	2.159	1 3/4	4 1/2	36089

Tool Coatings Also Available

Taper Pipe Taps

Taraud au pas du gaz Machuelo de roscar para tuberías

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. LIST NO. 2113	NO. OF FLUTES. LIST NO 2119	INTERRUPTED THREAD LIST NO. 2113 EDP NO. NPT/ANPT	INTERRUPTED THREAD LIST NO. 2113 EDP NO. NPTF	REGULAR THREAD LIST NO. 2119 EDP NO. NPT/ANPT	REGULAR THREAD LIST NO. 2119 EDP NO. 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.

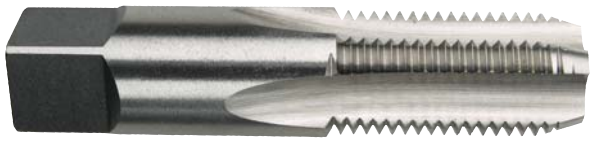
Straight Pipe Taps

Taraud au pas du gaz Machuelo de roscar para tuberías

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 PACKAGE 1/8″ thru 1/4″ — 6 each
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	EDP NO. NPSF
⅛-27* (Sm. Sk.)	4	¾	2⅛	36161	36181
⅛-27* (Lg. Sk.)	4	¾	2⅛	36162	36182
¼-18	4	1 1/16	2 7/16	36163	36183
⅜-18	4	1 1/16	2 9/16	36164	36184
½-14	4	1⅜	3⅛	36165	36185
¾-14	5	1⅜	3¼	36166	36186
1-11½	5	1¾	3¾	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

Taraud au pas du gaz Machuelo de roscar para tuberías

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 1/ thread chamfer in NPT thread form 1°-3° Rake.

List No. 2133 Steam Oxide Over Nitride Finish

STANDARD PACKAGE 1/8″ thru 1/4″ — 6 each
3/8″ thru 2″ — 1 each

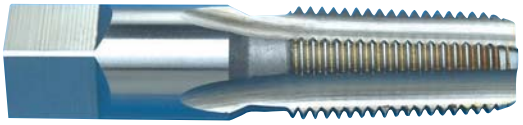
SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	NPT EDP NO.
⅛-27 (Lg. Sk.)	¾	2⅛	4	36202
¼-18	1 1/16	2 7/16	4	36203
⅜-18	1 1/16	2 9/16	4	36204
½-14	1⅜	3⅛	4	36205
¾-14	1⅜	3¼	5	36206

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	NPT EDP NO.
1-11½	1¾	3¾	5	36207
1¼-11½	1¾	4	5	36208
1½-11½	1¾	4¼	7	36209
2-11½	1¾	4½	7	36210

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

High Hook Taper Pipe Taps

Taraud au pas du gaz Machuelo de roscar para tuberías



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	EDP NO. 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

Taraud au pas du gaz Machuelo de roscar para tuberías

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.

Tool Coatings Also Available

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	EDP NO. 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

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_____

MORSE CUTTING TOOLS

800.255.1701

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.**

Combinaison foret et taraud

Combinación de broca y machuelo de roscar

List No. 2080 — Machine Screw, Fractional & Metric

STANDARD PACKAGE 4-40 — 3/8-24 — 12 ea.
7/16 — 3 ea.
1/2 — 1 ea.

List No. 2080 — Machine Screw & Fractional

TAP SIZE	TPI UNC	TPI UNF	PITCH DIA. LIMIT	THREAD LENGTH	DRILL SIZE	DRILL LENGTH	OAL	EDP NO.
4	–	48	H2	3/8	.0945	1/4	1 7/8	38601*
5	40	–	H2	13/32	.1040	9/32	1 15/16	38602*
	–	44	H2	13/32	.1060	9/32	1 15/16	38603*
6	32	–	H3	7/16	.1115	5/16	2	38604
	–	40	H2	7/16	.1170	5/16	2	38605*
8	32	–	H3	1/2	.1375	3/8	2 1/8	38606
	–	36	H2	1/2	.1405	3/8	2 1/8	38607*
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*
1/4	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

* Available While Supplies Last

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.

Taraud long à queue moyenne Machuelo de roscar para tuercas

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

Pulley Taps

Taraud à poulies | Machuelo de roscar para poleas

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″ LENGTH EDP NO.	8″ LENGTH EDP NO.	10″ LENGTH EDP NO.	12″ LENGTH EDP NO.
¼	20	1	4	34201	34207	—	—
5/16	18	1⅛	4	34202	34208	—	—
⅜	16	1¼	4	34203	34209	34213	—
7/16	14	1 7/16	4	34204	34210	—	—
½	13	1 21/32	4	34205	34211	34214	34217
⅝	11	1 13/16	4	34206	34212	34215	—
¾	10	2	4	—	—	34216	—

Solid Round Dies
NPT - Taper Pipe Sizes

Filière ronde pleine | Tarraja redonda sólida

Carbon Steel

THICKNESS 1 Inch O.D., 3/8 Inch Thick
1½ 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.
⅛-27	31251	31252	—
¼-18	—	31253	31255
⅜-18	—	31254	31256
½-14	—	—	31257

Adjustable Round Split Dies
Machine Screw Sizes

Filière ronde réglable | Tarraja redonda ajustable

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 UNC	TPI UNF	13/16″ O.D. EDP NO.
0	—	80	31101
1	64	—	31102
		72	31103
2	56	—	31104
	—	64	31105
3	48	—	31106
	—	56	31107
4	—	36*	31108
	40	—	31109
	—	48	31110
5	40	—	31111
	—	44	31112

*UNS

SIZE	TPI UNC	TPI UNF	13/16″ O.D. EDP NO.	1″ O.D. EDP NO.
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

Filière ronde réglable Tarraja redonda ajustable

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
1½″ O.D., 1/2″ Thick
2″ O.D., 5/8″ Thick
2½″ 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.
¼	20	—	—	31158	31164	31177	31191
	—	28	—	31159	31165	31178	31192
5/16	18	—	—	31160	31168	31179	31193
	—	24	—	—	31169	31180	31194
⅜	16	—	—	—	31171	31181	31195
	—	24	—	—	31172	31182	31196
7/16	14	—	—	—	31173	31183	31197
	—	20	—	—	31174	31184	31198
½	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.
⅝	11	—	—	31189	31203	31213	—
	—	18	—	31190	31204	—	—
11/16	—	—	11	—	31205	—	—
	—	—	16	—	31206	—	—
¾	10	—	—	—	31207	31214	—
	—	16	—	—	31208	31215	—
⅞	9	—	—	—	31209	31216	—
	—	14	—	—	31210	31217	—
1	8	—	—	—	31211	31218	31221
	—	12	—	—	31212	31219	31222
1⅛	7	—	—	—	—	—	31224
	—	12	—	—	—	—	31225
1¼	7	—	—	—	—	—	31226
	—	12	—	—	—	—	31227
1⅜	6	—	—	—	—	—	31228
	—	12	—	—	—	—	31229
1½	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

Filière ronde réglable

Tarraja redonda ajustable

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
1½″ 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 UNC	TPI UNF	13/16″ O.D. EDP NO.	1″ O.D. EDP NO.
5	40	—	31501	—
	—	44	31502	—
6	32	—	31503	31511
	—	40	31504	—
8	32	—	31505	31512

SIZE	TPI UNC	TPI UNF	13/16″ O.D. EDP NO.	1″ O.D. EDP NO.
8	—	36	31506	—
10	24	—	31507	31513
	—	32	31508	31514
12	24	—	31509	31515
	—	28	31510	—

List No. 2195 Fractional

SIZE	TPI UNC	TPI UNF	13/16″ O.D. EDP NO.	1″ O.D. EDP NO.	1-1/2″ O.D. EDP NO.	2″ O.D. EDP NO.
¼	20	—	31526	31530	31538	—
	—	28	31527	31531	31539	—
5/16	18	—	31528	31532	31540	—
	—	24	31529	31533	31541	—
⅜	16	—	—	31534	31542	—
	—	24	—	31535	31543	—
7/16	14	—	—	31536	31544	—
	—	20	—	31537	31545	—
½	13	—	—	—	31546	—
	—	20	—	—	31547	—
9/16	12	—	—	—	31548	—
	—	18	—	—	31549	—
⅝	11	—	—	—	31550	31552
	—	18	—	—	31551	31553
¾	10	—	—	—	—	31554
	—	16	—	—	—	31555
⅞	9	—	—	—	—	31556
	—	14	—	—	—	31557

List No. 2195M Metric

SIZE	13/16″ O.D. EDP NO.	1″ O.D. EDP NO.
M2.5 × 0.45	31560	—
M3 × 0.5	31561	—
M3.5 × 0.6	31562	—
M4 × 0.7	31563	—
M4.5 × 0.75	31564	—
M5 × 0.8	31565	—
M6 × 1	31566	31567
M7 × 1	—	31568

SIZE	1″ O.D. EDP NO.	1-1/2″ O.D. EDP NO.
M8 × 1.25	31569	—
M10 × 1.5	31570	—
M12 × 1.75	31571	—
M14 × 2	—	31572
M16 × 2	—	31573
M18 × 2.5	—	31574
M20 × 2.5	—	31575

Hexagon Rethreading Dies

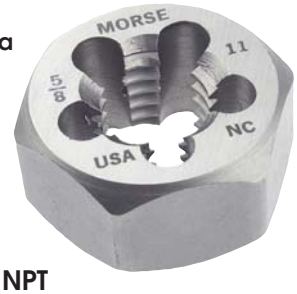
Carbon Steel

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

Écrou-filière hexagonal

Tarraja hexagonal refileteadora



List No. 1266 Fractional
List No. 1266M Metric
List No. 1267 Taper Pipe — NPT

List No. 1266 Fractional

SIZE	UNC	TPI UNF	UNS	DIMENSIONS ACROSS FLATS	DIMENSIONS THICK-NESS	EDP NO.
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
11/16	—	—	11	1 7/16	3/4	31315
	—	—	16	1 7/16	3/4	31316
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. 1266M Metric

SIZE	DIMENSIONS ACROSS FLATS	THICKNESS	EDP NO.
M5 x 0.8	19/32	1/4	31340
M6 x 1	19/32	1/4	31341
M8 x 1.25	11/16	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

List No. 1267 Taper Pipe — NPT

SIZE	TPI	DIMENSIONS ACROSS FLATS	THICKNESS	EDP NO.
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

Hexagon Rethreading Die Sets

Carbon Steel

List No. 7200

Jeu de filières

Juego de terrajas

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

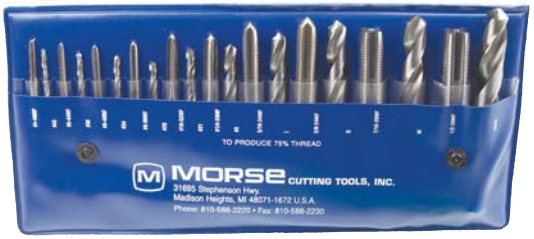
Tap and Drill Kits

Ensemble de tarauds et de forets Juegos de machuelos y brocas

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.

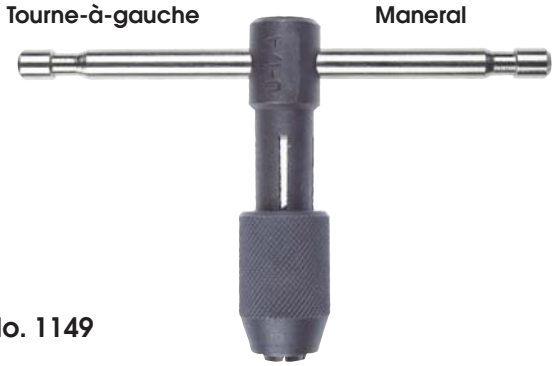


List No. 8001

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
¼-20	#7	¼-28	#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
½-13	27/64	½-20	29/64	M12 x 1.75	Y

"T" Handle Tap Wrenches

Tourne-à-gauche Maneral



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.

List No. 1149

STANDARD PACKAGE All sizes — 1 each

WRENCH NO.	TAPS CAPACITY INCH	TAPS CAPACITY METRIC	EDP NO.
2	0-¼	M1.5-M6.3	30522
4	¼ - ½	M6.3-M12.5	30524

Tap Wrenches

Tourne-à-gauche Maneral

List No. 1148

STANDARD PACKAGE All sizes — 1 each

WRENCH NO.	CAPACITY CUTTING SIZE FRACTIONAL TAPS	PIPE TAPS	REAMERS	EDP NO.
11	1/16 - ¼		⅛ - 17/64	30501
12	1/16 - 3/8		⅛ - 25/64	30502
13	5/32 - ½	⅛	11/64 - 7/16	30503
14	5/32 - ¾	⅛ - ¼	11/64 - 41/64	30504
15	¼ - 1⅛	⅛ - ¾	9/32 - 29/32	30505
16	¾ - 1⅝	3/8 - 1¼	37/64 - 1 11/32	30506
17	1 - 2½	¾ - 2	⅞ - 2½	30507

Die Stocks

Porte-filière Terraja de cojinetes

List No. 1179

STANDARD PACKAGE All sizes — 1 each

DIE STOCK NO.	CAPACITY DIE O.D.	DIE THICKNESS	EDP NO.
2	13/16	¼	30512
3	1	3/8	30513
5	1½	½	30514
6	2	⅝	30515
7	2½	¾	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 13⁄16" OD Adjustable Dies
#2 Die Stock
#2 "T" Handle Tap Wrench
Screw Driver
Plastic Case

List No. 7130 **EDP No. 37011**

23-Pc. 1/4" thru 1/2" NC & NF Tap & Die Set

Set No. 100

¼ to ½ NC & NF HSS Plug Taps
¼ to ½ NC & NF Carbon Steel 1" OD Adjustable Dies
#3 Die Stock
#4 "T" Handle Tap Wrench
Screw Driver
Plastic Case

List No. 7120 **EDP No. 37001**

49-Pc. 1/4" thru 1" NC & NF Tap & Die Set

Set No. 101

¼ to 1 NC & NF HSS Plug Taps
⅛ NPT HSS Plug Tap
¼ to ⅜ NC & NF & ⅛ NPT Carbon Steel 1 OD Adjustable Dies
7⁄16 to ⅝ NC & NF Carbon Steel 1 ½" OD Adjustable Dies
¾ to 1 NC & NF Carbon Steel 2 OD Adjustable Dies
#3, #5 & #6 Die Stocks
#13 & #15 Straight Tap Wrenches
2 Screw Driver
Plastic Case

List No. 7120 **EDP No. 37002**

SHEARTAP™ 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 Based on 75% Thread (in.)	FORMING TAPS Based on 65% Thread (in.)	TAP SIZE	CUTTING TAPS Based on 75% Thread (in.)	FORMING TAPS 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

Formula for Obtaining Tap Drill Sizes for Cutting Taps:

$$\text{Major Dia. of Thread} - \frac{.01299 \times \text{Amt. of percentage of full thread}}{\text{No. of threads per inch}} = \text{Drilled Hole* Size}$$

Note: Select nearest commercial stock drill.

Percentage of Full Thread for Other Drill Sizes

$$\text{No. of Threads per Inch} \times \frac{\text{Major Dia. Selected of Thread} - \text{Drill Dia.}}{.01299} = \text{Percentage of Full Thread}$$

Formula For Obtaining Tap Drill Sizes For Thread Forming Taps:

$$\text{*Drill Hole Size (inches)} = \text{Basic Major Dia. of thread (inches)} - .0068 \times \frac{\text{Percentage of Full Thread}}{\text{No. of Threads per Inch}}$$

$$\text{*Drilled Hole Size (mm)} = \text{Basic Major Dia. of thread (mm)} - \frac{\text{Percentage of Full Thread X mm Pitch}}{147.06}$$

*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

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).

