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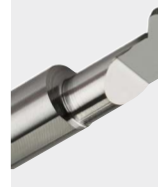
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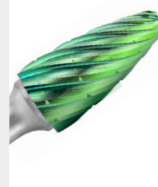
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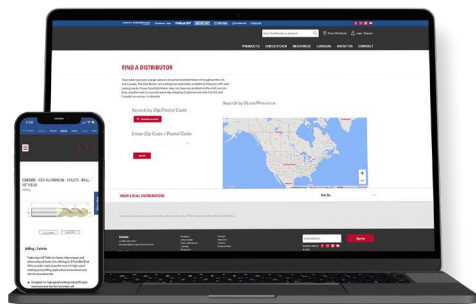
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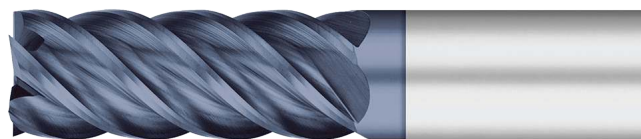
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11 MILLING



121 MICRO MILLING



156 SPECIALTY PROFILING



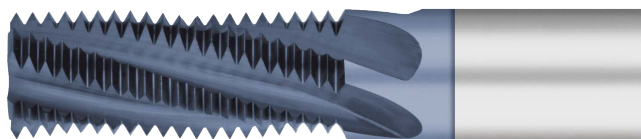
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MILLING

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	3 Flute	Square	Carbide	45° Helix - Chipbreaker	21
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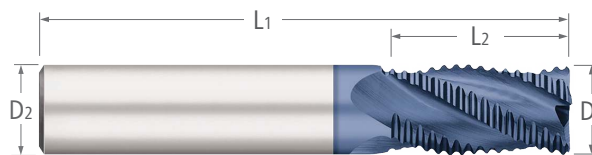
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GENERAL PURPOSE END MILLS - CARBIDE - ROUGHERS

4 Flute - Square - 30° Helix - Fine Pitch Rougher



- Excellent performance in hardened steels, titanium, Inconel, and high temp alloys
- Offered in stub, regular, and long length styles
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- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D1^{+0.000}_{-0.002}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC20308	32.35	TC29308	35.10
	1/8	1/2	1-1/2	TC20508	33.60	TC29508	36.40
	1/8	3/4	2-1/4	TC20608	36.50	TC29608	41.90
	1/8	1	3	TC20609	42.35	TC29609	47.80
3/16	3/16	3/8	2	TC20312	35.95	TC29312	39.00
	3/16	5/8	2	TC20512	37.45	TC29512	40.50
	3/16	7/8	2	TC20612	40.65	TC29612	46.30
	3/16	1-1/4	3	TC20613	47.00	TC29613	50.25
1/4	1/4	3/8	2	TC20316	39.85	TC29316	43.50
	1/4	1/2	2	TC20517	41.20	TC29517	45.10
	1/4	3/4	2-1/2	TC20516	44.60	TC29516	48.60
	1/4	1-1/8	3	TC20617	51.90	TC29617	55.85
	1/4	1-1/2	4	TC20616	65.15	TC29616	69.50
5/16	5/16	1/2	2	TC20320	56.35	TC29320	60.85
	5/16	13/16	2-1/2	TC20520	62.85	TC29520	67.65
	5/16	1-1/8	3	TC20621	73.00	TC29621	77.85
	5/16	1-1/2	4	TC20620	83.95	TC29620	89.25
3/8	3/8	9/16	2	TC20324	65.50	TC29324	70.90
	3/8	7/8	2-1/2	TC20524	73.10	TC29524	78.90
	3/8	1-1/8	3	TC20625	86.00	TC29625	91.80
	3/8	1-1/2	4	TC20626	99.10	TC29626	105.30
	3/8	1-3/4	4	TC20624	105.80	TC29624	112.10
	3/8	2-1/4	5			TC29627	124.20
NEW 7/16	1/2	1	3			TC29528	86.25
1/2	1/2	5/8	2-1/2	TC20332	81.00	TC29332	88.70
	1/2	1	3	TC20533	88.20	TC29533	95.95
	1/2	1-1/4	3	TC20532	91.65	TC29532	99.45
	1/2	1-1/2	4	TC20633	113.95	TC29633	122.30
	1/2	2	4	TC20632	121.15	TC29632	129.50
	1/2	3	6			TC29634	145.15

continued on next page

GENERAL PURPOSE END MILLS - CARBIDE - ROUGHERS

4 Flute - Square - 30° Helix - Fine Pitch Rougher (Cont.)

End Mills

Roughers

For Aluminum

Carbide

Cobalt

continued from previous page

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
D1 ^{+0.000"} _{-0.003"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC20340	182.10	TC29340	191.60
	5/8	1-1/4	3-1/2	TC20541	195.05	TC29541	205.15
	5/8	1-5/8	3-1/2	TC20540	202.75	TC29540	212.90
	5/8	2-1/4	5	TC20641	276.75	TC29641	287.95
	5/8	2-1/2	5	TC20640	292.20	TC29640	303.30
	5/8	3	6	TC20642	311.70	TC29642	331.95
3/4	3/4	1	3	TC20348	219.80	TC29348	231.05
	3/4	1-5/8	4	TC20548	246.00	TC29548	257.95
	3/4	2-1/4	5	TC20649	338.05	TC29649	351.40
	3/4	2-1/2	5	TC20648	351.00	TC29648	364.35
	3/4	3	6	TC20650	375.25	TC29650	389.60
1	1	1-1/4	3-1/2	TC20364	394.50	TC29364	424.55
	1	2	4	TC20564	456.45	TC29564	474.40
	1	2-1/2	5	TC20664	604.80	TC29664	624.50



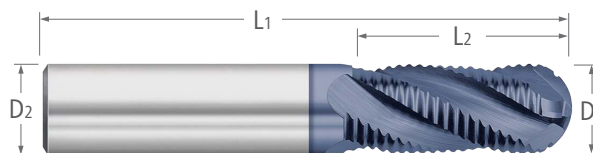
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For technical information, see page 113

GENERAL PURPOSE END MILLS - CARBIDE - ROUGHERS

4 Flute - Ball - 30° Helix - Fine Pitch Rougher



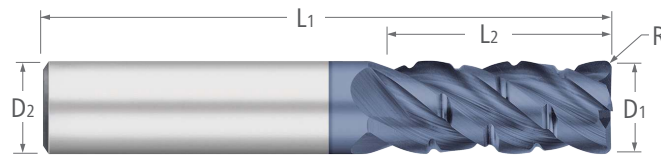
- Excellent performance in hardened steels, titanium, Inconel, and high temp alloys
- Offered in stub, regular, and long length styles
- Fine pitch for maximized material removal rates (MRR) and minimized vibration or chatter
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0001}_{-.002}$	D_2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/4	1/4	3/8	2	TC20715	51.95	TC29915	58.70
	1/4	3/4	2-1/2	TC20716	56.75	TC29916	60.90
	1/4	1-1/2	4	TC20717	77.30	TC29917	85.10
5/16	5/16	1/2	2	TC20718	72.70	TC29918	80.90
	5/16	7/8	2-1/2	TC20720	73.80	TC29920	82.45
	5/16	1-1/2	4	TC20721	100.35	TC29921	109.65
3/8	3/8	9/16	2	TC20722	86.60	TC29922	96.30
	3/8	1	2-1/2	TC20724	94.20	TC29924	100.00
	3/8	1-3/4	4	TC20725	126.95	TC29925	138.00
1/2	1/2	5/8	2-1/2	TC20726	118.60	TC29926	132.65
	1/2	1-1/4	3	TC20732	129.35	TC29932	137.35
	1/2	2	4	TC20733	158.80	TC29933	173.85
$D_1^{+.0001}_{-.003}$	D_2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC20734	209.15	TC29934	225.55
	5/8	1-5/8	3-1/2	TC20740	229.80	TC29940	240.05
	5/8	2-1/2	5	TC20741	319.25	TC29941	338.00
3/4	3/4	1	3	TC20742	296.35	TC29942	315.80
	3/4	1-5/8	4	TC20748	322.45	TC29948	343.25
	3/4	2-1/2	5	TC20749	427.60	TC29949	449.95
1	1	2	4	TC20764	525.40	TC29964	403.17
	1	2-1/2	5	TC20765	673.60	TC29965	704.65

For technical information, see page 113

GENERAL PURPOSE END MILLS - CARBIDE - ROUGHERS

4 Flute - Corner Radius - 40° Helix - Rougher/Finisher



- Excellent performance in hardened steels, titanium, Inconel, and high temp alloys
- Engineered with chipbreaker geometry for optimal chip evacuation, reduced harmonics, and reduced tool pressure
- Corner radius for increased edge strength
- Higher helix for enhanced cutting action
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		AlTiN COATED	
$D1^{+.000"}_{-.002"}$	D2 (h6)	$R^{+.001"}_{-.001"}$	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.010	1/2	1-1/2	TC29708	51.25	TC29808	56.35
	1/8	.010	3/4	2-1/4	TC29770	52.20	TC29870	57.55
	1/8	.010	1	3	TC29785	53.70	TC29885	59.00
	1/8	.020	1/2	1-1/2			TC29815	56.35
3/16	3/16	.010	5/8	2	TC29712	60.95	TC29812	66.60
	3/16	.010	7/8	2-1/2	TC29771	62.90	TC29871	68.95
	3/16	.010	1-1/8	3	TC29786	65.05	TC29886	71.10
	3/16	.030	3/4	2-1/2			TC29813	67.90
1/4	1/4	.020	3/4	2-1/2	TC29716	72.20	TC29816	79.45
	1/4	.020	1-1/8	3	TC29772	72.50	TC29872	79.70
	1/4	.020	1-1/2	4	TC29787	78.75	TC29887	86.60
	1/4	.030	1	3			TC29892	79.60
5/16	5/16	.020	13/16	2-1/2	TC29720	77.70	TC29820	86.45
	5/16	.020	1-1/8	3	TC29773	89.40	TC29873	98.05
	5/16	.020	1-5/8	4	TC29788	99.75	TC29888	109.15
3/8	3/8	.020	7/8	2-1/2	TC29724	83.70	TC29824	94.00
	3/8	.020	1-1/8	3	TC29774	101.70	TC29874	112.05
	3/8	.020	1-1/2	4	TC29775	103.90	TC29875	115.00
	3/8	.020	2	4	TC29789	105.60	TC29889	116.65
	3/8	.030	1-1/2	4			TC29893	115.00
1/2	1/2	.030	1-1/4	3	TC29733	102.65	TC29833	116.65
	1/2	.030	1-1/2	4	TC29776	94.90	TC29876	109.95
	1/2	.030	2	4	TC29777	96.75	TC29877	111.95
	1/2	.030	3	6	TC29790	105.10	TC29890	122.65
	1/2	.040	1-1/4	3	TC29732	94.50	TC29832	108.55
	1/2	.060	2	4			TC29894	117.50

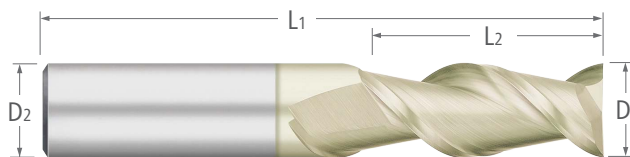
$D1^{+.000"}_{-.003"}$	D2 (h6)	$R^{+.001"}_{-.001"}$	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.030	1-5/8	3-1/2	TC29742*	209.10	TC29842*	226.55
	5/8	.030	2-1/4	5	TC29778*	222.65	TC29878*	251.70
	5/8	.030	3	6	TC29791*	228.60	TC29891*	259.20
	5/8	.040	1-1/4	3-1/2	TC29741*	206.60		
	5/8	.040	1-5/8	3-1/2	TC29740*	199.00	TC29840*	227.65
3/4	3/4	.030	1-5/8	4	TC29749*	280.80	TC29849*	301.60
	3/4	.030	2-1/4	5	TC29779*	296.10	TC29879*	332.20
	3/4	.040	1-5/8	4	TC29748*	268.65	TC29848*	289.45
1	1	.030	1-5/8	4	TC29765*	457.45	TC29865*	487.50
	1	.040	1-5/8	4	TC29764*	457.45	TC29864*	353.87

*Includes Weldon Flat

For technical information, see page 113

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

2 Flute - Square - 45° Helix



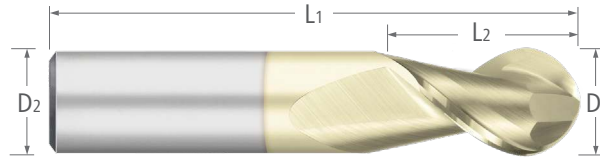
- Designed for high speed slotting and profiling in aluminum and non-ferrous materials
- Offered in stub, regular, and long length styles
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		ZrN COATED	
$D1^{+0.000}_{-0.002}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC62000	12.05	TC62100	14.90
	1/8	1/2	1-1/2	TC62608	17.85	TC62708	20.80
	1/8	3/4	2-1/4	TC63208	31.95	TC63308	35.35
3/16	3/16	3/8	2	TC62002	18.90	TC62102	22.15
	3/16	5/8	2	TC62612	25.50	TC62712	28.85
	3/16	3/4	2-1/2	TC63212	36.90	TC63312	40.60
1/4	1/4	1/2	2	TC62004	27.55	TC62104	31.65
	1/4	3/4	2-1/2	TC62616	36.00	TC62716	40.35
	1/4	1-1/4	3	TC63216	50.85	TC63316	55.30
5/16	5/16	1/2	2	TC62006	33.55	TC62106	38.55
	5/16	13/16	2-1/2	TC62620	42.60	TC62720	47.85
	5/16	1-3/8	3	TC63220	69.85	TC63320	75.25
3/8	3/8	5/8	2	TC62008	36.30	TC62108	42.00
	3/8	1	2-1/2	TC62624	44.45	TC62724	50.70
	3/8	1-1/2	4	TC63224	83.45	TC63324	90.10
1/2	1/2	5/8	2-1/2	TC62010	62.60	TC62110	70.80
	1/2	1-1/4	3	TC62632	71.50	TC62732	80.00
	1/2	2	4	TC63232	117.40	TC63332	126.60
$D1^{+0.000}_{-0.003}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC62012	132.65	TC62112	150.60
	5/8	1-5/8	3-1/2	TC62640	149.95	TC62740	160.70
	5/8	2-3/8	5	TC63240	262.45	TC63340	274.40
3/4	3/4	1	3	TC62014	202.95	TC62114	215.10
	3/4	1-3/4	4	TC62648	217.80	TC62748	230.80
	3/4	2-1/2	5	TC63248	283.75	TC63348	298.00
1	1	1-1/4	3-1/2	TC62016	341.90	TC62116	272.37
	1	1-3/4	4	TC62664	359.05	TC62764	378.15
	1	2-1/4	5	TC63264	446.10	TC63364	481.70

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

2 Flute - Ball - 45° Helix



- Designed for high speed slotting and profiling in aluminum and non-ferrous materials
- Offered in stub and regular length styles
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision manufactured in the USA

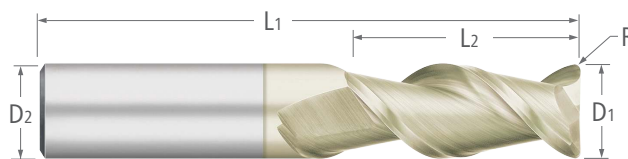
CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		ZrN COATED	
$D1^{+0.000}_{-0.002}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	1-1/2	TC63050	22.45	TC63085	28.05
	1/8	3/4	2-1/4	TC63070	40.05	TC63100	46.00
3/16	3/16	5/8	2	TC63051	31.35	TC63086	37.60
	3/16	3/4	2-1/2	TC63071	46.35	TC63101	53.40
1/4	1/4	3/4	2-1/2	TC63052	41.80	TC63087	49.75
	1/4	1-1/4	3	TC63072	59.30	TC63102	67.30
5/16	5/16	13/16	2-1/2	TC63053	49.70	TC63088	59.25
	5/16	1-3/8	3	TC63073	81.40	TC63103	91.00
3/8	3/8	1	2-1/2	TC63054	51.85	TC63089	63.10
	3/8	1-1/2	4	TC63074	96.10	TC63104	108.30
1/2	1/2	1-1/4	3	TC63055	83.20	TC63090	98.70
	1/2	2	4	TC63075	135.40	TC63105	151.90

$D1^{+0.000}_{-0.003}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	1-5/8	3-1/2	TC63056	164.80	TC63091	184.00
	5/8	2-3/8	5	TC63076	289.35	TC63106	310.00
3/4	3/4	1-3/4	4	TC63057	239.30	TC63092	262.15
	3/4	2-1/2	5	TC63077	312.90	TC63107	337.60
1	1	1-3/4	4	TC63058	396.20	TC63093	429.25
	1	2-1/4	5	TC63078	492.20	TC63108	527.70

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

2 Flute - Corner Radius - 45° Helix



- Designed for high speed slotting and profiling in aluminum and non-ferrous materials
- Offered in stub, regular, and long length styles
- Corner radius for increased edge strength
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		ZrN COATED	
$D_1^{+.0001}_{-.002}$	$D_2 (h6)$	$R^{+.001}_{-.001}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.010	1/4	1-1/2	TC62300	15.40	TC62400	18.35
	1/8	.010	1/2	1-1/2	TC64608	21.70	TC64708	24.85
	1/8	.010	3/4	2-1/4	TC65208	39.00	TC65308	42.15
	1/8	.015	1/4	1-1/2	TC62363	15.40	TC62463	20.95
	1/8	.015	1/2	1-1/2	TC62390	21.70	TC62490	27.20
	1/8	.015	3/4	2-1/4	TC62436	39.00	TC62517	44.95
	1/8	.020	1/4	1-1/2	TC62364	15.40	TC62464	20.95
	1/8	.020	1/2	1-1/2	TC62391	21.70	TC62491	27.20
	1/8	.020	3/4	2-1/4	TC62437	39.00	TC62518	44.95
	1/8	.030	1/4	1-1/2	TC62365	15.40	TC62465	20.95
	1/8	.030	1/2	1-1/2	TC62392	21.70	TC62492	27.20
	1/8	.030	3/4	2-1/4	TC62438	39.00	TC62519	44.95
3/16	3/16	.010	3/8	2	TC62302	23.20	TC62402	26.55
	3/16	.010	5/8	2	TC64612	30.55	TC64712	34.00
	3/16	.010	3/4	2-1/2	TC65212	45.00	TC65312	48.70
	3/16	.020	3/8	2	TC62366	23.20	TC62466	29.45
	3/16	.020	5/8	2	TC62393	30.55	TC62493	36.75
	3/16	.020	3/4	2-1/2	TC62439	45.00	TC62520	51.65
	3/16	.030	3/8	2	TC62367	23.20	TC62467	29.45
	3/16	.030	5/8	2	TC62394	30.55	TC62494	36.75
1/4	1/4	.015	1/2	2	TC62368	33.20	TC62468	40.70
	1/4	.015	3/4	2-1/2	TC62395	40.55	TC62495	48.50
	1/4	.015	1-1/4	3	TC62441	57.60	TC62522	65.65
	1/4	.020	1/2	2	TC62304	33.20	TC62404	37.35
	1/4	.020	3/4	2-1/2	TC64616	40.55	TC64716	44.95
	1/4	.020	1-1/4	3	TC65216	57.60	TC65316	62.00
	1/4	.030	1/2	2	TC62369	33.20	TC62469	40.70
	1/4	.030	3/4	2-1/2	TC62396	40.55	TC62496	48.50
	1/4	.030	1-1/4	3	TC62442	57.60	TC62523	65.65
	1/4	.060	1/2	2	TC62370	33.20	TC62470	40.70
	1/4	.060	3/4	2-1/2	TC62397	40.55	TC62497	48.50
	1/4	.060	1-1/4	3	TC62443	57.60	TC62524	65.65

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GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

2 Flute - Corner Radius - 45° Helix (Cont.)

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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		ZrN COATED	
D1 ^{+0.000"} -0.002"	D2 (h6)	R ^{+0.001"} -0.001"	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/16	5/16	.020	1/2	2	TC62306	38.65	TC62406	34.67
	5/16	.020	13/16	2-1/2	TC64620	48.20	TC64720	38.67
	5/16	.020	1-3/8	3	TC65220	79.05	TC65320	84.40
	5/16	.030	1/2	2	TC62371	38.65	TC62471	47.65
	5/16	.030	13/16	2-1/2	TC62417	48.20	TC62498	57.75
	5/16	.030	1-3/8	3	TC62444	79.05	TC62525	88.55
	5/16	.060	1/2	2	TC62372	38.65	TC62472	47.65
	5/16	.060	13/16	2-1/2	TC62418	48.20	TC62499	57.75
	5/16	.060	1-3/8	3	TC62445	79.05	TC62526	88.55
3/8	3/8	.015	5/8	2	TC62373	40.85	TC62473	51.45
	3/8	.015	1	2-1/2	TC62419	50.40	TC62500	61.65
	3/8	.015	1-1/2	4	TC62446	93.45	TC62527	105.60
	3/8	.020	5/8	2	TC62308	40.85	TC62408	51.45
	3/8	.020	1	2-1/2	TC64624	50.40	TC64724	56.50
	3/8	.020	1-1/2	4	TC65224	93.45	TC65324	100.15
	3/8	.030	5/8	2	TC62374	40.85	TC62474	51.45
	3/8	.030	1	2-1/2	TC62420	50.40	TC62501	61.65
	3/8	.030	1-1/2	4	TC62447	93.45	TC62528	105.60
	3/8	.060	5/8	2	TC62375	40.85	TC62475	51.45
	3/8	.060	1	2-1/2	TC62421	50.40	TC62502	61.65
	3/8	.060	1-1/2	4	TC62448	93.45	TC62529	105.60
1/2	1/2	.015	5/8	2-1/2	TC62376	67.10	TC62476	82.45
	1/2	.015	1-1/4	3	TC62422	80.80	TC62503	96.20
	1/2	.015	2	4	TC62449	131.45	TC62530	148.00
	1/2	.020	5/8	2-1/2	TC62377	67.10	TC62477	82.45
	1/2	.020	1-1/4	3	TC62423	80.80	TC62504	96.20
	1/2	.020	2	4	TC62450	131.45	TC62531	148.00
	1/2	.030	5/8	2-1/2	TC62378	67.10	TC62478	82.45
	1/2	.030	1-1/4	3	TC62424	80.80	TC62505	96.20
	1/2	.030	2	4	TC62451	131.45	TC62532	148.00
	1/2	.040	5/8	2-1/2	TC62310	67.10	TC62410	75.50
	1/2	.040	1-1/4	3	TC64632	80.80	TC64732	89.30
	1/2	.040	2	4	TC65232	131.45	TC65332	140.75
	1/2	.060	5/8	2-1/2	TC62379	67.10	TC62479	82.45
	1/2	.060	1-1/4	3	TC62425	80.80	TC62506	96.20
	1/2	.060	2	4	TC62452	131.45	TC62533	148.00
	1/2	.125	5/8	2-1/2	TC62380	67.10	TC62480	82.45
	1/2	.125	1-1/4	3	TC62426	80.80	TC62507	96.20
	1/2	.125	2	4	TC62453	131.45	TC62534	148.00

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GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

2 Flute - Corner Radius - 45° Helix (Cont.)

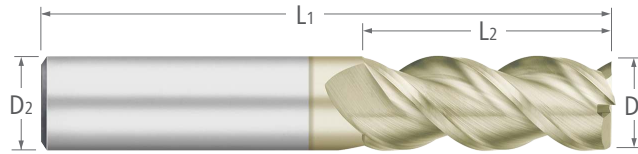
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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		ZrN COATED	
D1 ^{+0.000"} -0.003"	D2 (h6)	R ^{+0.001"} -0.001"	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.015	3/4	3	TC62381	140.20	TC62481	158.10
	5/8	.015	1-5/8	3-1/2	TC62427	160.05	TC62508	179.20
	5/8	.015	2-3/8	5	TC62454	280.85	TC62535	301.55
	5/8	.040	3/4	3	TC62312	140.20		
	5/8	.040	1-5/8	3-1/2	TC64640	160.05	TC64740	179.20
	5/8	.040	2-3/8	5	TC65240	280.85	TC65340	218.97
	5/8	.060	3/4	3	TC62382	140.20	TC62482	158.10
	5/8	.060	1-5/8	3-1/2	TC62428	160.05	TC62509	179.20
	5/8	.060	2-3/8	5	TC62455	280.85	TC62536	301.55
3/4	3/4	.015	1	3	TC62383	210.00	TC62483	231.35
	3/4	.015	1-3/4	4	TC62429	232.25	TC62510	255.10
	3/4	.015	2-1/2	5	TC62456	303.80	TC62537	328.45
	3/4	.030	1	3	TC62384	210.00	TC62484	231.35
	3/4	.030	1-3/4	4	TC62430	232.25	TC62511	255.10
	3/4	.030	2-1/2	5	TC62457	303.80	TC62538	328.45
	3/4	.040	1	3	TC62314	210.00	TC62414	168.17
	3/4	.040	1-3/4	4	TC64648	232.25	TC64748	245.25
	3/4	.040	2-1/2	5	TC65248	303.80	TC65348	328.45
	3/4	.060	1	3	TC62835	210.00	TC62485	231.35
	3/4	.060	1-3/4	4	TC62431	232.25	TC62512	255.10
	3/4	.060	2-1/2	5	TC62458	303.80	TC62539	328.45
	3/4	.125	1	3	TC62836	210.00	TC62486	231.35
	3/4	.125	1-3/4	4	TC62432	232.25	TC62513	255.10
	3/4	.125	2-1/2	5	TC62459	303.80	TC62540	328.45
1	1	.030	1-1/4	3-1/2	TC62837	352.50	TC62487	385.55
	1	.030	1-3/4	4	TC62433	384.60	TC62514	417.70
	1	.030	2-1/4	5	TC62460	477.85	TC62541	513.40
	1	.040	1-1/4	3-1/2	TC62316	352.50		
	1	.040	1-3/4	4	TC64664	384.60		
	1	.040	2-1/4	5	TC65264	477.85		
	1	.060	1-1/4	3-1/2	TC62888	352.50	TC62488	385.55
	1	.060	1-3/4	4	TC62434	384.60	TC62515	417.70
	1	.060	2-1/4	5	TC62461	477.85	TC62542	513.40
	1	.125	1-1/4	3-1/2	TC62889	352.50	TC62489	385.55
	1	.125	1-3/4	4	TC62435	384.60	TC62516	417.70
	1	.125	2-1/4	5	TC62462	477.85	TC62543	513.40

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Square - 45° Helix



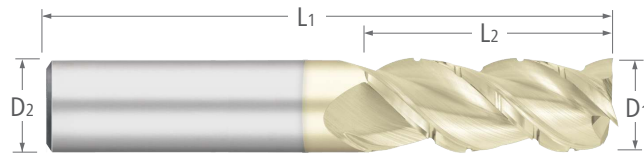
- Designed for high speed slotting and profiling in aluminum and non-ferrous materials
- Additional flute has 50% more cutting performance than certain 2 flute applications
- Offered in stub, regular, and long length styles
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		ZrN COATED	
D1 ^{+0.000"} _{-0.002"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC62975	12.05	TC63000	14.90
	1/8	3/8	1-1/2			TC63001	20.40
	1/8	1/2	1-1/2	TC62808	17.85	TC62908	20.80
	1/8	5/8	2			TC62909	29.05
	1/8	3/4	2-1/4	TC63408	31.90	TC63508	35.25
	1/8	1	2-1/2			TC63507	39.05
9/64	3/16	9/16	1-1/2			TC63511	25.20
3/16	3/16	3/8	2	TC62977	18.90	TC63002	22.15
	3/16	5/8	2	TC62812	25.50	TC62912	28.85
	3/16	3/4	2-1/2	TC63412	36.90	TC63512	40.60
	3/16	15/16	2-1/2			TC63513	44.50
7/32	1/4	5/8	2			TC63515	35.00
1/4	1/4	1/2	2	TC62979	27.55	TC63004	31.65
	1/4	3/4	2-1/2	TC62816	36.00	TC62916	40.35
	1/4	1	2-1/2			TC62917	37.90
	1/4	1-1/4	3	TC63416	50.85	TC63516	55.30
	1/4	2	4			TC63517	61.70
5/16	5/16	1/2	2	TC62981	33.55	TC63006	38.55
	5/16	13/16	2-1/2	TC62820	42.60	TC62920	47.85
	5/16	1-3/8	3	TC63420	69.85	TC63520	75.25
3/8	3/8	5/8	2	TC62983	36.30	TC63008	42.00
	3/8	1	2-1/2	TC62824	44.45	TC62924	50.70
	3/8	1-1/2	4	TC63424	83.45	TC63524	90.10
	3/8	2-1/4	5			TC63525	100.55
1/2	1/2	5/8	2-1/2	TC62985	62.60	TC63010	70.80
	1/2	1-1/4	3	TC62832	71.50	TC62932	80.00
	1/2	2	4	TC63432	117.40	TC63532	126.60
	1/2	3	6			TC63533	165.65
D1 ^{+0.000"} _{-0.003"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC62987	133.30	TC63012	143.30
	5/8	1-5/8	3-1/2	TC62840	149.95	TC62940	160.70
	5/8	2-3/8	5	TC63440	262.45	TC63540	274.40
3/4	3/4	1	3	TC62989	202.95	TC63014	215.10
	3/4	1-3/4	4	TC62848	217.80	TC62948	230.80
	3/4	2-1/2	5	TC63448	283.75	TC63548	298.00
	3/4	3	6			TC63549	315.40
1	1	1-1/4	3-1/2	TC62991	343.60	TC63016	376.65
	1	1-3/4	4	TC62864	360.95	TC62964	379.90
	1	2-1/4	5	TC63464	446.10	TC63564	466.95

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Square - 45° Helix - Chipbreaker



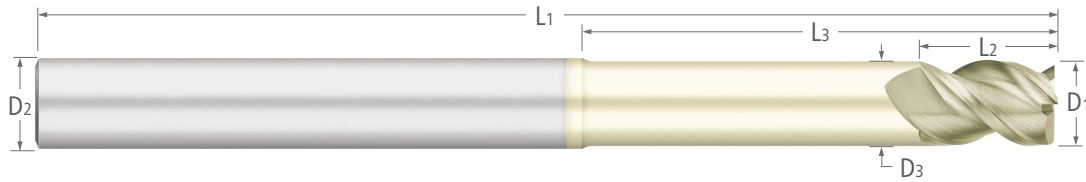
- Designed for roughing, high speed slotting, profiling, and certain finishing applications in aluminum and non-ferrous materials
- Chipbreaker geometry for optimal chip evacuation, reduced harmonics, and minimized tool pressure
- Additional flute has 50% more cutting performance than certain 2 flute applications
- Offered in stub, regular, and long length styles
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		ZrN COATED	
$D_1^{+.000}_{-.002}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	1-1/2	TC67207	20.85	TC67232	26.45
	1/8	3/4	2-1/4	TC67216	34.90	TC67241	40.80
3/16	3/16	5/8	2	TC67208	29.10	TC67233	35.35
	3/16	3/4	2-1/2	TC67217	40.50	TC67242	47.15
1/4	1/4	1/2	2	TC67200	31.40	TC67225	38.85
	1/4	3/4	2-1/2	TC67209	39.70	TC67234	47.80
	1/4	1-1/4	3	TC67218	54.55	TC67243	62.70
5/16	5/16	1/2	2	TC67201	37.55	TC67226	46.55
	5/16	13/16	2-1/2	TC67210	46.50	TC67235	56.10
	5/16	1-3/8	3	TC67219	73.65	TC67244	83.40
3/8	3/8	5/8	2	TC67202	41.05	TC67227	51.70
	3/8	1	2-1/2	TC67211	49.25	TC67236	60.55
	3/8	1-1/2	4	TC67220	88.05	TC67245	100.40
1/2	1/2	5/8	2-1/2	TC67203	67.45	TC67228	82.95
	1/2	1-1/4	3	TC67212	76.35	TC67237	91.85
	1/2	2	4	TC67221	123.45	TC67246	140.00
$D_1^{+.000}_{-.003}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC67204	139.05	TC67229	157.20
	5/8	1-5/8	3-1/2	TC67213	155.70	TC67238	175.10
	5/8	2-3/8	5	TC67222	268.80	TC67247	289.65
3/4	3/4	1	3	TC67205	209.90	TC67230	231.45
	3/4	1-3/4	4	TC67214	224.75	TC67239	247.85
	3/4	2-1/2	5	TC67223	291.25	TC67248	316.20
1	1	1-1/4	3-1/2	TC67206	352.85	TC67231	386.25
	1	1-3/4	4	TC67215	370.20	TC67240	403.60
	1	2-1/4	5	TC67224	455.90	TC67249	491.80

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Square - 45° Helix - Long Reach



- Designed for high speed slotting and profiling in aluminum and non-ferrous materials
- Reduced neck provides maximum strength in long reach and deep pocketing applications
- Additional flute has 50% more cutting performance than certain 2 flute applications
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision Manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	OVERALL REACH	NECK DIA.	ZrN COATED	
$D_1^{+.000"_{-.002"}}$	D_2 (h6)	L_2	L_1	L_3	D_3	TOOL #	USD\$
1/8	1/8	5/32	3	3/4	.119	TC64360	32.75
1/4	1/4	3/8	4	1-1/8	.238	TC64362	49.45
	1/4	3/8	4	1-5/8	.238	TC64364	64.85
	1/4	3/8	4	2-1/8	.238	TC64366	50.55
3/8	3/8	1/2	4	1-1/8	.356	TC64368	81.95
	3/8	1/2	4	2-1/8	.356	TC64370	68.05
1/2	1/2	5/8	4	2-1/4	.475	TC64372	94.50

NEW

NEW

NEW

NEW

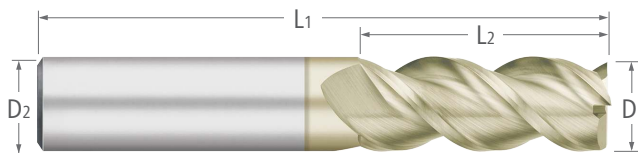
NEW

NEW

NEW

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Square - 45° Helix - Metric

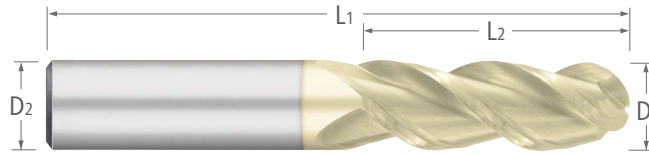


- Designed for high speed slotting and profiling in aluminum and non-ferrous materials
- Additional flute has 50% more cutting performance than certain 2 flute applications
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision Manufactured in the USA

	CUTTER DIA.	SHANK DIA.	LOC	OAL	ZrN COATED	
	$D_1^{+0.00 \text{ mm}}_{-0.05 \text{ mm}}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$
NEW	3.0 mm	3 mm	12 mm	38 mm	TC63780	19.15
NEW	4.0 mm	4 mm	14 mm	50 mm	TC63782	19.55
NEW	5.0 mm	6 mm	16 mm	50 mm	TC63784	24.55
NEW	6.0 mm	6 mm	19 mm	50 mm	TC63786	29.50
NEW	6.5 mm	8 mm	19 mm	63 mm	TC63788	29.85
NEW	7.0 mm	8 mm	19 mm	63 mm	TC63790	30.05
NEW	8.0 mm	8 mm	20 mm	63 mm	TC63792	41.85
NEW	10.0 mm	10 mm	22 mm	75 mm	TC63794	48.35

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Ball - 45° Helix



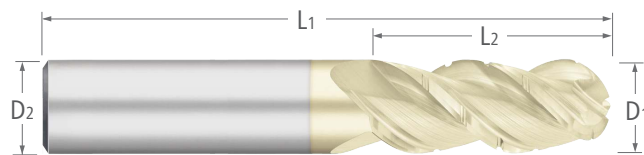
- Designed for high speed slotting and profiling in aluminum and non-ferrous materials
- Additional flute has 50% more cutting performance than certain 2 flute applications
- Offered in stub and regular length styles
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		ZrN COATED	
$D1^{+.000}_{-.002}$ "	$D2$ (h6)	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	1-1/2	TC63115	21.70	TC63145	27.20
	1/8	3/4	2-1/4	TC63130	39.00	TC63160	44.95
3/16	3/16	5/8	2	TC63116	30.55	TC63146	36.75
	3/16	3/4	2-1/2	TC63131	45.00	TC63161	51.65
1/4	1/4	3/4	2-1/2	TC63117	40.55	TC63147	48.50
	1/4	1-1/4	3	TC63132	57.60	TC63162	65.65
5/16	5/16	13/16	2-1/2	TC63118	48.20	TC63148	57.75
	5/16	1-3/8	3	TC63133	79.05	TC63163	88.55
3/8	3/8	1	2-1/2	TC63119	50.40	TC63149	61.65
	3/8	1-1/2	4	TC63134	93.45	TC63164	105.60
1/2	1/2	1-1/4	3	TC63120	80.80	TC63150	96.20
	1/2	2	4	TC63135	131.45	TC63165	148.00
$D1^{+.000}_{-.003}$ "	$D2$ (h6)	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	1-5/8	3-1/2	TC63121	160.05	TC63151	179.20
	5/8	2-3/8	5	TC63136	280.85	TC63166	301.55
3/4	3/4	1-3/4	4	TC63122	232.25	TC63152	255.10
	3/4	2-1/2	5	TC63137	303.80	TC63167	328.45
1	1	1-3/4	4	TC63123	384.60	TC63153	417.70
	1	2-1/4	5	TC63138	477.85	TC63168	513.40

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Ball - 45° Helix - Chipbreaker



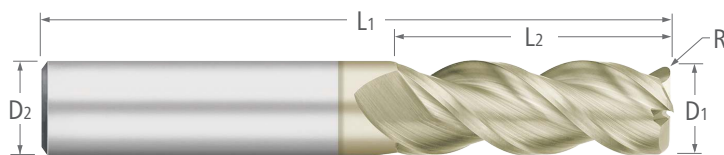
- Designed for roughing, high speed slotting, profiling, and certain finishing applications in aluminum and non-ferrous materials
- Additional flute has 50% more cutting performance than certain 2 flute applications
- Chipbreaker geometry for optimal chip evacuation, reduced harmonics, and minimized tool pressure
- Offered in stub and regular styles
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		ZrN COATED	
$D_1^{+.000}_{-.002}$	D_2 (h6)	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	1-1/2	TC67452	24.70	TC67470	30.25
	1/8	3/4	2-1/4	TC67461	42.05	TC67479	47.95
3/16	3/16	5/8	2	TC67453	34.15	TC67471	40.35
	3/16	3/4	2-1/2	TC67462	48.55	TC67480	55.25
1/4	1/4	3/4	2-1/2	TC67454	44.35	TC67472	52.35
	1/4	1-1/4	3	TC67463	61.45	TC67481	69.45
5/16	5/16	13/16	2-1/2	TC67455	52.10	TC67473	61.70
	5/16	1-3/8	3	TC67464	82.85	TC67482	92.55
3/8	3/8	1	2-1/2	TC67456	55.15	TC67474	66.40
	3/8	1-1/2	4	TC67465	98.05	TC67483	110.45
1/2	1/2	1-1/4	3	TC67457	85.80	TC67475	101.20
	1/2	2	4	TC67466	137.20	TC67484	154.00
$D_1^{+.000}_{-.003}$	D_2 (h6)	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	1-5/8	3-1/2	TC67458	165.80	TC67476	185.15
	5/8	2-3/8	5	TC67467	287.20	TC67485	308.10
3/4	3/4	1-3/4	4	TC67459	239.20	TC67477	262.30
	3/4	2-1/2	5	TC67468	311.30	TC67486	336.25
1	1	1-3/4	4	TC67460	393.85	TC67478	427.30
	1	2-1/4	5	TC67469	487.65	TC67487	523.55

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Corner Radius - 45° Helix



- Designed for high speed slotting and profiling in aluminum and non-ferrous materials
- Additional flute has 50% more cutting performance than certain 2 flute applications
- Offered in stub, regular, and long length styles
- Corner radius for increased edge strength
- 45° helix for faster chip removal and a better finish
- Center cutting
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		ZrN COATED	
$D1^{+.000}_{-.002}$	D2 (h6)	$R^{+.001}_{-.001}$	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.010	1/4	1-1/2	TC63575	15.40	TC63600	18.35
	1/8	.010	1/2	1-1/2	TC65808	21.70	TC65908	24.85
	1/8	.010	3/4	2-1/4	TC66408	39.00	TC66508	42.15
	1/8	.015	1/4	1-1/2	TC65400	15.40	TC65481	20.95
	1/8	.015	1/2	1-1/2	TC65427	21.70	TC65508	27.20
	1/8	.015	3/4	2-1/4	TC65454	39.00	TC65535	44.95
	1/8	.020	1/4	1-1/2	TC65401	15.40	TC65482	20.95
	1/8	.020	1/2	1-1/2	TC65428	21.70	TC65509	27.20
	1/8	.020	3/4	2-1/4	TC65455	39.00	TC65536	44.95
	1/8	.030	1/4	1-1/2	TC65402	15.40	TC65483	20.95
	1/8	.030	1/2	1-1/2	TC65429	21.70	TC65510	27.20
	1/8	.030	3/4	2-1/4	TC65456	39.00	TC65537	44.95
3/16	3/16	.010	3/8	2	TC63577	23.20	TC63602	26.55
	3/16	.010	5/8	2	TC65812	30.55	TC65912	34.00
	3/16	.010	3/4	2-1/2	TC66412	45.00	TC66512	48.70
	3/16	.020	3/8	2	TC65403	23.20	TC65484	29.45
	3/16	.020	5/8	2	TC65430	30.55	TC65511	36.75
	3/16	.020	3/4	2-1/2	TC65457	45.00	TC65538	51.65
	3/16	.030	3/8	2	TC65404	23.20	TC65485	29.45
	3/16	.030	5/8	2	TC65431	30.55	TC65512	36.75
	3/16	.030	3/4	2-1/2	TC65458	45.00	TC65539	51.65
1/4	1/4	.015	1/2	2	TC65405	33.20	TC65486	40.70
	1/4	.015	3/4	2-1/2	TC65432	40.55	TC65513	48.50
	1/4	.015	1-1/4	3	TC65459	57.60	TC65540	65.65
	1/4	.020	1/2	2	TC63579	33.20	TC63604	37.35
	1/4	.020	3/4	2-1/2	TC65816	40.55	TC65916	44.95
	1/4	.020	1-1/4	3	TC66416	57.60	TC66516	62.00
	1/4	.030	1/2	2	TC65406	33.20	TC65487	40.70
	1/4	.030	3/4	2-1/2	TC65433	40.55	TC65514	48.50
	1/4	.030	1-1/4	3	TC65460	57.60	TC65541	65.65
	1/4	.060	1/2	2	TC65407	33.20	TC65488	40.70
	1/4	.060	3/4	2-1/2	TC65434	40.55	TC65515	48.50
	1/4	.060	1-1/4	3	TC65461	57.60	TC65542	65.65

continued on next page

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Corner Radius - 45° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		ZrN COATED	
D1 ^{+0.000"} -0.002"	D2 (h6)	R ^{+0.001"} -0.001"	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/16	5/16	.020	1/2	2	TC63581	38.95	TC63606	48.00
	5/16	.020	13/16	2-1/2	TC65820	48.20	TC65920	53.45
	5/16	.020	1-3/8	3	TC66420	79.05	TC66520	84.40
	5/16	.030	1/2	2	TC65408	38.95	TC65489	48.00
	5/16	.030	13/16	2-1/2	TC65435	48.20	TC65516	57.75
	5/16	.030	1-3/8	3	TC65462	79.05	TC65543	88.55
	5/16	.060	1/2	2	TC65409	38.95	TC65490	48.00
	5/16	.060	13/16	2-1/2	TC65436	48.20	TC65517	57.75
	5/16	.060	1-3/8	3	TC65463	79.05	TC65544	88.55
3/8	3/8	.015	5/8	2	TC65410	41.05	TC65491	51.70
	3/8	.015	1	2-1/2	TC65437	50.40	TC65518	61.65
	3/8	.015	1-1/2	4	TC65464	93.45	TC65545	105.60
	3/8	.020	5/8	2	TC63583	41.05	TC63608	46.85
	3/8	.020	1	2-1/2	TC65824	50.40	TC65924	56.50
	3/8	.020	1-1/2	4	TC66424	93.45	TC66524	100.15
	3/8	.030	5/8	2	TC65411	41.05	TC65492	51.70
	3/8	.030	1	2-1/2	TC65438	50.40	TC65519	61.65
	3/8	.030	1-1/2	4	TC65465	93.45	TC65546	105.60
	3/8	.060	5/8	2	TC65412	41.05	TC65493	51.70
	3/8	.060	1	2-1/2	TC65439	50.40	TC65520	61.65
	3/8	.060	1-1/2	4	TC65466	93.45	TC65547	105.60
1/2	1/2	.015	5/8	2-1/2	TC65413	67.10	TC65494	82.45
	1/2	.015	1-1/4	3	TC65440	80.80	TC65521	96.20
	1/2	.015	2	4	TC65467	131.45	TC65548	148.00
	1/2	.020	5/8	2-1/2	TC65414	67.10	TC65495	82.45
	1/2	.020	1-1/4	3	TC65441	80.80	TC65522	96.20
	1/2	.020	2	4	TC65468	131.45	TC65549	148.00
	1/2	.030	5/8	2-1/2	TC65415	67.10	TC65496	82.45
	1/2	.030	1-1/4	3	TC65442	80.80	TC65523	96.20
	1/2	.030	2	4	TC65469	131.45	TC65550	148.00
	1/2	.040	5/8	2-1/2	TC63585	67.10	TC63610	75.50
	1/2	.040	1-1/4	3	TC65832	80.80	TC65932	89.30
	1/2	.040	2	4	TC66432	131.45	TC66532	140.75
	1/2	.060	5/8	2-1/2	TC65416	67.10	TC65497	82.45
	1/2	.060	1-1/4	3	TC65443	80.80	TC65524	96.20
	1/2	.060	2	4	TC65470	131.45	TC65551	148.00
	1/2	.125	5/8	2-1/2	TC65417	67.10	TC65498	82.45
	1/2	.125	1-1/4	3	TC65444	80.80	TC65525	96.20
	1/2	.125	2	4	TC65471	131.45	TC65552	148.00

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GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Corner Radius - 45° Helix (Cont.)

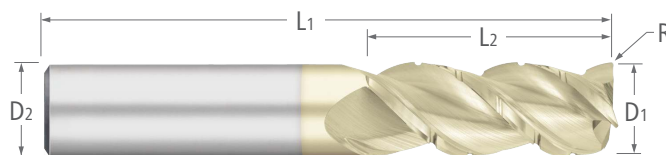
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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		ZrN COATED	
D1 ^{+0.000"} _{-.003"}	D2 (h6)	R ^{+0.001"} _{-.001"}	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.015	3/4	3	TC65418	140.20	TC65499	158.10
	5/8	.015	1-5/8	3-1/2	TC65445	160.85	TC65526	180.00
	5/8	.015	2-3/8	5	TC65472	280.85	TC65553	301.55
	5/8	.040	3/4	3	TC63587	140.20	TC63612	158.10
	5/8	.040	1-5/8	3-1/2	TC65840	160.85	TC65940	171.60
	5/8	.040	2-3/8	5	TC66440	280.85	TC66540	293.05
	5/8	.060	3/4	3	TC65419	140.20	TC65500	158.10
	5/8	.060	1-5/8	3-1/2	TC65446	160.85	TC65527	180.00
	5/8	.060	2-3/8	5	TC65473	280.85	TC65554	301.55
3/4	3/4	.015	1	3	TC65420	210.00	TC65501	231.35
	3/4	.015	1-3/4	4	TC65447	232.25	TC65528	255.10
	3/4	.015	2-1/2	5	TC65474	303.80	TC65555	328.45
	3/4	.030	1	3	TC65421	210.00	TC65502	231.35
	3/4	.030	1-3/4	4	TC65448	232.25	TC65529	255.10
	3/4	.030	2-1/2	5	TC65475	303.80	TC65556	328.45
	3/4	.040	1	3	TC63589	210.00	TC63614	231.35
	3/4	.040	1-3/4	4	TC65848	232.25	TC65948	245.25
	3/4	.040	2-1/2	5	TC66448	303.80	TC66548	318.20
	3/4	.060	1	3	TC65422	210.00	TC65503	231.35
	3/4	.060	1-3/4	4	TC65449	232.25	TC65530	255.10
	3/4	.060	2-1/2	5	TC65476	303.80	TC65557	328.45
	3/4	.125	1	3	TC65423	210.00	TC65504	231.35
	3/4	.125	1-3/4	4	TC65450	232.25	TC65531	255.10
	3/4	.125	2-1/2	5	TC65477	303.80	TC65558	328.45
1	1	.030	1-1/4	3-1/2	TC65424	352.50	TC65505	385.55
	1	.030	1-3/4	4	TC65451	384.60	TC65532	417.70
	1	.030	2-1/4	5	TC65478	477.85	TC65559	513.40
	1	.040	1-1/4	3-1/2	TC63591	352.50		
	1	.040	1-3/4	4	TC65864	384.60	TC65964	303.47
	1	.040	2-1/4	5	TC66464	477.85	TC66564	372.77
	1	.060	1-1/4	3-1/2	TC65425	352.50	TC65506	385.55
	1	.060	1-3/4	4	TC65452	384.60	TC65533	417.70
	1	.060	2-1/4	5	TC65479	477.85	TC65560	513.40
	1	.125	1-1/4	3-1/2	TC65426	352.50	TC65507	385.55
	1	.125	1-3/4	4	TC65453	384.60	TC65534	417.70
	1	.125	2-1/4	5	TC65480	477.85	TC65561	513.40

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Corner Radius - 45° Helix - Chipbreaker



- Designed for roughing, high speed slotting, profiling, and certain finishing applications in aluminum and non-ferrous materials
- Chipbreaker geometry for optimal chip evacuation, reduced harmonics, and minimized tool pressure
- Additional flute has 50% more cutting performance than certain 2 flute applications
- Offered in stub, regular, and long length styles
- Corner radius for increased edge strength
- 45° helix for faster chip removal and a better finish
- ZrN coating offers increased speed rates and prolonged tool life
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		ZrN COATED	
$D_1^{+.0001}_{-.0021}$	D2 (h6)	$R^{+.0011}_{-.0011}$	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.010	1/2	1-1/2	TC67279	24.70	TC67380	30.25
	1/8	.010	3/4	2-1/4	TC67315	42.05	TC67416	47.95
	1/8	.015	1/2	1-1/2	TC67280	24.70	TC67381	30.25
	1/8	.015	3/4	2-1/4	TC67316	42.05	TC67417	47.95
	1/8	.020	1/2	1-1/2	TC67281	24.70	TC67382	30.25
	1/8	.020	3/4	2-1/4	TC67317	42.05	TC67418	47.95
	1/8	.030	1/2	1-1/2	TC67282	24.70	TC67383	30.25
	1/8	.030	3/4	2-1/4	TC67318	42.05	TC67419	47.95
3/16	3/16	.010	5/8	2	TC67283	34.15	TC67384	40.35
	3/16	.010	3/4	2-1/2	TC67319	48.55	TC67420	55.25
	3/16	.020	5/8	2	TC67284	34.15	TC67385	40.35
	3/16	.020	3/4	2-1/2	TC67320	48.55	TC67421	55.25
	3/16	.030	5/8	2	TC67285	34.15	TC67386	40.35
	3/16	.030	3/4	2-1/2	TC67321	48.55	TC67422	55.25
1/4	1/4	.015	1/2	2	TC67250	37.05	TC67351	44.55
	1/4	.015	3/4	2-1/2	TC67286	44.35	TC67387	52.35
	1/4	.015	1-1/4	3	TC67322	61.45	TC67423	69.45
	1/4	.020	1/2	2	TC67251	37.05	TC67352	44.55
	1/4	.020	3/4	2-1/2	TC67287	44.35	TC67388	52.35
	1/4	.020	1-1/4	3	TC67323	61.45	TC67424	69.45
	1/4	.030	1/2	2	TC67252	37.05	TC67353	44.55
	1/4	.030	3/4	2-1/2	TC67288	44.35	TC67389	52.35
	1/4	.030	1-1/4	3	TC67324	61.45	TC67425	69.45
	1/4	.060	1/2	2	TC67253	37.05	TC67354	44.55
	1/4	.060	3/4	2-1/2	TC67289	44.35	TC67390	52.35
	1/4	.060	1-1/4	3	TC67325	61.45	TC67426	69.45

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GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Corner Radius - 45° Helix - Chipbreaker (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		ZrN COATED	
D1 ^{+0.000"} -0.002"	D2 (h6)	R ^{+0.001"} -0.001"	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/16	5/16	.020	1/2	2	TC67254	42.95	TC67355	51.95
	5/16	.020	13/16	2-1/2	TC67290	52.10	TC67391	61.70
	5/16	.020	1-3/8	3	TC67326	82.85	TC67427	92.55
	5/16	.030	1/2	2	TC67255	42.95	TC67356	51.95
	5/16	.030	13/16	2-1/2	TC67291	52.10	TC67392	61.70
	5/16	.030	1-3/8	3	TC67327	82.85	TC67428	92.55
	5/16	.060	1/2	2	TC67256	42.95	TC67357	51.95
	5/16	.060	13/16	2-1/2	TC67292	52.10	TC67393	61.70
	5/16	.060	1-3/8	3	TC67328	82.85	TC67429	92.55
3/8	3/8	.015	5/8	2	TC67257	45.90	TC67358	56.50
	3/8	.015	1	2-1/2	TC67293	55.15	TC67394	66.40
	3/8	.015	1-1/2	4	TC67329	98.05	TC67430	110.45
	3/8	.020	5/8	2	TC67258	45.90	TC67359	56.50
	3/8	.020	1	2-1/2	TC67294	55.15	TC67395	66.40
	3/8	.020	1-1/2	4	TC67330	98.05	TC67431	110.45
	3/8	.030	5/8	2	TC67259	45.90	TC67360	56.50
	3/8	.030	1	2-1/2	TC67295	55.15	TC67396	66.40
	3/8	.030	1-1/2	4	TC67331	98.05	TC67432	110.45
	3/8	.060	5/8	2	TC67260	45.90	TC67361	56.50
	3/8	.060	1	2-1/2	TC67296	55.15	TC67397	66.40
	3/8	.060	1-1/2	4	TC67332	98.05	TC67433	110.45
1/2	1/2	.015	5/8	2-1/2	TC67261	71.95	TC67362	87.45
	1/2	.015	1-1/4	3	TC67297	85.80	TC67398	101.20
	1/2	.015	2	4	TC67333	137.20	TC67434	154.00
	1/2	.020	5/8	2-1/2	TC67262	71.95	TC67363	87.45
	1/2	.020	1-1/4	3	TC67298	85.80	TC67399	101.20
	1/2	.020	2	4	TC67334	137.20	TC67435	154.00
	1/2	.030	5/8	2-1/2	TC67263	71.95	TC67364	87.45
	1/2	.030	1-1/4	3	TC67299	85.80	TC67400	101.20
	1/2	.030	2	4	TC67335	137.20	TC67436	154.00
	1/2	.040	5/8	2-1/2	TC67264	71.95	TC67365	87.45
	1/2	.040	1-1/4	3	TC67300	85.80	TC67401	101.20
	1/2	.040	2	4	TC67336	137.20	TC67437	154.00
	1/2	.060	5/8	2-1/2	TC67265	71.95	TC67366	87.45
	1/2	.060	1-1/4	3	TC67301	85.80	TC67402	101.20
	1/2	.060	2	4	TC67337	137.20	TC67438	154.00
	1/2	.125	5/8	2-1/2	TC67266	71.95	TC67367	87.45
	1/2	.125	1-1/4	3	TC67302	85.80	TC67403	101.20
	1/2	.125	2	4	TC67338	137.20	TC67439	154.00