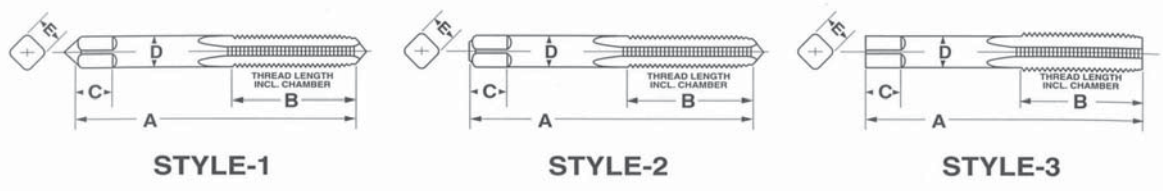
Machine Screw & Fractional

	THREADS PER INCH		"H" LIMIT for CLASS of FIT		
SIZE	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

		"D" LIMIT for CLASS of FIT	
SIZE	PITCH	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

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	THREAD LENGTH	SQUARE LENGTH	SHANK DIAMETER	SIZE OF SQUARE
OVER	TO (Incl.)					A	B	C	D	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	11/16	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	15/16	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		11/16	M18	3	4 1/32	1 13/16	5/8	.542	.406
.709	.760		3/4	—	3	4 1/4	2	11/16	.590	.442
.760	.823		13/16	M20	3	4 15/32	2	11/16	.652	.489
.823	.885		7/8	M22	3	4 11/16	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 11/16	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 9/16	1 1/4	1.519	1.139
1.885	2.010		2	M48	3	7 5/8	3 9/16	1 3/8	1.644	1.233
2.010	2.135		2 1/8	—	3	8	3 9/16	1 3/8	1.769	1.327
2.135	2.260		2 1/4	M56	3	8 1/4	3 9/16	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

(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
OVER	TO (Incl.)									
2.885	3.010		3	—	3	9¾	4⁹⁄₁₆	1⅝	2.543	1.907
3.010	3.135		3⅛	—	3	9¾	4⁹⁄₁₆	1⅝	2.668	2.001
3.135	3.260		3¼	M80	3	10	4⁹⁄₁₆	1¾	2.793	2.095
3.260	3.385		3⅜	—	3	10	4⁹⁄₁₆	1¾	2.883	2.162
3.385	3.510		3½	—	3	10¼	4¹⁵⁄₁₆	2	3.008	2.256
3.510	3.635		3⅝	M90	3	10¼	4¹⁵⁄₁₆	2	3.133	2.350
3.635	3.760		3¾	—	3	10½	5⁵⁄₁₆	2⅛	3.217	2.413
3.760	3.885		3⅞	—	3	10½	5⁵⁄₁₆	2⅛	3.342	2.506
3.885	4.010		4	M100	3	10¾	5⁵⁄₁₆	2¼	3.467	2.600

Tolerances

ELEMENT	NOMINAL DIAMETER RANGE —INCHES		DIRECTION	TOLERANCE — INCHES
	OVER	TO (Incl.)		
Length Overall — A	.052	1.010	Plus or Minus	1⁄32
	1.010	4.010	Plus or Minus	1⁄16
Length of Thread — B	.052	.223	Plus or Minus	3⁄64
	.223	.510	Plus or Minus	1⁄16
	.510	1.510	Plus or Minus	3⁄32
	1.510	4.010	Plus or Minus	1⁄8
Length of Square — C	.052	1.010	Plus or Minus	1⁄32
	1.010	4.010	Plus or Minus	1⁄16
Diameter of Shank — D	.052	.223	Minus	.0015
	.223	.635	Minus	.0015
	.635	1.010	Minus	.002
	1.010	1.510	Minus	.002
	1.510	2.010	Minus	.003
	2.010	4.010	Minus	.003
Size of Square — E	.052	.510	Minus	.004
	.510	1.010	Minus	.006
	1.010	2.010	Minus	.008
	2.010	4.010	Minus	.010

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.

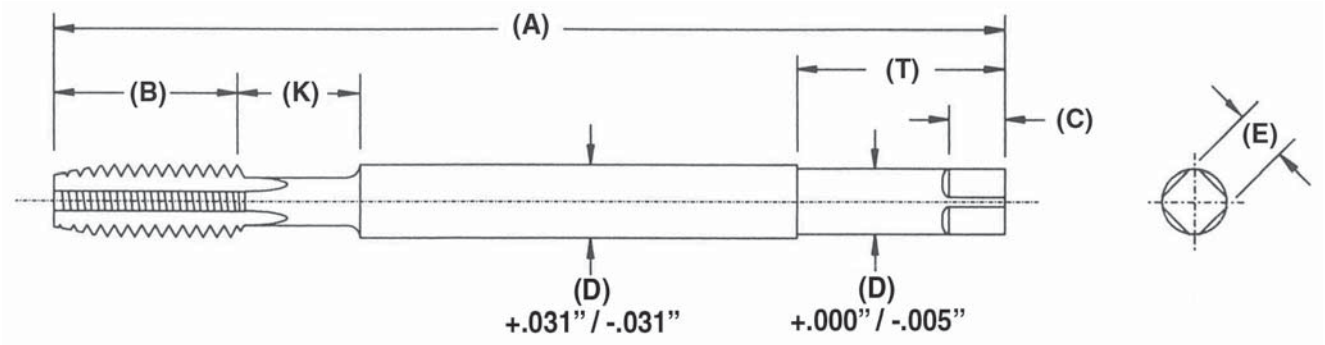
Notes

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 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

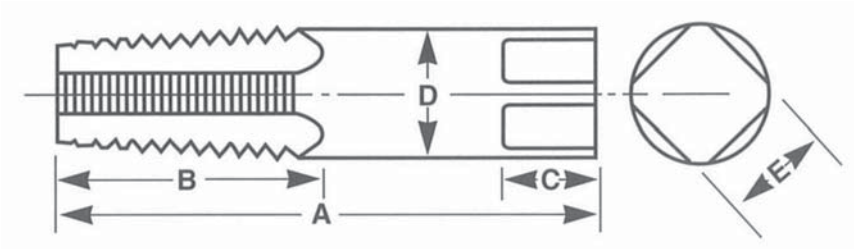
Tolerances

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.

Table 311 — Pipe Taps



General Dimensions

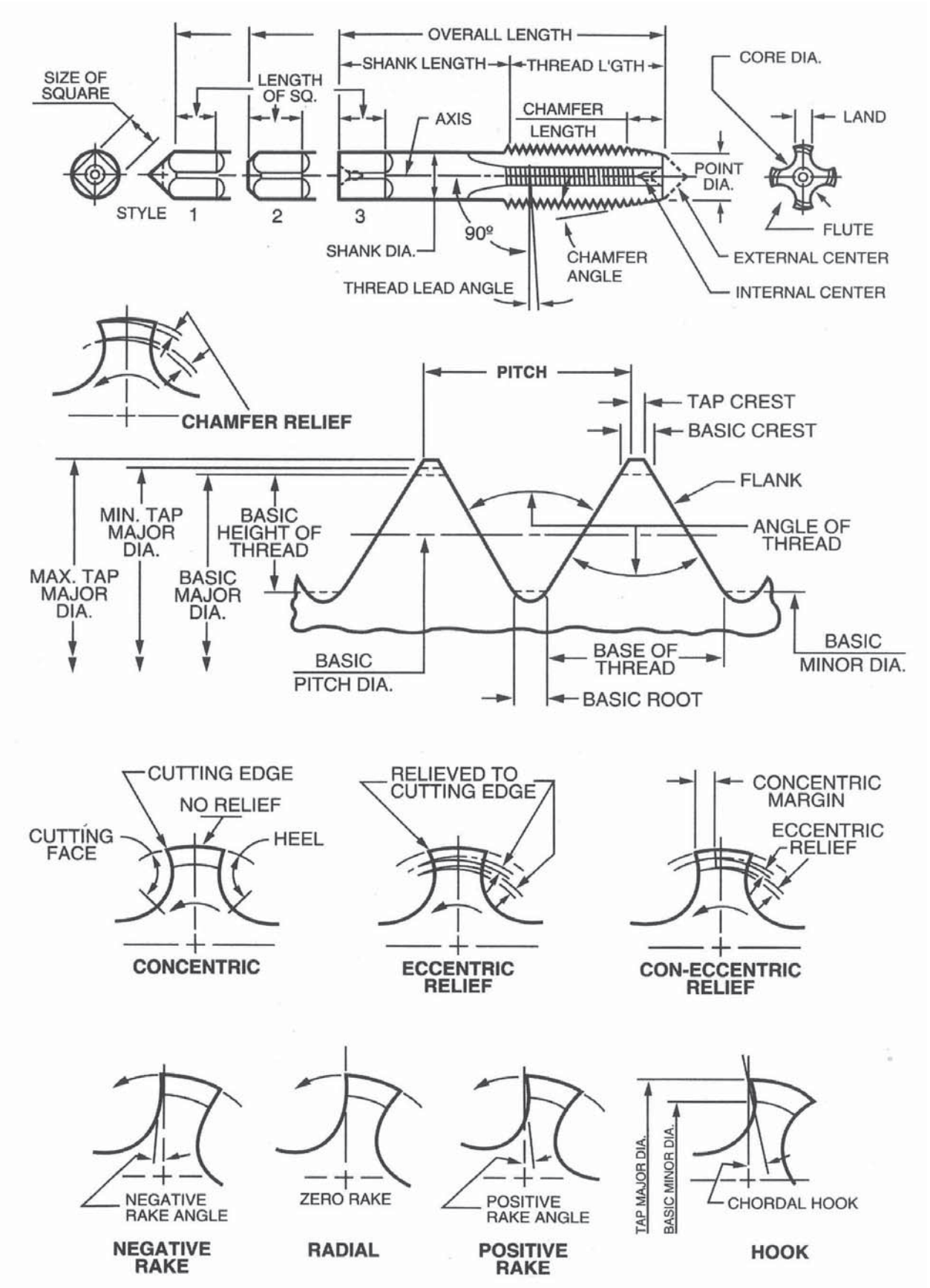
NOMINAL SIZE INCHES	DIMENSIONS - INCHES				
	LENGTH OVERALL A	LENGTH OF THREAD B	LENGTH OF SQUARE C	DIA. OF SHANK D	SIZE OF SQUARE E
1/16	2 1/8	11/16	3/8	.3125	.234
1/8	2 1/8	3/4	3/8	.3125	.234
1/8	2 1/8	3/4	3/8	.4375	.328
1/4	2 7/16	1 1/16	7/16	.5625	.421
3/8	2 9/16	1 1/16	1/2	.7000	.531
1/2	3 1/8	1 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

Tolerances

ELEMENT	RANGE	DIRECTION	TOLERANCE
Length Overall — A	1/16″ to 3/4″ incl.	Plus or Minus	1/32″
	1″ to 4″ incl.	Plus or Minus	1/16″
Length of Thread — B	1/16″ to 3/4″ incl.	Plus or Minus	1/16″
	1″ to 1 1/4″ incl.	Plus or Minus	3/32″
	1 1/2″ to 4″ incl.	Plus or Minus	1/8″
Length of Square — C	1/16″ to 3/4″ incl.	Plus or Minus	1/32″
	1″ to 4″ incl.	Plus or Minus	1/16″
Diameter of Shank — D	1/16″ to 1/8″ incl.	Minus	.0015″
	1/4″ to 1/2″ incl.	Minus	.0020″
	3/4″ to 1″ incl.	Minus	.0020″
	1 1/4″ to 4″ incl.	Minus	.0030″
Size of Square — E	1/16″ to 1/8″ incl.	Minus	.0040″
	1/4″ to 3/4″ incl.	Minus	.0060″
	1″ to 4″ incl.	Minus	.0080″

USEFUL FORMULAS		
Surface Feet Per Minute = SFM Revolutions Per Minute = RPM Threads Per Inch = TPI Pitch = P Inches Per Minute = IPM	When TPI is known **P = 1 ÷ TPI**	When SFM and DIA are known: **RPM = 3.82 x SFM ÷ DIA** When RPM and P are known: **IPM = RPM x P**

Tap Terminology



END MILLS

PAGE NO.

(continued)

END MILLS (continued)

COBALT - DOUBLE END (continued)

COBALT - ROUGHING

COBALT - ROUGHING / FINISHING

HIGH SPEED STEEL - SINGLE END

HIGH SPEED STEEL - DOUBLE END

HIGH SPEED STEEL - ROUGHING

SETS

WOODRUFF KEYSEAT CUTTERS

TECHNICAL DATA

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.**

variFLUTE®
Variable Flute ALTiN Coated HPE 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.	-.0001/ - .0004

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.

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

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.
		STUB LENGTH			
¼	¼	⅜	2	.015-.020	56270
⅜	⅜	½	2	.015-.020	56271
½	½	⅝	2½	.025-.030	56272
⅝	⅝	¾	3	.030-.035	56273
¾	¾	⅞	3	.030-.035	56274
		REGULAR LENGTH			
⅛	⅛	⅜	1½	.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	¼	7/16	2½	.015-.020	56278
¼	¼	⅝	2½	.015-.020	56279
9/32	5/16	⅝	2½	.015-.020	56280
5/16	5/16	¾	2½	.015-.020	56281
⅜	⅜	⅞	2½	.015-.020	56282
7/16	7/16	1	2¾	.015-.020	56283
½	½	1	3	.025-.030	56284
⅝	⅝	1¼	3½	.030-.035	56285
¾	¾	1½	4	.030-.035	56286
1	1	1½	4	.030-.035	56287

Speeds & Feeds: Page 201

variFLUTE® Solid Carbide Single End Mills

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

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 201

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
		REGULAR LENGTH		
1/8	1/8	3/8	1 1/2	56320
5/32	3/16	7/16	2	56321
3/16	3/16	7/16	2	56322
7/32	1/4	7/16	2 1/2	56323
1/4	1/4	5/8	2 1/2	56324
9/32	5/16	5/8	2 1/2	56325
5/16	5/16	3/4	2 1/2	56326
3/8	3/8	7/8	2 1/2	56327
7/16	7/16	1	2 3/4	56328
1/2	1/2	1	3	56329

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

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.
		REGULAR LENGTH		
1/8	1/8	3/8	1 1/2	56373
5/32	3/16	7/16	2	56374
3/16	3/16	7/16	2	56375
7/32	1/4	7/16	2 1/2	56376
1/4	1/4	5/8	2 1/2	56377
9/32	5/16	5/8	2 1/2	56378
5/16	5/16	3/4	2 1/2	56379
3/8	3/8	7/8	2 1/2	56380
7/16	7/16	1	2 3/4	56381
1/2	1/2	1	3	56382
5/8	5/8	1 1/4	3 1/2	56383
3/4	3/4	1 1/2	4	56384
1	1	1 1/2	4	56385

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.

variFLUTE® Solid Carbide Single End Mills

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

List No. 5994 – 4-Flute – Corner Radius

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.

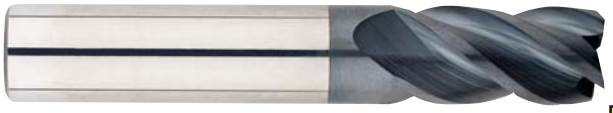
Corner Radius strengthens the end mill to minimize chipping and reduce corner wear. Also used when the finished part requires a radius.

Speeds & Feeds: Page 201

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.
		STUB LENGTH			
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
		REGULAR LENGTH			
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
		LONG LENGTH			
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
		EXTENDED LENGTH			
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.

variFLUTE® Solid Carbide Single End Mills



Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

List No. 5995 – 4-Flute – Square End

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.

Square End for peripheral milling and finishing applications requiring machining to a sharp corner.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
REGULAR LENGTH				
¼	¼	⅝	2½	56365
5/16	5/16	¾	2½	56366
⅜	⅜	⅞	2½	56367
7/16	7/16	1	2¾	56368
½	½	1	3	56369
⅝	⅝	1¼	3½	56370
¾	¾	1½	4	56371
1	1	1½	4	56372

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

List No. 5986 – 5-Flute – Corner Radius

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.

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.
STUB LENGTH					
¼	¼	⅜	2	.015-.020	56290
⅜	⅜	½	2	.015-.020	56291
½	½	⅝	2½	.025-.030	56292
⅝	⅝	¾	3	.030-.035	56293
¾	¾	⅞	3	.030-.035	56294
REGULAR LENGTH					
¼	¼	⅝	2½	.015-.020	56295
5/16	5/16	¾	2½	.015-.020	56296
⅜	⅜	⅞	2½	.015-.020	56297
7/16	7/16	1	2¾	.015-.020	56298
½	½	1	3	.025-.030	56299
⅝	⅝	1¼	3½	.030-.035	56300
¾	¾	1½	4	.030-.035	56301
1	1	1½	4	.030-.035	56302
LONG LENGTH					
¼	¼	1¼	3	.015-.020	56330
⅜	⅜	1¼	3	.015-.020	56331
½	½	2	4	.025-.030	56332
⅝	⅝	2¼	5	.030-.035	56333
¾	¾	2¼	5	.030-.035	56334
EXTENDED LENGTH					
¼	¼	⅝	4	.015-.020	56303
⅜	⅜	⅞	4	.015-.020	56304
½	½	1	6	.025-.030	56305
⅝	⅝	1¼	6	.030-.035	56306
¾	¾	1½	6	.030-.035	56307

Speeds & Feeds: Page 201

variFLUTE® Solid Carbide Single End Mills

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

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.
		REGULAR LENGTH		
1/4	1/4	5/8	2 1/2	56310
5/16	5/16	3/4	2 1/2	56311
3/8	3/8	7/8	2 1/2	56312
7/16	7/16	1	2 3/4	56313
1/2	1/2	1	3	56314
5/8	5/8	1 1/4	3 1/2	56315
3/4	3/4	1 1/2	4	56316
1	1	1 1/2	4	56317

variFLUTE® SPEEDS & FEEDS

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"
Plain Steels -Low & Medium Carbon 1008, 1010, 1020	175	Profile	500	0.0004	0.0013	0.0030	0.0038	0.0042
		Slot	400	0.0003	0.0010	0.0024	0.0030	0.0034
Plain Steels -Low & Medium Carbon 1008, 1010, 1020	275	Profile	400	0.0004	0.0013	0.0030	0.0038	0.0042
		Slot	320	0.0003	0.0010	0.0024	0.0030	0.0034
Alloy Steels - Medium Carbon 4140, 4150, 4340	275	Profile	400	0.0003	0.0010	0.0025	0.0035	0.0040
		Slot	320	0.0002	0.0008	0.0020	0.0028	0.0032
Alloy Steels - Medium Carbon 4140, 4150, 4340	375	Profile	300	0.0003	0.0010	0.0025	0.0035	0.0040
		Slot	240	0.0002	0.0008	0.0020	0.0028	0.0032
Mold & Die Steels O1, A2, D2, H13, P20	275	Profile	180	0.0002	0.0010	0.0025	0.0035	0.0040
		Slot	145	0.0002	0.0008	0.0020	0.0028	0.0032
Stainless Steels 300 Series 304, 310, 316	275	Profile	300	0.0003	0.0010	0.0025	0.0035	0.0042
		Slot	240	0.0002	0.0008	0.0020	0.0028	0.0034
Stainless Steels 400 Series 409, 430, 436	325	Profile	250	0.0003	0.0010	0.0025	0.0035	0.0042
		Slot	200	0.0002	0.0008	0.0020	0.0028	0.0034
Stainless Steels Precipitation Hardened 15-5PH, 17-4PH	325	Profile	250	0.0002	0.0010	0.0022	0.0030	0.0040
		Slot	200	0.0002	0.0008	0.0018	0.0024	0.0032
High Temperature Alloys Inconel, Hastelloy, Waspaloy	300	Profile	75	0.0002	0.0007	0.0020	0.0025	0.0032
		Slot	60	0.0002	0.0006	0.0016	0.0020	0.0026
Titanium Alloys Ti-6Al-4V, ASTM B367 Grades C-3, C-4	300	Profile	300	0.0003	0.0010	0.0025	0.0027	0.0035
		Slot	240	0.0002	0.0008	0.0020	0.0022	0.0028
Cast Iron Grey	200	Profile	550	0.0004	0.0012	0.0030	0.0038	0.0042
		Slot	440	0.0003	0.0010	0.0024	0.0030	0.0034
Cast Iron Ductile	300	Profile	250	0.0003	0.0010	0.0030	0.0033	0.0042
		Slot	200	0.0002	0.0008	0.0024	0.0026	0.0034

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.

RECOMMENDED MAXIMUM DEPTHS OF CUT	PROFILING Radial Depth = .5XD Axial Depth = 1.5XD	SLOTTING Axial Depth = 1XD

May be increased or decreased depending on actual material and machining conditions.

variFLUTE® NF
Solid Carbide Variable Flute HPE Ultra-High Performance Single End Mills For Aluminum and Non-Ferrous Materials

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

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.

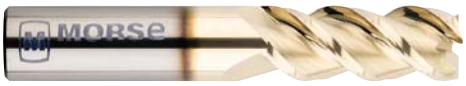
ZrN - Zirconium Nitride coating is a pale gold hard thin high-lubricity coating particularly well suited to machining non-ferrous materials including aluminum, copper alloys and brass.

DLC, CrN, and other high performance coatings also available.

TOLERANCES:
Diameter -.0001 / -.0003
Shank -.0001/ -.0003
Runout Less Than 0.0001 TIR

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

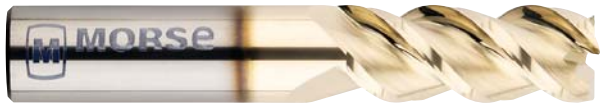
Dia.	Shank Dia.	Length Of Cut	OAL	Corner Radius	List No. 5990 Bright Finish EDP No.	List No. 5990Z ZrN Coated EDP No.
			STANDARD LENGTH			
1/4	1/4	3/4	2-1/2	.003 - .005	52900	92600
5/16	5/16	3/4	2-1/2	.003 - .005	52901	92601
3/8	3/8	1	2-1/2	.003 - .005	52902	92602
1/2	1/2	1-1/4	3	.005 - .007	52903	92603
5/8	5/8	1-5/8	3-1/2	.005 - .007	52904	92604
3/4	3/4	1-3/4	4	.005 - .007	52905	92605
1	1	1-3/4	4	.005 - .007	52906	92606
			LONG LENGTH			
1/4	1/4	1-1/4	3	.003 - .005	52910	92610
5/16	5/16	1-3/8	3	.003 - .005	52911	92611
3/8	3/8	1-1/2	3-1/2	.003 - .005	52912	92612
1/2	1/2	2	4	.005 - .007	52913	92613
5/8	5/8	2-3/8	5	.005 - .007	52914	92614
3/4	3/4	2-1/2	5	.005 - .007	52915	92615
1	1	3	6	.005 - .007	52916	92616

Speeds & Feeds: Page 204

variFLUTE® NF
Solid Carbide High Performance End Mills for Aluminum and Non Ferrous Materials

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento



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 BRIGHT FINISH EDP NO.	LIST NO. 5992Z ZrN COATED EDP NO.
			STANDARD LENGTH			
1/4	1/4	3/4	2-1/2	.003 - .005	52930	92630
5/16	5/16	3/4	2-1/2	.003 - .005	52931	92631
3/8	3/8	1	2-1/2	.003 - .005	52932	92632
1/2	1/2	1-1/4	3	.005 - .007	52933	92633
5/8	5/8	1-5/8	3-1/2	.005 - .007	52934	92634
3/4	3/4	1-3/4	4	.005 - .007	52935	92635
1	1	1-3/4	4	.005 - .007	52936	92636
			LONG LENGTH			
1/4	1/4	1-1/4	3	.003 - .005	52940	92940
5/16	5/16	1-3/8	3	.003 - .005	52941	92941
3/8	3/8	1-1/2	3-1/2	.003 - .005	52942	92942
1/2	1/2	2	4	.005 - .007	52943	92943
5/8	5/8	2-3/8	5	.005 - .007	52944	92944
3/4	3/4	2-1/2	5	.005 - .007	52945	92945
1	1	3	6	.005 - .007	52946	92946

Speeds & Feeds: Page 204

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 BRIGHT FINISH EDP NO.	LIST NO. 5991Z ZRN COATED EDP NO.
			STANDARD LENGTH		
1/4	1/4	3/4	2-1/2	52920	92920
5/16	5/16	3/4	2-1/2	52921	92921
3/8	3/8	1	2-1/2	52922	92922
1/2	1/2	1-1/4	3	52923	92923
5/8	5/8	1-5/8	3-1/2	52924	92924
3/4	3/4	1-3/4	4	52925	92925
1	1	1-3/4	4	52926	92926

variFLUTE® NF
Solid Carbide High Performance End Mills for Aluminum and Non Ferrous Materials

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

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 BRIGHT FINISH EDP NO.	LIST NO. 5993Z ZrN COATED EDP NO.
		STANDARD LENGTH			
1/4	1/4	3/4	2-1/2	52950	92650
5/16	5/16	3/4	2-1/2	52951	92651
3/8	3/8	1	2-1/2	52952	92652
1/2	1/2	1-1/4	3	52953	92653
5/8	5/8	1-5/8	3-1/2	52954	92654
3/4	3/4	1-3/4	4	52955	92655
1	1	1-3/4	4	52956	92656

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	SLOTTING Axial Depth = 1XD

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

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 TiAlN coated tools, speeds may be increased by up to 50% with the feed rate unchanged.

2-Flute Single End Mills

Fraise à queue à rainurer simple cortador vertical sencilloe

High Speed Steel & M42 8% 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.

M42 8% 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 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

Tool Coatings Also Available

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1898 High Speed Steel EDP NO.	1898G High Speed Steel TIN COATED EDP NO.	4580 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)

Fraise à queue à rainurer simple **cortador vertical sencilloe**

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1898 High Speed Steel EDP NO.	1898G High Speed Steel TIN COATED EDP NO.	4580 COBALT 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 — Diamond Like Carbon

2-Flute Long Length Single End Mills

Fraise à queue à rainurer longue cortador vertical largo

High Speed Steel & M42 8% Cobalt
Bright Finish & TiN Coated
Center Cutting

List No. 4599 High Speed Steel
List No. 4599G High Speed Steel TiN Coated
List No. 4584 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

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

M42 8% 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.

Tool Coatings Also Available

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	4599 High Speed Steel EDP NO.	4599G High Speed Steel TIN COATED EDP NO.	4584 COBALT 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	—
15/32	.4688	1/2	2	4	43010*	—	—
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
13/16	.8125	7/8	2 1/2	4 3/4	43013*	—	—
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	—	—

*** Available While Supplies Last**

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

Fraise à queue à rainurer longue

cortador vertical largo

High Speed Steel & M42 8% 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.

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.

List No. 1899 High Speed Steel
List No. 1899G High Speed Steel TiN Coated
List No. 4585 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

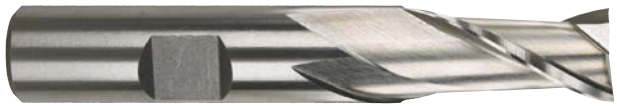
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	LENGTH BELOW SHANK	OAL	1899 High Speed Steel EDP NO.	1899G High Speed Steel TIN COATED EDP NO.	4585 COBALT EDP NO.
1/8	.1250	3/8	3/8	13/16	2 9/16	43749	96215	45380*
3/16	.1875	3/8	1/2	1 1/8	2 11/16	43750	96216	45381*
1/4	.2500	3/8	5/8	1 1/2	3 1/16	43751	96217	—
5/16	.3125	3/8	3/4	1 3/4	3 5/16	43752	96218	45383*
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

Fraise à queue à rainurer simple

cortador vertical sencilloe



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.

List No. 1898M

STANDARD PACKAGE All sizes — 1 each

DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
3.0	.1181	3/8	3/8	2 5/16	43339
4.0	.1575	3/8	7/16	2 5/16	43340
5.0	.1968	3/8	1/2	2 5/16	43333
6.0	.2362	3/8	1/2	2 5/16	43335
7.0	.2756	3/8	9/16	2 5/16	43337
8.0	.3150	3/8	9/16	2 5/16	43307
9.0	.3543	3/8	9/16	2 5/16	43309
10.0	.3937	3/8	13/16	2 1/2	43311
11.0	.4331	3/8	13/16	2 1/2	43313
12.0	.4724	3/8	13/16	2 1/2	43315
13.0	.5118	1/2	1 1/8	3 1/8	43317
14.0	.5512	1/2	1 1/8	3 1/8	43319
15.0	.5906	1/2	1 1/8	3 1/8	43321
16.0	.6299	5/8	1 5/16	3 7/16	43322
17.0	.6693	5/8	1 5/16	3 7/16	43323
18.0	.7087	5/8	1 5/16	3 7/16	43324
19.0	.7480	3/4	1 5/8	3 7/8	43325
20.0	.7874	3/4	1 1/2	3 3/4	43326
22.0	.8661	3/4	1 1/2	3 3/4	43328
23.0	.9055	7/8	1 7/8	4 1/8	43329
24.0	.9449	1	2	4 1/2	43330
25.0	.9843	1	2	4 1/2	43331

Tool Coatings Also Available

DRILL-MILL™

M42 8% Cobalt

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

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

Fraise de forage Broca de fresado

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	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
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

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.

Fraise à queue à rainurer à hélice serrée cortador vertical con hélice alta

List No. 1921 Long Length

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
1 1/2	1.5000	1 1/4	4	6 1/2	44061*
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
1 1/4	1.2500	1 1/4	2	4 1/2	44030*

* Available While Supplies Last

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

2-Flute Double End Mills

Fraise à queue à rainurer double — cortador vertical doble

High Speed Steel & M42 8% 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.