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GENERAL PURPOSE END MILLS - CARBIDE - FOR ALUMINUM

3 Flute - Corner Radius - 45° Helix - Chipbreaker (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		ZrN COATED	
D1 ^{+0.000"} -0.003"	D2 (h6)	R ^{+0.001"} -0.001"	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.015	3/4	3	TC67267	145.95	TC67368	164.10
	5/8	.015	1-5/8	3-1/2	TC67303	166.60	TC67404	186.00
	5/8	.015	2-3/8	5	TC67339	287.20	TC67440	308.10
	5/8	.040	3/4	3	TC67268	145.95	TC67369	164.10
	5/8	.040	1-5/8	3-1/2	TC67304	166.60	TC67405	186.00
	5/8	.040	2-3/8	5	TC67340	287.20	TC67441	308.10
	5/8	.060	3/4	3	TC67269	145.95	TC67370	164.10
	5/8	.060	1-5/8	3-1/2	TC67305	166.60	TC67406	186.00
	5/8	.060	2-3/8	5	TC67341	287.20	TC67442	308.10
3/4	3/4	.015	1	3	TC67270	216.95	TC67371	238.55
	3/4	.015	1-3/4	4	TC67306	239.20	TC67407	262.30
	3/4	.015	2-1/2	5	TC67342	311.30	TC67443	336.25
	3/4	.030	1	3	TC67271	216.95	TC67372	238.55
	3/4	.030	1-3/4	4	TC67307	239.20	TC67408	262.30
	3/4	.030	2-1/2	5	TC67343	311.30	TC67444	336.25
	3/4	.040	1	3	TC67272	216.95	TC67373	238.55
	3/4	.040	1-3/4	4	TC67308	239.20	TC67409	262.30
	3/4	.040	2-1/2	5	TC67344	311.30	TC67445	336.25
	3/4	.060	1	3	TC67273	216.95	TC67374	238.55
	3/4	.060	1-3/4	4	TC67309	239.20	TC67410	262.30
	3/4	.060	2-1/2	5	TC67345	311.30	TC67446	336.25
	3/4	.125	1	3	TC67274	216.95	TC67375	238.55
	3/4	.125	1-3/4	4	TC67310	239.20	TC67411	262.30
	3/4	.125	2-1/2	5	TC67346	311.30	TC67447	336.25
1	1	.030	1-1/4	3-1/2	TC67275	361.75	TC67376	395.15
	1	.030	1-3/4	4	TC67311	393.85	TC67412	427.30
	1	.030	2-1/4	5	TC67347	487.65	TC67448	523.55
	1	.040	1-1/4	3-1/2	TC67276	361.75	TC67377	395.15
	1	.040	1-3/4	4	TC67312	393.85	TC67413	427.30
	1	.040	2-1/4	5	TC67348	487.65	TC67449	523.55
	1	.060	1-1/4	3-1/2	TC67277	361.75	TC67378	395.15
	1	.060	1-3/4	4	TC67313	393.85	TC67414	427.30
	1	.060	2-1/4	5	TC67349	487.65	TC67450	523.55
	1	.125	1-1/4	3-1/2	TC67278	361.75	TC67379	395.15
	1	.125	1-3/4	4	TC67314	393.85	TC67415	427.30
	1	.125	2-1/4	5	TC67350	487.65	TC67451	523.55

End Mills

Roughers

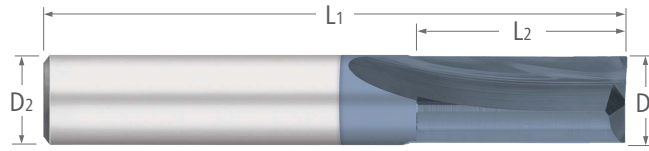
For Aluminum

Carbide

Cobalt

GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Square - Straight Flute



- Straight flute design for cutting high Rc materials
- Offered in regular length styles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

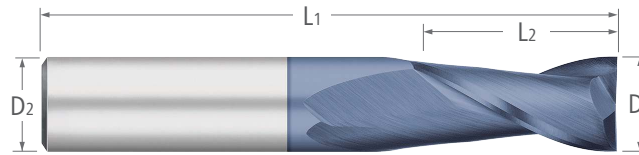
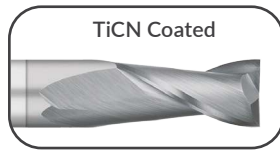
CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.000}_{-.002}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	1-1/2	TC30700	10.85	TC30710	15.90
3/16	3/16	5/8	2	TC30701	14.85	TC30711	20.55
1/4	1/4	3/4	2-1/2	TC30702	18.15	TC30712	25.45
5/16	5/16	13/16	2-1/2	TC30703	23.90	TC30713	32.55
3/8	3/8	1	2-1/2	TC30704	28.35	TC30714	38.65
7/16	7/16	1	2-3/4	TC30705	43.45	TC30715	55.55
1/2	1/2	1-1/4	3	TC30706	52.55	TC30716	66.55
$D_1^{+.000}_{-.003}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	1-1/4	3-1/2	TC30707	100.35	TC30717	117.70
3/4	3/4	1-1/2	4	TC30708	140.25	TC30718	161.05
1	1	1-1/2	4	TC30709	236.15	TC30719	266.15

**Explore Solutions to Common Milling Issues with
Milling Trouble Shooting Guide**

titancuttingtools.com/resources

GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Square - 30° Helix



- Offered in stub, regular, long, and extra long length styles
- TiCN coating adds enhanced performance when AlTiN cannot be used

- AlTiN coating offers increased wear and heat resistance
- Solid carbide

- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiCN COATED		AlTiN COATED	
$D_1^{+.0001}_{-.001}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/64	1/8	.023	1-1/2	TC10201	18.45			TC11201	23.55
	1/8	1/32	1-1/2	TC10001	19.50	TC90001	23.60	TC10101	24.50
	1/8	.045	1-1/2	TC10033	20.55			TC10133	25.55
1/32	1/8	1/16	1-1/2	TC10202	11.40	TC91272	15.40	TC11202	15.40
	1/8	1/8	1-1/2	TC10002	13.05	TC90002	17.05	TC10102	18.05
	1/8	3/16	1-1/2	TC10034	13.90			TC10134	18.95
3/64	1/8	3/32	1-1/2	TC10203	11.40	TC91273	15.40	TC11203	15.05
	1/8	1/8	1-1/2	TC10003	11.10	TC90003	15.15	TC10103	15.65
1/16	1/8	1/8	1-1/2	TC10204	8.65	TC91274	12.65	TC11204	11.55
	1/8	1/4	1-1/2	TC10004	11.15	TC90004	13.25	TC10104	13.25
	1/8	3/8	1-1/2	TC10211	12.45			TC11209	17.50
5/64	1/8	1/8	1-1/2	TC10205	14.50	TC91275	18.55	TC11205	18.75
	1/8	1/4	1-1/2	TC10005	11.55	TC90005	15.55	TC10105	16.10
3/32	1/8	3/16	1-1/2	TC10206	8.65	TC91276	12.65	TC11206	11.55
	1/8	3/8	1-1/2	TC10006	10.25	TC90006	13.25	TC10106	13.25
	1/8	9/16	1-1/2	TC10035	11.20			TC10135	16.25
	1/8	3/4	1-1/2	TC10037	12.25			TC10137	17.30
7/64	1/8	3/8	1-1/2	TC10007	10.60	TC90007	14.70	TC10107	14.75

$D_1^{+.0001}_{-.002}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC10208	8.30	TC91278	11.10	TC11208	11.10
	1/8	3/8	1-1/2	TC10038	8.95			TC10138	13.95
	1/8	1/2	1-1/2	TC10008	9.60	TC90008	12.30	TC10108	12.30
	1/8	5/8	2	TC10039	13.80			TC10139	18.85
	1/8	3/4	2-1/4	TC15008	15.65	TC95008	19.95	TC15108	21.05
	1/8	1	3	TC17008	17.60	TC97008	21.90	TC17108	22.95
9/64	3/16	9/16	2	TC10009	14.05	TC90009	18.60	TC10109	19.75
5/32	3/16	5/16	2	TC10210	13.50	TC91280	18.05	TC11210	17.35
	3/16	9/16	2	TC10010	14.40	TC90010	17.15	TC10110	17.15
11/64	3/16	5/8	2	TC10011	13.65	TC90011	18.15	TC10111	19.05
3/16	3/16	3/8	2	TC10212	12.70	TC91282	16.45	TC11212	16.10
	3/16	5/8	2	TC10012	13.30	TC90012	17.15	TC10112	17.25
	3/16	3/4	2-1/2	TC15012	19.75	TC95012	24.60	TC15112	24.60
	3/16	1-1/8	3	TC17012	19.10	TC97012	23.95	TC17112	25.20
13/64	1/4	5/8	2-1/2	TC10013	19.35	TC90013	25.15	TC10113	26.30
7/32	1/4	7/16	2	TC10214	17.10	TC91284	22.55	TC11214	21.20
	1/4	5/8	2-1/2	TC10014	19.70	TC90014	23.85	TC10114	23.85

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Square - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiCN COATED		AlTiN COATED	
D ₁ ^{+0.000"} -0.002"	D ₂ (h6)	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
15/64	1/4	3/4	2-1/2	TC10015	22.30	TC90015	28.10	TC10115	29.60
1/4	1/4	1/2	2	TC10216	15.00	TC91286	19.30	TC11216	19.30
	1/4	3/4	2-1/2	TC10016	16.25	TC90016	22.05	TC10116	23.55
	1/4	1	4	TC15017	27.70	TC95017	33.90	TC15117	35.50
	1/4	1-1/8	3	TC15016	26.35	TC95016	32.05	TC15116	33.55
	1/4	1-1/2	4	TC17016	28.65	TC97016	34.80	TC17116	36.40
	1/4	1-1/2	6	TC17017	36.55	TC97017	43.75	TC17117	45.60
	1/4	2	4	TC17018	31.05			TC17118	38.80
17/64	5/16	3/4	2-1/2	TC10017	29.35	TC90017	27.07	TC10117	38.00
9/32	5/16	3/4	2-1/2	TC10018	29.35	TC90018	36.25	TC10118	38.00
19/64	5/16	13/16	2-1/2	TC10019	29.35	TC90019	36.25	TC10119	38.00
5/16	5/16	1/2	2	TC10220	20.15			TC11220	27.40
	5/16	13/16	2-1/2	TC10020	21.30	TC90020	28.25	TC10120	28.40
	5/16	1-1/8	3	TC15020	29.90	TC95020	36.85	TC15120	38.60
	5/16	1-5/8	4	TC17020	36.65	TC97020	44.10	TC17120	46.00
21/64	3/8	1	2-1/2	TC10021	33.10	TC90021	41.35	TC10121	43.45
11/32	3/8	1	2-1/2	TC10022	33.10	TC90022	30.97	TC10122	43.45
23/64	3/8	1	2-1/2	TC10023	33.10	TC90023	41.35	TC10123	43.45
3/8	3/8	5/8	2	TC10224	26.35	TC91290	33.70	TC11224	33.70
	3/8	1	2-1/2	TC10024	25.35	TC90024	32.55	TC10124	32.55
	3/8	1	4	TC15025	39.95	TC95025	48.75	TC15125	51.00
	3/8	1-1/8	3	TC15024	34.25	TC95024	42.45	TC15124	44.60
	3/8	1-1/2	6	TC17025	63.30	TC97025	73.75	TC17125	76.30
	3/8	1-3/4	4	TC17024	41.85	TC97024	50.70	TC17124	52.90
25/64	7/16	1	2-3/4	TC10025	43.35	TC90025	53.00	TC10125	55.40
13/32	7/16	1	2-3/4	TC10026	43.35	TC90026	53.00	TC10126	55.40
27/64	7/16	1	2-3/4	TC10027	44.65	TC90027	40.67	TC10127	56.75
7/16	7/16	5/8	2-1/2	TC10228	32.75	TC91292	42.40	TC11228	42.10
	7/16	1	2-3/4	TC10028	38.85	TC90028	48.50	TC10128	49.75
	7/16	2	4	TC15028	54.00	TC95028	64.25	TC15128	66.80
	7/16	3	6	TC17028	85.35	TC97028	72.97	TC17128	77.77
29/64	1/2	1	3	TC10029	64.35			TC10129	58.67
15/32	1/2	1	3	TC10030	64.35	TC90030	56.67	TC10130	78.40
31/64	1/2	1	3	TC10031	48.17	TC90031	56.67	TC10131	58.67
1/2	1/2	5/8	2-1/2	TC10232	38.90	TC91294	50.10	TC11232	52.95
	1/2	1	3	TC10032	44.00	TC90032	55.20	TC10132	60.65
	1/2	1	4	TC15032	56.45	TC95032	68.50	TC15132	71.55
	1/2	1-1/2	6	TC17032	90.20	TC97032	104.20	TC17132	107.75
	1/2	2	4	TC15033	59.75	TC95033	71.80	TC15133	74.85
	1/2	3	6	TC17033	95.10	TC97033	88.47	TC17133	112.65

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GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Square - 30° Helix (Cont.)

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CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiCN COATED		AlTiN COATED	
D1 ^{+0.000"} _{-0.003"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
9/16	9/16	1-1/4	3-1/2	TC10036	82.80	TC90036	76.47	TC10136	100.25
5/8	5/8	3/4	3	TC10240	82.35			TC11240	98.70
	5/8	1-1/4	3-1/2	TC10040	84.20	TC90040	81.17	TC10140	101.65
	5/8	2-1/4	5	TC15040	129.25	TC95040	144.25	TC15140	148.05
	5/8	3	6	TC17040	139.45	TC97040	123.47	TC17140	159.70
3/4	3/4	1	3	TC10248	114.80			TC11248	134.20
	3/4	1-1/2	4	TC10048	117.65	TC90048	134.25	TC10148	138.45
	3/4	2-1/4	5	TC15048	178.55	TC95048	174.97	TC15148	200.85
	3/4	3	6	TC17048	208.30	TC97048	193.47	TC17148	232.40
7/8	7/8	1-1/2	4	TC10056	216.35	TC90056	236.35	TC10156	241.40
	7/8	2-1/4	5	TC15056	269.87				
	7/8	3	6	TC17056	295.77			TC17156	317.57
1	1	1-1/4	3-1/2	TC10264	190.00	TC91299	214.05	TC11264	219.95
	1	1-1/2	4	TC10064	198.10	TC90064	192.67	TC10164	228.15
	1	2-1/4	5	TC15064	244.45	TC95064	214.37	TC15164	276.80
	1	3	6	TC17064	351.90	TC97064	301.67	TC17164	306.97

End Mills

Roughers

For Aluminum

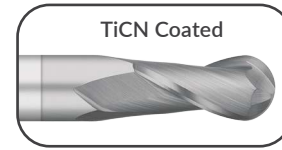
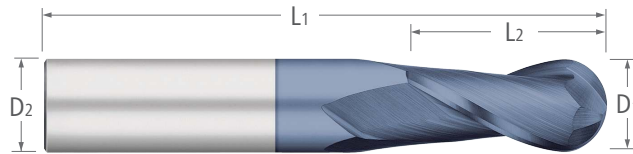
Carbide

Cobalt

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Ball - 30° Helix



- Offered in stub, regular, long, and extra long length styles
- TiCN coating adds enhanced performance when AlTiN cannot be used
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiCN COATED		AlTiN COATED	
$D_1^{+.000}_{-.001}''$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/64	1/8	.023	1-1/2	TC10301	23.20			TC11301	28.25
	1/8	1/32	1-1/2	TC11001	21.90	TC91001	25.90	TC11101	26.90
1/32	1/8	1/16	1-1/2	TC10302	14.85	TC91302	18.90	TC11302	19.85
	1/8	1/8	1-1/2	TC11002	13.95	TC91002	18.05	TC11102	19.00
3/64	1/8	3/32	1-1/2	TC10303	14.85			TC11303	19.85
	1/8	1/8	1-1/2	TC11003	13.95	TC91003	18.05	TC11103	19.00
1/16	1/8	1/8	1-1/2	TC10304	11.10	TC91304	14.85	TC11304	14.85
	1/8	3/16	1-1/2	TC10307	12.10			TC11307	17.10
	1/8	1/4	1-1/2	TC11004	13.05	TC91004	17.05	TC11104	18.05
	1/8	3/8	1-1/2	TC11033	13.90			TC11133	18.95
5/64	1/8	1/8	1-1/2	TC10305	17.95	TC91305	22.05	TC11305	23.00
	1/8	1/4	1-1/2	TC11005	13.05	TC91005	12.77	TC11105	18.05
3/32	1/8	3/16	1-1/2	TC10306	11.10	TC91306	15.15	TC11306	14.85
	1/8	3/8	1-1/2	TC11006	13.65	TC91006	17.70	TC11106	18.65
7/64	1/8	3/8	1-1/2	TC11007	13.65			TC11107	18.65

$D_1^{+.000}_{-.002}''$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC10308	10.55	TC91308	14.05	TC11308	14.00
	1/8	3/8	1-1/2	TC10309	11.60			TC11309	16.60
	1/8	1/2	1-1/2	TC11008	12.55	TC91008	16.60	TC11108	17.60
	1/8	3/4	2-1/4	TC16008	18.55	TC96008	22.80	TC16108	23.90
	1/8	1	3	TC18008	21.00	TC98008	25.30	TC18108	26.40
9/64	3/16	9/16	2	TC11009	18.15	TC91009	16.87	TC11109	23.80
5/32	3/16	5/16	2	TC10310	17.60			TC11310	23.20
5/32	3/16	9/16	2	TC11010	18.15	TC91010	22.65	TC11110	23.80
11/64	3/16	5/8	2	TC11011	18.15			TC11111	23.80
3/16	3/16	3/8	2	TC10312	16.55	TC91312	21.05	TC11312	21.95
	3/16	5/8	2	TC11012	16.35	TC91012	20.85	TC11112	22.00
	3/16	3/4	2-1/2	TC16012	21.50	TC96012	19.57	TC16112	27.55
	3/16	1-1/8	3	TC18012	25.05	TC98012	29.90	TC18112	30.60
13/64	1/4	5/8	2-1/2	TC11013	23.85	TC91013	22.17	TC11113	31.10
7/32	1/4	7/16	2	TC10314	22.30	TC91314	27.70	TC11314	29.10
	1/4	5/8	2-1/2	TC11014	23.85	TC91014	22.17	TC11114	31.10
15/64	1/4	3/4	2-1/2	TC11015	23.85			TC11115	31.10
1/4	1/4	1/2	2	TC10316	21.20	TC91316	26.65	TC11316	27.55
	1/4	3/4	2-1/2	TC11016	23.20	TC91016	28.95	TC11116	29.80
	1/4	1	4	TC16017	33.20	TC96017	39.35	TC16117	40.95
	1/4	1-1/8	3	TC16016	30.10	TC96016	35.90	TC16116	37.40
	1/4	1-1/2	4	TC18016	36.60	TC98016	42.85	TC18116	42.45
	1/4	1-1/2	6	TC18017	43.25	TC98017	50.45	TC18117	52.30

For technical information, see page 115

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GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Ball - 30° Helix (Cont.)

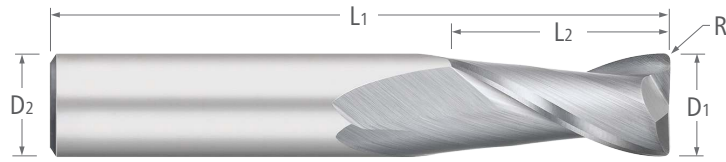
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CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiCN COATED		AlTiN COATED	
D ₁ ^{+0.000} _{-0.002} "	D ₂ (h6)	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
17/64	5/16	3/4	2-1/2	TC11017	22.47	TC91017	27.67	TC11117	38.80
9/32	5/16	3/4	2-1/2	TC11018	30.15	TC91018	27.77	TC11118	38.85
19/64	5/16	13/16	2-1/2	TC11019	24.47	TC91019	29.77	TC11119	41.45
5/16	5/16	1/2	2	TC10320	26.35	TC91320	32.90	TC11320	34.45
	5/16	13/16	2-1/2	TC11020	27.80	TC91020	34.70	TC11120	36.45
	5/16	1-1/8	3	TC16020	35.40	TC96020	34.17	TC16120	44.05
	5/16	1-5/8	4	TC18020	44.20	TC98020	38.67	TC18120	53.55
21/64	3/8	1	2-1/2	TC11021	38.00	TC91021	34.57	TC11121	48.40
11/32	3/8	1	2-1/2	TC11022	40.00	TC91022	48.20	TC11122	37.67
23/64	3/8	1	2-1/2	TC11023	28.37			TC11123	36.27
3/8	3/8	5/8	2	TC10324	34.05	TC91324	41.80	TC11324	43.05
	3/8	1	2-1/2	TC11024	29.90	TC91024	38.10	TC11124	40.25
	3/8	1	4	TC16025	50.05	TC96025	58.95	TC16125	61.20
	3/8	1-1/8	3	TC16024	41.10	TC96024	39.27	TC16124	51.45
	3/8	1-1/2	6	TC18025	67.45			TC18125	80.45
	3/8	1-3/4	4	TC18024	47.65	TC98024	56.50	TC18124	58.70
25/64	7/16	1	2-3/4	TC11025	51.70			TC11125	47.77
13/32	7/16	1	2-3/4	TC11026	51.95			TC11126	64.00
27/64	7/16	1	2-3/4	TC11027	38.77	TC91027	61.30	TC11127	47.77
7/16	7/16	5/8	2-1/2	TC10328	42.60			TC11328	39.07
	7/16	1	2-3/4	TC11028	43.95	TC91028	40.07	TC11128	55.95
	7/16	2	4	TC16028	68.45			TC16128	81.25
	7/16	3	6	TC18028	100.75				
29/64	1/2	1	3	TC11029	50.97			TC11129	61.47
15/32	1/2	1	3	TC11030	50.97				
31/64	1/2	1	3	TC11031	50.97			TC11131	61.47
1/2	1/2	5/8	2-1/2	TC10332	50.15	TC91332	61.40	TC11332	64.25
	1/2	1	3	TC11032	56.95	TC91032	68.10	TC11132	71.00
	1/2	1	4	TC16032	65.85	TC96032	77.90	TC16132	80.95
	1/2	1-1/2	6	TC18032	100.90	TC98032	114.95	TC18132	118.50
	1/2	2	4	TC16033	66.50	TC96033	78.55	TC16133	81.60
	1/2	3	6	TC18033	101.50	TC98033	93.97	TC18133	119.00
D ₁ ^{+0.000} _{-0.003} "	D ₂ (h6)	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
9/16	9/16	1-1/4	3-1/2	TC11036	86.80	TC91036	79.67	TC11136	104.20
5/8	5/8	3/4	3	TC10340	96.10			TC11340	88.77
	5/8	1-1/4	3-1/2	TC11040	91.65	TC91040	83.57	TC11140	109.10
	5/8	2-1/4	5	TC16040	152.35	TC96040	132.77	TC16140	171.15
	5/8	3	6	TC18040	159.25			TC18140	179.55
3/4	3/4	1	3	TC10348	146.70			TC11348	131.57
	3/4	1-1/2	4	TC11048	135.05	TC91048	120.17	TC11148	155.85
	3/4	2-1/4	5	TC16048	211.20			TC16148	185.07
	3/4	3	6	TC18048	225.95	TC98048	194.77	TC18148	198.27
7/8	7/8	1-1/2	4	TC11056	261.50	TC91056	223.47	TC11156	227.27
	7/8	2-1/4	5	TC16056	289.47			TC16156	309.67
	7/8	3	6	TC18056	318.97				
1	1	1-1/4	3-1/2	TC10364	226.25	TC91364	250.25	TC11364	256.25
	1	1-1/2	4	TC11064	241.10	TC91064	265.15	TC11164	214.77
	1	2-1/4	5	TC16064	333.37				
	1	3	6	TC18064	321.57				

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Corner Radius - 30° Helix



- Offered in stub, regular, and long length styles
- Corner radius for increased edge strength
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED	
D1 ^{+0.000"} -0.002"	D2 (h6)	R ^{+0.001"} -0.001"	L2	L1	TOOL #	USD\$
1/8	1/8	.005	1/4	1-1/2	TC71950	10.55
	1/8	.005	1/2	1-1/2	TC71951	14.50
	1/8	.010	1/4	1-1/2	TC71952	10.55
	1/8	.010	1/2	1-1/2	TC71953	14.50
	1/8	.015	1/4	1-1/2	TC71954	10.55
	1/8	.015	1/2	1-1/2	TC72003	14.50
	1/8	.020	1/4	1-1/2	TC71955	10.55
	1/8	.020	1/2	1-1/2	TC72005	14.50
	1/8	.030	1/4	1-1/2	TC71956	10.55
	1/8	.030	1/2	1-1/2	TC72007	14.50
3/16	3/16	.005	3/8	2	TC71957	16.55
	3/16	.005	5/8	2	TC71958	15.85
	3/16	.010	3/8	2	TC71959	16.55
	3/16	.010	5/8	2	TC71960	15.85
	3/16	.015	3/8	2	TC71961	16.55
	3/16	.015	5/8	2	TC72009	15.85
	3/16	.020	3/8	2	TC71962	16.55
	3/16	.020	5/8	2	TC72011	15.85
	3/16	.030	3/8	2	TC71963	16.55
	3/16	.030	5/8	2	TC72013	15.85
1/4	1/4	.005	1/2	2	TC71964	21.15
	1/4	.005	3/4	2-1/2	TC71965	21.70
	1/4	.005	1-1/2	4	TC71966	34.20
	1/4	.010	1/2	2	TC71967	21.15
	1/4	.010	3/4	2-1/2	TC71968	21.70
	1/4	.010	1-1/2	4	TC71969	34.20
	1/4	.015	1/2	2	TC71970	21.15
	1/4	.015	3/4	2-1/2	TC72015	21.70
	1/4	.015	1-1/2	4	TC71971	34.20
	1/4	.020	1/2	2	TC71972	21.15
	1/4	.020	3/4	2-1/2	TC72017	21.70
	1/4	.020	1-1/2	4	TC71973	34.20
	1/4	.030	1/2	2	TC71974	21.15
	1/4	.030	3/4	2-1/2	TC72019	21.70
	1/4	.030	1-1/2	4	TC71975	34.20
	1/4	.060	1/2	2	TC71976	21.15
	1/4	.060	3/4	2-1/2	TC72023	21.70
	1/4	.060	1-1/2	4	TC71977	34.20

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GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Corner Radius - 30° Helix (Cont.)

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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED	
$D_1^{+.000"}_{-.002"}$	$D_2 (h6)$	$R^{+.001"}_{-.001"}$	L_2	L_1	TOOL #	USD\$
5/16	5/16	.030	13/16	2-1/2	TC72029	33.35
	5/16	.060	13/16	2-1/2	TC72033	33.35
3/8	3/8	.015	5/8	2	TC71978	34.05
	3/8	.015	1	2-1/2	TC72035	39.60
	3/8	.015	1-3/4	4	TC71979	51.10
	3/8	.030	5/8	2	TC71980	34.05
	3/8	.030	1	2-1/2	TC72039	39.60
	3/8	.030	1-3/4	4	TC71981	51.10
	3/8	.060	5/8	2	TC71982	34.05
	3/8	.060	1	2-1/2	TC72043	39.60
	3/8	.060	1-3/4	4	TC71983	51.10
	3/8	.125	5/8	2	TC71984	34.05
	3/8	.125	1	2-1/2	TC71985	39.60
	3/8	.125	1-3/4	4	TC71986	51.10
1/2	1/2	.015	1	3	TC72045	63.70
	1/2	.015	2	4	TC71987	80.20
	1/2	.030	1	3	TC72049	63.70
	1/2	.030	2	4	TC71988	80.20
	1/2	.060	1	3	TC72053	63.70
	1/2	.060	2	4	TC71989	80.20
	1/2	.125	1	3	TC72057	63.70
	1/2	.125	2	4	TC71990	80.20
$D_1^{+.000"}_{-.003"}$	$D_2 (h6)$	$R^{+.001"}_{-.001"}$	L_2	L_1	TOOL #	USD\$
5/8	5/8	.060	1-1/4	3-1/2	TC72067	98.75
	5/8	.125	1-1/4	3-1/2	TC71991	98.75
3/4	3/4	.030	1-1/2	4	TC72075	146.15
	3/4	.060	1-1/2	4	TC72079	146.15
	3/4	.125	1-1/2	4	TC72083	146.15
1	1	.030	1-1/2	4	TC72089	276.75
	1	.060	1-1/2	4	TC72093	276.75
	1	.125	1-1/2	4	TC72097	276.75

End Mills

Roughers

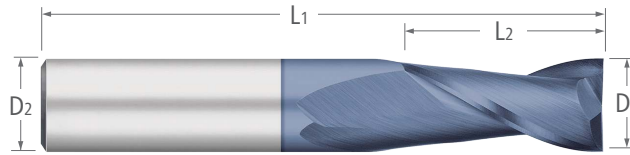
For Aluminum

Carbide

Cobalt

GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Square - 30° Helix - NC Tolerance



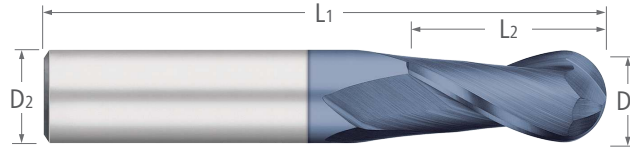
- Excellent for keyways
- Tight tolerance for precision machining
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D1^{+0.001}_{-0.000}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/16	1/8	3/16	1-1/2	TC65000	15.30	TC65020	20.35
3/32	1/8	3/8	1-1/2	TC65001	16.30	TC65021	21.30
1/8	1/8	1/2	1-1/2	TC65002	19.20	TC65022	24.25
5/32	3/16	9/16	2	TC65003	23.45	TC65023	29.10
3/16	3/16	5/8	2	TC65004	27.55	TC65024	33.20
7/32	1/4	5/8	2-1/2	TC65005	34.10	TC65025	41.35
1/4	1/4	3/4	2-1/2	TC65006	38.80	TC65026	46.05
9/32	5/16	3/4	2-1/2	TC65007	42.25	TC65027	50.95
5/16	5/16	13/16	2-1/2	TC65008	45.95	TC65028	54.55
3/8	3/8	1	2-1/2	TC65009	47.90	TC65029	58.30
7/16	7/16	1	2-3/4	TC65010	62.20	TC65030	74.30
1/2	1/2	1	3	TC65011	77.05	TC65031	91.10
5/8	5/8	1-1/4	3-1/2	TC65012	161.50	TC65032	178.90
3/4	3/4	1-1/2	4	TC65013	233.75	TC65033	254.45
1	1	1-1/2	4	TC65014	382.35	TC65034	412.40

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

2 Flute - Ball - 30° Helix - NC Tolerance



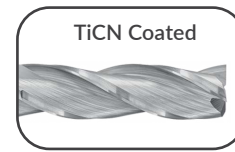
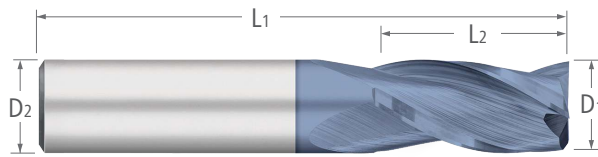
- Excellent for keyways
- Tight tolerance for precision machining
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D1^{+0.001''}_{-0.000''}$	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/16	1/8	3/16	1-1/2	TC65080	18.35	TC65100	23.35
3/32	1/8	3/8	1-1/2	TC65081	19.60	TC65101	24.60
1/8	1/8	1/2	1-1/2	TC65082	23.10	TC65102	28.15
5/32	3/16	9/16	2	TC65083	28.05	TC65103	33.70
3/16	3/16	5/8	2	TC65084	33.00	TC65104	38.65
7/32	1/4	5/8	2-1/2	TC65085	40.85	TC65105	48.10
1/4	1/4	3/4	2-1/2	TC65086	46.50	TC65106	53.75
9/32	5/16	3/4	2-1/2	TC65087	50.80	TC65107	59.50
5/16	5/16	13/16	2-1/2	TC65088	55.10	TC65108	63.70
3/8	3/8	1	2-1/2	TC65089	57.45	TC65109	67.80
7/16	7/16	1	2-3/4	TC65090	74.80	TC65110	86.80
1/2	1/2	1	3	TC65091	92.50	TC65111	106.50
5/8	5/8	1-1/4	3-1/2	TC65092	193.65	TC65112	211.10
3/4	3/4	1-1/2	4	TC65093	280.40	TC65113	301.20
1	1	1-1/2	4	TC65094	458.95	TC65114	488.95

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Square - 30° Helix



- Offered in stub, regular, long, and extra long length styles
- TiCN coating adds enhanced performance when AlTiN cannot be used
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiCN COATED		AlTiN COATED	
D1 ^{+0.000"} _{-0.001"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/64	1/8	.023	1-1/2			TC91101	22.55	TC11401	23.55
	1/8	1/32	1-1/2	TC10801	19.50	TC90801	23.60		
1/32	1/8	1/16	1-1/2	TC10402	11.40	TC91102	15.40	TC11402	15.40
	1/8	1/8	1-1/2	TC10802	13.05	TC90802	17.05	TC99802	18.05
3/64	1/8	3/32	1-1/2	TC10403	11.40	TC91103	15.40	TC11403	16.40
	1/8	1/8	1-1/2	TC10803	11.10	TC90803	15.15	TC99803	16.15
1/16	1/8	1/8	1-1/2	TC10404	8.65	TC91104	12.65	TC11404	11.55
	1/8	1/4	1-1/2	TC10804	11.15	TC90804	13.25	TC99804	13.25
5/64	1/8	1/8	1-1/2	TC10405	14.50	TC91105	18.55	TC11405	19.50
	1/8	1/4	1-1/2	TC10805	11.55	TC90805	15.55	TC99805	16.55
3/32	1/8	3/16	1-1/2	TC10406	8.65	TC91106	12.65	TC11406	13.65
	1/8	3/8	1-1/2	TC10806	10.25	TC90806	14.30	TC99806	13.25
7/64	1/8	3/8	1-1/2	TC10807	10.60	TC90807	14.70	TC99807	15.60

D1 ^{+0.000"} _{-0.002"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC10408	8.30	TC91108	11.10	TC11408	11.10
	1/8	1/2	1-1/2	TC10808	9.60	TC90808	12.30	TC99808	12.30
	1/8	3/4	2-1/4	TC15308	15.65	TC95308	19.95	TC15408	21.05
	1/8	1	3	TC17308	17.60	TC97408	21.90	TC17408	22.95
9/64	3/16	9/16	2	TC10809	14.05	TC90809	18.60	TC99809	19.75
5/32	3/16	5/16	2	TC10410	13.50	TC91110	18.05	TC11410	17.35
	3/16	9/16	2	TC10810	14.40	TC90810	17.15	TC99810	17.15
11/64	3/16	5/8	2	TC10811	13.65			TC99811	19.30
3/16	3/16	3/8	2	TC10412	12.70	TC91112	17.20	TC11412	16.45
	3/16	5/8	2	TC10812	13.30	TC90812	17.80	TC99812	17.15
	3/16	3/4	2-1/2	TC15312	19.75	TC95312	24.60	TC15412	24.60
	3/16	1-1/8	3	TC17312	19.10	TC97412	23.95	TC17412	25.20
13/64	1/4	5/8	2-1/2	TC10813	19.35	TC90813	25.15	TC99813	26.60
7/32	1/4	7/16	2	TC10414	17.10	TC91114	22.55	TC11414	23.90
	1/4	5/8	2-1/2	TC10814	19.70	TC90814	25.45	TC99814	26.95
15/64	1/4	3/4	2-1/2	TC10815	22.30			TC99815	29.60
1/4	1/4	1/2	2	TC10416	15.00	TC91116	19.30	TC11416	19.30
	1/4	3/4	2-1/2	TC10816	16.25	TC90816	22.05	TC99816	23.55
	1/4	1	4	TC15317	27.70	TC95317	33.90	TC15417	35.50
	1/4	1-1/8	3	TC15316	26.35	TC95316	32.05	TC15416	33.55
	1/4	1-1/2	4	TC17316	27.00	TC97416	33.15	TC17416	34.75
	1/4	1-1/2	6	TC17317	36.55	TC97417	43.75	TC17417	45.60
17/64	5/16	3/4	2-1/2	TC10817	29.35	TC90817	36.25	TC99817	38.00
9/32	5/16	3/4	2-1/2	TC10818	29.35	TC90818	36.25	TC99818	38.00
19/64	5/16	13/16	2-1/2	TC10819	29.35			TC99819	38.00

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Square - 30° Helix (Cont.)

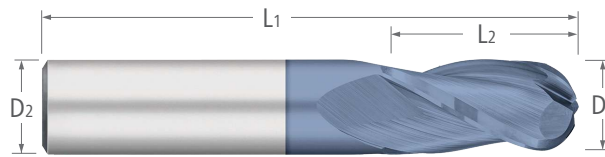
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CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiCN COATED		AlTiN COATED	
D1 ^{+0.000"} -0.002"	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
5/16	5/16	1/2	2	TC10420	20.15	TC91120	26.80	TC11420	28.35
	5/16	13/16	2-1/2	TC10820	21.30	TC90820	28.25	TC99820	28.40
	5/16	1-1/8	3	TC15320	29.90	TC95320	36.85	TC15420	38.60
	5/16	1-5/8	4	TC17320	36.65	TC97420	44.10	TC17420	46.00
21/64	3/8	1	2-1/2	TC10821	33.10	TC90821	41.35		
11/32	3/8	1	2-1/2	TC10822	33.10	TC90822	41.35	TC99822	43.45
23/64	3/8	1	2-1/2	TC10823	33.10				
3/8	3/8	5/8	2	TC10424	26.35	TC91124	34.10	TC11424	32.20
	3/8	1	2-1/2	TC10824	25.35	TC90824	32.55	TC99824	32.55
	3/8	1	4	TC15325	39.95	TC95325	48.75	TC15425	51.00
	3/8	1-1/8	3	TC15324	34.25	TC95324	42.45	TC15424	44.60
	3/8	1-1/2	6	TC17325	63.30	TC97425	73.75	TC17425	76.30
	3/8	1-3/4	4	TC17324	41.85	TC97424	50.70	TC17424	52.90
25/64	7/16	1	2-3/4	TC10825	43.35	TC90825	53.00	TC99825	55.40
13/32	7/16	1	2-3/4	TC10826	43.35	TC90826	53.00	TC99826	55.40
27/64	7/16	1	2-3/4	TC10827	44.65			TC99827	56.75
7/16	7/16	5/8	2-1/2	TC10428	32.75			TC11428	44.80
	7/16	1	2-3/4	TC10828	38.85	TC90828	48.50	TC99828	50.90
	7/16	2	4	TC15328	54.00	TC95328	64.25	TC15428	66.80
	7/16	3	6	TC17328	85.35	TC97428	97.35	TC17428	100.35
29/64	1/2	1	3	TC10829	64.35			TC99829	78.40
15/32	1/2	1	3	TC10830	64.35	TC90830	75.55		
31/64	1/2	1	3			TC90831	75.55	TC99831	78.40
1/2	1/2	5/8	2-1/2	TC10432	38.90	TC91132	50.10	TC11432	52.95
	1/2	1	3	TC10832	44.00	TC90832	55.20	TC99832	58.05
	1/2	1	4	TC15332	56.45	TC95332	68.50	TC15432	71.55
	1/2	1-1/4	3	TC10833	44.00	TC90833	55.20	TC99833	58.05
	1/2	1-1/2	6	TC17332	90.20	TC97432	104.20	TC17432	107.75
	1/2	2	4	TC15333	59.75	TC95333	71.80	TC15433	74.85
	1/2	3	6	TC17333	95.10	TC97433	109.15	TC17433	112.65
D1 ^{+0.000"} -0.003"	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
9/16	9/16	1-1/4	3-1/2	TC10836	82.80	TC90836	96.75	TC99836	100.25
5/8	5/8	3/4	3	TC10440	82.35			TC11440	98.70
	5/8	1-1/4	3-1/2	TC10840	84.20	TC90840	98.20	TC99840	101.65
	5/8	2-1/4	5	TC15340	129.25	TC95340	144.25	TC15440	148.05
	5/8	3	6	TC17340	139.45	TC97440	155.75	TC17440	159.70
3/4	3/4	1	3	TC10448	114.80	TC91148	130.30	TC11448	134.20
	3/4	1-1/2	4	TC10848	117.65	TC90848	134.25	TC99848	138.45
	3/4	2-1/4	5	TC15348	178.55	TC95348	196.40	TC15448	200.85
	3/4	3	6	TC17348	208.30	TC97448	227.60	TC17448	232.40
	3/4	4	7	TC17349	357.50	TC97449	378.50	TC17449	383.75
7/8	7/8	1-1/2	4			TC90856	236.35	TC99856	241.40
	7/8	3	6	TC17356	370.85	TC97456	394.15	TC17456	400.05
1	1	1-1/4	3-1/2			TC91164	214.05	TC11464	219.95
	1	1-1/2	4	TC10864	198.10				
	1	2-1/4	5	TC15364	244.45	TC95364	270.35	TC15464	276.80
	1	3	6	TC17364	351.90			TC17464	386.90
	1	4	7	TC17365	461.30	TC97465	491.65		

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Ball - 30° Helix



- Offered in stub, regular, long, and extra long length styles
- TiCN coating adds enhanced performance when AlTiN cannot be used
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiCN COATED		AlTiN COATED	
D1 ^{+0.000"} _{-0.001"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/64	1/8	0.023	1-1/2			TC92001	27.25	TC12301	28.25
	1/8	1/32	1-1/2	TC12901	21.90	TC92101	25.90	TC13201	26.90
1/32	1/8	1/16	1-1/2	TC12202	14.85			TC12302	19.85
	1/8	1/8	1-1/2	TC12902	13.95	TC92102	18.05	TC13202	19.00
3/64	1/8	3/32	1-1/2	TC12203	14.85	TC92003	18.90	TC12303	19.85
	1/8	1/8	1-1/2	TC12903	13.95	TC92103	18.05	TC13203	19.00
1/16	1/8	1/8	1-1/2	TC12204	11.10	TC92004	15.15	TC12304	14.85
	1/8	1/4	1-1/2	TC12904	13.05	TC92104	17.05	TC13204	18.05
5/64	1/8	1/8	1-1/2	TC12205	17.95			TC12305	23.00
	1/8	1/4	1-1/2	TC12905	13.05	TC92105	17.05	TC13205	18.05
3/32	1/8	3/16	1-1/2	TC12206	11.10	TC92006	15.15	TC12306	16.15
	1/8	3/8	1-1/2	TC12906	13.65	TC92106	17.70	TC13206	18.65
7/64	1/8	3/8	1-1/2	TC12907	13.65			TC13207	18.65

D1 ^{+0.000"} _{-0.002"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC12208	10.55	TC92008	14.60	TC12308	14.05
	1/8	1/2	1-1/2	TC12908	12.55	TC92108	16.60	TC13208	17.60
	1/8	3/4	2-1/4	TC16208	18.55	TC92408	22.80	TC16308	23.90
	1/8	1	3	TC18308	21.00	TC99108	25.30	TC18408	26.40
9/64	3/16	9/16	2	TC12909	18.15	TC92109	22.65	TC13209	23.80
5/32	3/16	5/16	2	TC12210	17.60	TC92010	22.10	TC12310	23.20
5/32	3/16	9/16	2	TC12910	18.15	TC92110	22.65	TC13210	23.80
11/64	3/16	5/8	2	TC12911	18.15	TC92111	22.65	TC13211	23.80
3/16	3/16	3/8	2	TC12212	16.55	TC92012	21.05	TC12312	21.95
	3/16	5/8	2	TC12912	16.35	TC92112	20.85	TC13212	22.00
	3/16	3/4	2-1/2	TC16212	21.50	TC92412	26.40	TC16312	27.55
	3/16	1-1/8	3	TC18312	25.05	TC99112	29.90	TC18412	30.60
13/64	1/4	5/8	2-1/2	TC12913	23.85				
7/32	1/4	5/8	2-1/2	TC12914	23.85			TC13214	31.10
15/64	1/4	3/4	2-1/2	TC12915	23.85	TC92115	29.65	TC13215	31.10
1/4	1/4	1/2	2	TC12216	21.20	TC92016	26.65	TC12316	28.05
	1/4	3/4	2-1/2	TC12916	22.30	TC92116	28.10	TC13216	29.60
	1/4	1	4	TC16217	33.20	TC92417	39.35	TC16317	40.95
	1/4	1-1/8	3	TC16216	30.10	TC92416	35.90	TC16316	37.40
	1/4	1-1/2	4	TC18316	36.60	TC99116	42.85	TC18416	42.45
	1/4	1-1/2	6	TC18317	43.25	TC99117	50.45	TC18417	52.30
17/64	5/16	3/4	2-1/2			TC92117	37.05		
9/32	5/16	3/4	2-1/2	TC12918	30.15	TC92118	37.10	TC13218	38.85
19/64	5/16	13/16	2-1/2			TC92119	39.65	TC13219	41.45

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Ball - 30° Helix (Cont.)

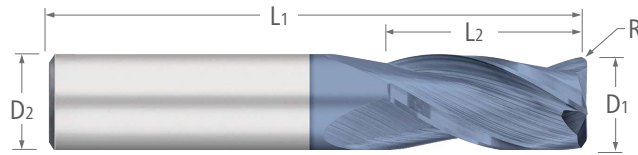
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CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiCN COATED		AlTiN COATED	
D1 ^{+0.000"} _{-0.002"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
5/16	5/16	1/2	2	TC12220	26.35			TC12320	34.45
	5/16	13/16	2-1/2	TC12920	27.80	TC92120	34.70	TC13220	36.45
	5/16	1-1/8	3	TC16220	35.40	TC92420	42.30	TC16320	44.05
	5/16	1-5/8	4	TC18320	44.20	TC99120	51.65	TC18420	53.55
21/64	3/8	1	2-1/2	TC12921	38.00	TC92121	46.30		
11/32	3/8	1	2-1/2			TC92122	48.20	TC13222	50.35
23/64	3/8	1	2-1/2	TC12923	38.00	TC92123	46.30	TC13223	48.40
3/8	3/8	5/8	2	TC12224	34.05			TC12324	43.70
	3/8	1	2-1/2	TC12924	29.90	TC92124	38.10	TC13224	40.25
	3/8	1	4	TC16225	50.05	TC92425	58.95	TC16325	61.20
	3/8	1-1/8	3	TC16224	41.10	TC92424	49.35	TC16324	51.45
	3/8	1-1/2	6	TC18325	67.45	TC99125	77.85	TC18425	80.45
	3/8	1-3/4	4	TC18324	47.65	TC99124	56.50	TC18424	58.70
13/32	7/16	1	2-3/4	TC12926	51.95			TC13226	64.00
27/64	7/16	1	2-3/4	TC12927	51.70			TC13227	63.65
7/16	7/16	5/8	2-1/2	TC12228	42.60			TC12328	54.65
	7/16	1	2-3/4	TC12928	43.95	TC92128	53.60		
	7/16	2	4	TC16228	68.45			TC16328	81.25
	7/16	3	6	TC18328	100.75			TC18428	115.75
1/2	1/2	5/8	2-1/2	TC12232	50.15	TC92032	61.40	TC12332	64.25
	1/2	1	3	TC12932	56.95	TC92132	68.10	TC13232	71.00
	1/2	1	4	TC16232	65.85	TC92432	77.90	TC16332	80.95
	1/2	1-1/2	6	TC18332	100.90	TC99132	114.95	TC18432	118.50
	1/2	2	4	TC16233	66.50	TC92433	78.55	TC16333	81.60
	1/2	3	6	TC18333	101.50	TC99133	115.45	TC18433	119.00
D1 ^{+0.000"} _{-0.003"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
9/16	9/16	1-1/4	3-1/2			TC92136	100.80	TC13236	104.20
5/8	5/8	3/4	3	TC12240	96.10	TC92040	109.15	TC12340	112.45
	5/8	1-1/4	3-1/2	TC12940	91.65	TC92140	105.60	TC13240	109.10
	5/8	2-1/4	5			TC92440	167.35		
	5/8	3	6	TC18340	159.25	TC99140	175.55	TC18440	179.55
3/4	3/4	1	3	TC12248	146.70	TC92048	162.15	TC12348	166.10
	3/4	1-1/2	4	TC12948	135.05	TC92148	151.70	TC13248	155.85
	3/4	2-1/4	5	TC16248	211.20			TC16348	233.50
	3/4	3	6	TC18348	225.95	TC99148	245.25	TC18448	250.10
	3/4	4	7	TC18349	373.90	TC99149	394.05	TC18449	400.10
7/8	7/8	1-1/2	4			TC92156	281.50		
	7/8	3	6	TC18356	399.80			TC18456	429.05
1	1	1-1/4	3-1/2	TC12264	226.25			TC12364	256.25
	1	1-1/2	4	TC12964	241.10	TC92164	265.15		
	1	2-1/4	5	TC16264	417.85			TC16364	450.25
	1	3	6	TC18364	403.05			TC18464	438.10
	1	4	7	TC18365	489.90			TC18465	527.80

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Corner Radius - 30° Helix



- Offered in stub, regular, long, and extra long length styles
- Corner radius for increased edge strength
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0001}_{-.002}$	$D_2 (h6)$	$R^{+.001}_{-.001}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.005	1/4	1-1/2	TC15200	10.55	TC16400	15.55
	1/8	.005	1/2	1-1/2	TC15700	14.50	TC16700	19.50
	1/8	.005	3/4	2-1/4	TC15800	19.75	TC16800	25.15
	1/8	.005	1	3	TC15900	22.35	TC16900	27.70
	1/8	.010	1/4	1-1/2	TC15201	10.55	TC16401	15.55
	1/8	.010	1/2	1-1/2	TC15701	14.50	TC16701	19.50
	1/8	.010	3/4	2-1/4	TC15801	19.75	TC16801	25.15
	1/8	.010	1	3	TC15901	22.35	TC16901	27.70
	1/8	.015	1/4	1-1/2	TC15202	10.55	TC16402	15.55
	1/8	.015	1/2	1-1/2	TC15702	14.50	TC16702	19.50
	1/8	.015	3/4	2-1/4	TC15802	19.75	TC16802	25.15
	1/8	.015	1	3	TC15902	22.35	TC16902	27.70
	1/8	.020	1/4	1-1/2	TC15203	10.55	TC16403	15.55
	1/8	.020	1/2	1-1/2	TC15703	14.50	TC16703	19.50
	1/8	.020	3/4	2-1/4	TC15803	19.75	TC16803	25.15
	1/8	.020	1	3	TC15903	22.35	TC16903	27.70
	1/8	.030	1/4	1-1/2	TC15204	10.55	TC16404	15.55
	1/8	.030	1/2	1-1/2	TC15704	14.50	TC16704	19.50
	1/8	.030	3/4	2-1/4	TC15804	19.75	TC16804	25.15
	1/8	.030	1	3	TC15904	22.35	TC16904	27.70
3/16	3/16	.005	3/8	2	TC15205	16.55	TC16405	22.20
	3/16	.005	5/8	2	TC15705	15.85	TC16705	21.45
	3/16	.005	3/4	2-1/2	TC15805	22.80	TC16805	28.85
	3/16	.005	1-1/8	3	TC15905	24.50	TC16905	30.55
	3/16	.010	3/8	2	TC15206	16.55	TC16406	22.20
	3/16	.010	5/8	2	TC15706	15.85	TC16706	21.45
	3/16	.010	3/4	2-1/2	TC15806	22.80	TC16806	28.85
	3/16	.010	1-1/8	3	TC15906	24.50	TC16906	30.55
	3/16	.015	3/8	2	TC15207	16.55	TC16407	22.20
	3/16	.015	5/8	2	TC15707	15.85	TC16707	21.45
	3/16	.015	3/4	2-1/2	TC15807	22.80	TC16807	28.85
	3/16	.015	1-1/8	3	TC15907	24.50	TC16907	30.55

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GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Corner Radius - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		AlTiN COATED	
D1 ^{+0.001"} _{-.002"}	D2 (h6)	R ^{+0.001"} _{-.001"}	L2	L1	TOOL #	USD\$	TOOL #	USD\$
3/16	3/16	.020	3/8	2	TC15208	16.55	TC16408	22.20
	3/16	.020	5/8	2	TC15708	15.85	TC16708	21.45
	3/16	.020	3/4	2-1/2	TC15808	22.80	TC16808	28.85
	3/16	.020	1-1/8	3	TC15908	24.50	TC16908	30.55
	3/16	.030	3/8	2	TC15209	16.55	TC16409	22.20
	3/16	.030	5/8	2	TC15709	15.85	TC16709	21.45
	3/16	.030	3/4	2-1/2	TC15809	22.80	TC16809	28.85
	3/16	.030	1-1/8	3	TC15909	24.50	TC16909	30.55
1/4	1/4	.005	1/2	2	TC15210	21.15	TC16410	28.00
	1/4	.005	3/4	2-1/2	TC15710	21.70	TC16710	28.95
	1/4	.005	1	4	TC15816	33.50	TC16816	41.35
	1/4	.005	1-1/8	3	TC15810	32.00	TC16810	39.25
	1/4	.005	1-1/2	4	TC15910	34.20	TC16910	41.95
	1/4	.005	1-1/2	6	TC15916	45.90	TC16916	54.95
	1/4	.010	1/2	2	TC15211	21.15	TC16411	28.00
	1/4	.010	3/4	2-1/2	TC15711	21.70	TC16711	28.95
	1/4	.010	1	4	TC15817	33.50	TC16817	41.35
	1/4	.010	1-1/8	3	TC15811	32.00	TC16811	39.25
	1/4	.010	1-1/2	4	TC15911	34.20	TC16911	41.95
	1/4	.010	1-1/2	6	TC15917	45.90	TC16917	54.95
	1/4	.015	1/2	2	TC15212	21.15	TC16412	28.00
	1/4	.015	3/4	2-1/2	TC15712	21.70	TC16712	28.95
	1/4	.015	1	4	TC15818	33.50	TC16818	41.35
	1/4	.015	1-1/8	3	TC15812	32.00	TC16812	39.25
	1/4	.015	1-1/2	4	TC15912	34.20	TC16912	41.95
	1/4	.015	1-1/2	6	TC15918	45.90	TC16918	54.95
	1/4	.020	1/2	2	TC15213	21.15	TC16413	28.00
	1/4	.020	3/4	2-1/2	TC15713	21.70	TC16713	28.95
	1/4	.020	1	4	TC15819	33.50	TC16819	41.35
	1/4	.020	1-1/8	3	TC15813	32.00	TC16813	39.25
	1/4	.020	1-1/2	4	TC15913	34.20	TC16913	41.95
	1/4	.020	1-1/2	6	TC15919	45.90	TC16919	54.95
	1/4	.030	1/2	2	TC15214	21.15	TC16414	28.00
	1/4	.030	3/4	2-1/2	TC15714	21.70	TC16714	28.95
	1/4	.030	1	4	TC15820	33.50	TC16820	41.35
	1/4	.030	1-1/8	3	TC15814	32.00	TC16814	39.25
	1/4	.030	1-1/2	4	TC15914	34.20	TC16914	41.95
	1/4	.030	1-1/2	6	TC15920	45.90	TC16920	54.95
	1/4	.060	1/2	2	TC15215	21.15	TC16415	28.00
	1/4	.060	3/4	2-1/2	TC15715	21.70	TC16715	28.95
	1/4	.060	1	4	TC15821	33.50	TC16821	41.35
	1/4	.060	1-1/8	3	TC15815	32.00	TC16815	39.25
	1/4	.060	1-1/2	4	TC15915	34.20	TC16915	41.95
	1/4	.060	1-1/2	6	TC15921	45.90	TC16921	54.95

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Corner Radius - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		AlTiN COATED	
D1 ^{+0.000"} -0.002"	D2 (h6)	R ^{+0.001"} -0.001"	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/16	5/16	.015	13/16	2-1/2	TC15716	33.35	TC16716	42.05
	5/16	.015	1-1/8	3	TC15822	36.30	TC16822	44.95
	5/16	.020	13/16	2-1/2	TC15717	33.35	TC16717	42.05
	5/16	.020	1-1/8	3	TC15823	36.30	TC16823	44.95
	5/16	.030	13/16	2-1/2	TC15718	33.35	TC16718	42.05
	5/16	.030	1-1/8	3	TC15824	36.30	TC16824	44.95
	5/16	.045	13/16	2-1/2	TC15719	33.35	TC16719	42.05
	5/16	.045	1-1/8	3	TC15825	36.30	TC16825	44.95
	5/16	.060	13/16	2-1/2	TC15720	33.35	TC16720	42.05
	5/16	.060	1-1/8	3	TC15826	36.30	TC16826	44.95
3/8	3/8	.010	5/8	2	TC15216	34.05	TC16416	43.70
	3/8	.010	1	2-1/2	TC15721	39.60	TC16721	49.90
	3/8	.015	5/8	2	TC15217	34.05	TC16417	43.70
	3/8	.015	1	2-1/2	TC15722	39.60	TC16722	49.90
	3/8	.020	5/8	2	TC15218	34.05	TC16418	43.70
	3/8	.020	1	2-1/2	TC15723	39.60	TC16723	49.90
	3/8	.030	5/8	2	TC15219	34.05	TC16419	43.70
	3/8	.030	1	2-1/2	TC15724	39.60	TC16724	49.90
	3/8	.045	5/8	2	TC15220	34.05	TC16420	43.70
	3/8	.045	1	2-1/2	TC15725	39.60	TC16725	49.90
	3/8	.060	5/8	2	TC15221	34.05	TC16421	43.70
	3/8	.060	1	2-1/2	TC15726	39.60	TC16726	49.90
	3/8	.090	5/8	2	TC15222	34.05	TC16422	43.70
	3/8	.090	1	2-1/2	TC15727	39.60	TC16727	49.90
	3/8	.125	5/8	2	TC15223	34.05	TC16423	43.70
	3/8	.125	1	2-1/2	TC15728	39.60	TC16728	49.90
1/2	1/2	.010	5/8	2-1/2	TC15224	50.15	TC16424	64.25
	1/2	.010	1	3	TC15729	63.70	TC16729	77.80
	1/2	.010	1	4	TC15827	75.25	TC16827	90.35
	1/2	.015	5/8	2-1/2	TC15225	50.15	TC16425	64.25
	1/2	.015	1	3	TC15730	63.70	TC16730	77.80
	1/2	.015	1	4	TC15828	75.25	TC16828	90.35
	1/2	.020	5/8	2-1/2	TC15226	50.15	TC16426	64.25
	1/2	.020	1	3	TC15731	63.70	TC16731	77.80
	1/2	.020	1	4	TC15829	75.25	TC16829	90.35
	1/2	.030	5/8	2-1/2	TC15227	50.15	TC16427	64.25
	1/2	.030	1	3	TC15732	63.70	TC16732	77.80
	1/2	.030	1	4	TC15830	75.25	TC16830	90.35
	1/2	.060	5/8	2-1/2	TC15228	50.15	TC16428	64.25
	1/2	.060	1	3	TC15733	63.70	TC16733	77.80
	1/2	.060	1	4	TC15831	75.25	TC16831	90.35
	1/2	.090	5/8	2-1/2	TC15229	50.15	TC16429	64.25
	1/2	.090	1	3	TC15734	63.70	TC16734	77.80
	1/2	.090	1	4	TC15832	75.25	TC16832	90.35
	1/2	.125	5/8	2-1/2	TC15230	50.15	TC16430	64.25
	1/2	.125	1	3	TC15735	63.70	TC16735	77.80
	1/2	.125	1	4	TC15833	75.25	TC16833	90.35

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Corner Radius - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0001}_{-.001}$	D2 (h6)	$R^{+.001}_{-.001}$	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.015	1-1/4	3-1/2	TC15736	98.75	TC16736	116.15
	5/8	.020	1-1/4	3-1/2	TC15737	98.75	TC16737	116.15
	5/8	.030	1-1/4	3-1/2	TC15738	98.75	TC16738	116.15
	5/8	.045	1-1/4	3-1/2	TC15739	98.75	TC16739	116.15
	5/8	.060	1-1/4	3-1/2	TC15740	98.75	TC16740	116.15
	5/8	.090	1-1/4	3-1/2	TC15741	98.75	TC16741	116.15
3/4	3/4	.015	1-1/2	4	TC15742	146.15	TC16742	166.95
	3/4	.020	1-1/2	4	TC15743	146.15	TC16743	166.95
	3/4	.030	1-1/2	4	TC15744	146.15	TC16744	166.95
	3/4	.045	1-1/2	4	TC15745	146.15	TC16745	166.95
	3/4	.060	1-1/2	4	TC15746	146.15	TC16746	166.95
	3/4	.090	1-1/2	4	TC15747	146.15	TC16747	166.95
	3/4	.125	1-1/2	4	TC15748	146.15	TC16748	166.95
	3/4	.250	1-1/2	4	TC15749	146.15	TC16749	166.95
1	1	.015	1-1/2	4	TC15750	276.75	TC16750	306.75
	1	.020	1-1/2	4	TC15751	276.75	TC16751	306.75
	1	.030	1-1/2	4	TC15752	276.75	TC16752	306.75
	1	.045	1-1/2	4	TC15753	276.75	TC16753	306.75
	1	.060	1-1/2	4	TC15754	276.75	TC16754	306.75
	1	.090	1-1/2	4	TC15755	276.75	TC16755	306.75
	1	.125	1-1/2	4	TC15756	276.75	TC16756	306.75

**DID YOU
KNOW?**



Premature tool wear and breakage are easily avoidable, but can lead to poor part finish, machine downtime, and even scrapped parts.