M42 8% 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 8% 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 High Speed Steel EDP NO.	1896G High Speed Steel TIN COATED EDP NO.	4581 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 1/8	43414	96054	44562
13/64	.2031	3/8	1/2	3 1/8	43433	—	—
7/32	.2188	3/8	1/2	3 1/8	43415	96056	44563
15/64	.2344	3/8	1/2	3 1/8	43434	—	—
1/4	.2500	3/8	1/2	3 1/8	43416	96058	44564
17/64	.2656	3/8	9/16	3 1/8	43435	—	—
9/32	.2812	3/8	9/16	3 1/8	43417	96060	44565
19/64	.2969	3/8	9/16	3 1/8	43436	—	—
5/16	.3125	3/8	9/16	3 1/8	43418	96062	44566
21/64	.3281	3/8	9/16	3 1/8	43437	—	—
11/32	.3438	3/8	9/16	3 1/8	43419	96064	44567
23/64	.3594	3/8	9/16	3 1/8	43438	—	—
3/8	.3750	3/8	9/16	3 1/8	43420	96066	44568
25/64	.3906	1/2	13/16	3 3/4	43439	—	—
13/32	.4062	1/2	13/16	3 3/4	43421	96068	44569
27/64	.4219	1/2	13/16	3 3/4	43440	—	—
7/16	.4375	1/2	13/16	3 3/4	43422	96070	44570
29/64	.4531	1/2	13/16	3 3/4	43441	—	—
15/32	.4688	1/2	13/16	3 3/4	43423	96072	—
31/64	.4844	1/2	13/16	3 3/4	43442	—	—
1/2	.5000	1/2	13/16	3 3/4	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

Fraise à queue à rainurer double cortador vertical doble

3/16″ Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

List No. 4571 High Speed Steel
List No. 4571C M42 8% 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.

M42 8% 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	4571 High Speed Steel EDP NO.	4571C 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

Fraise à queue à rainurer double cortador vertical doble

3/16″ Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

List No. 1896 High Speed Steel
List No. 1896C M42 8% 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.

M42 8% 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

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1896 High Speed Steel EDP NO.	1896C 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

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 8% 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.

M42 8% 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

Fraise à queue à rainurer double **cortador vertical doble**

List No. 1894 High Speed Steel
List No. 1894C M42 8% Cobalt

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1894 High Speed Steel EDP NO.	1894C 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

Fraise à queue à rainurer double **cortador vertical doble**

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

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 — Diamond Like Carbon

SHEARMILL™ M42 8% Cobalt 3-Flute 60° High Helix Single End Mills

Center Cutting

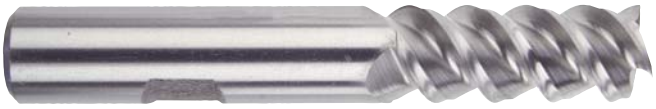
High Spiral Design Cuts Cleanly & Efficiently

Tool Coatings Also Available

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

Fraise à queue à rainurer à haut rendement

cortador vertical de alto rendimiento



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.
⅜	.3750	⅜	1½	3¼	42919*
½	.5000	½	3	5	42922*
⅞	.8750	¾	1⅞	4⅛	42944*
⅞	.8750	¾	3½	5¾	42945*
1	1.0000	1	4	6½	42954*
1¼	1.2500	1	2	4½	42970*

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1¼	1.2500	1¼	2	4½	42971*
1½	1.5000	1¼	2	4½	42980*
1¾	1.7500	1¼	2	4½	42989*
2	2.0000	1¼	2	4½	42995*
2	2.0000	2	2	5¾	43000*

*Available While Supplies Last

Morse® Plastic Wall Chart

Tableau mural Tabla mural

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 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.

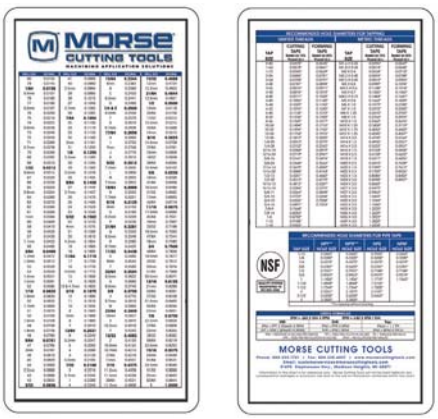
List No. 1007 **EDP No. 01650**

Decimal Equivalent Pocket Chart

List No. 1005

Tableau décimal Tabla de medidas decimales

Front **Back**



NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜″ × 7″, Printed on plastic

Pack of 50 **EDP No. 20412**

Pack of 100 **EDP No. 20413**

3-Flute Single End Mills

Fraise à queue à rainurer simple cortador vertical sencilloe

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

List No. 1881 – Long Length

STANDARD PACKAGE All sizes — 1 each

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
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
1 3/4	1.7500	1 1/4	2	4 1/2	42070*
2	2.0000	2	3	6 3/4	42071

* Available While Supplies Last

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
5/8	.6250	5/8	2 1/2	4 5/8	42085
3/4	.7500	3/4	3	5 1/4	42086
7/8	.8750	7/8	3 1/2	5 3/4	42087*
2	2.0000	1 1/4	4	6 1/2	42092*

* Available While Supplies Last

3-Flute Double End Mills

Fraise à queue à rainurer double cortador vertical doble

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. 1882

STANDARD PACKAGE All sizes — 1 each

Tool Coatings Also Available

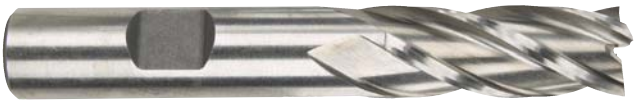
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
1/8	.1250	3/8	3/8	3 1/16	42100
3/16	.1875	3/8	1/2	3 1/4	42101
1/4	.2500	3/8	5/8	3 3/8	42102
5/16	.3125	3/8	3/4	3 1/2	42103
3/8	.3750	3/8	3/4	3 1/2	42104
7/16	.4375	1/2	1	4 1/8	42105
1/2	.5000	1/2	1	4 1/8	42106
9/16	.5625	5/8	1 3/8	5	42107
5/8	.6250	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 Single End Mills

Fraise à queue à rainurer simple cortador vertical sencilloe

High Speed Steel & M42 8% 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.

M42 8% 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 8% 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 High Speed Steel NON-CENTER CUTTING EDP NO.	4550 High Speed Steel CENTER CUTTING EDP NO.	4550G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4586 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)

Fraise à queue à rainurer simple — cortador vertical sencilloe

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1897 High Speed Steel NON-CENTER CUTTING EDP NO.	4550 High Speed Steel CENTER CUTTING EDP NO.	4550G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4586 COBALT CENTER CUTTING 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	1 1/2	3 7/8	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

Fraise à queue à rainurer longue cortador vertical largo

High Speed Steel & M42 8% 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.

M42 8% 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 8% 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 High Speed Steel NON-CENTER CUTTING EDP NO.	4551 High Speed Steel CENTER CUTTING EDP NO.	4551G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4587 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

Fraise à queue à rainurer extra-longue — cortador vertical extra largo

High Speed Steel & M42 8% 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.

M42 8% 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 8% Cobalt Center Cutting

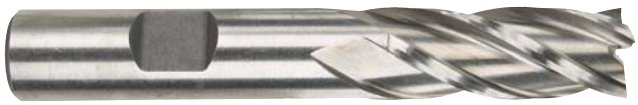
Titanium Nitride (TiN) Coating is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1901 High Speed Steel NON-CENTER CUTTING EDP NO.	4552 High Speed Steel CENTER CUTTING EDP NO.	4552G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4588 COBALT CENTER CUTTING 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

Fraise à queue à rainurer simple — cortador vertical sencilloe



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.
3.0	.1181	3/8	3/8	2 5/16	43392
4.0	.1575	3/8	7/16	2 5/16	43393
5.0	.1968	3/8	9/16	2 1/2	43361
6.0	.2362	3/8	5/8	2 1/2	43363
7.0	.2756	3/8	5/8	2 1/2	43365
8.0	.3150	3/8	3/4	2 1/2	43367
9.0	.3543	3/8	3/4	2 1/2	43369
10.0	.3937	3/8	1	2 11/16	43371
11.0	.4331	3/8	1	2 11/16	43373
12.0	.4724	3/8	1	2 11/16	43375
13.0	.5118	1/2	1 3/8	3 3/8	43377
14.0	.5512	1/2	1 3/8	3 3/8	43379
15.0	.5906	1/2	1 3/8	3 3/8	43381
16.0	.6299	5/8	1 5/8	3 3/4	43382
17.0	.6693	5/8	1 5/8	3 3/4	43383
18.0	.7087	5/8	1 5/8	3 3/4	43384
19.0	.7480	3/4	1 5/8	3 7/8	43385
20.0	.7874	3/4	1 7/8	4 1/8	43386
22.0	.8661	3/4	1 7/8	4 1/8	43388
23.0	.9055	7/8	1 7/8	4 1/8	43389
24.0	.9449	1	2	4 1/2	43390
25.0	.9843	1	2	4 1/2	43391

4-Flute Double End Mills

Fraise à queue à rainurer double

cortador vertical doble

High Speed Steel & M42 8% Cobalt
Bright Finish & TiN Coated

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 8% Cobalt Center Cutting

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.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and longer life in production applications.

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 High Speed Steel NON-CENTER CUTTING EDP NO.	4553 High Speed Steel CENTER CUTTING EDP NO.	4553G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4582 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	43072*	—	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

Fraise à queue à rainurer double cortador vertical doble

List No. 4569 High Speed Steel
List No. 4569C M42 8% Cobalt

3/16″ Shank — Center Cutting
High Speed Steel & M42 8% 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.

M42 8% 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 High Speed Steel EDP NO.	4569C COBALT 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

Fraise à queue à rainurer double cortador vertical doble

List No. 1895 High Speed Steel
List No. 1895C M42 8% Cobalt

3/16″ Dia. Shank — Center Cutting
High Speed Steel & M42 8% 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.

M42 8% 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 High Speed Steel EDP NO.	1895C COBALT 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 — Diamond Like Carbon

4-Flute Miniature Long Length Double End Mills

Fraise à queue à rainurer double cortador vertical doble

3/16″ Dia. Shank — Center Cutting High Speed Steel & M42 8% 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. 1893 High Speed Steel
List No. 1893C M42 8% Cobalt

M42 8% 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	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

Tool Coatings Also Available

4-Flute Stub Length Double End Mills

Fraise à queue à rainurer double cortador vertical doble

High Speed Steel

Multi-Flute end mills offer higher feed rates, improved surface finish and greater core strength for reduced tool deflection.

List No. 4561 High Speed Steel

STANDARD PACKAGE All sizes — 1 each

Stub Length provides increased rigidity in shallow milling applications.

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

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 8% 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.

Fraise cylindrique deux tailles à bout hémisphérique

cortador vertical con punta esférica

List No. 1887 High Speed Steel
List No. 1887G High Speed Steel TiN Coated
List No. 4583 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1887 High Speed Steel EDP NO.	1887G High Speed Steel TIN COATED EDP NO.	4583 COBALT 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 8% 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.

Fraise cylindrique deux tailles à bout hémisphérique

cortador vertical con punta esférica

List No. 1888 High Speed Steel
List No. 1888G High Speed Steel TiN Coated
List No. 4590 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	LENGTH BELOW SHANK	OAL	1888 High Speed Steel EDP NO.	1888G High Speed Steel TIN COATED EDP NO.	4590 COBALT 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 plunge cutting like a drill into solid material.

Fraise cylindrique deux tailles à bout hémisphérique

cortador vertical con punta esférica

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 High Speed Steel EDP NO.	1889G 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

Tableau mural **Tabla mural**

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 8% 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.

Fraise cylindrique deux tailles à bout hémisphérique

cortador vertical con punta esférica

List No. 4570 High Speed Steel
List No. 4570C M42 8% Cobalt

M42 8% 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	4570 High Speed Steel EDP NO.	4570C 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

Tool Coatings Also Available

2-Flute Miniature Ball Nose Regular Length Double End Mills

3/16″ Dia. Shank — Center Cutting
High Speed Steel & M42 8% 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.

Fraise cylindrique deux tailles à bout hémisphérique

cortador vertical con punta esférica

List No. 1890 High Speed Steel
List No. 1890C M42 8% Cobalt

M42 8% 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	1890 High Speed Steel EDP NO.	1890C COBALT EDP NO.
1/32	.0312	3/32	2¼	43186	—
1/16	.0625	3/16	2¼	43188	43200
3/32	.0938	9/32	2¼	43190	43202
1/8	.1250	3/8	2¼	43192	43204
5/32	.1562	7/16	2¼	43194	43206
3/16	.1875	1/2	2¼	43196	43208

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 specifc machining application.**

Multi-Flute Ball Nose Single End Mills

High Speed Steel & M42 8% 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.

Fraise cylindrique deux tailles à bout hémisphérique

cortador vertical con punta esférica

List No. 4554 High Speed Steel
List No. 4554G High Speed Steel TiN Coated
List No. 4589 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	4554 High Speed Steel EDP NO.	4554G High Speed Steel TIN COATED EDP NO.	4589 COBALT EDP NO.
⅛	.1250	⅜	⅜	2 5/16	4	—	—	44451
3/16	.1875	⅜	½	2⅜	4	—	—	44452
¼	.2500	⅜	¾	2 9/16	4	44274	96512	44453
5/16	.3125	⅜	1	2¾	4	44275	96513	44454
⅜	.3750	⅜	1	2¾	4	44276	96514	44455
½	.5000	½	1¼	3¼	4	44277	96515	44456
⅝	.6250	⅝	1⅝	3¾	4	44278	96516	44457
¾	.7500	¾	1⅝	3⅞	4	44279	96517	44458
⅞	.8750	⅞	1⅞	4⅛	4	44280	96518	—
1	1.0000	1	2	4½	4	44281	96519	44460
1	1.0000	1	2	4½	6	—	—	44461

Multi-Flute Long Length Ball Nose Single End Mills

High Speed Steel
Bright Finish & TiN Coated
Center Cutting

Fraise cylindrique deux tailles à bout hémisphérique

cortador vertical con punta esférica

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 High Speed Steel EDP NO.	4555G High Speed Steel TIN COATED EDP NO.
¼	.2500	⅜	1¼	3 1/16	4	44298	96525
5/16	.3125	⅜	1⅜	3⅛	4	44299	96526
⅜	.3750	⅜	1½	3¼	4	44300	96527
½	.5000	½	2	4	4	44301	96528
⅝	.6250	⅝	2½	4⅝	4	44302	96529
¾	.7500	¾	3	5¼	4	44303	96530
1	1.0000	1	4	6½	4	44304	—
1¼	1.2500	1¼	4	6½	4	44305	—
1½	1.5000	1¼	4	6½	4	44306	—

TOOL COATING SERVICE

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

TiN — Titanium Nitride	**TiCN** — Titanium Carbonite
TiALN — Titanium Aluminum Nitride	**ALTiN** — Aluminum Titanium Nitride
CrN — Chromium Nitride	**CrC** — Chromium Carbide

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.

Fraise à queue à rainurer de dégrossissage

cortador vertical para desbaste

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.
¼	.2500	⅜	⅝	2 7/16	3	44464
5/16	.3125	⅜	¾	2½	3	44465
⅜	.3750	⅜	¾	2½	4	44466
½	.5000	½	1¼	3¼	4	44476
⅝	.6250	⅝	1⅝	3¾	4	44477
¾	.7500	¾	1⅝	3⅞	4	44478
1	1.0000	¾	1⅞	4⅛	5	44463
1	1.0000	1	2	4½	5	44480
1	1.0000	1	3	5½	5	44468
1¼	1.2500	¾	2	4½	6	44469
1¼	1.2500	1¼	2	4½	6	44482
1½	1.5000	¾	2¼	4½	6	44470
1½	1.5000	1¼	2	4½	6	44483
2	2.0000	1¼	2	4½	8	44471

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
½	.5000	½	2	4	4	44467
¾	.7500	¾	3	5¼	4	44488
1	1.0000	1	4	6½	5	44490
1¼	1.2500	1¼	4	6½	6	44491
1½	1.5000	1¼	4	6½	6	44492
2	2.0000	2	6	9¾	8	44494*

* Available While Supplies Last

Tool Coatings Also Available

End Mill Sets

Single End and Double End
High Speed Steel
In Wooden Stand

Jeu de fraises à queue à rainurer

Juego de cortadores verticales

Center Cutting

Non-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

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

M42 8% 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.

Fraise à queue à rainurer de dégrossissage et de finition

cortador vertical para desbastado/acabado

List No. 4640 — Bright Finish
List No. 4640G — TiN Coated
List No. 4640C — TiCN Coated

M42 8% 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 EDP NO.	TiN COATED EDP NO.	TiCN COATED 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	1 5/8	4 1/8	5	—	45241*	45341*
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 1/4	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*	45254*	45354*
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	**TiCN —** Titanium Carbonite
TiALN — Titanium Aluminum Nitride	**ALTiN —** Aluminum Titanium Nitride
CrN — Chromium Nitride	**CrC —** Chromium Carbide

M42 8% 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.

Fraise à queue à rainurer de dégrossissage

cortador vertical para desbaste

List No. 4594

M42 8% 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

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

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.

M42 8% 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.

Fraise à queue à rainurer de dégrossissage

cortador vertical para desbaste

List No. 4596

M42 8% 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

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

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

M42 8% 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.

Fraise à queue à rainurer de dégrossissage

cortador vertical para desbaste

List No. 4611 — Regular Length

List No. 4612 — Medium & Long Length

M42 8% 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 EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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 7/8	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 EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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 — Diamond Like Carbon

M42 8% Cobalt Fine Pitch Center Cutting Roughing End Mills

Fraise à queue à rainurer de dégrossissage

cortador vertical para desbaste

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

M42 8% 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 EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
¼	.2500	⅜	⅝	2 7/16	4	45441	—	—	45443
⅜	.3750	⅜	¾	2½	4	45442	—	—	45444
½	.5000	½	1¼	3¼	4	44970	44981	45050	45445
⅝	.6250	⅝	1⅝	3¾	4	44971	44982	45051	45446
¾	.7500	¾	1⅝	3⅞	4	44972	44983	45052	45447
⅞	.8750	¾	1⅞	4⅛	5	44973	44984	45053	45448
1	1.0000	1	2	4½	5	44974	44985	45054	45449
1¼	1.2500	1¼	2	4½	6	44975	44986	45055	45450
1½	1.5000	1¼	2	4½	6	44976	44987	45056	45451
2	2.0000	2	2	5¾	8	—	—	45057*	—
2	2.0000	2	3	6¾	8	—	44989*	—	—

End Mills with 2″ dia. shanks are provided with a dual drive shank
*** Available while supplies last**

List No. 4614 - Medium & Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
½	.5000	½	2	4	4	45061	45070	45079	45452
⅝	.6250	⅝	2½	4⅝	4	45062	45071	45080	45453
¾	.7500	¾	3	5¼	4	45063	45072	45081	45454
1	1.0000	1	3	5½	5	45064	45073	45082	45455
1	1.0000	1	4	6½	5	45065	45074	45083	45456
1¼	1.2500	1¼	3	5½	6	45066	45075	45084	45457
1¼	1.2500	1¼	4	6½	6	45067	45076	45085	45458
1½	1.5000	1¼	3	5½	6	45068	45077	45086	45459
1½	1.5000	1¼	4	6½	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.**

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.

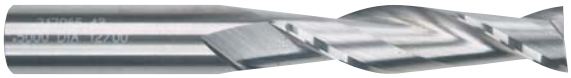
TOLERANCES

Size to 1/4"	+.000 - .002
9/32" to 1"	+.000 - .003
Shank Dia.	+.0000 - .0005

Fraise à queue à rainurer au carbure

cortador vertical de carburo

List No. 5944 Regular Length



List No. 5954 Long Length

List No. 5950 Extra Long Length

List No. 5944 Regular Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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
1/4	1/4	3/4	2 1/2	58016	90014	90051	90088
9/32	5/16	3/4	2 1/2	58018	90016	90053	90090
5/16	5/16	13/16	2 1/2	58020	90018	90055	90092
3/8	3/8	7/8	2 1/2	58024	90022	90059	90096
7/16	7/16	7/8	2 1/2	58028	90026	90063	90100
1/2	1/2	1	3	58032	90030	90067	90104
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 Long Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	3/4	2 1/4	58238	90120	90130	90140
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	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

List No. 5950 Extra Long Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	1	3	58408	90160	90170	90180
3/16	3/16	1 1/8	3	58412	90161	90171	90181
1/4	1/4	1 1/2	4	58416	90162	90172	90182
5/16	5/16	1 5/8	4	58420	90163	90173	90183
3/8	3/8	1 3/4	4	58424	90164	90174	90184
7/16	7/16	3	6	58428	90165	90175	90185
1/2	1/2	3	6	58432	90166	90176	90186
5/8	5/8	3	6	58440	90167	90177	90187
3/4	3/4	3	6	58448	90168	90178	90188
1	1	3	6	58464	90169	90179	90189

Solid Carbide Metric 2-Flute Single End Mills

Fraise à queue à rainurer au carbure cortador vertical de carburo

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.	TiALN 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

Fraise à queue à rainurer au carbure cortador vertical de carburo

Speeds & Feeds: Page 205

List No. 5947 Stub Length

List No. 5896 Regular Length

Micrograin Carbide – Center Cutting
30° Helix Angle

List No. 5947 Stub Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN 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.	TiALN 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

Fraise cylindrique deux tailles à bout hémisphérique au carbure

cortador vertical con punta esférica de carburo

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 Long Length

List No. 5952 Extra Long Length

List No. 5940 Regular Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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
1/4	1/4	3/4	2 1/2	58116	90411	90434	90457
9/32	5/16	3/4	2 1/2	58118	90412	90435	90458
5/16	5/16	13/16	2 1/2	58120	90413	90436	90459
3/8	3/8	7/8	2 1/2	58124	90414	90437	90460
7/16	7/16	1	2 3/4	58128	90415	90438	90461
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 Long Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	3/4	2 1/4	57575	90470	90480	90490
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	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

List No. 5952 Extra Long Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	1	3	58608	90500	90510	90520
3/16	3/16	1 1/8	3	58612	90501	90511	90521
1/4	1/4	1 1/2	4	58616	90502	90512	90522
5/16	5/16	1 5/8	4	58620	90503	90513	90523
3/8	3/8	1 3/4	4	58624	90504	90514	90524
7/16	7/16	3	6	58628	90505	90515	90525
1/2	1/2	3	6	58632	90506	90516	90526
5/8	5/8	3	6	58640	90507	90517	90527
3/4	3/4	3	6	58648	90508	90518	90528
1	1	3	6	58664	90509	90519	90529

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.

Fraise cylindrique deux tailles à bout hémisphérique au carbure

cortador vertical con punta esférica de carburo

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.	TiALN 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: Page 205

Solid Carbide 2-Flute Stub Length Ball Nose Double End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

TOLERANCES

Size to 1/4"	+.000 - .002
9/32" to 1"	+.000 - .003
Shank Dia.	+.0000 - .0005

STANDARD PACKAGE
All sizes – 1 each

Fraise cylindrique deux tailles à bout hémisphérique au carbure

cortador vertical con punta esférica de carburo

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.

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/16	1/8	1/8	1½	58304	90600	90611	90622
3/32	1/8	3/16	1½	58306	90601	90612	90623
1/8	1/8	1/4	1½	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	2½	58314	90605	90616	90627
1/4	1/4	1/2	2½	58316	90606	90617	90628
5/16	5/16	1/2	2½	58320	90607	90618	90629
3/8	3/8	9/16	2½	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 Stub Length Single End Mills

Micrograin Carbide — Center Cutting 30° Helix Angle

2-Flute & 4-Flute Square End & Ball Nose

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

Fraise à queue à rainurer au carbure

cortador vertical de carburo

List No. 5973 2-Flute Square End

List No. 5974 2-Flute Ball Nose

List No. 5975 4-Flute Square End

List No. 5976 4-Flute Ball Nose

Stub Length for high rigidity & minimal tool deflection.

2-Flute

DIA.	SHANK DIA.	LOC	OAL	SQUARE END – LIST 5973 UNCOATED EDP NO.	SQUARE END – LIST 5973 TiALN COATED EDP NO.	BALL NOSE – LIST 5974 UNCOATED EDP NO.	BALL NOSE – LIST 5974 TiALN COATED EDP NO.
1/32	1/8	1/16	1-1/2	57085	92860	57089	92864
3/64	1/8	3/32	1-1/2	57086	92861	57090	92865
1/16	1/8	1/8	1-1/2	57025	92800	57055	92830
3/32	1/8	3/16	1-1/2	57026	92801	57056	92831
1/8	1/8	1/4	1-1/2	57027	92802	57057	92832
5/32	3/16	5/16	2	57028	92803	57058	92833
3/16	3/16	3/8	2	57029	92804	57059	92834
7/32	1/4	7/16	2	57030	92805	57060	92835
1/4	1/4	1/2	2	57031	92806	57061	92836
5/16	5/16	1/2	2	57032	92807	57062	92837
3/8	3/8	5/8	2	57033	92808	57063	92838
7/16	7/16	5/8	2-1/2	57034	92809	57064	92839
1/2	1/2	5/8	2-1/2	57035	92810	57065	92840
5/8	5/8	3/4	3	57036	92811	57066	92841
3/4	3/4	1	3	57037	92812	57067	92842

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4-Flute

DIA.	SHANK DIA.	LOC	OAL	SQUARE END – LIST 5975 UNCOATED EDP NO.	SQUARE END – LIST 5975 TiALN COATED EDP NO.	BALL NOSE – LIST 5976 UNCOATED EDP NO.	BALL NOSE – LIST 5976 TiALN COATED EDP NO.
1/32	1/8	1/16	1-1/2	57087	92862	57091	92866
3/64	1/8	3/32	1-1/2	57088	92863	57092	92867
1/16	1/8	1/8	1-1/2	57040	92815	57070	92845
3/32	1/8	3/16	1-1/2	57041	92816	57071	92846
1/8	1/8	1/4	1-1/2	57042	92817	57072	92847
5/32	3/16	5/16	2	57043	92818	57073	92848
3/16	3/16	3/8	2	57044	92819	57074	92849
7/32	1/4	7/16	2	57045	92820	57075	92850
1/4	1/4	1/2	2	57046	92821	57076	92851
5/16	5/16	1/2	2	57047	92822	57077	92852
3/8	3/8	5/8	2	57048	92823	57078	92853
7/16	7/16	5/8	2-1/2	57049	92824	57079	92854
1/2	1/2	5/8	2-1/2	57050	92825	57080	92855
5/8	5/8	3/4	3	57051	92826	57081	92856
3/4	3/4	1	3	57052	92827	57082	92857

Tool Coatings Also Available

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

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.

				SQUARE END		BALL NOSE	
DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiALN COATED EDP NO.	UNCOATED EDP NO.	TiALN 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.

TiN — Titanium Nitride	**TiCN —** Titanium Carbonite
TiALN — Titanium Aluminum Nitride	**ALTiN —** Aluminum Titanium Nitride
CrN — Chromium Nitride	**CrC —** Chromium Carbide

Solid Carbide 4-Flute Single End Mills

Fraise à queue à rainurer au carbure cortador vertical de carburo

Micrograin Carbide – Center Cutting 30° Helix Angle

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool defection. 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.

TOLERANCES

Size to 1/4"	+.000 - .002
9/32" to 1"	+.000 - .003
Shank Dia.	+.0000 - .0005

List No. 5943 Regular Length

List No. 5955 Long Length

List No. 5951 Extra Long Length

List No. 5943 Regular Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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
1/4	1/4	3/4	2 1/2	57916	90714	90751	90788
9/32	5/16	3/4	2 1/2	57918	90716	90753	90790
5/16	5/16	13/16	2 1/2	57920	90718	90755	90792
3/8	3/8	7/8	2 1/2	57924	90722	90759	90796
7/16	7/16	7/8	2 1/2	57928	90726	90763	90800
1/2	1/2	1	3	57932	90730	90767	90804
9/16	9/16	1 1/4	3 1/2	57936	90731	90768	90805
5/8	5/8	1 1/4	3 1/2	57940	90732	90769	90806
11/16	3/4	1 1/2	4	57944	90733	90770	90807
3/4	3/4	1 1/2	4	57948	90734	90771	90808
7/8	7/8	1 1/2	4	57956	90735	90772	90809
1	1	1 1/2	4	57964	90736	90773	90810

List No. 5955 Long Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	3/4	2 1/4	58138	90820	90830	90840
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	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

List No. 5951 Extra Long Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	1	3	58508	90860	90870	90880
3/16	3/16	1 1/8	3	58512	90861	90871	90881
1/4	1/4	1 1/2	4	58516	90862	90872	90882
5/16	5/16	1 5/8	4	58520	90863	90873	90883
3/8	3/8	1 3/4	4	58524	90864	90874	90884
7/16	7/16	3	6	58528	90865	90875	90885
1/2	1/2	3	6	58532	90866	90876	90886
5/8	5/8	3	6	58540	90867	90877	90887
3/4	3/4	3	6	58548	90868	90878	90888
1	1	3	6	58564	90869	90879	90889

Solid Carbide Metric 4-Flute Single End Mills

Fraise à queue à rainurer au carbure cortador vertical de carburo

List No. 5961

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool defection. 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

TOLERANCE
All Sizes +.000mm/-.051mm
Shank Dia. +.000mm/-.013mm

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN 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

Solid Carbide 4-Flute Double End Mills

Fraise à queue à rainurer au carbure cortador vertical de carburo

Speeds & Feeds: Page 205

List No. 5946 Stub Length

List No. 5895 Regular Length

Micrograin Carbide – Center Cutting
30° Helix Angle

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.	TiALN COATED EDP NO.
1/16	1/8	1/8	1½	57270	91000	91011	91022
3/32	1/8	3/16	1½	57271	91001	91012	91023
1/8	1/8	1/4	1½	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	2½	57275	91005	91016	91027
1/4	1/4	1/2	2½	57276	91006	91017	91028
5/16	5/16	1/2	2½	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.	TiALN 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

Fraise cylindrique deux tailles à bout hémisphérique au carbure

cortador vertical con punta esférica de carburo

Micrograin Carbide – Center Cutting
30° Helix Angle

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool defection. 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 Long Length

List No. 5953 Extra Long Length

List No. 5942 Regular Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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
1/4	1/4	3/4	2 1/2	58216	91111	91134	91157
9/32	5/16	3/4	2 1/2	58218	91112	91135	91158
5/16	5/16	13/16	2 1/2	58220	91113	91136	91159
3/8	3/8	7/8"	2 1/2	58224	91114	91137	91160
7/16	7/16	1	2 3/4	58228	91115	91138	91161
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 Long Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	3/4	2 1/4	58838	91170	91180	91190
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	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

List No. 5953 Extra Long Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	1	3	58708	91200	91210	91220
3/16	3/16	1 1/8	3	58712	91201	91211	91221
1/4	1/4	1 1/2	4	58716	91202	91212	91222
5/16	5/16	1 5/8	4	58720	91203	91213	91223
3/8	3/8	1 3/4	4	58724	91204	91214	91224
7/16	7/16	3	6	58728	91205	91215	91225
1/2	1/2	3	6	58732	91206	91216	91226
5/8	5/8	3	6	58740	91207	91217	91227
3/4	3/4	3	6	58748	91208	91218	91228
1	1	3	6	58764	91209	91219	91229

Solid Carbide Metric 4-Flute Ball Nose Single End Mills

Fraise cylindrique deux tailles à bout hémisphérique au carbure

cortador vertical con punta esférica de carburo

List No. 5965

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.