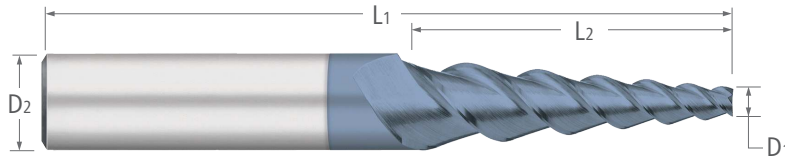
Read More : **End Mill and Milling Troubleshooting Guide**
on our technical blog, "In The Loupe"

harveyperformance.com/in-the-loupe/end-mill-troubleshooting-guide



GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Square - 30° Helix - Tapered



- Excellent for holding draft angles in mold and die applications
- Offered in 1°, 1.5°, 2°, 3°, 5°, and 7° angles per side
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

Angle Per Side	TIP DIA. $D1^{+0.001}_{-0.001}$	SHANK DIA. $D2 (h6)$	LOC $L2$	OAL $L1$	UNCOATED		AlTiN COATED	
					TOOL #	USD\$	TOOL #	USD\$
1°	1/8	1/4	1-1/2	3	TC85000	43.50	TC85016	50.80
	3/16	3/8	1-3/4	3-1/2	TC85001	66.30	TC85017	77.40
1.5°	1/8	1/4	1-1/2	3	TC85002	44.85	TC85018	52.05
	3/16	3/8	1-3/4	3-1/2	TC85003	68.90	TC85019	80.00
2°	1/8	1/4	1	3	TC85004	43.50	TC85020	50.80
	3/16	3/8	1-3/4	3-1/2	TC85005	66.30	TC85021	77.40
	1/4	1/2	2	4	TC85006	95.20	TC85022	110.30
3°	1/8	1/4	1	3	TC85007	44.85	TC85023	52.05
	5/32	3/8	1-3/4	3-1/2	TC85008	68.90	TC85024	80.00
	1/4	1/2	2	4	TC85009	95.20	TC85025	110.30
5°	1/8	1/4	3/4	3	TC85010	44.85	TC85026	52.05
	1/8	3/8	1-1/2	3-1/2	TC85011	68.65	TC85027	79.70
	1/4	1/2	1-1/4	4	TC85012	95.20	TC85028	110.30
7°	1/8	1/4	1/2	3	TC85013	44.85	TC85029	52.05
	5/32	3/8	3/4	3-1/2	TC85014	68.65	TC85030	79.70
	3/16	1/2	1-1/4	4	TC85015	95.20	TC85031	110.30



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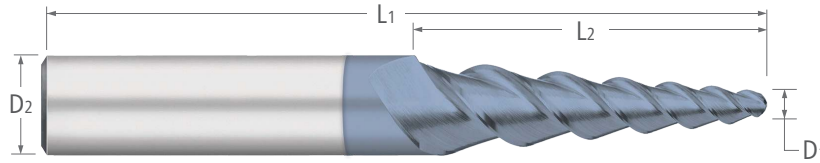
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For technical information, see page 115

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GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Ball - 30° Helix - Tapered



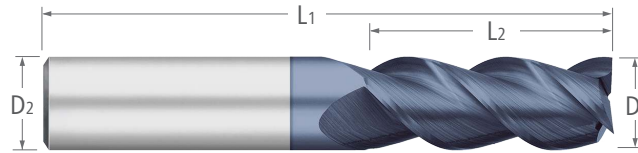
- Excellent for holding draft angles in mold and die applications
- Offered in 1°, 1.5°, 2°, 3°, 5°, and 7° angles per side
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

Angle Per Side	TIP DIA. $D1_{-0.001}^{+0.001}$	SHANK DIA. $D2 (h6)$	LOC $L2$	OAL $L1$	UNCOATED		AlTiN COATED	
					TOOL #	USD\$	TOOL #	USD\$
1°	1/8	1/4	1-1/2	3	TC85032	50.05	TC85048	57.35
	3/16	3/8	1-3/4	3-1/2	TC85033	76.25	TC85049	87.30
1.5°	1/8	1/4	1-1/2	3	TC85034	51.55	TC85050	58.75
	3/16	3/8	1-3/4	3-1/2	TC85035	79.50	TC85051	90.55
2°	1/8	1/4	1	3	TC85036	50.05	TC85052	57.35
	3/16	3/8	1-3/4	3-1/2	TC85037	76.50	TC85053	87.60
	1/4	1/2	2	4	TC85038	109.50	TC85054	124.60
3°	1/8	1/4	1	3	TC85039	51.55	TC85055	58.75
	5/32	3/8	1-3/4	3-1/2	TC85040	79.05	TC85056	90.05
	1/4	1/2	2	4	TC85041	109.50	TC85057	124.60
5°	1/8	1/4	3/4	3	TC85042	51.55	TC85058	58.75
	1/8	3/8	1-1/2	3-1/2	TC85043	79.05	TC85059	90.05
	1/4	1/2	1-1/4	4	TC85044	109.50	TC85060	124.60
7°	1/8	1/4	1/2	3	TC85045	51.55	TC85061	58.75
	5/32	3/8	3/4	3-1/2	TC85046	79.05	TC85062	90.05
	3/16	1/2	1-1/4	4	TC85047	109.50	TC85063	124.60

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Square - 45° Helix



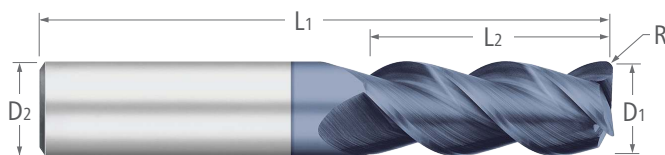
- Engineered to slot and profile at increased speed and feed rates
- Optimized shearing action for excellent part finish
- Proven performance in stainless steels and similar alloys
- 45° helix for faster chip removal and a better finish
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D1^{+.000}_{-.002}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC40507	11.50	TC49506	16.50
	1/8	1/2	1-1/2	TC40508	18.00	TC49508	22.30
3/16	3/16	3/8	2	TC40511	18.10	TC49511	23.75
	3/16	5/8	2	TC40512	21.65	TC49512	26.70
1/4	1/4	1/2	2-1/2	TC40515	26.55	TC49515	33.75
	1/4	3/4	2-1/2	TC40516	23.15	TC49516	28.70
5/16	5/16	1/2	2	TC40519	32.40	TC49518	40.50
	5/16	13/16	2-1/2	TC40520	28.00	TC49520	34.70
3/8	3/8	5/8	2	TC40523	34.90	TC49523	44.65
	3/8	1	2-1/2	TC40524	37.50	TC49524	46.40
1/2	1/2	5/8	2-1/2	TC40531	60.05	TC49530	74.05
	1/2	1-1/4	3	TC40532	64.00	TC49532	78.00
$D1^{+.000}_{-.003}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC40539	128.20	TC49539	144.55
	5/8	1-5/8	3-1/2	TC40540	127.40	TC49540	144.80
3/4	3/4	1	3	TC40547	195.20	TC49547	214.60
	3/4	1-5/8	4	TC40548	178.90	TC49548	199.70

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Corner Radius - 45° Helix



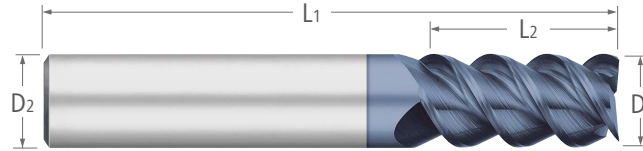
- Engineered to slot and profile at increased speed and feed rates
- Optimized shearing action for excellent part finish
- Proven performance in stainless steels and similar alloys
- Corner radius for increased edge strength
- 45° helix for faster chip removal and a better finish
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0001}_{-.002}$	$D2 (h6)$	$R^{+.001}_{-.001}$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.010	1/4	1-1/2	TC40707	14.85	TC49707	19.85
	1/8	.010	1/2	1-1/2	TC40708	20.10	TC49708	25.00
3/16	3/16	.010	3/8	2	TC40711	22.30	TC49710	28.00
	3/16	.010	5/8	2	TC40712	24.15	TC49712	29.80
1/4	1/4	.020	1/2	2-1/2	TC40715	31.95	TC49715	39.20
	1/4	.020	3/4	2-1/2	TC40716	25.85	TC49716	32.00
5/16	5/16	.020	1/2	2	TC40719	37.40	TC49719	43.10
	5/16	.020	13/16	2-1/2	TC40720	31.25	TC49720	38.75
3/8	3/8	.020	5/8	2	TC40723	39.50	TC49722	49.20
	3/8	.020	1	2-1/2	TC40724	41.95	TC49724	52.30
1/2	1/2	.040	5/8	2-1/2	TC40731	64.45	TC49730	78.45
	1/2	.040	1-1/4	3	TC40732	71.60	TC49732	85.60
$D1^{+.0001}_{-.003}$	$D2 (h6)$	$R^{+.001}_{-.001}$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.040	3/4	3	TC40739	134.85	TC49739	151.20
	5/8	.040	1-5/8	3-1/2	TC40740	136.10	TC49740	153.50
3/4	3/4	.040	1	3	TC40747	201.90	TC49746	221.30
	3/4	.040	1-5/8	4	TC40748	190.95	TC49748	158.67

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Square - 60° Helix

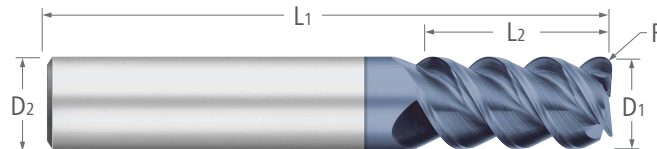


- "High shear" geometry for slotting and profiling
- Proven performance in high-temp alloys such as Inconel, hastelloy, waspalloy, and titanium
- 60° helix for improved surface finish
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0001}_{-.002}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	1-1/2	TC30508	18.00	TC39508	22.30
3/16	3/16	5/8	2	TC30512	21.65	TC39512	26.70
1/4	1/4	3/4	2-1/2	TC30516	23.15	TC39516	28.70
5/16	5/16	13/16	2-1/2	TC30520	28.00	TC39520	34.70
3/8	3/8	1	2-1/2	TC30524	37.50	TC39524	45.30
1/2	1/2	1-1/4	3	TC30532	64.00	TC39532	78.00
$D_1^{+.0001}_{-.003}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	1-5/8	3-1/2	TC30540	127.40	TC39540	144.80
3/4	3/4	1-5/8	4	TC30548	178.90	TC39548	199.70

GENERAL PURPOSE END MILLS - CARBIDE

3 Flute - Corner Radius - 60° Helix



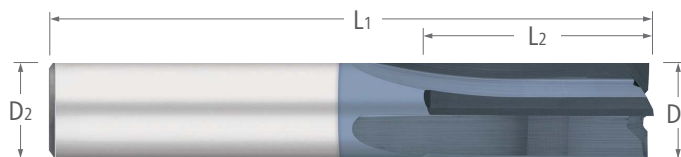
- "High shear" geometry for slotting and profiling
- Proven performance in high-temp alloys such as Inconel, hastelloy, waspalloy, and titanium
- Corner radius for increased edge strength
- 60° helix for improved surface finish
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0001}_{-.002}$	$D_2 (h6)$	$R^{+.0011}_{-.0011}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.010	1/2	1-1/2	TC30608	20.10	TC39608	25.00
3/16	3/16	.010	5/8	2	TC30612	24.15	TC39612	29.80
1/4	1/4	.020	3/4	2-1/2	TC30616	25.85	TC39616	32.00
5/16	5/16	.020	13/16	2-1/2	TC30620	31.25	TC39620	29.97
3/8	3/8	.020	1	2-1/2	TC30624	41.95	TC39624	52.30
1/2	1/2	.040	1-1/4	3	TC30632	71.60	TC39632	85.55
$D_1^{+.0001}_{-.003}$	$D_2 (h6)$	$R^{+.0011}_{-.0011}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.040	1-5/8	3-1/2	TC30640	136.10		
3/4	3/4	.040	1-5/8	4	TC30648	190.95	TC39648	211.75

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Square - Straight Flute

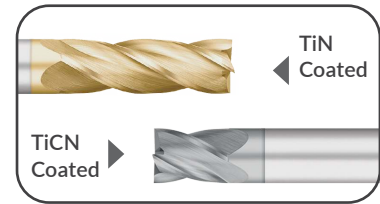
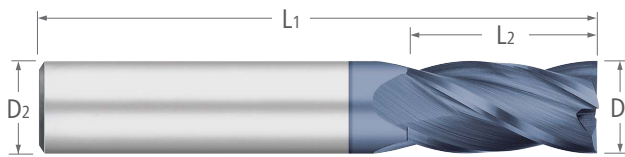


- Straight flute design for cutting high Rc materials
- Offered in regular length styles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D1_{-0.002}^{+0.000}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	1-1/2	TC30720	10.85	TC30730	15.90
3/16	3/16	5/8	2	TC30721	14.85	TC30731	20.55
1/4	1/4	3/4	2-1/2	TC30722	18.15	TC30732	25.45
5/16	5/16	13/16	2-1/2	TC30723	23.90	TC30733	32.55
3/8	3/8	1	2-1/2	TC30724	28.35	TC30734	38.65
7/16	7/16	1	2-3/4	TC30725	43.45	TC30735	55.55
1/2	1/2	1-1/4	3	TC30726	52.55	TC30736	66.55
$D1_{-0.003}^{+0.000}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	1-1/4	3-1/2	TC30727	100.35	TC30737	117.70
3/4	3/4	1-1/2	4	TC30728	140.25	TC30738	161.05
1	1	1-1/2	4	TC30729	236.15	TC30739	266.15

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Square - 30° Helix



- Offered in stub, regular, long, and extra long length styles
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- TiCN coating adds enhanced performance when AlTiN cannot be used
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiN COATED		TiCN COATED		AlTiN COATED	
D1 ^{+0.000"} -0.001"	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/64	1/8	0.023	1-1/2	TC10601	18.45					TC10901	23.55
	1/8	1/32	1-1/2	TC10501	19.50			TC90501	17.67	TC99501	24.50
1/32	1/8	1/16	1-1/2	TC10602	11.40	TC95601	15.00	TC90902	15.40	TC10902	15.40
	1/8	1/8	1-1/2	TC10502	13.05	TC95637	16.65	TC90502	17.05	TC99502	18.05
	1/8	3/16	1-1/2	TC10534	13.90					TC99534	18.95
3/64	1/8	3/32	1-1/2	TC10603	11.40	TC95602	15.00	TC90903	15.40	TC10903	15.40
	1/8	1/8	1-1/2	TC10503	11.10	TC95638	14.80	TC90503	15.15	TC99503	15.65
	1/8	3/16	1-1/2	TC10537	11.90					TC99535	16.90
1/16	1/8	.050	1-1/2	TC10600	9.90					TC10900	14.90
	1/8	1/8	1-1/2	TC10604	8.65	TC95603	12.25	TC90904	11.55	TC10904	11.60
	1/8	1/4	1-1/2	TC10504	11.15	TC95639	14.85	TC90504	13.35	TC99504	13.25
	3/8	3/8	1-1/2	TC10538	12.00					TC99537	17.00
5/64	1/8	1/8	1-1/2	TC10605	14.50	TC95604	18.15	TC90905	18.55	TC10905	18.75
	1/8	1/4	1-1/2	TC10505	11.55	TC95640	15.15	TC90505	15.55	TC99505	16.10
	1/8	5/16	1-1/2	TC10539	12.45					TC99538	17.50
3/32	1/8	3/16	1-1/2	TC10606	8.65	TC95605	12.25	TC90906	11.55	TC10906	11.60
	1/8	5/16	1-1/2	TC10541	9.45					TC99539	14.50
	1/8	3/8	1-1/2	TC10506	10.25	TC95641	13.85	TC90506	13.35	TC99506	13.25
7/64	1/8	3/8	1-1/2	TC10507	10.60	TC95642	14.30	TC90507	14.70	TC99507	14.75

D1 ^{+0.000"} -0.002"	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.100	1-1/2	TC10609	8.30					TC10909	13.30
	1/8	1/4	1-1/2	TC10608	8.30	TC95606	11.95	TC90908	11.10	TC10908	11.10
	1/8	3/8	1-1/2	TC10542	8.95					TC99541	13.95
	1/8	1/2	1-1/2	TC10508	9.60	TC95643	13.30	TC90508	12.10	TC99508	12.30
	1/8	5/8	2-1/4	TC15509	15.00					TC15609	20.40
	1/8	3/4	2-1/4	TC15508	15.65	TC95675	19.50	TC95508	19.95	TC15608	21.05
	1/8	1	3	TC17508	17.60	TC95689	21.40	TC97508	21.90	TC17608	22.95
	1/8	1-1/4	3	TC17509	18.85					TC17609	24.20
9/64	3/16	9/32	2	TC10543	12.50					TC99542	18.15
	3/16	9/16	2	TC10509	14.05	TC95644	18.20	TC90509	18.60	TC99509	19.75
5/32	3/16	5/16	2	TC10610	13.50	TC95607	17.65	TC90910	18.05	TC10910	17.35
	3/16	9/16	2	TC10510	14.40	TC95645	18.45	TC90510	17.25	TC99510	17.15
	3/16	15/16	2	TC10544	15.25					TC99543	20.90
11/64	3/16	11/32	2	TC10545	12.80					TC99544	18.40
	3/16	5/8	2	TC10511	13.65	TC95646	17.75	TC90511	18.15	TC99511	19.05

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GENERAL PURPOSE END MILLS - CARBIDE

4 Flute- Square - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiN COATED		TiCN COATED		AlTiN COATED	
D1 ^{+0.000"} _{-0.002"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
3/16	3/16	.1500	2	TC10613	12.70					TC10913	18.35
	3/16	3/8	2	TC10612	12.70	TC95608	16.80	TC90912	16.45	TC10912	16.45
	3/16	5/8	2	TC10512	13.30	TC95647	17.45	TC90512	17.25	TC99512	17.15
	3/16	3/4	2-1/2	TC15512	19.75	TC95676	24.10	TC95512	24.60	TC15612	24.60
	3/16	1-1/8	3	TC17512	19.10	TC95690	23.50	TC97512	23.95	TC17612	25.20
	3/16	1-1/2	3	TC17513	20.40					TC17613	26.45
13/64	1/4	5/8	2-1/2	TC10513	19.35	TC95648	24.60	TC90513	25.15	TC99513	26.30
7/32	1/4	7/16	2	TC10614	17.10	TC95609	22.05	TC90914	22.15	TC10914	22.15
	1/4	5/8	2-1/2	TC10514	19.70	TC95649	24.95	TC90514	23.85	TC99514	23.85
	1/4	1-3/32	2-1/2	TC10546	20.35					TC99545	27.55
15/64	1/4	3/4	2-1/2	TC10515	22.30	TC95650	27.55	TC90515	28.10	TC99515	29.60
1/4	1/4	.200	2	TC10617	15.00					TC10917	21.85
	1/4	1/2	2	TC10616	15.00	TC95610	19.90	TC90916	19.30	TC10916	19.30
	1/4	3/4	2-1/2	TC10516	16.25	TC95651	21.50	TC90516	22.05	TC99516	23.55
	1/4	1	4	TC15517	27.70	TC95678	33.30	TC95517	33.90	TC15617	35.50
	1/4	1-1/8	3	TC15516	26.35	TC95677	31.55	TC95516	32.05	TC15616	33.55
	1/4	1-1/2	4	TC17516	28.65	TC95691	34.25	TC97516	34.80	TC17616	36.40
	1/4	1-1/2	6	TC17517	36.55			TC97517	43.75	TC17617	45.60
	1/4	2	4	TC17518	29.60					TC17618	37.35
17/64	5/16	3/4	2-1/2	TC10517	29.35	TC95652	35.55	TC90517	36.25	TC99517	38.00
9/32	5/16	3/4	2-1/2	TC10518	29.35	TC95653	35.55	TC90518	36.25	TC99518	38.00
	5/16	1-1/8	2-1/2	TC10547	30.20					TC99546	38.95
19/64	5/16	13/16	2-1/2	TC10519	29.35	TC95654	35.55	TC90519	36.25	TC99519	38.00
5/16	5/16	1/2	2	TC10620	20.15	TC95611	26.10	TC90920	26.80	TC10920	27.40
	5/16	13/16	2-1/2	TC10520	21.30	TC95655	27.55	TC90520	28.25	TC99520	28.40
	5/16	1-1/8	3	TC15520	29.90	TC95679	36.10	TC95520	36.85	TC15620	38.60
	5/16	1-5/8	4	TC17520	36.65	TC95693	43.45	TC97520	44.10	TC17620	46.00
	5/16	2	4	TC17521	37.60					TC17621	46.90
21/64	3/8	1	2-1/2	TC10521	33.10	TC95656	40.50	TC90521	41.35	TC99521	43.45
11/32	3/8	1	2-1/2	TC10522	33.10	TC95657	40.50	TC90522	41.35	TC99522	43.45
23/64	3/8	1	2-1/2	TC10523	33.10	TC95658	40.50	TC90523	41.35	TC99523	43.45
3/8	3/8	.300	2	TC10623	26.35					TC10923	36.00
	3/8	5/8	2	TC10624	26.35	TC95612	33.25	TC90924	34.10	TC10924	33.70
	3/8	1	2-1/2	TC10524	25.35	TC95659	32.75	TC90524	32.55	TC99524	32.55
	3/8	1	4	TC15525	39.95	TC95681	47.95	TC95525	48.75	TC15625	51.00
	3/8	1-1/8	3	TC15524	34.25	TC95680	41.65	TC95524	42.45	TC15624	44.60
	3/8	1-1/2	6	TC17525	63.30	TC95695	72.65	TC97525	73.75	TC17625	76.30
	3/8	1-3/4	4	TC17524	41.85	TC95694	49.80	TC97524	50.70	TC17624	52.90
	3/8	2-1/4	4	TC17526	43.70					TC17626	54.75
25/64	7/16	1	2-3/4	TC10525	43.35			TC90525	53.00	TC99525	55.40
13/32	7/16	1	2-3/4	TC10526	43.35	TC95661	52.05	TC90526	53.00	TC99526	55.40
27/64	7/16	1	2-3/4	TC10527	44.65	TC95662	53.40	TC90527	54.30	TC99527	56.75
7/16	7/16	5/8	2-1/2	TC10628	32.75	TC95613	41.45	TC90928	42.40	TC10928	42.10
	7/16	1	2-3/4	TC10528	38.85	TC95663	47.55	TC90528	48.50	TC99528	49.75
	7/16	2	4	TC15528	54.00	TC95682	63.25	TC95528	64.25	TC15628	66.80
	7/16	3	6	TC17528	85.35	TC95696	96.15			TC17628	100.35
29/64	1/2	1	3	TC10529	64.35	TC95664	74.50	TC90529	56.67	TC99529	78.40
15/32	1/2	1	3	TC10530	64.35			TC90530	56.67	TC99530	78.40
31/64	1/2	1	3	TC10531	64.35	TC95666	74.50	TC90531	75.55	TC99531	78.40

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute- Square - 30° Helix (Cont.)