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 EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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
25 mm	25 mm	38 mm	102 mm	59462*	—	—	—

* Available While Supplies Last

Solid Carbide 4-Flute Stub Length Ball Nose Double End Mills

Fraise cylindrique deux tailles à bout hémisphérique au carbure

cortador vertical con punta esférica de carburo

List No. 5949

Micrograin Carbide – Center Cutting
30° Helix Angle

TOLERANCES

Size to 1/4″	+.000 - .002
9/32″ to 1″	+.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.

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/16	1/8	1/8	1½	58354	91300	91311	91322
3/32	1/8	3/16	1½	58356	91301	91312	91323
1/8	1/8	1/4	1½	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	2½	58364	91305	91316	91327
1/4	1/4	1/2	2½	58366	91306	91317	91328
5/16	5/16	1/2	2½	58370	91307	91318	91329
3/8	3/8	9/16	2½	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 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.

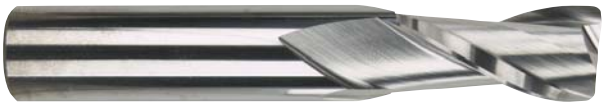
2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron.

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool defection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish.

Speeds & Feeds: Page 205

Fraise à queue à rainurer de rayon de bec au carbure

cortador vertical con radio de esquina de carburo



List No. 5967 2-Flute

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

List No. 5967 2-Flute

DIA.	SHANK DIA.	LOC	OAL	CORNER RADIUS	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	1/2	1 1/2	.020	58910	94830	94875	94920
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	.020	58916	94836	94881	94926
1/4	1/4	3/4	2 1/2	.030	58917	94837	94882	94927
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
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
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	.060	58932	94852	94897	94942
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	.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	.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	.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	.020	58949	94869	94914	94959
1	1	1 1/2	4	.030	58950	94870	94915	94960
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

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 Corner Radius Single End Mills

Fraise à queue à rainurer de rayon de bec au carbure

cortador vertical con radio de esquina de carburo

List No. 5968 **4-Flute**

DIA.	SHANK DIA.	LOC	OAL	CORNER RADIUS	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED EDP NO.
1/8	1/8	1/2	1 1/2	.020	59000	94965	95010	95055
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	.020	59006	94971	95016	95061
1/4	1/4	3/4	2 1/2	.030	59007	94972	95017	95062
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
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
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	.060	59022	94987	95032	95077
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	.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	.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	.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	.020	59039	95004	95049	95094
1	1	1 1/2	4	.030	59040	95005	95050	95095
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

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.

Solid Carbide Miniature Decimal Size Stub Length Single End Mills

Fraise à queue à rainurer au carbure cortador vertical de carburo

Micrograin Carbide – Center Cutting
30° Helix Angle
2-Flute & 4-Flute
Square End & Ball Nose
1/8" Shank Dia. • 1-1/2" OAL

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

Stub Length provides increased rigidity in shallow milling applications.

Tool Coatings Also Available

List No. 5906 — 2-Flute Square End

List No. 5907 — 2-Flute Ball Nose

List No. 5908 — 4-Flute Square End

List No. 5909 — 4-Flute Ball Nose

TOLERANCES

Dia.	+.0005 - .0005
Shank Dia.	+.0000 - .0003

DIA.	SHANK DIA.	LOC	OAL	LIST 5906 2-FLUTE SQUARE EDP NO.	LIST 5907 2-FLUTE BALL NOSE EDP NO.	LIST 5908 4-FLUTE SQUARE EDP NO.	LIST 5909 4-FLUTE BALL NOSE EDP NO.
.010	1/8	.015	1-1/2	52430	52455	52480	52505
.015	1/8	.023	1-1/2	52431	52456	52481	52506
.020	1/8	.030	1-1/2	52432	52457	52482	52507
.025	1/8	.038	1-1/2	52433	52458	52483	52508
.030	1/8	.045	1-1/2	52434	52459	52484	52509
.035	1/8	.053	1-1/2	52435	52460	52485	52510
.040	1/8	.060	1-1/2	52436	52461	52486	52511
.045	1/8	.068	1-1/2	52437	52462	52487	52512
.050	1/8	.075	1-1/2	52438	52463	52488	52513
.055	1/8	.083	1-1/2	52439	52464	52489	52514
.060	1/8	.090	1-1/2	52440	52465	52490	52515
.065	1/8	.098	1-1/2	52441	52466	52491	52516
.070	1/8	.105	1-1/2	52442	52467	52492	52517
.075	1/8	.113	1-1/2	52443	52468	52493	52518
.080	1/8	.120	1-1/2	52444	52469	52494	52519
.085	1/8	.128	1-1/2	52445	52470	52495	52520
.090	1/8	.135	1-1/2	52446	52471	52496	52521
.095	1/8	.143	1-1/2	52447	52472	52497	52522
.100	1/8	.150	1-1/2	52448	52473	52498	52523
.105	1/8	.158	1-1/2	52449	52474	52499	52524
.110	1/8	.165	1-1/2	52450	52475	52500	52525
.115	1/8	.173	1-1/2	52451	52476	52501	52526
.120	1/8	.180	1-1/2	52452	52477	52502	52527

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 Miniature Decimal Size Regular Length Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle
2-Flute & 4-Flute
Square End & Ball Nose
1/8" Shank Dia. • 1-1/2" OAL

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

TOLERANCES

Dia.	+.0005 - .0005
Shank Dia.	+.0000 - .0003

List No. 5910 — 2-Flute Square End

List No. 5911 — 2-Flute Ball Nose

List No. 5912 — 4-Flute Square End

List No. 5913 — 4-Flute Ball Nose

DIA.	SHANK DIA.	LOC	OAL	LIST 5910 2-FLUTE SQUARE EDP NO.	LIST 5911 2-FLUTE BALL NOSE EDP NO.	LIST 5912 4-FLUTE SQUARE EDP NO.	LIST 5913 4-FLUTE BALL NOSE EDP NO.
.005	1/8	.015	1-1/2	52530	—	52680	—
.006	1/8	.018	1-1/2	52531	—	52681	—
.007	1/8	.021	1-1/2	52532	—	52682	—
.008	1/8	.024	1-1/2	52533	—	52683	—
.009	1/8	.027	1-1/2	52534	—	52684	—
.010	1/8	.030	1-1/2	52535	52610	52685	52760
.011	1/8	.033	1-1/2	52536	52611	52686	52761
.012	1/8	.036	1-1/2	52537	52612	52687	52762
.013	1/8	.039	1-1/2	52538	52613	52688	52763
.014	1/8	.042	1-1/2	52539	52614	52689	52764
.015	1/8	.045	1-1/2	52540	52615	52690	52765
.016	1/8	.048	1-1/2	52541	52616	52691	52766
.017	1/8	.051	1-1/2	52542	52617	52692	52767
.018	1/8	.054	1-1/2	52543	52618	52693	52768
.019	1/8	.057	1-1/2	52544	52619	52694	52769
.020	1/8	.060	1-1/2	52545	52620	52695	52770
.021	1/8	.063	1-1/2	52546	52621	52696	52771
.022	1/8	.066	1-1/2	52547	52622	52697	52772
.023	1/8	.069	1-1/2	52548	52623	52698	52773
.024	1/8	.072	1-1/2	52549	52624	52699	52774
.025	1/8	.075	1-1/2	52550	52625	52700	52775
.026	1/8	.078	1-1/2	52551	52626	52701	52776
.027	1/8	.081	1-1/2	52552	52627	52702	52777
.028	1/8	.084	1-1/2	52553	52628	52703	52778
.029	1/8	.087	1-1/2	52554	52629	52704	52779
.030	1/8	.090	1-1/2	52555	52630	52705	52780
.031	1/8	.093	1-1/2	52556	52631	52706	52781
.032	1/8	.096	1-1/2	52557	52632	52707	52782
.033	1/8	.099	1-1/2	52558	52633	52708	52783
.034	1/8	.102	1-1/2	52559	52634	52709	52784
.035	1/8	.105	1-1/2	52560	52635	52710	52785
.036	1/8	.108	1-1/2	52561	52636	52711	52786
.037	1/8	.111	1-1/2	52562	52637	52712	52787
.038	1/8	.114	1-1/2	52563	52638	52713	52788
.039	1/8	.117	1-1/2	52564	52639	52714	52789

Tool Coatings Also Available

(continued)

Solid Carbide Miniature Decimal Size Regular Length Single End Mills

Fraise à queue à rainurer au carbure cortador vertical de carburo

Micrograin Carbide – Center Cutting
30° Helix Angle
2-Flute & 4-Flute
Square End & Ball Nose
1/8" Shank Dia. • 1-1/2" OAL

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

List No. 5910 — 2-Flute Square End

List No. 5911 — 2-Flute Ball Nose

List No. 5912 — 4-Flute Square End

List No. 5913 — 4-Flute Ball Nose

TOLERANCES

Dia.	+.0005 - .0005
Shank Dia.	+.0000 - .0003

(continued)

DIA.	SHANK DIA.	LOC	OAL	LIST 5910 2-FLUTE SQUARE EDP NO.	LIST 5911 2-FLUTE BALL NOSE EDP NO.	LIST 5912 4-FLUTE SQUARE EDP NO.	LIST 5913 4-FLUTE BALL NOSE EDP NO.
.040	1/8	.120	1-1/2	52565	52640	52715	52790
.041	1/8	.123	1-1/2	52566	52641	52716	52791
.042	1/8	.126	1-1/2	52567	52642	52717	52792
.043	1/8	.129	1-1/2	52568	52643	52718	52793
.044	1/8	.132	1-1/2	52569	52644	52719	52794
.045	1/8	.135	1-1/2	52570	52645	52720	52795
.046	1/8	.138	1-1/2	52571	52646	52721	52796
.047	1/8	.141	1-1/2	52572	52647	52722	52797
.048	1/8	.144	1-1/2	52573	52648	52723	52798
.049	1/8	.147	1-1/2	52574	52649	52724	52799
.050	1/8	.150	1-1/2	52575	52650	52725	52800
.051	1/8	.153	1-1/2	52576	52651	52726	52801
.052	1/8	.156	1-1/2	52577	52652	52727	52802
.053	1/8	.159	1-1/2	52578	52653	52728	52803
.054	1/8	.162	1-1/2	52579	52654	52729	52804
.055	1/8	.165	1-1/2	52580	52655	52730	52805
.056	1/8	.168	1-1/2	52581	52656	52731	52806
.057	1/8	.171	1-1/2	52582	52657	52732	52807
.058	1/8	.174	1-1/2	52583	52658	52733	52808
.059	1/8	.177	1-1/2	52584	52659	52734	52809
.060	1/8	.180	1-1/2	52585	52660	52735	52810
.061	1/8	.183	1-1/2	52586	52661	52736	52811
.062	1/8	.186	1-1/2	52587	52662	52737	52812
.063	1/8	.189	1-1/2	52588	52663	52738	52813
.064	1/8	.192	1-1/2	52589	52664	52739	52814
.065	1/8	.195	1-1/2	52590	52665	52740	52815
.070	1/8	.210	1-1/2	52591	52666	52741	52816
.075	1/8	.225	1-1/2	52592	52667	52742	52817
.080	1/8	.240	1-1/2	52593	52668	52743	52818
.085	1/8	.255	1-1/2	52594	52669	52744	52819
.090	1/8	.270	1-1/2	52595	52670	52745	52820
.095	1/8	.285	1-1/2	52596	52671	52746	52821
.100	1/8	.300	1-1/2	52597	52672	52747	52822
.105	1/8	.315	1-1/2	52598	52673	52748	52823
.110	1/8	.330	1-1/2	52599	52674	52749	52824
.115	1/8	.345	1-1/2	52600	52675	52750	52825
.120	1/8	.360	1-1/2	52601	52676	52751	52826

CARBIDE DRILL-MILL™

2-Flute & 4-Flute

Fraise de forage au carbure Broca fresadora de carburo

List No. 5989 – 2-Flute

List No. 5989 – 4-Flute

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

STANDARD PACKAGE All sizes — 1 each

2-Flute 90° Point Angle

Speeds & Feeds: Page 205

DIA.	SHANK DIA.	LOC*	OAL*	UNCOATED EDP NO.	TiN COATED EDP NO.	TiCN COATED EDP NO.	TiALN COATED 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.)

2-Flute 60° Point Angle

DIA.	SHANK DIA.	LOC*	OAL*	UNCOATED EDP NO.	TiALN COATED EDP NO.
1/16	1/8	3/16	1 1/2	59076	95361
3/32	1/8	3/8	1 1/2	59077	95362
1/8	1/8	1/2	1 1/2	59078	95363
3/16	3/16	5/8	2	59079	95364
1/4	1/4	3/4	2 1/2	59080	95365
3/8	3/8	1	2 1/2	59081	95366
1/2	1/2	1	3	59082	95367
5/8	5/8	1 1/4	3 1/2	59083	95368
3/4	3/4	1 1/2	4	59084	95369

4-Flute 90° Point Angle

DIA.	SHANK DIA.	LOC*	OAL*	UNCOATED EDP NO.	TiALN COATED EDP NO.
1/16	1/8	3/16	1 1/2	59085	95370
3/32	1/8	3/8	1 1/2	59086	95371
1/8	1/8	1/2	1 1/2	59087	95372
3/16	3/16	5/8	2	59088	95373
1/4	1/4	3/4	2 1/2	59089	95374
3/8	3/8	1	2 1/2	59090	95375
1/2	1/2	1	3	59091	95376
5/8	5/8	1 1/4	3 1/2	59092	95377
3/4	3/4	1 1/2	4	59093	95378

* Lengths include the conical cutting point.

Solid Carbide Roughing / Finishing Single End Mills

Fraise à queue à rainurer de dégrossissage et de finition au carbure

cortador vertical de carburo para desbaste/acabado

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.

Titanium Aluminum Nitride (TiALN) 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 TiALN 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

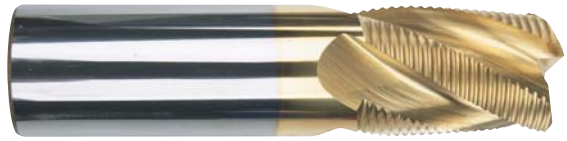
DIA.	SHANK DIA.	LOC	OAL	CORNER RADIUS	LIST 5929 UNCOATED EDP NO.	LIST 5929T TiALN COATED EDP NO.
1/8	1/8	1/2	1-1/2	.005 - .010	57465	92360
3/16	3/16	5/8	2	.005 - .010	57466	92361
1/4	1/4	3/4	2-1/2	.005 - .010	57467	92362
5/16	5/16	13/16	2-1/2	.005 - .010	57468	92363
3/8	3/8	1	2-1/2	.010 - .015	57469	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 Multi-Flute Roughing End Mills

Fraise à queue à rainurer de dégrossissage au carbure

cortador vertical de carburo para desbaste



Micrograin Carbide – Center Cutting
30° 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

* Available while supplies last

Woodruff Keyseat Cutters

Fraise à rainure de clavette
Cortachaveteros cortador de ranuras

High Speed Steel — ½″ Dia. Shank

Woodruff Keyseat cutters are designed for cutting keyways and keyseats in a wide variety of materials.