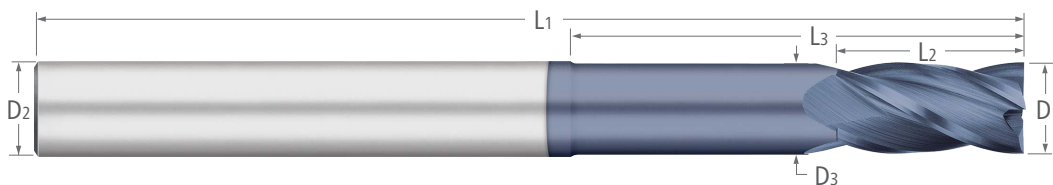
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CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiN COATED		TiCN COATED		AlTiN COATED	
D ₁ ^{+0.000"} _{-0.002"}	D ₂ (h6)	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/2	1/2	.400	2-1/2	TC10633	38.90					TC10931	52.95
	1/2	5/8	2-1/2	TC10632	38.90	TC95614	49.05	TC90932	50.10	TC10932	52.95
	1/2	1	3	TC10532	44.00	TC95667	54.10	TC90532	55.20	TC99532	58.05
	1/2	1	4	TC15532	56.45	TC95683	67.30	TC95532	68.50	TC15632	71.55
	1/2	1-1/4	3	TC10533	44.00	TC95668	54.10	TC90533	55.20	TC99533	58.05
	1/2	1-1/2	6	TC17532	90.20	TC95697	102.80	TC97532	104.20	TC17632	107.75
	1/2	2	4	TC15533	59.75	TC95684	70.60	TC95533	71.80	TC15633	74.85
	1/2	2-1/2	4	TC15534	63.05					TC15634	78.15
	1/2	3	6	TC17533	95.10	TC95698	107.75	TC97533	109.15	TC17633	112.65
D ₁ ^{+0.000"} _{-0.003"}	D ₂ (h6)	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
9/16	9/16	1-1/4	3-1/2	TC10536	82.80	TC95669	95.30	TC90536	96.75	TC99536	100.25
5/8	5/8	3/4	3	TC10640	82.35	TC95615	94.05	TC90942	95.35	TC10940	98.70
	5/8	1-1/4	3-1/2	TC10540	84.20	TC95670	96.70	TC90540	98.20	TC99540	101.65
	5/8	2-1/4	5	TC15540	129.25	TC95685	142.80	TC95540	144.25	TC15640	148.05
	5/8	3	6	TC17540	139.45	TC95699	154.10	TC97540	155.75	TC17640	159.70
3/4	3/4	.600	3	TC10647	114.80					TC10947	134.20
	3/4	1	3	TC10648	114.80	TC95616	128.80	TC90948	130.30	TC10948	134.20
	3/4	1-1/2	4	TC10548	117.65	TC95671	132.65	TC90548	134.25	TC99548	138.45
	3/4	2-1/4	5	TC15548	178.55	TC95686	194.65	TC95548	196.40	TC15648	200.85
	3/4	3	6	TC17548	208.30	TC95700	225.60	TC97548	227.60	TC17648	232.40
	3/4	4	7	TC17549	357.50	TC95701	375.60	TC97549	378.50	TC17649	383.75
7/8	7/8	1-1/2	4	TC10556	196.75	TC95672	234.40	TC90556	236.35	TC99556	219.55
	7/8	2-1/4	5	TC15556	338.30			TC95556	286.07	TC15656	365.35
	7/8	3	6	TC17556	370.85	TC95702	391.85	TC97556	313.37	TC17656	400.05
1	1	1-1/4	3-1/2	TC10664	190.00	TC95617	211.55	TC90964	214.05	TC10964	219.95
	1	1-1/2	4	TC10564	198.10	TC95673	219.70	TC90564	222.15	TC99564	228.15
	1	2-1/4	5	TC15564	244.45	TC95688	267.75	TC95564	214.37	TC15664	276.80
	1	3	6	TC17564	351.90	TC95703	377.05	TC97564	379.90	TC17664	386.90
	1	4	7	TC17565	461.30			TC97565	491.65	TC17665	499.20
1-1/4	1-1/4	2	4-1/2	TC10580	539.87					TC99580	714.90

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Square - 30° Helix - Long Reach

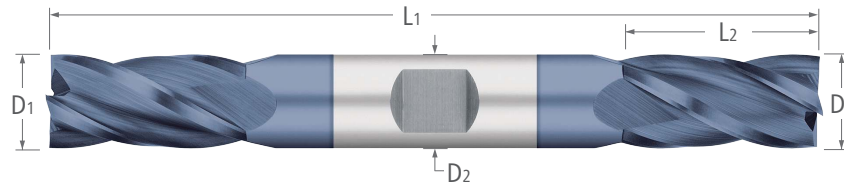


- Reduced neck provides maximum strength in long reach and deep pocketing applications
- 4 flutes
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

	CUTTER DIA.	SHANK DIA.	LOC	OAL	OVERALL REACH	NECK DIA.	UNCOATED		AlTiN COATED	
	$D_1^{+.0000}_{-.0020}$	$D_2 (h6)$	L_2	L_1	L_3	D_3	TOOL #	USD\$	TOOL #	USD\$
NEW	1/8	1/8	1/2	1-1/2	5/8	.119	TC69000	20.50	TC69200	25.35
NEW		1/8	1/2	2	1	.119	TC69002	33.35	TC69202	38.20
NEW	3/16	3/16	5/8	2	1	.178	TC69004	28.35	TC69204	33.80
NEW		3/16	5/8	2-1/2	1-1/2	.178	TC69006	41.95	TC69206	47.75
NEW	1/4	1/4	3/4	2-1/2	1-1/4	.238	TC69008	34.55	TC69208	41.50
NEW		1/4	3/4	4	2	.238	TC69010	60.85	TC69210	68.30
NEW	3/8	3/8	1	4	1-7/8	.356	TC69012	66.35	TC69212	76.95
NEW		3/8	1	4	3	.356	TC69014	77.45	TC69214	88.05
NEW	1/2	1/2	1-1/2	4	2-1/2	.475	TC69016	115.80	TC69216	130.25
NEW		1/2	1-1/2	6	4	.475	TC69018	174.75	TC69218	191.55

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Square - 30° Helix - Double-Ended



- Double-ended
- Offered in stub and regular length styles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

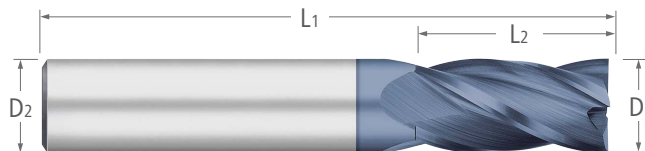
CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0001}_{-.002}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/16	1/8	.0500	1-1/2			TC14901	23.95
	1/8	1/8	1-1/2	TC14504	17.45	TC14904	22.50
3/32	1/8	.0750	1-1/2			TC14900	24.40
	1/8	3/16	1-1/2	TC14506	17.90	TC14906	23.05
1/8	1/8	.1000	1-1/2			TC14899	21.00
	1/8	1/4	1-1/2	TC14508	14.50	TC14908	19.50
	3/8	3/8	3-1/8	TC12508*	64.95	TC12608*	77.05
	3/8	1/2	3-1/8			TC12609*	82.60
5/32	3/16	5/16	2	TC14510	20.30	TC14910	26.05
	3/8	7/16	3-1/4	TC12510*	64.95	TC12610*	77.05
3/16	3/16	.1500	2			TC14898	27.45
	3/16	3/8	2	TC14512	20.30	TC14912	26.05
	3/8	1/2	3-1/4	TC12512*	64.95	TC12612*	77.05
7/32	1/4	1/2	2-1/2	TC14514	27.95	TC14914	35.20
	3/8	9/16	3-1/2	TC12514*	65.95	TC12614*	78.90
1/4	1/4	.2000	2-1/2			TC14897	36.30
	1/4	1/2	2-1/2	TC14516	27.95	TC14916	35.20
	3/8	5/8	3-1/2	TC12516*	65.95	TC12616*	81.60
	3/8	1	3-1/2			TC12617*	91.85
9/32	3/8	11/16	3-1/2	TC12518*	67.55	TC12618*	84.60
5/16	5/16	1/2	2-1/2	TC14520	36.20	TC14920	44.70
	3/8	3/4	3-1/2	TC12520*	67.55	TC12620*	84.60
11/32	3/8	3/4	3-1/2	TC12522*	67.55	TC12622*	84.60
3/8	3/8	.3000	2-1/2			TC14896	53.20
	3/8	9/16	2-1/2	TC14524	39.85	TC14924	49.30
	3/8	3/4	3-1/2	TC12524*	67.55	TC12624*	84.60
7/16	7/16	9/16	2-3/4	TC14528	56.35	TC14928	68.30
	1/2	7/8	4	TC12528*	98.05	TC12628*	125.95
1/2	1/2	.4000	3			TC14895	95.60
	1/2	5/8	3	TC14532	68.85	TC14932	88.50
	1/2	1	4	TC12532*	110.10	TC12632*	141.45

*Includes weldon flat

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Square - 30° Helix - Metric



- Offered in stub, regular, long, and extra long length styles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
$D_1^{+0.00 \text{ mm}}_{-0.05 \text{ mm}}$	$D_2 \text{ (h6)}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1.0 mm	3 mm	3 mm	38 mm	TC11859	16.35	TC11959	20.65
1.5 mm	3 mm	4.5 mm	38 mm	TC11860	16.35	TC11960	20.65
2.0 mm	3 mm	6.3 mm	38 mm	TC11861	16.35	TC11961	20.65
2.5 mm	3 mm	9.5 mm	38 mm	TC11862	16.35	TC11962	20.65
3.0 mm	3 mm	6 mm	38 mm	TC82500	16.35	TC82509	21.35
	3 mm	12 mm	38 mm	TC11863	16.35	TC11963	20.65
	3 mm	18 mm	50 mm	TC82518	16.80	TC82534	21.90
	3 mm	25 mm	63 mm	TC82550	16.80	TC82565	22.20
3.5 mm	4 mm	12 mm	50 mm	TC11864	20.10	TC11964	24.60
4.0 mm	4 mm	8 mm	50 mm	TC82501	20.10	TC82510	25.80
	4 mm	14 mm	50 mm	TC11865	20.10	TC11965	25.45
	4 mm	20 mm	63 mm	TC82519	20.55	TC82535	26.55
	4 mm	25 mm	63 mm	TC82551	20.55	TC82566	26.55
4.5 mm	6 mm	16 mm	50 mm	TC11866	24.60	TC11966	31.10
5.0 mm	6 mm	10 mm	50 mm	TC82502	24.60	TC82511	31.45
	6 mm	16 mm	50 mm	TC11867	24.60	TC11967	31.10
	6 mm	25 mm	63 mm	TC82520	25.10	TC82536	32.35
	6 mm	32 mm	63 mm	TC82552	25.10	TC82567	32.35
5.5 mm	6 mm	16 mm	50 mm	TC11881	24.60	TC11981	31.10
6.0 mm	6 mm	12 mm	50 mm	TC82503	25.75	TC82512	32.65
	6 mm	19 mm	50 mm	TC11868	25.85	TC11968	32.55
	6 mm	25 mm	63 mm	TC82521	26.45	TC82537	33.65
	6 mm	32 mm	63 mm	TC82553	26.45	TC82568	33.65
6.5 mm	8 mm	19 mm	63 mm	TC11882	28.25	TC11982	35.40
7.0 mm	8 mm	19 mm	63 mm	TC11869	28.25	TC11969	35.40
7.5 mm	8 mm	19 mm	63 mm	TC11883	29.05	TC11983	36.85
8.0 mm	8 mm	12 mm	50 mm	TC82504	29.05	TC82513	38.80
	8 mm	20 mm	63 mm	TC11870	29.05	TC11970	36.85
	8 mm	26 mm	63 mm	TC82522	29.50	TC82538	39.75
	8 mm	32 mm	63 mm	TC82523	29.50	TC82539	39.75
	8 mm	38 mm	75 mm	TC82554	29.50	TC82569	39.75
	8 mm	45 mm	100 mm	TC82555	30.75	TC82570	41.85

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GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Square - 30° Helix - Metric (Cont.)

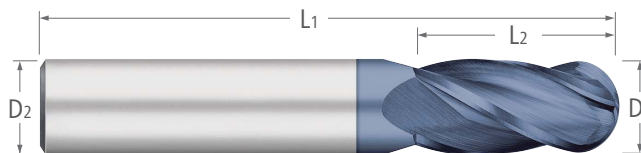
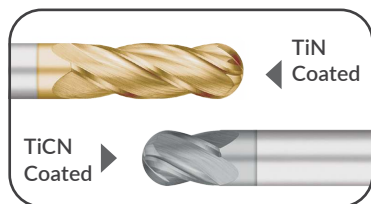
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CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+0.00 mm} _{-0.05 mm}	D ₂ (h6)	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
9.0 mm	10 mm	22 mm	75 mm	TC11871	42.60	TC11971	53.85
10.0 mm	10 mm	16 mm	50 mm	TC82505	53.95	TC82514	65.20
	10 mm	22 mm	75 mm	TC11872	54.15	TC11972	66.15
	10 mm	28 mm	75 mm	TC82524	53.95	TC82540	65.90
	10 mm	34 mm	75 mm	TC82525	54.35	TC82541	66.40
	10 mm	40 mm	75 mm	TC82556	54.35	TC82571	66.40
	10 mm	45 mm	100 mm	TC82557	56.40	TC82572	69.20
11.0 mm	12 mm	25 mm	75 mm	TC11873	59.45	TC11973	73.45
12.0 mm	12 mm	16 mm	63 mm	TC82506	61.65	TC82515	75.65
	12 mm	25 mm	75 mm	TC11874	61.65	TC11974	75.65
	12 mm	35 mm	75 mm	TC82526	61.65	TC82542	75.65
	12 mm	50 mm	100 mm	TC82527	63.65	TC82543	78.70
	12 mm	63 mm	100 mm	TC82558	63.65	TC82573	78.70
	12 mm	75 mm	127 mm	TC82559	65.60	TC82574	81.75
14.0 mm	14 mm	18 mm	75 mm			TC82516	120.70
	14 mm	32 mm	89 mm	TC11875	104.85	TC11975	124.30
	14 mm	50 mm	100 mm	TC82528	106.25	TC82544	123.65
	14 mm	75 mm	127 mm	TC82560	106.65	TC82575	125.35
16.0 mm	16 mm	20 mm	75 mm	TC82508	118.85	TC82517	138.20
	16 mm	32 mm	89 mm	TC11876	118.85	TC11976	141.65
	16 mm	50 mm	100 mm	TC82529	120.80	TC82545	141.65
	16 mm	75 mm	127 mm	TC82561	122.50	TC82576	144.75
18.0 mm	18 mm	38 mm	100 mm	TC11877	163.45	TC11977	193.75
	18 mm	50 mm	100 mm	TC82530	162.60	TC82546	183.40
	18 mm	75 mm	127 mm	TC82562	165.25	TC82577	187.55
20.0 mm	20 mm	38 mm	100 mm	TC11878	258.00	TC11978	307.30
	20 mm	50 mm	100 mm	TC82531	258.00	TC82547	283.00
	20 mm	63 mm	100 mm	TC82532	258.00		
	20 mm	75 mm	127 mm	TC82563	260.60	TC82578	287.55
25.0 mm	25 mm	38 mm	100 mm	TC11879	252.27	TC11979	366.45
	25 mm	75 mm	127 mm			TC82579	371.50

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Ball - 30° Helix



- Offered in stub, regular, long, and extra long length styles
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds

- TiCN coating adds enhanced performance when AlTiN cannot be used
- AlTiN coating offers increased wear and heat resistance

- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiN COATED		TiCN COATED		AlTiN COATED	
$D_1^{+.0000}_{-.0010}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/64	1/8	.023	1-1/2	TC10701	23.20	TC95618	26.90			TC11701	28.25
	1/8	1/32	1-1/2	TC11501	21.90	TC95705	25.50	TC91501	25.90	TC11601	26.90
1/32	1/8	.0250	1-1/2	TC10700	14.30					TC11700	19.30
	1/8	1/16	1-1/2	TC10702	14.85	TC95619	18.45	TC91702	18.90	TC11702	19.85
	1/8	1/8	1-1/2	TC11502	13.95			TC91502	18.05	TC11602	19.00
	1/8	3/16	1-1/2	TC11500	15.65					TC11600	20.75
3/64	1/8	3/32	1-1/2	TC10703	14.85			TC91703	18.90	TC11703	19.85
	1/8	1/8	1-1/2	TC11503	13.95	TC95707	17.65	TC91503	18.05	TC11603	19.00
	1/8	3/16	1-1/2	TC11499	15.65					TC11599	20.75
1/16	1/8	.0500	1-1/2	TC10699	11.70					TC11699	16.70
	1/8	1/8	1-1/2	TC10704	11.10	TC95621	14.80	TC91704	14.85	TC11704	14.85
	1/8	1/4	1-1/2	TC11504	13.05	TC95708	16.65	TC91504	17.05	TC11604	18.05
	1/8	3/8	1-1/2	TC11498	13.90					TC11598	18.95
5/64	1/8	1/8	1-1/2	TC10705	17.95			TC91705	22.05	TC11705	23.00
	1/8	1/4	1-1/2	TC11505	13.05			TC91505	17.05	TC11605	18.05
3/32	1/8	3/16	1-1/2	TC10706	11.10	TC95623	14.80	TC91706	15.15	TC11706	14.85
	1/8	3/8	1-1/2	TC11506	13.65	TC95710	17.30	TC91506	17.70	TC11606	18.65
	1/8	1/2	1-1/2	TC11533	16.15					TC11633	21.15
7/64	1/8	3/8	1-1/2	TC11507	13.65			TC91507	17.70	TC11607	18.65

$D_1^{+.0000}_{-.0020}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.1000	1-1/2	TC10707	10.55					TC11707	15.55
	1/8	1/4	1-1/2	TC10708	10.55	TC95624	14.20	TC91708	14.60	TC11708	14.05
	1/8	3/8	1-1/2	TC11497	11.60					TC11597	16.60
	1/8	1/2	1-1/2	TC11508	12.55	TC95712	16.20	TC91508	16.60	TC11608	17.60
	1/8	3/4	2-1/4	TC16508	18.55			TC96508	22.80	TC16608	23.90
	1/8	1	3	TC18508	21.00	TC95756	24.85	TC98508	25.30	TC18608	26.40
9/64	3/16	9/16	2	TC11509	18.15			TC91509	22.65	TC11609	23.80
5/32	3/16	5/16	2	TC10710	17.60	TC95625	21.65	TC91710	22.10	TC11710	23.20
	3/16	9/16	2	TC11510	18.15	TC95714	22.25	TC91510	22.65	TC11610	23.80
	3/16	3/4	2	TC11534	18.70					TC11634	24.35
11/64	3/16	5/8	2	TC11511	18.15			TC91511	22.65	TC11611	23.80
3/16	3/16	.1500	2	TC10711	16.00					TC11711	21.60
	3/16	3/8	2	TC10712	16.55	TC95626	20.65	TC91712	21.05	TC11712	21.95
	3/16	5/8	2	TC11512	16.35	TC95716	20.45	TC91512	20.85	TC11612	22.00
	3/16	3/4	2-1/2	TC16512	21.50	TC95743	25.85	TC96512	26.40	TC16612	27.55
	3/16	1-1/8	3	TC18512	25.05	TC95757	29.40	TC98512	29.90	TC18612	30.60
13/64	1/4	5/8	2-1/2	TC11513	23.85			TC91513	29.65	TC11613	31.10

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Ball - 30° Helix (Cont.)

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CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TiN COATED		TiCN COATED		AlTiN COATED	
D1 ^{+0.000"} -0.002"	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
7/32	1/4	7/16	2	TC10714	22.30			TC91714	27.70	TC11714	29.10
	1/4	5/8	2-1/2	TC11514	23.85	TC95718	29.10	TC91514	29.65	TC11614	31.10
15/64	1/4	3/4	2-1/2	TC11515	23.85	TC95719	29.10	TC91515	22.17	TC11615	31.10
1/4	1/4	.200	2	TC10715	20.65					TC11715	27.45
	1/4	1/2	2	TC10716	21.20	TC95628	26.10	TC91716	26.65	TC11716	28.05
	1/4	3/4	2-1/2	TC11516	23.20	TC95720	28.50	TC91516	28.95	TC11616	29.80
	1/4	1	4	TC16517	33.20	TC95745	38.80	TC96517	39.35	TC16617	40.95
	1/4	1-1/8	3	TC16516	30.10	TC95744	35.40	TC96516	35.90	TC16616	37.40
	1/4	1-1/2	4	TC18516	36.60	TC95758	42.20	TC98516	42.85	TC18616	42.45
	1/4	1-1/2	6	TC18517	43.25	TC95759	49.75	TC98517	50.45	TC18617	52.30
17/64	5/16	3/4	2-1/2	TC11517	30.10	TC95721	36.35	TC91517	27.67	TC11617	38.80
9/32	5/16	3/4	2-1/2	TC11518	30.15	TC95722	36.40	TC91518	37.10	TC11618	38.85
19/64	5/16	13/16	2-1/2	TC11519	32.75	TC95723	39.00	TC91519	39.65	TC11619	41.45
5/16	5/16	1/2	2	TC10720	26.35	TC95629	32.20	TC91720	32.90	TC11720	34.45
	5/16	13/16	2-1/2	TC11520	27.80	TC95724	34.05	TC91520	34.70	TC11620	36.45
	5/16	1-1/8	3	TC16520	35.40	TC95746	41.60	TC96520	42.30	TC16620	44.05
	5/16	1-5/8	4	TC18520	44.20	TC95760	50.95	TC98520	51.65	TC18620	53.55
21/64	3/8	1	2-1/2	TC11521	38.00	TC95725	45.45	TC91521	34.57	TC11621	48.40
11/32	3/8	1	2-1/2	TC11522	40.00	TC95726	47.45	TC91522	48.20	TC11622	50.35
23/64	3/8	1	2-1/2	TC11523	38.00	TC95727	45.45	TC91523	46.30	TC11623	48.40
3/8	3/8	5/8	2	TC10724	34.05	TC95630	40.95	TC91724	41.80	TC11724	43.05
	3/8	1	2-1/2	TC11524	29.90	TC95728	37.35	TC91524	38.10	TC11624	40.25
	3/8	1	4	TC16525	50.05	TC95748	58.10	TC96525	58.95	TC16625	61.20
	3/8	1-1/8	3	TC16524	41.10	TC95747	48.55	TC96524	49.35	TC16624	51.45
	3/8	1-1/2	6	TC18525	67.45			TC98525	77.85	TC18625	80.45
	3/8	1-3/4	4	TC18524	47.65	TC95761	55.65	TC98524	56.50	TC18624	58.70
25/64	7/16	1	2-3/4	TC11525	51.70	TC95729	60.35	TC91525	45.87	TC11625	63.70
13/32	7/16	1	2-3/4	TC11526	51.95			TC91526	61.60	TC11626	64.00
27/64	7/16	1	2-3/4	TC11527	38.77	TC95731	60.30	TC91527	45.87	TC11627	63.65
7/16	7/16	5/8	2-1/2	TC10728	42.60	TC95631	51.30			TC11728	53.90
	7/16	1	2-3/4	TC11528	43.95			TC91528	53.60	TC11628	55.95
	7/16	2	4	TC16528	68.45	TC95749	77.70	TC96528	78.70	TC16628	81.25
	7/16	3	6	TC18528	75.47	TC95763	111.50	TC98528	112.70	TC18628	115.75
29/64	1/2	1	3	TC11529	50.97					TC11629	82.10
15/32	1/2	1	3	TC11530	68.05			TC91530	59.27	TC11630	82.15
31/64	1/2	1	3	TC11531	50.97					TC11631	82.10
1/2	1/2	.4000	2-1/2	TC10731	49.65					TC11731	63.65
	1/2	5/8	2-1/2	TC10732	50.15	TC95632	60.30	TC91733	61.40	TC11732	64.25
	1/2	1	3	TC11532	56.95	TC95736	67.10	TC91532	68.10	TC11632	71.00
	1/2	1	4	TC16532	65.85	TC95750	76.70	TC96532	77.90	TC16632	80.95
	1/2	1-1/2	6	TC18532	100.90	TC95764	113.60	TC98532	114.95	TC18632	118.50
	1/2	2	4	TC16533	66.50	TC95751	77.40	TC96533	78.55	TC16633	81.60
	1/2	3	6	TC18533	101.50	TC95765	114.10	TC98533	115.45	TC18633	119.00

continued on next page

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Ball - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		TIN COATED		TiCN COATED		AlTiN COATED	
D ₁ ^{+0.000"} _{-0.003"}	D ₂ (h6)	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
9/16	9/16	1-1/4	3-1/2	TC11536	86.80	TC95737	99.30	TC91536	79.67	TC11636	104.20
5/8	5/8	3/4	3	TC10740	96.10			TC91740	109.15	TC11740	112.45
	5/8	1-1/4	3-1/2	TC11540	91.65			TC91540	105.60	TC11640	109.10
	5/8	2-1/4	5	TC16540	152.35	TC95752	165.85	TC96540	167.35	TC16640	171.15
	5/8	3	6	TC18540	159.25	TC95766	173.90	TC98540	139.17	TC18640	179.55
3/4	3/4	1	3	TC10748	146.70	TC95634	160.65	TC91748	162.15	TC11748	166.10
	3/4	1-1/2	4	TC11548	135.05	TC95739	150.10	TC91548	151.70	TC11648	155.85
	3/4	2-1/4	5	TC16548	211.20	TC95753	227.30	TC96548	229.10	TC16648	233.50
	3/4	3	6	TC18548	225.95			TC98548	245.25	TC18648	250.10
	3/4	4	7	TC18549	373.90			TC98549	313.87	TC18649	400.10
7/8	7/8	1-1/2	4	TC11556	237.80	TC95740	279.50	TC91556	223.47	TC11656	260.60
	7/8	2-1/4	5	TC16556	289.47	TC95754	382.40			TC16656	389.90
	7/8	3	6	TC18556	399.80					TC18656	340.77
1	1	1-1/4	3-1/2	TC10764	226.25			TC91764	250.25	TC11764	256.25
	1	1-1/2	4	TC11564	241.10	TC95741	262.70	TC91564	210.37	TC11664	271.15
	1	2-1/4	5	TC16564	333.37	TC95755	441.15	TC96564	352.67	TC16664	450.25
	1	3	6	TC18564	403.05	TC95770	428.25	TC98564	342.57	TC18664	438.10
	1	4	7	TC18565	489.90	TC95771	517.20	TC98565	413.47	TC18665	527.80

End Mills

Roughers

For Aluminum

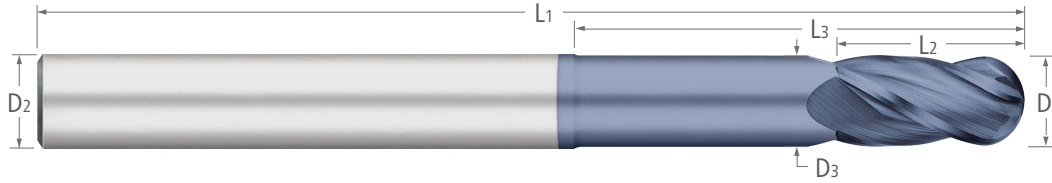
Carbide

Cobalt

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Ball - 30° Helix - Long Reach



- Reduced neck provides maximum strength in long reach and deep pocketing applications
- 4 flutes
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	OVERALL REACH	NECK DIA.	UNCOATED		AlTiN COATED	
$D1^{+.000}_{-.002}$	$D2 (h6)$	$L2$	$L1$	$L3$	$D3$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	1-1/2	5/8	.119	TC69700	25.10	TC69800	29.95
	1/8	1/2	2	1	.119	TC69702	31.10	TC69802	35.95
3/16	3/16	5/8	2	1	.178	TC69704	34.30	TC69804	39.75
	3/16	5/8	2-1/2	1-1/2	.178	TC69706	38.35	TC69806	44.15
1/4	1/4	3/4	2-1/2	1-1/4	.238	TC69708	43.95	TC69808	50.90
	1/4	3/4	4	2	.238	TC69710	59.30	TC69810	66.75
3/8	3/8	1	4	1-7/8	.356	TC69712	77.75	TC69812	88.35
	3/8	1	4	3	.356	TC69714	85.05	TC69814	95.65
1/2	1/2	1-1/2	4	2-1/2	.475	TC69716	117.65	TC69816	132.10
	1/2	1-1/2	6	4	.475	TC69718	180.20	TC69818	197.00

NEW

NEW

NEW

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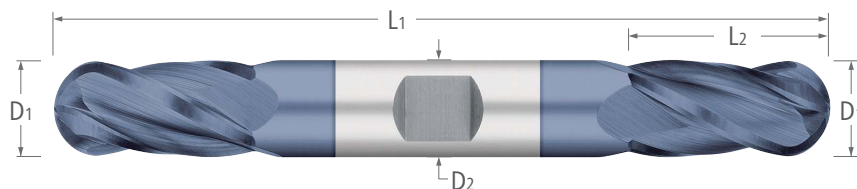
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GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Ball - 30° Helix - Double-Ended



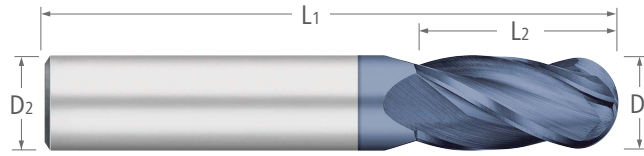
- Double-ended
- Offered in stub and regular length styles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
$D_1^{+0.000}_{-0.002}$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/16	1/8	1/8	1-1/2	TC14604	21.75	TC14704	28.05
3/32	1/8	3/16	1-1/2	TC14606	22.35	TC14706	28.75
1/8	1/8	1/4	1-1/2	TC14608	18.05	TC14708	23.20
	3/8	3/8	3-1/8	TC13508*	73.85	TC13608*	90.45
5/32	3/16	5/16	2	TC14610	25.45	TC14710	31.30
	3/8	7/16	3-1/4	TC13510*	73.85	TC13610*	90.45
3/16	3/16	3/8	2	TC14612	25.45	TC14712	31.30
	3/8	1/2	3-1/4	TC13512*	73.85	TC13612*	90.45
7/32	1/4	1/2	2-1/2	TC14614	33.30	TC14714	42.95
	3/8	9/16	3-1/2	TC13514*	74.80	TC13614*	91.40
1/4	1/4	1/2	2-1/2	TC14616	33.30	TC14716	42.95
	3/8	5/8	3-1/2	TC13516*	74.80	TC13616*	91.40
9/32	3/8	11/16	3-1/2	TC13518*	81.90	TC13618*	73.77
5/16	5/16	1/2	2-1/2	TC14620	45.20	TC14720	53.90
	3/8	3/4	3-1/2	TC13520*	81.90	TC13620*	105.30
11/32	3/8	3/4	3-1/2	TC13522*	81.90	TC13622*	98.50
3/8	3/8	9/16	2-1/2	TC14624	49.80	TC14724	60.20
	3/8	3/4	3-1/2	TC13524*	81.90	TC13624*	105.30
7/16	7/16	9/16	2-3/4	TC14628	70.40	TC14728	82.40
	1/2	7/8	4	TC13528*	118.55	TC13628*	141.15
1/2	1/2	5/8	3	TC14632	86.05	TC14732	107.10
	1/2	1	4	TC13532	121.25	TC13632	155.75