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
202 1/2	5/16	1/16	2 1/16	40527
302 1/2	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 BITS

Tool Coatings Also Available

Square Tool Bits

Outil rapporté Buril

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	2½	28014	½	4	28022
¼	2½	28015	⅝	4½	28024
5/16	2½	28017	¾	5	28025
⅜	3	28019	1	7	28026
7/16	3½	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	2½	28101	½	4	28106
¼	2½	28102	⅝	4½	28108
5/16	2½	28103	¾	5	28109
⅜	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	2½	28301	½	4	28306
¼	2½	28302	⅝	4½	28308
5/16	2½	28303	¾	5	28309
⅜	3	28304	⅞	6	28310
7/16	3½	28305	1	7	28311

List No. 4226F — Rectangular

SIZE				SIZE			
WIDTH	HEIGHT	OAL	EDP NO.	WIDTH	HEIGHT	OAL	EDP NO.
¼	½	4	28352	⅜	¾	6	28377
⅜	½	4	28356	½	¾	6	28379
⅜	⅝	4	28375	½	1	8	28361
⅜	⅝	6	28376	¾	1	6	28380

List No. 4226R — Round

SIZE	OAL	EDP NO.
5/16	3	28216*
5/16	4	28217*
⅜	4	28218*
½	4	28219*
⅝	4	28220*

*Available While Supplies Last

Styles AR & AL 0° Lead Angle Turning Tools

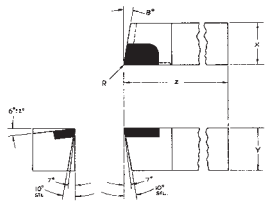
Premium Carbide Tipped

For turning to a square shoulder

STANDARD PACKAGE A4-A10 — 10 each A12 — 5 each A16-A44 — 1 each

Outil rapporté à pointe au carbure Buril con punta de carburo

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 W	SHANK SIZE H	L	NOSE RAD.	GRADE 883E EDP NO.	GRADE 370E EDP NO.
AR-4	¼	¼	2	1/64	70102	70103
AR-5	5/16	5/16	2¼	1/64	70108	70109
AR-6	⅜	⅜	2½	1/64	70114	70115
AR-7	7/16	7/16	3	1/32	70120	70121
AR-8	½	½	3½	1/32	70126	70127
AR-10	⅝	⅝	4	1/32	70132	70133
AR-12	¾	¾	4½	1/32	70138	70139
AR-16	1	1	7	1/32	70144	70145
AR-20	1¼	1¼	8	1/32	70150*	—
AR-44	½	1	7	1/32	—	70163*

Style AL – Left Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883E EDP NO.	GRADE 370E EDP NO.
AL-4	¼	¼	2	1/64	70202	70203
AL-5	5/16	5/16	2¼	1/64	70208	70209
AL-6	⅜	⅜	2½	1/64	70214	70215
AL-7	7/16	7/16	3	1/32	70220	70221
AL-8	½	½	3½	1/32	70226	70227
AL-10	⅝	⅝	4	1/32	70232	70233
AL-12	¾	¾	4½	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

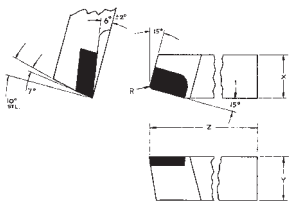
Premium Carbide Tipped

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

Outil rapporté à pointe au carbure Buril con punta de carburo

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 W	SHANK SIZE H	L	NOSE RAD.	GRADE 883E EDP NO.	GRADE 370E EDP NO.
BR-4	¼	¼	2	1/64	70302	70303
BR-5	5/16	5/16	2¼	1/64	70308	70309
BR-6	⅜	⅜	2½	1/64	70314	70315
BR-7	7/16	7/16	3	1/32	70320	70321
BR-8	½	½	3½	1/32	70326	70327
BR-10	⅝	⅝	4	1/32	70332	70333
BR-12	¾	¾	4½	1/32	70338	70339
BR-16	1	1	7	1/32	70344	70345
BR-20	1¼	1¼	8	1/32	70350*	—

Style BL – Left Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883E EDP NO.	GRADE 370E EDP NO.
BL-4	¼	¼	2	1/64	70402	70403
BL-5	5/16	5/16	2¼	1/64	70408	70409
BL-6	⅜	⅜	2½	1/64	70414	70415
BL-7	7/16	7/16	3	1/32	70420	70421
BL-8	½	½	3½	1/32	70426	70427
BL-10	⅝	⅝	4	1/32	70432	70433
BL-12	¾	¾	4½	1/32	70438	70439
BL-16	1	1	7	1/32	70444	70445
BL-20	1¼	1¼	8	1/32	70450*	70451*

*Available While Supplies Last

Style C Square Nose Tools

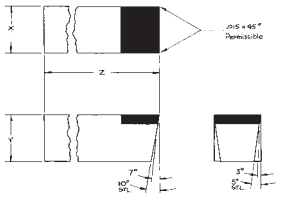
Outil rapporté à pointe au carbure Buril con punta de carburo

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 W	H	L	GRADE 883E EDP NO.	GRADE 370E EDP NO.
C-4	¼	¼	2	70502	70503
C-5	5/16	5/16	2¼	70508	70509
C-6	⅜	⅜	2½	70514	70515
C-7	7/16	7/16	3	70520	70521
C-8	½	½	3½	70526	70527
C-10	⅝	⅝	4	70532	70533
C-12	¾	¾	4½	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

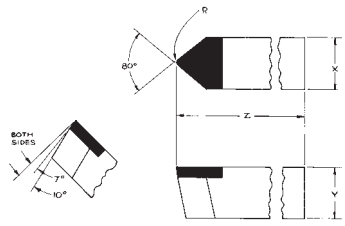
Outil rapporté à pointe au carbure Buril con punta de carburo

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 W	H	L	NOSE RAD.	GRADE 883E EDP NO.	GRADE 370E EDP NO.
D-4	¼	¼	2	1/64	70602	70603
D-5	5/16	5/16	2¼	1/64	70608	70609
D-6	⅜	⅜	2½	1/64	70614	70615
D-7	7/16	7/16	3	1/32	70620	70621
D-8	½	½	3½	1/32	70626	70627
D-10	⅝	⅝	4	1/32	70632	70633
D-12	¾	¾	4½	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

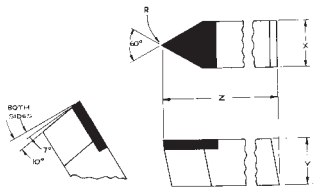
Outil rapporté à pointe au carbure Buril con punta de carburo

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 W	H	L	GRADE 883E EDP NO.	GRADE 370E EDP NO.
E-4	¼	¼	2	70701	70702
E-5	5/16	5/16	2¼	70705	70706
E-6	⅜	⅜	2½	70709	70710
E-8	½	½	3½	70713	70714
E-10	⅝	⅝	4	70717	70718
E-12	¾	¾	4½	70721	70722

Styles ER & EL
60° Included Angle Offset Threading Tools

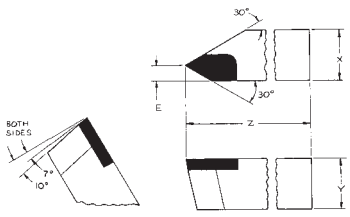
Outil rapporté à pointe au carbure Buril con punta de carburo

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 W	H	L	GRADE 883E EDP NO.	GRADE 370E EDP NO.
ER-4	¼	¼	2	70801	70802
ER-5	5/16	5/16	2¼	70804	70805
ER-6	⅜	⅜	2½	70807	70808
ER-8	½	½	3½	70810	70811
ER-10	⅝	⅝	4	70813	70814
ER-12	¾	¾	4½	70815	70816

Style EL – Left Hand

TOOL NO.	SHANK SIZE W	H	L	GRADE 883E EDP NO.	GRADE 370E EDP NO.
EL-4	¼	¼	2	70853	70854
EL-5	5/16	5/16	2¼	70855	70856
EL-6	⅜	⅜	2½	70857	70858
EL-8	½	½	3½	70860	70861
EL-10	⅝	⅝	4	70863	70864
EL-12	¾	¾	4½	70865	70866

Styles CTR & CTL Cut-Off Tools

Outil rapporté à pointe au carbure | Buril con punta de carburo

Premium Carbide Tipped

For bar stock cut-off applications

Style CTR – Right Hand

Style CTL – Left Hand

List No. 4190

GRADE 883E = C2
For use in cast iron and non-ferrous materials

GRADE 370E = C5
For use in steel and steel alloys

TOOL NO.	INDUSTRY NO.	W	SHANK SIZE H	L	STD PKG. QTY.	TIP WIDTH	GRADE 883E EDP NO.	GRADE 370E EDP NO.
CTR-11	CTR-111	½	1	5	5	⅛	71101	71102
CTR-22	CTR-122	½	1	5	5	3⁄16	71104	71105
CTR-33	CTR-121	½	1	5	5	¼	71107	71108
CTR-44	CTR-120	½	1	5	5	5⁄16	71110	71111
CTR-55	CTR-130	⅝	1¼	5	2	⅜	71113	71114
CTL-11	CTL-111	½	1	5	5	⅛	71151	71152
CTL-22	CTL-122	½	1	5	5	3⁄16	71154	71155
CTL-33	CTL-121	½	1	5	5	¼	71157	71158
CTL-44	CTL-120	½	1	5	5	5⁄16	71160	71161
CTL-55	CTL-130	⅝	1¼	5	2	⅜	71163	71164

Types T & C S.A. Series Swiss Automatic Tools

Outil rapporté à pointe au carbure | Buril con punta de carburo

Carbide Tipped
Grade C2 Carbide
Left Hand

List No. 4100 — Type T
For Turning

Grade C2
For use in cast iron and non-ferrous materials.

List No. 4100 — Type C
For Cut-Off and Forming

SHANK SIZE SQ.	SHANK SIZE LENGTH	STD. PKG. QTY.	TYPE T TOOL NO.	TYPE T CARBIDE SIZE T	TYPE T CARBIDE SIZE W	TYPE T CARBIDE SIZE L	TYPE T EDP NO.	TYPE C TOOL NO.	TYPE C CARBIDE SIZE T	TYPE C CARBIDE SIZE W	TYPE C CARBIDE SIZE L	TYPE C EDP NO.
¼	6	10	SA6T	3⁄32	⅛	1¼	70001	SA6C	⅛	3⁄32	1¼	70021
9⁄32	6	10	SA7T	3⁄32	⅛	1¼	70002	SA7C	⅛	3⁄32	1¼	70022
5⁄16	6	10	SA8T	3⁄32	3⁄16	1¼	70003	SA8C	⅛	3⁄32	1¼	70023
⅜	6	10	SA9T	3⁄32	3⁄16	1¼	70004	SA9C	⅛	3⁄32	1¼	70024
13⁄32	6	10	SA10T	3⁄32	3⁄16	1¼	70005	SA10C	⅛	3⁄32	1¼	70025
7⁄16	6	10	SA11T	⅛	¼	1	70006	SA11C	3⁄32	⅛	1¼	70026
15⁄32	6	10	SA11.5T	⅛	¼	1	70007	SA11.5C	3⁄32	⅛	1¼	70027
½	6	10	SA12T	⅛	¼	1	70008	SA12C	3⁄32	⅛	1¼	70028

Types TSA, TSC & TSE Square Shank Boring Tools

Premium Carbide Tipped

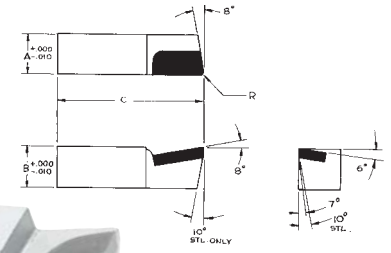
STANDARD PACKAGE 10 each

Outil rapporté à pointe au carbure

Buril con punta de carburo

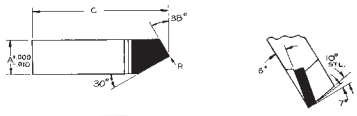
GRADE 883E = C2
For use in cast iron and non-ferrous materials

GRADE 370E = C5
For use in steel and steel alloys

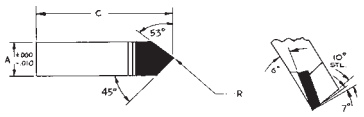


TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883E EDP NO.	GRADE 370E EDP NO.
TSA-5	5/16	5/16	1½	1/64	72081	72082
TSA-6	3/8	3/8	1¾	1/64	72085	72086
TSA-8	½	½	2½	1/32	72089	72090
TSC-5	5/16	5/16	1½	1/64	72101	72102
TSC-6	3/8	3/8	1¾	1/64	72105	72106
TSC-8	½	½	2½	1/32	72109	72110
TSE-5	5/16	5/16	1½	1/64	72121	72122
TSE-6	3/8	3/8	1¾	1/64	72125	72126
TSE-8	½	½	2½	1/32	72129	72130

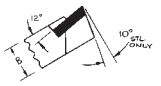
List No. 4200 — Type TSA



List No. 4200 — Type TSC



List No. 4200 — Type TSE



Types TRG, TRC & TRE Round Shank Boring Tools

Premium Carbide Tipped

Outil rapporté à pointe au carbure

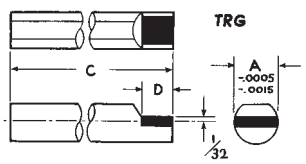
Buril con punta de carburo

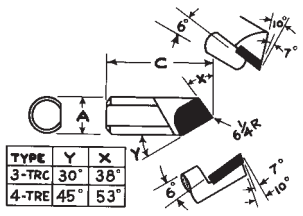
List No. 4200 Type TRG

List No. 4200 Types TRC & TRE

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 A DIA.	C LENGTH	D TIP	STD. PKG. QTY.	GRADE 883E EDP NO.	GRADE 370E EDP NO.
TRG-5	5/16	1½	7/32	10	72001	72002
TRG-6	3/8	1¾	¼	10	72004	72005
TRG-8	½	2½	11/32	10	72007	72008

TOOL NO.	SHANK SIZE A DIA.	C LENGTH	STD. PKG. QTY	GRADE 883E EDP NO.	GRADE 370E EDP NO.
TRC-5	.312	1½	10	72041	72042
TRC-6	.3745	1¾	10	72045	72046
TRC-8	.4995	2½	10	72049	72050
TRE-5	.312	1½	10	72061	72062
TRE-6	.3745	1¾	10	72065	72066
TRE-8	.4995	2½	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

Outil rapporté à pointe au carbure **Buril con punta de carburo**

List No. 4111

Grade C2
For use in cast iron and non-ferrous materials

Grade C5
For roughing cuts in steel and steel alloys

Grade C6
For general purpose use in steel and steel alloys

Style AR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE C5	GRADE 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 C2	GRADE C5	GRADE 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.