*Includes weldon flat

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Ball - 30° Helix - Metric



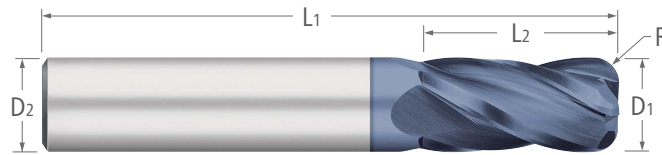
- Regular length for versatility
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
$D_1^{+0.00 \text{ mm}}_{-0.05 \text{ mm}}$	$D_2 \text{ (h6)}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1.0 mm	3 mm	3 mm	38 mm	TC12701	18.55	TC12802	23.60
1.5 mm	3 mm	4.5 mm	38 mm	TC12703	13.87	TC12804	23.60
2.0 mm	3 mm	6.3 mm	38 mm	TC12705	18.55	TC12806	23.60
2.5 mm	3 mm	9.5 mm	38 mm	TC12707	18.55	TC12808	23.60
3.0 mm	3 mm	12 mm	38 mm	TC12709	18.55	TC12810	23.60
3.5 mm	4 mm	12 mm	50 mm	TC12711	22.85	TC12812	28.50
4.0 mm	4 mm	14 mm	50 mm	TC12713	22.85	TC12814	28.50
4.5 mm	6 mm	16 mm	50 mm	TC12715	20.97	TC12816	34.75
5.0 mm	6 mm	16 mm	50 mm	TC12717	28.00	TC12818	34.80
5.5 mm	6 mm	16 mm	50 mm	TC12719	28.00	TC12820	34.80
6.0 mm	6 mm	19 mm	50 mm	TC12721	29.15	TC12822	36.00
6.5 mm	8 mm	19 mm	63 mm	TC12723	33.20	TC12824	40.90
7.0 mm	8 mm	19 mm	63 mm	TC12725	24.77	TC12826	40.90
7.5 mm	8 mm	19 mm	63 mm	TC12727	34.55	TC12828	42.60
8.0 mm	8 mm	20 mm	63 mm	TC12729	34.65	TC12830	42.60
9.0 mm	10 mm	22 mm	75 mm	TC12731	48.35	TC12832	60.35
10.0 mm	10 mm	22 mm	75 mm	TC12733	63.25	TC12834	75.30
11.0 mm	12 mm	25 mm	75 mm	TC12735	67.50	TC12836	61.07
12.0 mm	12 mm	25 mm	75 mm	TC12737	70.40	TC12838	84.40
14.0 mm	14 mm	32 mm	89 mm	TC12739	119.00	TC12840	136.40
16.0 mm	16 mm	32 mm	89 mm	TC12741	135.00	TC12842	116.87
18.0 mm	18 mm	38 mm	100 mm	TC12743	138.47	TC12844	205.40
20.0 mm	20 mm	38 mm	100 mm	TC12745	219.67	TC12846	318.00
25.0 mm	25 mm	38 mm	100 mm			TC12848	309.07

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Corner Radius - 30° Helix



- Offered in stub, regular, long, and extra long length styles
- Corner radius for increased edge strength
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
$D1^{+.000" \atop - .002"}$	$D2 (h6)$	$R^{+.001" \atop - .001"}$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.005	1/4	1-1/2	TC73802	10.55	TC73902	15.55
	1/8	.005	1/2	1-1/2	TC74001	14.50	TC74102	19.50
	1/8	.005	3/4	2-1/4	TC74366	19.75	TC74466	25.15
	1/8	.005	1	3	TC74580	22.35	TC74680	27.70
	1/8	.010	1/4	1-1/2	TC73803	10.55	TC73903	15.55
	1/8	.010	1/2	1-1/2	TC74002	14.50	TC74103	19.50
	1/8	.010	3/4	2-1/4	TC74367	19.75	TC74467	25.15
	1/8	.010	1	3	TC74581	22.35	TC74681	27.70
	1/8	.015	1/4	1-1/2	TC73804	10.55	TC73904	15.55
	1/8	.015	1/2	1-1/2	TC74003	14.50	TC74104	19.50
	1/8	.015	3/4	2-1/4	TC74301	19.75	TC74401	25.15
	1/8	.015	1	3	TC74501	22.35	TC74601	27.70
	1/8	.020	1/4	1-1/2	TC73806	10.55	TC73906	15.55
	1/8	.020	1/2	1-1/2	TC74005	14.50	TC74106	19.50
	1/8	.020	3/4	2-1/4	TC74302	19.75	TC74402	25.15
	1/8	.020	1	3	TC74502	22.35	TC74602	27.70
	1/8	.030	1/4	1-1/2	TC73808	10.55	TC73908	15.55
	1/8	.030	1/2	1-1/2	TC74007	14.50	TC74108	19.50
	1/8	.030	3/4	2-1/4	TC74303	19.75	TC74403	25.15
	1/8	.030	1	3	TC74503	22.35	TC74603	27.70
3/16	3/16	.005	3/8	2	TC73809	16.55	TC73909	22.20
	3/16	.005	5/8	2	TC74008	15.85	TC74109	21.45
	3/16	.005	3/4	2-1/2	TC74368	22.80	TC74468	28.85
	3/16	.005	1-1/8	3	TC74582	24.50	TC74682	30.55
	3/16	.010	3/8	2	TC73811	16.55	TC73911	22.20
	3/16	.010	5/8	2	TC74010	15.85	TC74111	21.45
	3/16	.010	3/4	2-1/2	TC74369	22.80	TC74469	28.85
	3/16	.010	1-1/8	3	TC74583	24.50	TC74683	30.55
	3/16	.015	3/8	2	TC73810	16.55	TC73910	22.20
	3/16	.015	5/8	2	TC74009	15.85	TC74110	21.45
	3/16	.015	3/4	2-1/2	TC74304	22.80	TC74404	28.85
	3/16	.015	1-1/8	3	TC74504	24.50	TC74604	30.55
	3/16	.020	3/8	2	TC73812	16.55	TC73912	22.20
	3/16	.020	5/8	2	TC74011	15.85	TC74112	21.45
	3/16	.020	3/4	2-1/2	TC74305	22.80	TC74405	28.85
	3/16	.020	1-1/8	3	TC74505	24.50	TC74605	30.55
	3/16	.030	3/8	2	TC73814	16.55	TC73914	22.20
	3/16	.030	5/8	2	TC74013	15.85	TC74114	21.45
	3/16	.030	3/4	2-1/2	TC74306	22.80	TC74406	28.85
	3/16	.030	1-1/8	3	TC74506	24.50	TC74606	30.55

For technical information, see page 115

continued on next page

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Corner Radius - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+.000"} - .002"	D ₂ (h6)	R ₁ ^{+.001"} - .001"	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
1/4	1/4	.005	1/2	2	TC73815	21.15	TC73915	28.00
	1/4	.005	3/4	2-1/2	TC74014	21.70	TC74115	28.95
	1/4	.005	1	4	TC74372	33.50	TC74472	41.35
	1/4	.005	1-1/8	3	TC74370	32.00	TC74470	39.25
	1/4	.005	1-1/2	4	TC74584	34.20	TC74684	41.95
	1/4	.005	1-1/2	6	TC74586	45.90	TC74686	54.95
	1/4	.010	1/2	2	TC73817	21.15	TC73917	28.00
	1/4	.010	3/4	2-1/2	TC74016	21.70	TC74117	28.95
	1/4	.010	1	4	TC74373	33.50	TC74473	41.35
	1/4	.010	1-1/8	3	TC74371	32.00	TC74471	39.25
	1/4	.010	1-1/2	4	TC74585	34.20	TC74685	41.95
	1/4	.010	1-1/2	6	TC74587	45.90	TC74687	54.95
	1/4	.015	1/2	2	TC73816	21.15	TC73916	28.00
	1/4	.015	3/4	2-1/2	TC74015	21.70	TC74116	28.95
	1/4	.015	1	4	TC74312	33.50	TC74412	41.35
	1/4	.015	1-1/8	3	TC74307	32.00	TC74407	39.25
	1/4	.015	1-1/2	4	TC74507	34.20	TC74607	41.95
	1/4	.015	1-1/2	6	TC74512	45.90	TC74612	54.95
	1/4	.020	1/2	2	TC73818	21.15	TC73918	28.00
	1/4	.020	3/4	2-1/2	TC74017	21.70	TC74118	28.95
	1/4	.020	1	4	TC74313	33.50	TC74413	41.35
	1/4	.020	1-1/8	3	TC74308	32.00	TC74408	39.25
	1/4	.020	1-1/2	4	TC74508	34.20	TC74608	41.95
	1/4	.020	1-1/2	6	TC74513	45.90	TC74613	54.95
	1/4	.030	1/2	2	TC73820	21.15	TC73920	28.00
	1/4	.030	3/4	2-1/2	TC74019	21.70	TC74120	28.95
	1/4	.030	1	4	TC74314	33.50	TC74414	41.35
	1/4	.030	1-1/8	3	TC74309	32.00	TC74409	39.25
	1/4	.030	1-1/2	4	TC74509	34.20	TC74609	41.95
	1/4	.030	1-1/2	6	TC74514	45.90	TC74614	54.95
	1/4	.045	1/2	2	TC73822	21.15	TC73922	28.00
	1/4	.045	3/4	2-1/2	TC74021	21.70	TC74122	28.95
	1/4	.045	1	4	TC74315	33.50	TC74415	41.35
	1/4	.045	1-1/8	3			TC74410	39.25
	1/4	.045	1-1/2	4			TC74610	41.95
	1/4	.045	1-1/2	6	TC74515	45.90	TC74615	41.07
	1/4	.060	1/2	2	TC73824	21.15	TC73924	28.00
	1/4	.060	3/4	2-1/2	TC74023	21.70	TC74124	28.95
	1/4	.060	1	4	TC74316	33.50	TC74416	41.35
	1/4	.060	1-1/8	3	TC74311	32.00	TC74411	39.25
	1/4	.060	1-1/2	4	TC74511	34.20	TC74611	41.95
	1/4	.060	1-1/2	6	TC74516	45.90	TC74616	54.95
5/16	5/16	.015	1/2	2	TC73826	26.35	TC73926	34.45
	5/16	.015	13/16	2-1/2	TC74025	33.35	TC74126	42.05
	5/16	.015	1-1/8	3	TC74317	36.30	TC74417	44.95
	5/16	.015	1-5/8	4	TC74517	46.80	TC74617	56.15
	5/16	.020	1/2	2			TC73928	34.45
	5/16	.020	13/16	2-1/2	TC74027	33.35	TC74128	42.05
	5/16	.020	1-1/8	3	TC74318	36.30	TC74418	44.95

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Corner Radius - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+.000"} - .002"	D ₂ (h6)	R ^{+.001"} - .001"	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
5/16	5/16	.020	1-5/8	4	TC74518	46.80	TC74618	56.15
	5/16	.030	1/2	2	TC73830	26.35	TC73930	34.45
	5/16	.030	13/16	2-1/2	TC74029	33.35	TC74130	42.05
	5/16	.030	1-1/8	3	TC74319	36.30	TC74419	44.95
	5/16	.030	1-5/8	4	TC74519	46.80	TC74619	56.15
	5/16	.045	1/2	2	TC73832	26.35	TC73932	34.45
	5/16	.045	13/16	2-1/2	TC74031	33.35	TC74132	42.05
	5/16	.045	1-1/8	3	TC74320	36.30	TC74420	44.95
	5/16	.045	1-5/8	4	TC74520	46.80	TC74620	56.15
	5/16	.060	1/2	2	TC73834	26.35	TC73934	34.45
	5/16	.060	13/16	2-1/2	TC74033	33.35	TC74134	42.05
	5/16	.060	1-1/8	3	TC74321	36.30	TC74421	44.95
	5/16	.060	1-5/8	4	TC74521	46.80	TC74621	56.15
3/8	3/8	.010	5/8	2	TC73835	34.05	TC73935	43.70
	3/8	.010	1	2-1/2	TC74034	39.60	TC74135	49.90
	3/8	.010	1	4	TC74375	57.00	TC74475	68.05
	3/8	.010	1-1/8	3	TC74374	46.60	TC74474	56.95
	3/8	.010	1-1/2	6	TC74589	72.50	TC74689	85.50
	3/8	.010	1-3/4	4	TC74588	51.10	TC74688	62.20
	3/8	.015	5/8	2	TC73836	34.05	TC73936	43.70
	3/8	.015	1	2-1/2	TC74035	39.60	TC74136	49.90
	3/8	.015	1	4	TC74327	57.00	TC74427	68.05
	3/8	.015	1-1/8	3	TC74322	46.60	TC74422	56.95
	3/8	.015	1-1/2	6	TC74527	72.50	TC74627	85.50
	3/8	.015	1-3/4	4	TC74522	51.10	TC74622	62.20
	3/8	.020	5/8	2	TC73838	34.05	TC73938	43.70
	3/8	.020	1	2-1/2	TC74037	39.60	TC74138	49.90
	3/8	.020	1	4	TC74328	57.00	TC74428	68.05
	3/8	.020	1-1/8	3	TC74323	46.60	TC74423	56.95
	3/8	.020	1-1/2	6	TC74528	72.50	TC74628	85.50
	3/8	.020	1-3/4	4	TC74523	51.10	TC74623	62.20
	3/8	.030	5/8	2	TC73840	34.05	TC73940	43.70
	3/8	.030	1	2-1/2	TC74039	39.60	TC74140	49.90
	3/8	.030	1	4	TC74329	57.00	TC74429	68.05
	3/8	.030	1-1/8	3	TC74324	46.60	TC74424	56.95
	3/8	.030	1-1/2	6	TC74529	72.50	TC74629	85.50
	3/8	.030	1-3/4	4	TC74524	51.10	TC74624	62.20
	3/8	.045	5/8	2	TC73842	34.05	TC73942	43.70
	3/8	.045	1	2-1/2	TC74041	39.60	TC74142	49.90
	3/8	.045	1	4	TC74330	57.00	TC74430	50.97
	3/8	.045	1-1/8	3	TC74325	46.60	TC74425	56.95
	3/8	.045	1-1/2	6	TC74530	72.50	TC74630	85.50
	3/8	.045	1-3/4	4	TC74525	51.10	TC74625	62.20
	3/8	.060	5/8	2	TC73844	34.05	TC73944	43.70
	3/8	.060	1	2-1/2	TC74043	39.60	TC74144	49.90
	3/8	.060	1	4	TC74331	57.00	TC74431	68.05
	3/8	.060	1-1/8	3	TC74326	46.60	TC74426	56.95
	3/8	.060	1-1/2	6	TC74531	72.50	TC74631	85.50
	3/8	.060	1-3/4	4	TC74526	51.10	TC74626	62.20
	3/8	.090	5/8	2	TC73845	34.05	TC73945	43.70

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Corner Radius - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+0.000"} -0.002"	D ₂ (h6)	R ^{+0.001"} -0.001"	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
3/8	3/8	.090	1	2-1/2	TC74044	39.60	TC74145	49.90
	3/8	.125	5/8	2	TC73847	34.05	TC73947	43.70
	3/8	.125	1	2-1/2	TC74046	39.60	TC74147	49.90
1/2	1/2	.010	5/8	2-1/2	TC73849	50.15	TC73949	64.25
	1/2	.010	1	3	TC74048	63.70	TC74149	77.80
	1/2	.010	1	4	TC74376	75.25	TC74476	90.35
	1/2	.010	1-1/2	6	TC74590	103.25	TC74690	120.75
	1/2	.010	2	4	TC74377	80.20	TC74477	95.30
	1/2	.010	3	6	TC74591	108.30	TC74691	125.85
	1/2	.015	5/8	2-1/2	TC73846	50.15	TC73946	64.25
	1/2	.015	1	3	TC74045	63.70	TC74146	77.80
	1/2	.015	1	4	TC74332	75.25	TC74432	90.35
	1/2	.015	1-1/2	6	TC74532	103.25	TC74632	120.75
	1/2	.015	2	4	TC74339	80.20	TC74439	95.30
	1/2	.015	3	6	TC74539	108.30	TC74639	125.85
	1/2	.020	5/8	2-1/2	TC73848	50.15	TC73948	64.25
	1/2	.020	1	3	TC74047	63.70	TC74148	77.80
	1/2	.020	1	4	TC74333	75.25	TC74433	90.35
	1/2	.020	1-1/2	6	TC74533	103.25	TC74633	120.75
	1/2	.020	2	4	TC74340	80.20	TC74440	95.30
	1/2	.020	3	6	TC74540	108.30	TC74640	125.85
	1/2	.030	5/8	2-1/2	TC73850	50.15	TC73950	64.25
	1/2	.030	1	3	TC74049	63.70	TC74150	77.80
	1/2	.030	1	4	TC74334	75.25	TC74434	90.35
	1/2	.030	1-1/2	6	TC74534	103.25	TC74634	120.75
	1/2	.030	2	4	TC74341	80.20	TC74441	95.30
	1/2	.030	3	6	TC74541	108.30	TC74641	125.85
	1/2	.045	5/8	2-1/2	TC73852	50.15	TC73952	64.25
	1/2	.045	1	3	TC74051	63.70	TC74152	77.80
	1/2	.045	1	4	TC74335	75.25	TC74435	90.35
	1/2	.045	1-1/2	6	TC74535	103.25	TC74635	120.75
	1/2	.045	2	4	TC74342	80.20	TC74442	95.30
	1/2	.045	3	6			TC74642	125.85
	1/2	.060	5/8	2-1/2	TC73854	50.15	TC73954	64.25
	1/2	.060	1	3	TC74053	63.70	TC74154	77.80
	1/2	.060	1	4	TC74336	75.25	TC74436	90.35
	1/2	.060	1-1/2	6	TC74536	103.25	TC74636	120.75
	1/2	.060	2	4	TC74343	80.20	TC74443	95.30
	1/2	.060	3	6	TC74543	108.30	TC74643	125.85
	1/2	.090	5/8	2-1/2	TC73856	50.15	TC73956	64.25
	1/2	.090	1	3	TC74055	63.70	TC74156	77.80
	1/2	.090	1	4	TC74337	75.25	TC74437	71.17
	1/2	.090	1-1/2	6	TC74537	103.25	TC74637	120.75
	1/2	.090	2	4	TC74344	80.20	TC74444	95.30
	1/2	.090	3	6	TC74544	108.30	TC74644	125.85
	1/2	.125	5/8	2-1/2	TC73858	50.15	TC73958	64.25
	1/2	.125	1	3	TC74057	63.70	TC74158	77.80
	1/2	.125	1	4	TC74338	75.25	TC74438	90.35
	1/2	.125	1-1/2	6	TC74538	103.25	TC74638	120.75
	1/2	.125	2	4	TC74345	80.20	TC74445	95.30
	1/2	.125	3	6	TC74545	108.30	TC74645	125.85

For technical information, see page 115

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GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Corner Radius - 30° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
D1 ^{+.000"} - .003"	D2 (h6)	R ^{+.001"} - .001"	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.015	3/4	3	TC73860	96.10	TC73960	112.45
	5/8	.015	1-1/4	3-1/2	TC74059	98.75	TC74160	116.15
	5/8	.015	2-1/4	5	TC74346	142.40	TC74446	161.15
	5/8	.015	3	6	TC74546	152.35	TC74646	137.17
	5/8	.020	3/4	3	TC73862	96.10	TC73962	112.45
	5/8	.020	1-1/4	3-1/2	TC74061	98.75	TC74162	116.15
	5/8	.020	2-1/4	5	TC74347	142.40	TC74447	161.15
	5/8	.020	3	6	TC74547	152.35	TC74647	172.65
	5/8	.030	3/4	3	TC73864	96.10	TC73964	112.45
	5/8	.030	1-1/4	3-1/2	TC74063	98.75	TC74164	116.15
	5/8	.030	2-1/4	5	TC74348	142.40	TC74448	161.15
	5/8	.030	3	6	TC74548	152.35	TC74648	172.65
	5/8	.045	3/4	3			TC73966	112.45
	5/8	.045	1-1/4	3-1/2	TC74065	98.75	TC74166	116.15
	5/8	.045	2-1/4	5	TC74349	142.40	TC74449	161.15
	5/8	.045	3	6	TC74549	152.35	TC74649	172.65
	5/8	.060	3/4	3	TC73868	96.10	TC73968	112.45
	5/8	.060	1-1/4	3-1/2	TC74067	98.75	TC74168	116.15
	5/8	.060	2-1/4	5	TC74350	142.40	TC74450	161.15
	5/8	.060	3	6	TC74550	152.35	TC74650	172.65
3/4	5/8	.090	3/4	3			TC73970	88.77
	5/8	.090	1-1/4	3-1/2	TC74069	98.75	TC74170	116.15
	5/8	.090	2-1/4	5	TC74351	142.40	TC74451	127.57
	3/4	.015	1	3	TC73872	146.05	TC73972	165.50
	3/4	.015	1-1/2	4	TC74071	146.15	TC74172	166.95
	3/4	.015	2-1/4	5	TC74352	198.50	TC74452	220.80
	3/4	.015	3	6	TC74552	212.60	TC74652	236.70
	3/4	.015	4	7	TC74559	343.45	TC74659	369.70
	3/4	.020	1	3	TC73874	146.05	TC73974	165.50
	3/4	.020	1-1/2	4	TC74073	146.15	TC74174	166.95
	3/4	.020	2-1/4	5	TC74353	198.50	TC74453	220.80
	3/4	.020	3	6	TC74553	212.60	TC74653	236.70
	3/4	.020	4	7	TC74560	343.45	TC74660	293.57
	3/4	.030	1	3	TC73876	146.05	TC73976	165.50
	3/4	.030	1-1/2	4	TC74075	146.15	TC74176	166.95
	3/4	.030	2-1/4	5	TC74354	198.50	TC74454	220.80
	3/4	.030	3	6	TC74554	212.60	TC74654	236.70
	3/4	.030	4	7	TC74561	343.45	TC74661	369.70
	3/4	.045	1	3			TC73978	165.50
	3/4	.045	1-1/2	4	TC74077	146.15	TC74178	166.95
	3/4	.045	2-1/4	5	TC74355	198.50	TC74455	220.80
	3/4	.045	3	6	TC74555	212.60	TC74655	187.57
	3/4	.045	4	7	TC74562	343.45	TC74662	326.07
	3/4	.060	1	3	TC73880	146.05	TC73980	165.50
	3/4	.060	1-1/2	4	TC74079	146.15	TC74180	166.95
	3/4	.060	2-1/4	5	TC74356	198.50	TC74456	220.80
	3/4	.060	3	6	TC74556	212.60	TC74656	236.70
	3/4	.060	4	7	TC74563	343.45	TC74663	369.70
	3/4	.090	1	3	TC73882	146.05	TC73982	130.97

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For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Corner Radius - 30° Helix (Cont.)

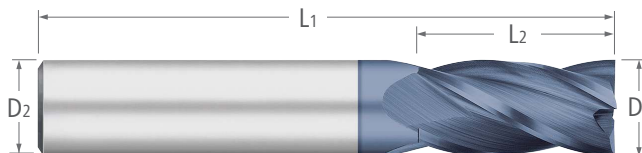
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CUTTER DIA.	SHANK DIA.	RADIUS	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
D1 ^{+.000"} _{-.003"}	D2 (h6)	R ^{+.001"} _{-.001"}	L2	L1	TOOL #	USD\$	TOOL #	USD\$
3/4	3/4	.090	1-1/2	4	TC74081	146.15	TC74182	166.95
	3/4	.090	2-1/4	5	TC74357	198.50	TC74457	220.80
	3/4	.090	3	6	TC74557	212.60	TC74657	236.70
	3/4	.090	4	7	TC74564	343.45	TC74664	326.07
	3/4	.125	1	3	TC73884	146.05	TC73984	165.50
	3/4	.125	1-1/2	4	TC74083	146.15	TC74184	166.95
	3/4	.125	2-1/4	5	TC74358	198.50	TC74458	220.80
	3/4	.125	3	6	TC74558	212.60	TC74658	236.70
	3/4	.125	4	7	TC74565	343.45	TC74665	369.70
	3/4	.250	1-1/2	4	TC74084	146.15	TC74185	166.95
	3/4	.250	2-1/4	5	TC74378	198.50	TC74478	220.80
	3/4	.250	3	6	TC74592	212.60	TC74692	236.70
1	1	.015	1-1/4	3-1/2	TC73886	226.25	TC73986	256.25
	1	.015	1-1/2	4	TC74085	276.75	TC74186	306.75
	1	.015	2-1/4	5	TC74359	291.10	TC74459	256.37
	1	.015	3	6	TC74566	358.95	TC74666	312.57
	1	.015	4	7	TC74573	491.30	TC74673	466.57
	1	.020	1-1/4	3-1/2	TC73888	226.25	TC73988	256.25
	1	.020	1-1/2	4	TC74087	276.75	TC74188	306.75
	1	.020	2-1/4	5			TC74460	323.40
	1	.020	3	6			TC74667	312.57
	1	.020	4	7	TC74574	491.30	TC74674	529.25
	1	.030	1-1/4	3-1/2	TC73890	226.25	TC73990	202.97
	1	.030	1-1/2	4	TC74089	276.75	TC74190	306.75
	1	.030	2-1/4	5	TC74361	291.10	TC74461	323.40
	1	.030	3	6	TC74568	358.95	TC74668	393.95
	1	.030	4	7	TC74575	491.30	TC74675	529.25
	1	.045	1-1/4	3-1/2			TC73992	256.25
	1	.045	1-1/2	4	TC74091	276.75	TC74192	306.75
	1	.045	2-1/4	5			TC74462	256.37
	1	.045	3	6	TC74569	358.95	TC74669	312.57
	1	.045	4	7			TC74676	420.47
	1	.060	1-1/4	3-1/2	TC73894	226.25	TC73994	256.25
	1	.060	1-1/2	4	TC74093	276.75	TC74194	306.75
	1	.060	2-1/4	5	TC74363	291.10	TC74463	323.40
	1	.060	3	6	TC74570	358.95	TC74670	393.95
	1	.060	4	7	TC74577	491.30	TC74677	529.25
	1	.090	1-1/4	3-1/2	TC73896	226.25	TC73996	202.97
	1	.090	1-1/2	4	TC74095	276.75	TC74196	306.75
	1	.090	2-1/4	5			TC74464	256.37
	1	.090	3	6	TC74571	358.95	TC74671	393.95
	1	.125	1-1/4	3-1/2	TC73898	226.25	TC73998	256.25
	1	.125	1-1/2	4	TC74097	276.75	TC74198	306.75
	1	.125	2-1/4	5	TC74365	291.10	TC74465	323.40
	1	.125	3	6	TC74572	358.95	TC74672	393.95
	1	.125	4	7	TC74579	491.30	TC74679	529.25

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Square - 30° Helix - NC Tolerance



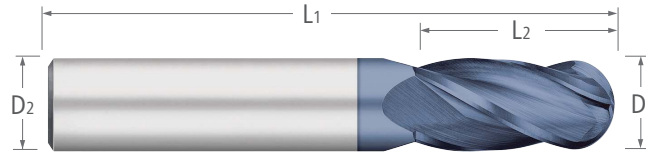
- Excellent for keyways
- Tight tolerance for precision machining
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D1^{+0.001}_{-0.000}$ "	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/16	1/8	3/16	1-1/2	TC65040	15.30	TC65060	20.35
3/32	1/8	3/8	1-1/2	TC65041	16.30	TC65061	21.30
1/8	1/8	1/2	1-1/2	TC65042	19.20	TC65062	24.25
5/32	3/16	9/16	2	TC65043	23.45	TC65063	29.10
3/16	3/16	5/8	2	TC65044	27.55	TC65064	33.20
7/32	1/4	5/8	2-1/2	TC65045	34.10	TC65065	41.35
1/4	1/4	3/4	2-1/2	TC65046	38.80	TC65066	46.05
9/32	5/16	3/4	2-1/2	TC65047	42.25	TC65067	50.95
5/16	5/16	13/16	2-1/2	TC65048	45.95	TC65068	54.55
3/8	3/8	1	2-1/2	TC65049	47.90	TC65069	58.30
7/16	7/16	1	2-3/4	TC65050	62.20	TC65070	74.30
1/2	1/2	1	3	TC65051	77.05	TC65071	91.10
5/8	5/8	1-1/4	3-1/2	TC65052	161.50	TC65072	178.90
3/4	3/4	1-1/2	4	TC65053	233.75	TC65073	254.45
1	1	1-1/2	4	TC65054	382.35	TC65074	412.40