Outil rapporté à pointe au carbure **Buril con punta de carburo**

List No. 4121

Grade C2
For use in cast iron and non-ferrous materials

Grade C5
For roughing cuts in steel and steel alloys

Grade C6
For general purpose use in steel and steel alloys

Style BR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE C5	GRADE 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 C2	GRADE C5	GRADE 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

Grade C2
For use in cast iron and non-ferrous materials

Grade C5
For roughing cuts in steel and steel alloys

Grade C6
For general purpose use in steel and steel alloys

Style C Square Nose Tools

Outil rapporté à pointe au carbure — Buril con punta de carburo

Carbide Tipped

For chamfering, facing, turning and for making special tool forms

List No. 4131

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE C5	GRADE 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
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

Outil rapporté à pointe au carbure — Buril con punta de carburo

Carbide Tipped

For under cutting and for ID and OD chamfering

List No. 4141

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE C5	GRADE C6
D4	10	73602	73603	73604
D5	10	73607	73608	73609
D6	10	73612	73613	73614
D7	10	73617	73618	73619
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

Outil rapporté à pointe au carbure — Buril con punta de carburo

Carbide Tipped

For standard 60° threading, boring, V-grooving and other applications

List No. 4151

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE C5	GRADE C6
E4	10	73702	73703	73704
E5	10	73707	73708	73709
E6	10	73712	73713	73714
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 FR & FL End Cutting Offset Tools

Outil rapporté à pointe au carbure

Buril con punta de carburo

Carbide Tipped

Offset for facing to a square shoulder

List No. 4171

Grade C2
For use in cast iron and non-ferrous materials

Grade C5
For roughing cuts in steel and steel alloys

Grade C6
For general purpose use in steel and steel alloys

Style FR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE C5	GRADE C6
FR10	5	—	73908*	73909*
FR12	5	—	73913*	73914*
FR16	1	73917*	73918*	—

Style FL – Left Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE C5	GRADE C6
FL8	5	73952*	—	—
FL10	5	73957*	73958*	73959*
FL12	5	—	73963*	73964*
FL16	1	73967*	73968*	73969*

*Available While Supplies Last

Styles CTR & CTL Cut-Off Tools

Outil rapporté à pointe au carbure

Buril con punta de carburo

Carbide Tipped

For bar stock cut-off applications

List No. 4191

Style CTR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE 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 C2	GRADE 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.

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.**

MISCELLANEOUS

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

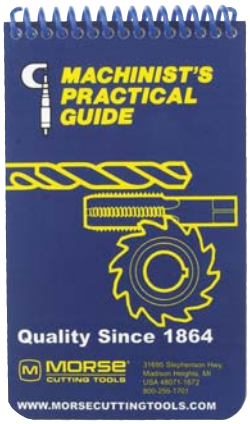
DLC — Diamond Like Carbon

Technical Publications

Guide technique Guía técnica

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

Tableau mural Tabla mural

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 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.

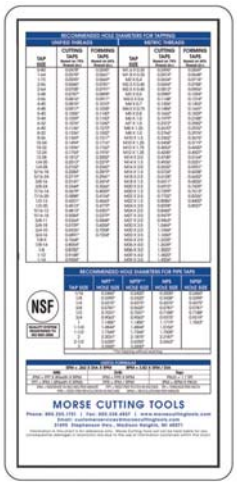
List No. 1007 EDP No. 01650

Decimal Equivalent Pocket Chart

List No. 1005

Tableau décimal Tabla de medidas decimales

Front



Back

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜″ × 7″, Printed on plastic

Pack of 50 EDP No. 20412

Pack of 100 EDP No. 20413

Screw Extractors

Extracteur à vis — Extractor de tornillos

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 SMALL END	DIAMETER LARGE END	OAL	FOR EXTRACTING DRILL SIZE TO USE	FOR EXTRACTING BOLT AND SCREW SIZE	FOR EXTRACTING STANDARD PIPE SIZE	EDP NO.
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

Jeu d'extracteurs à vis — Juego de extractores de tornillos

For removing broken bolts, screws or studs without damage to the threaded hole.

Furnished with a left-hand spiral. Carbon steel.

List No. 7300

EDP NO. 20217 — SET NO. 62 — In Plastic Pouch

EXTRACTOR NUMBER	SIZE RANGE
1	3/16 to 1/4
2	1/4 to 5/16
3	5/16 to 7/16
4	7/16 to 9/16
5	9/16 to 3/4

EDP NO. 20218 — SET NO. 68 — In Vinyl Pouch

EXTRACTOR NUMBER	SIZE RANGE
6	3/4 to 1
7	1 to 1 3/8
8	1 3/8 to 1 3/4
9	1 3/4 to 2 1/8

Combination Screw Extractor and Drill Set

In Metal Case – Screw Machine Length Drills

Jeu d'extracteurs à vis — Juego de extractores de tornillos

List No. 7301

SET NO. 64

EXTRACTOR NUMBER	DRILL SIZE	EDP NO.
1	5/64	
2	7/64	
3	5/32	20219
4	1/4	
5	17/64	

Morse Taper Drill Sleeves

Porte-foret | Manguito para broca

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 HOLE	MORSE TAPER SHANK	OAL	EDP NO.
1 to 2	1	2	3 9/16	20031
1 to 3	1	3	3 15/16	20032
1 to 4	1	4	4 7/8	20033
1 to 5	1	5	6 1/8	20034
2 to 3	2	3	4 7/16	20035
2 to 4	2	4	4 7/8	20036
2 to 5	2	5	6 1/8	20037
3 to 4	3	4	5 3/8	20038
3 to 5	3	5	6 1/8	20039
4 to 5	4	5	6 5/8	20040
4 to 6	4	6	8 5/8	20041
5 to 6	5	6	8 5/8	20042

Morse Taper Extension Sockets

Douille de raccord | Casquillo de extensión

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 HOLE	MORSE TAPER SHANK	OAL	EDP NO.
1 to 2	1	2	6 3/16	20011
1 to 3	1	3	6 15/16	20012
2 to 2	2	2	6 13/16	20014
2 to 3	2	3	7 9/16	20015
2 to 4	2	4	8 9/16	20016
3 to 2	3	2	7 3/4	20017
3 to 3	3	3	8 1/2	20018
3 to 4	3	4	8 1/2	20019
3 to 5	3	5	10 3/4	20020
4 to 3	4	3	9 7/16	20021
4 to 4	4	4	10 7/16	20022
4 to 5	4	5	11 1/16	20023
5 to 4	5	4	11 13/16	20024
5 to 5	5	5	13 1/16	20025
5 to 6	5	6	15 3/8	20026*

*** Available While Supplies Last**

Drill Drifts

For removal of sleeves, sockets, or taper shank cutting tools from spindles or tool holders.

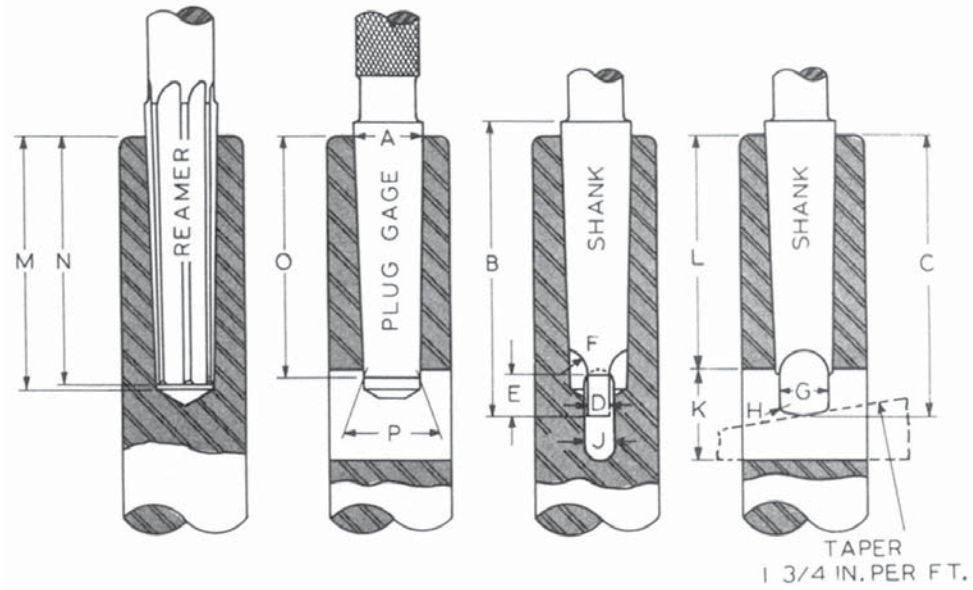
Size #1 for removal of #1 Morse Taper Tools
Size #2 for removal of #2 Morse Taper Tools
Size #3 for removal of #3 Morse Taper Tools
Size #4 for Tools #4 Morse Taper and larger Tools

List No. 0210

STANDARD PACKAGE
All sizes — 1 each

SIZE	EDP NO.
1	20051
2	20052
3	20053
4	20054

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 11/32	2 7/32	2 1/16	2 1/32	2	0.156	1/4	5/32	15/64	3/64	0.172	9/16	1 15/16	.052050	.62460
1	.36900	.47500	2 9/16	2 7/16	2 3/16	2 5/32	2 1/8	.203	3/8	3/16	11/32	3/64	0.218	3/4	2 1/16	.049882	.59858
2	.57200	.70000	3 1/8	2 15/16	2 21/32	2 39/64	2 9/16	0.250	7/16	1/4	17/32	1/16	0.266	7/8	2 1/2	.049951	.59941
3	.77800	.93800	3 7/8	3 11/16	3 5/16	3 1/4	3 3/16	0.312	9/16	9/32	23/32	5/64	0.328	1 3/16	3 1/16	.050195	.60235
4	1.02000	1.23100	4 7/8	4 5/8	4 3/16	4 1/8	4 1/16	0.469	5/8	5/16	31/32	3/32	0.484	1 1/4	3 7/8	.051938	.62326
4 1/2	1.26600	1.50000	5 3/8	5 1/8	4 5/8	4 9/16	4 1/2	0.562	1 1/16	3/8	1 13/64	1/8	0.578	1 3/8	4 5/16	.052000	.62400
5	1.47500	1.74800	6 1/8	5 7/8	5 5/16	5 1/4	5 3/16	0.625	3/4	3/8	1 13/32	1/8	0.656	1 1/2	4 15/16	.052626	.63151
6	2.11600	2.49400	8 9/16	8 1/4	7 13/32	7 21/64	7 1/4	0.750	1 1/8	1/2	2	5/32	0.781	1 3/4	7	.052138	.62565
7	2.75000	3.27000	11 5/8	11 1/4	10 5/32	10 5/64	10	1.125	1 3/8	3/4	2 5/8	3/16	1.156	2 5/8	9 1/2	.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.

CUTTING FLUIDS

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(Continued)

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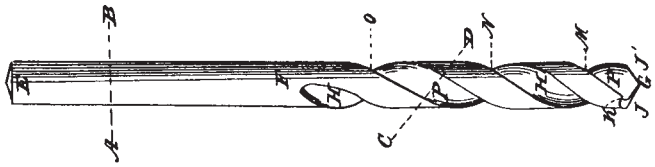
A HISTORY

Morse Cutting Tools began with the ideas of one man. From his ideas a company grew to become the leader in the design and manufacture of metal cutting tools. A firm's history plays an important role in shaping its present operation. This brief history outlines Morse's growth from the early 1800s to the present.



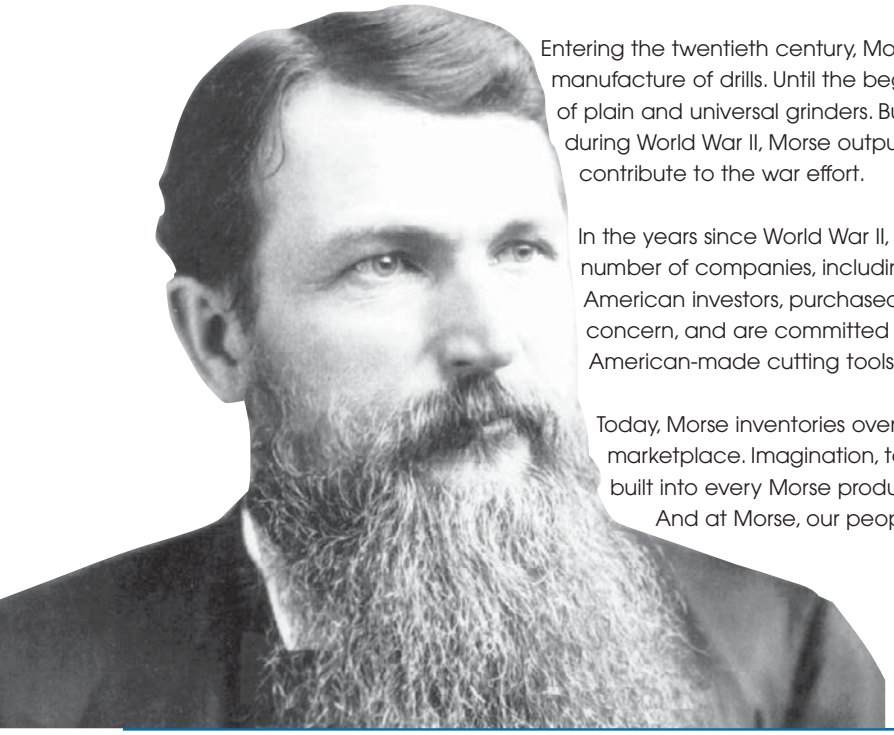
Stephen A. Morse, an enterprising mechanic, developed a new and better way to drill a hole when he invented the twist drill. With a new patent and a stockholder investment of $30,000, he opened the Morse Twist Drill and Machine Company in New Bedford, Massachusetts in 1864.

Recognizing the need for a way to drive his twist drill, Morse created the taper shank series. Two sets of master gages were made up; one, sent to the Bureau of Standards in Washington, D.C., was accepted as a National Standard. The other remains with the Morse company. Differences with his board caused Morse to resign from the company in 1868.

Philadelphia's 1877 Centennial Exhibition showcased the first exhibition of Morse tools. Morse products gained an international reputation for quality and were sold throughout the United States and in England, Russia, and Germany.

In the latter part of the nineteenth century, the company began a pattern of acquisition which resulted in enormous growth. Morse took over the Manhattan Fire Arms Company of Newark, New Jersey and the American Standard Tool Company of Danbury, Connecticut. Morse also acquired the Beach chuck patent of the Meridan Tool Company, Meridan, Connecticut, and the Schofield Patent Grinding Line, helping to insure accuracy in drill grinding.

In 1874, Morse purchased the machinery, patents and stock of the New York Tap and Die Company of Bridgeport, Connecticut. In 1897, Morse purchased the T&B Tool Company. T&B's machines, used in the manufacture of constant angle twist drills, were designed by a former Morse employee who had gone into business for himself and were built by Pratt and Whitney.



Entering the twentieth century, Morse developed a grinding machine used in the manufacture of drills. Until the beginning of World War I, the company marketed a line of plain and universal grinders. Business continued to grow between the wars, and during World War II, Morse output increased four to five times normal production to contribute to the war effort.

In the years since World War II, Morse has operated under the ownership of a number of companies, including Gulf+Western. The current owners, a group of American investors, purchased the company from a Scottish manufacturing concern, and are committed to upholding the Morse reputation for high quality, American-made cutting tools.

Today, Morse inventories over 10,000 varieties of cutting tools to serve our nation's marketplace. Imagination, technological innovation and insistence on quality are built into every Morse product.

And at Morse, our people wouldn't have it any other way!

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 Purolator 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 Purolator. All small packages are shipped via Purolator, 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 options, 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 for 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/cgi/TERMOFSALE

MORSE CUTTING TOOLS

NSF ISR

Certificate of Registration

This certifies that the Quality Management System of

Morse Cutting Tools

31695 Stephenson Hwy.
Madison Heights, Michigan, 48071-1672, United States

has been assessed by NSF-ISR and found to be in conformance to the following standard(s):

ISO 9001:2008

Scope of Registration:
The design of cutting tools and accessories including distribution services and sales thereof.

ANAB ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

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