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

4 Flute - Ball - 30° Helix - NC Tolerance



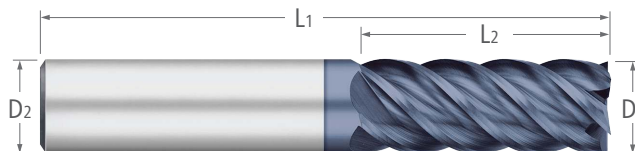
- Excellent for keyways
- Tight tolerance for precision machining
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED		AlTiN COATED	
$D1^{+0.001''}_{-0.000''}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/16	1/8	3/16	1-1/2	TC65120	18.35	TC65140	23.35
3/32	1/8	3/8	1-1/2	TC65121	19.60	TC65141	24.60
1/8	1/8	1/2	1-1/2	TC65122	23.10	TC65142	28.15
5/32	3/16	9/16	2	TC65123	28.05	TC65143	33.70
3/16	3/16	5/8	2	TC65124	33.00	TC65144	38.65
7/32	1/4	5/8	2-1/2	TC65125	40.85	TC65145	48.10
1/4	1/4	3/4	2-1/2	TC65126	46.50	TC65146	53.75
9/32	5/16	3/4	2-1/2	TC65127	50.80	TC65147	59.50
5/16	5/16	13/16	2-1/2	TC65128	55.10	TC65148	63.70
3/8	3/8	1	2-1/2	TC65129	57.45	TC65149	67.80
7/16	7/16	1	2-3/4	TC65130	74.80	TC65150	86.80
1/2	1/2	1	3	TC65131	92.50	TC65151	106.50
5/8	5/8	1-1/4	3-1/2	TC65132	193.65	TC65152	211.10
3/4	3/4	1-1/2	4	TC65133	280.40	TC65153	301.20
1	1	1-1/2	4	TC65134	458.95	TC65154	488.95

For technical information, see page 115

GENERAL PURPOSE END MILLS - CARBIDE

5 Flute - Square - 45° Helix



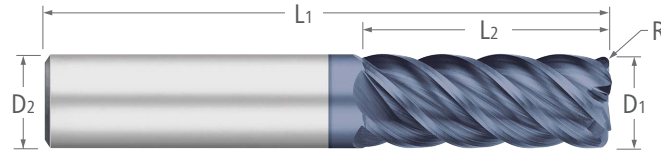
- Excellent performance in profiling and finishing applications
- Offered in stub and regular length styles
- 45° helix for faster chip removal and a better finish
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
$D1^{+.000}_{-.002}$ "	$D2$ (h6)	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/16	1/8	1/8	1-1/2			TC61487	14.50
	1/8	1/4	1-1/2			TC61489	17.35
1/32	1/8	3/16	1-1/2			TC61496	14.50
	1/8	3/8	1-1/2			TC61498	17.35
1/8	1/8	1/4	1-1/2	TC61408	9.75	TC61508	12.20
	1/8	1/2	1-1/2	TC61808	18.90	TC61908	22.60
3/16	3/16	3/8	2	TC61412	15.45	TC61512	18.35
	3/16	3/4	2	TC61812	23.80	TC61912	28.00
1/4	1/4	1/2	2	TC61416	18.70	TC61516	22.00
	1/4	3/4	2-1/2	TC61816	25.50	TC61916	30.15
5/16	5/16	1/2	2	TC61420	22.40	TC61520	27.70
	5/16	7/8	2-1/2	TC61820	30.75	TC61920	36.20
3/8	3/8	5/8	2	TC61424	36.90	TC61524	43.55
	3/8	1	2-1/2	TC61824	41.15	TC61924	48.55
7/16	7/16	5/8	2-1/2	TC61428	42.15	TC61528	49.70
1/2	1/2	5/8	2-1/2	TC61432	48.70	TC61532	57.50
	1/2	1-1/4	3	TC61832	76.90	TC61932	90.95
$D1^{+.000}_{-.003}$ "	$D2$ (h6)	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC61440	86.55	TC61540	102.90
	5/8	1-5/8	3-1/2	TC61840	145.80	TC61940	172.85
3/4	3/4	1	3	TC61448	116.65	TC61548	136.15
	3/4	1-5/8	4	TC61848	205.00	TC61948	235.00

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE

5 Flute - Corner Radius - 45° Helix



- Excellent performance in profiling and finishing applications
- 45° helix for faster chip removal and a better finish
- Corner radius for increased edge strength
- TiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		TiN COATED	
$D_1 \begin{smallmatrix} +.000" \\ -.002" \end{smallmatrix}$	$D_2 \text{ (h6)}$	$R \begin{smallmatrix} +.001" \\ -.001" \end{smallmatrix}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.010	1/4	1-1/2	TC61608	11.30	TC61708	13.60
	1/8	.010	1/2	1-1/2	TC63808	21.10	TC63908	26.05
	1/8	.020	1/4	1-1/2	TC61609	11.30	TC61709	16.35
	1/8	.020	1/2	1-1/2	TC63809	21.10	TC63909	26.10
	1/8	.030	1/4	1-1/2	TC61610	11.30	TC61710	16.35
	1/8	.030	1/2	1-1/2	TC63810	21.10	TC63910	26.10
3/16	3/16	.010	3/8	2	TC61612	17.40	TC61712	20.55
	3/16	.010	3/4	2	TC63812	26.50	TC63912	31.15
	3/16	.020	3/8	2	TC61613	17.40	TC61713	23.00
	3/16	.020	3/4	2	TC63813	26.50	TC63913	32.10
	3/16	.030	3/8	2	TC61614	17.40	TC61714	23.00
	3/16	.030	3/4	2	TC63814	26.50	TC63914	32.10
1/4	1/4	.010	1/2	2	TC61615	20.90	TC61715	27.65
	1/4	.010	3/4	2-1/2	TC63815	28.50	TC63915	35.75
	1/4	.020	1/2	2	TC61616	20.90	TC61716	24.45
	1/4	.020	3/4	2-1/2	TC63816	28.50	TC63916	33.55
	1/4	.030	1/2	2	TC61617	20.90	TC61717	27.65
	1/4	.030	3/4	2-1/2	TC63817	28.50	TC63917	35.75
5/16	5/16	.010	1/2	2	TC61618	25.05	TC61718	33.15
	5/16	.010	7/8	2-1/2	TC63818	34.35	TC63918	43.05
	5/16	.020	1/2	2	TC61620	25.05	TC61720	31.00
	5/16	.020	7/8	2-1/2	TC63820	34.35	TC63920	40.45
	5/16	.030	1/2	2	TC61621	25.05	TC61721	33.15
	5/16	.030	7/8	2-1/2	TC63821	34.35	TC63921	43.05
3/8	3/8	.010	5/8	2	TC61622	41.20	TC61722	50.95
	3/8	.010	1	2-1/2	TC63822	46.05	TC63922	56.35
	3/8	.020	5/8	2	TC61624	41.20	TC61724	48.50
	3/8	.020	1	2-1/2	TC63824	46.05	TC63924	54.25
	3/8	.030	5/8	2	TC61625	41.20	TC61725	50.95
	3/8	.030	1	2-1/2	TC63825	46.05	TC63925	56.35
7/16	7/16	.020	5/8	2-1/2	TC61628	47.15	TC61728	55.60
1/2	1/2	.020	5/8	2-1/2	TC61629	54.40	TC61729	68.50
	1/2	.020	1-1/4	3	TC63826	85.85	TC63926	99.90
	1/2	.030	5/8	2-1/2	TC61630	54.40	TC61730	68.50
	1/2	.030	1-1/4	3	TC63827	85.85	TC63927	99.90
	1/2	.040	5/8	2-1/2	TC61632	54.40	TC61732	64.20
	1/2	.040	1-1/4	3	TC63832	85.85	TC63932	99.90

continued on next page

For technical information, see page 116

GENERAL PURPOSE END MILLS - CARBIDE

5 Flute - Corner Radius - 45° Helix (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+0.000"} -0.003"	D ₂ (h6)	R ^{+0.001"} -0.001"	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.020	3/4	3	TC61633	92.50	TC61733	108.75
	5/8	.030	3/4	3	TC61634	92.50	TC61734	108.75
	5/8	.040	3/4	3	TC61640	92.50	TC61740	108.75
	5/8	.040	1-5/8	3-1/2	TC63840	155.65	TC63940	184.60
3/4	3/4	.020	1	3	TC61641	124.60	TC61741	144.00
	3/4	.020	1-5/8	4	TC63841	218.90	TC63941	239.70
	3/4	.030	1	3	TC61642	124.60	TC61742	144.00
	3/4	.030	1-5/8	4	TC63842	218.90	TC63942	239.70
	3/4	.040	1	3	TC61648	124.60	TC61748	144.00
	3/4	.040	1-5/8	4	TC63848	218.90	TC63948	250.95

End Mills

Roughers

For Aluminum

Carbide

Cobalt



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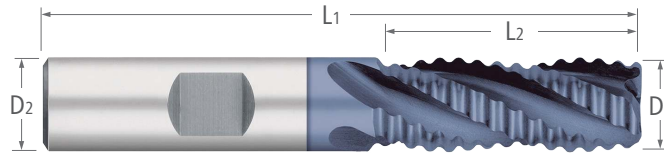
titancuttingtools.com/find-a-distributor-page

For technical information, see page 116

Trust in Titan USA

GENERAL PURPOSE END MILLS - COBALT

Roughers - Coarse Pitch - 30° Helix



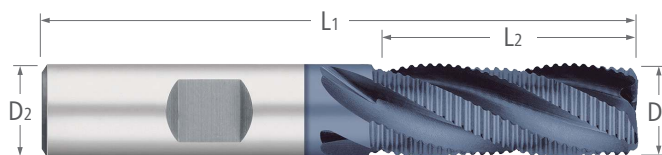
- Coarse pitch for increased metal removal rates (MRR) with decreased horse power requirements
- Weldon flat
- M42 cobalt
- AlTiN coating offers increased wear and heat resistance
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	FLUTES	OAL	UNCOATED		AlTiN COATED	
$D1^{+0.005}_{-0.005}$	$D2^{+0.001}_{-0.005}$	$L2$		$L1$	TOOL #	USD\$	TOOL #	USD\$
1/4	3/8	5/8	4	2-7/16	TE63404	70.60	TE63504	78.00
5/16	3/8	3/4	4	2-1/2	TE63409	77.55	TE63509	85.00
3/8	3/8	3/4	4	2-1/2	TE63414	81.30	TE63514	88.70
7/16	3/8	1	4	2-11/16	TE63419	81.75	TE63519	89.20
1/2	1/2	1	4	3	TE63428	81.45	TE63528	90.95
1/2	1/2	1-1/4	4	3-1/4	TE63429	84.00	TE63529	94.00
5/8	5/8	1-5/8	4	3-3/4	TE63436	107.85	TE63536	119.65
3/4*	3/4	1-5/8	4	3-7/8	TE63445	117.80	TE63545	131.60
7/8*	3/4	1-7/8	5	4-1/8	TE63454	166.60	TE63554	182.70
1*	1	2	5	4-1/2	TE63466	155.50	TE63566	176.25
1-1/8*	1	2	6	4-1/2	TE63471	249.35	TE63571	198.07
1-1/4*	1-1/4	2	6	4-1/2	TE63475	269.10	TE63575	296.50
1-1/2*	1-1/4	2	6	4-1/2	TE63483	319.00	TE63583	346.50
2*	1-1/4	2	8	4-1/2	TE63492	450.90	TE63592	347.17

*Non Center Cutting

GENERAL PURPOSE END MILLS - COBALT

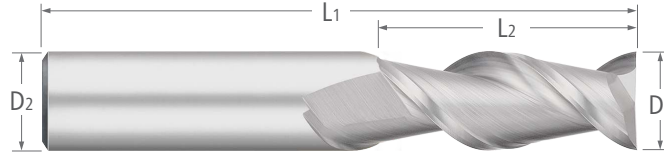
Roughers - Fine Pitch - 30° Helix



- Fine pitch for maximized material removal rates (MRR) and minimized vibration or chatter
- Weldon flat
- M42 cobalt
- AlTiN coating offers increased wear and heat resistance
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	FLUTES	OAL	UNCOATED		AlTiN COATED	
$D_1^{+0.005}_{-0.005}$	$D_2^{+0.0001}_{-0.0005}$	L_2		L_1	TOOL #	USD\$	TOOL #	USD\$
1/4	3/8	5/8	4	2-7/16	TE66104	70.60	TE66204	78.00
5/16	3/8	3/4	4	2-1/2	TE66109	77.55	TE66209	85.00
3/8	3/8	3/4	4	2-1/2	TE66114	81.75	TE66214	89.20
7/16	3/8	1	4	2-11/16	TE66119	82.15	TE66219	89.60
1/2	1/2	1-1/4	4	3-1/4	TE66129	80.95	TE66229	90.95
5/8	5/8	1-5/8	4	3-3/4	TE66136	107.85	TE66236	119.65
3/4*	3/4	1-5/8	4	3-7/8	TE66145	117.80	TE66245	131.60
7/8*	3/4	1-7/8	5	4-1/8	TE66154	155.80	TE66254	171.85
1*	1	2	5	4-1/2	TE66166	155.55	TE66266	176.40
1-1/8*	1	2	6	4-1/2	TE66171	267.40	TE66271	211.17
1-1/4*	1-1/4	2	6	4-1/2	TE66175	269.10	TE66275	215.47
1-1/2*	1-1/4	2	6	4-1/2	TE66183	337.15		
2*	1-1/4	2	8	4-1/2	TE66192	483.25	TE66292	370.57

*Non Center Cutting

GENERAL PURPOSE END MILLS - COBALT - FOR ALUMINUM**2 Flute - Square - 40° Helix**

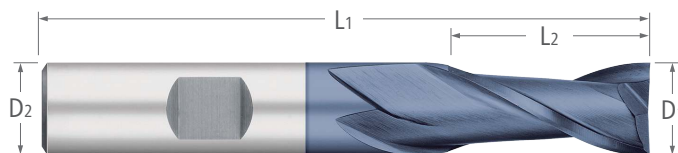
- Designed for high speed slotting and profiling in aluminum and non-ferrous materials
- 2 flutes
- 40° helix for improved chip evacuation and surface finish
- M42 cobalt
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	UNCOATED	
$D_1^{+0.0015"}_{-0.0000"}\)$	$D_2 (h6)$	L_2	L_1	TOOL #	USD\$
3/16	3/8	7/16	2-5/16	TE80912	28.40
1/4	3/8	5/8	2-7/16	TE80916	33.45
	3/8	1-1/4	3-1/16	TE80917	35.65
5/16	3/8	9/16	2-5/16	TE80920	29.10
	3/8	1-3/8	3-1/8	TE80921	33.85
3/8	3/8	9/16	2-5/16	TE80924	29.00
	3/8	1-1/2	3-1/4	TE80925	33.85
1/2	1/2	1	3	TE80932	42.60
	1/2	2	4	TE80933	54.00

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GENERAL PURPOSE END MILLS - COBALT

2 Flute - Square - 30° Helix



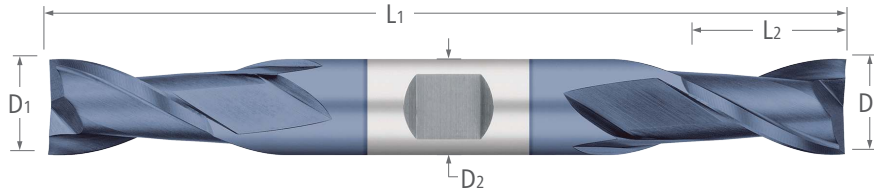
- Center cutting
- M42 cobalt
- AlTiN coating offers increased wear and heat resistance
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
$D_1^{+0.0015''}_{-0.0000''}$	$D_2^{-0.0001''}_{-0.0005''}$	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
1/8	3/8	3/8	2-5/16	TE82701	29.05	TE82802	37.20
3/16	3/8	7/16	2-5/16	TE82705	29.05	TE82806	37.20
1/4	3/8	1/2	2-5/16	TE82709	36.70	TE82810	37.20
5/16	3/8	9/16	2-5/16	TE82713	36.70	TE82814	37.20
3/8	3/8	9/16	2-5/16	TE82715	29.05	TE82816	37.20
7/16	3/8	13/16	2-1/2	TE82717	39.95	TE82818	50.70
1/2	3/8	13/16	2-1/2	TE82719	49.25	TE82820	51.35
	1/2	1	3	TE82721	42.45	TE82822	54.30
9/16	1/2	1-1/8	3-1/8	TE82723	47.75	TE82824	61.15
5/8	1/2	1-1/8	3-1/8	TE82725	65.05	TE82826	75.95
	5/8	1-5/16	3-7/16	TE82727	54.30	TE82828	69.50
3/4	1/2	1-5/16	3-5/16	TE82729	76.35	TE82830	79.55
	5/8	1-5/16	3-7/16	TE82731	76.35	TE82832	79.55
	3/4	1-5/16	3-9/16	TE82733	76.35	TE82834	79.55
13/16	5/8	1-1/2	3-5/8	TE82735	76.50	TE82836	68.37
	3/4	1-1/2	3-3/4	TE82737	77.00	TE82838	98.10
7/8	3/4	1-1/2	3-3/4	TE82741	84.65	TE82842	100.70
	7/8	1-1/2	3-3/4	TE82743	84.65	TE82844	102.65
15/16	5/8	1-1/2	3-5/8	TE82745	97.45	TE82846	79.87
	3/4	1-1/2	3-3/4	TE82747	103.90	TE82848	118.85
1	3/4	1-1/2	3-3/4	TE82753	105.10	TE82854	110.85
	1	1-5/8	4-1/8	TE82757	120.55	TE82858	143.90
1-1/8	1	1-5/8	4-1/8	TE82761	154.60	TE82862	129.37
1-1/4	1	1-5/8	4-1/8	TE82765	180.40	TE82866	214.15
1-1/2	1-1/4	1-5/8	4-1/8	TE82773	219.65	TE82874	259.35

For technical information, see page 117

GENERAL PURPOSE END MILLS - COBALT

2 Flute - Square - 30° Helix - Double-Ended



- Double-ended
- Center cutting
- Weldon flat
- ALTiN coating offers increased wear and heat resistance
- M42 cobalt
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		ALTiN COATED	
$D1_{+0.0000}^{-0.0015}$	$D2_{-0.0001}^{-0.0005}$	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/8	3/8	3/8	3-1/16	TE81701	44.80	TE81802	56.25
5/32	3/8	7/16	3-1/8	TE81703	47.60	TE81804	59.55
3/16	3/8	7/16	3-1/4	TE81705	44.80	TE81806	56.25
7/32	3/8	1/2	3-1/4	TE81707	47.60	TE81808	59.55
1/4	3/8	1/2	3-3/8	TE81709	45.00	TE81810	56.50
9/32	3/8	9/16	3-3/8	TE81711	47.60	TE81812	59.55
5/16	3/8	9/16	3-1/2	TE81713	52.65	TE81814	64.55
11/32	3/8	9/16	3-1/2	TE81715	47.60	TE81816	43.37
3/8*	3/8	9/16	3-1/2	TE81717	45.00	TE81818	56.50
13/32	1/2	13/16	4-1/8	TE81719	59.50	TE81820	76.25
7/16	1/2	13/16	4-1/8	TE81721	68.55	TE81822	86.00
1/2*	1/2	13/16	3-3/4	TE81725	68.85	TE81826	84.40
9/16	5/8	1-1/8	5	TE81727	88.00	TE81828	78.97
5/8*	5/8	1-1/8	5	TE81729	99.70	TE81830	120.00
3/4*	3/4	1-5/16	5	TE81733	120.70	TE81834	143.85
7/8*	7/8	1-9/16	5-1/2	TE81737	140.95	TE81838	125.67
1*	1	1-5/8	5-7/8	TE81741	197.15	TE81842	211.65

*Tolerance is +.000"/-.0025

GENERAL PURPOSE END MILLS - COBALT

4 & 6 Flute - Square - 30° Helix



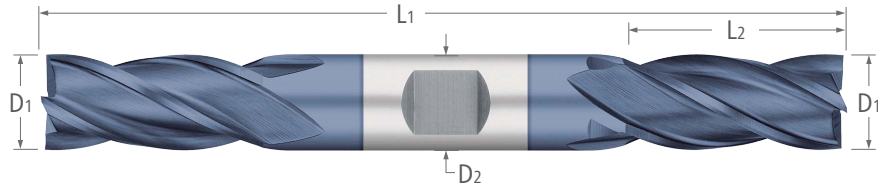
- Center cutting
- Stocked in 4 and 6 flute options
- Weldon flat
- AlTiN coating offers increased wear and heat resistance
- M42 cobalt
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	FLUTES	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0015" / -.0000"}$	$D_2^{-.0001" / -.0005"}$	L_2		L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	3/8	3/8	4	2-5/16	TE81201	30.05	TE81302	37.80
5/32	3/8	7/16	4	2-5/16	TE81203	40.50	TE81304	51.10
3/16	3/8	1/2	4	2-3/8	TE81205	30.05	TE81306	37.80
7/32	3/8	1/2	4	2-3/8	TE81207	40.50	TE81308	51.10
1/4	3/8	5/8	4	2-7/16	TE81209	30.15	TE81310	37.60
9/32	3/8	11/16	4	2-1/2	TE81211	40.50	TE81312	51.10
5/16	3/8	3/4	4	2-1/2	TE81213	30.15	TE81314	37.60
11/32	3/8	3/4	4	2-1/2	TE81215	41.20	TE81316	52.05
3/8	3/8	3/4	4	2-1/2	TE81217	30.15	TE81318	37.60
13/32	3/8	1	4	2-11/16	TE81219	60.40	TE81320	67.80
7/16	3/8	1	4	2-11/16	TE81221	39.90	TE81322	50.65
15/32	3/8	1	4	2-11/16	TE81223	63.70	TE81324	51.57
1/2	3/8	1	4	2-11/16	TE81225	49.05	TE81326	51.20
	1/2	1-1/4	4	3-1/4	TE81227	40.10	TE81328	50.95
17/32	1/2	1-3/8	4	3-3/8	TE81229	74.75	TE81330	85.55
9/16	1/2	1-3/8	4	3-3/8	TE81231	47.80	TE81332	61.45
5/8	1/2	1-3/8	4	3-3/8	TE81233	54.45	TE81334	66.95
	5/8	1-5/8	4	3-3/4	TE81235	61.80	TE81336	74.40
11/16	1/2	1-5/8	4	3-5/8	TE81237	65.35	TE81338	77.60
	5/8	1-5/8	4	3-3/4	TE81239	67.20	TE81340	79.70
3/4	1/2	1-5/8	4	3-5/8	TE81241	93.10	TE81342	94.15
	5/8	1-5/8	4	3-3/4	TE81243	93.10	TE81344	94.15
	3/4	1-5/8	4	3-7/8	TE81245	79.10	TE81346	94.00
13/16	3/4	1-7/8	4	4-1/8	TE81247	87.40	TE81348	106.35
7/8	3/4	1-7/8	4	4-1/8	TE81249	86.40	TE81350	105.95
	7/8	1-7/8	4	4-1/8	TE81251	86.40	TE81352	105.85
15/16	3/4	1-7/8	4	4-1/8	TE81253	109.15	TE81354	125.20
1	3/4	1-7/8	4	4-1/8	TE81257	114.60	TE81358	120.45
	1	2	4	4-1/2	TE81261	103.55	TE81362	126.80
1-1/8	3/4	1-5/8	6	3-7/8	TE81265	153.10	TE81366	174.60
1-1/4	1	2	6	4-1/2	TE81269	166.35	TE81370	195.25
	1-1/4	2	6	4-1/2	TE81273	170.30	TE81374	144.17
1-3/8	3/4	2	6	4-1/4	TE81275	237.60	TE81376	260.90
1-1/2	1	2	6	4-1/2	TE81277	270.05	TE81378	293.25
	1-1/4	2	4	4-1/2	TE81279	222.00	TE81380	181.37
1-5/8	1-1/4	2	6	4-1/2	TE81283	361.30	TE81384	388.75
2	1-1/4	2	6	4-1/2	TE81291	409.45	TE81392	317.17

For technical information, see page 117

GENERAL PURPOSE END MILLS - COBALT

4 Flute - Square - 30° Helix - Double-Ended



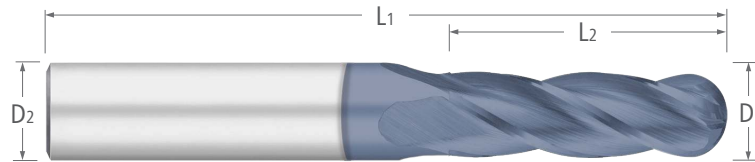
- Double-ended
- Center cutting
- Weldon flat
- AlTiN coating offers increased wear and heat resistance
- M42 cobalt
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0000/-0.0015}$	$D_2^{-.0001/-0.0005}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	3/8	3/8	3-1/16	TE82301	45.30	TE82402	56.80
5/32	3/8	7/16	3-1/8	TE82303	47.80	TE82404	59.25
3/16	3/8	1/2	3-1/4	TE82305	45.30	TE82406	56.80
7/32	3/8	9/16	3-1/4	TE82307	47.80	TE82408	59.25
1/4	3/8	5/8	3-3/8	TE82309	45.60	TE82410	57.10
9/32	3/8	11/16	3-3/8	TE82311	47.80	TE82412	59.25
5/16	3/8	3/4	3-1/2	TE82313	53.15	TE82414	57.45
3/8*	3/8	3/4	3-1/2	TE82317	45.60	TE82418	57.10
13/32	1/2	1	4-1/8	TE82319	70.00	TE82420	63.67
7/16	1/2	1	4-1/8	TE82321	68.10	TE82422	84.85
1/2*	1/2	1	4-1/8	TE82325	68.40	TE82426	85.15
9/16	5/8	1-3/8	5	TE82327	90.05	TE82428	110.25
5/8*	5/8	1-3/8	5	TE82329	90.40	TE82430	106.75
3/4*	3/4	1-5/8	5-5/8	TE82333	119.60	TE82434	145.70
7/8*	7/8	1-7/8	6-1/8	TE82337	140.35		
1*	1	1-7/8	6-3/8	TE82341	170.25	TE82442	154.07

*Tolerance is $+.0000/-0.0025$

GENERAL PURPOSE END MILLS - COBALT

4 Flute - Ball - 30° Helix



- Center cutting
- AlTiN coating offers increased wear and heat resistance
- M42 cobalt
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	AlTiN COATED	
$D_1^{+0.0005"}_{-0.0005"}$	D_2	L_2	L_1	TOOL #	USD\$
1/8	3/8	3/8	2-5/16	TE81900	45.50
1/4	3/8	3/4	2-9/16	TE81902	52.40
5/16	3/8	1	2-3/4	TE81904	52.40
3/8	3/8	1	2-3/4	TE81906	52.40
1/2	3/8	1	2-11/16	TE81908	69.15
1/2	1/2	1-1/4	3-1/4	TE81910	77.25
$D_1^{+0.001"}_{-0.001"}$	D_2	L_2	L_1	TOOL #	USD\$
3/4	3/4	1-5/8	3-7/8	TE81918	115.50

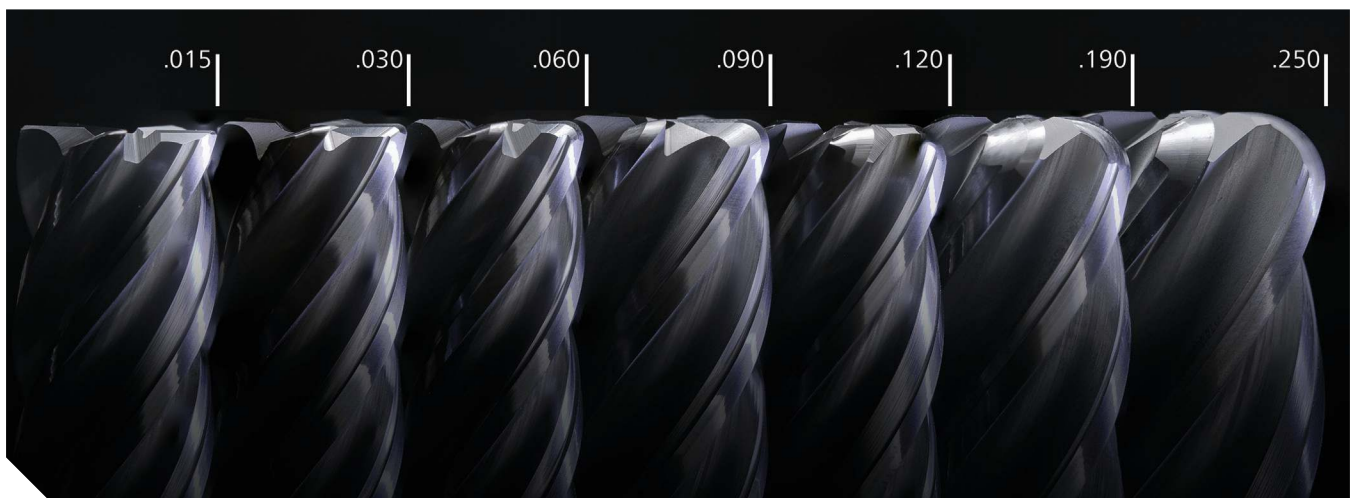


TITAN's VI-PRO® is a High Performance, carbide end mill, that incorporates the ultimate in variable index geometry. Our flute configuration produces a harmonics shift, resulting in minimal chatter and an exceptional finish.

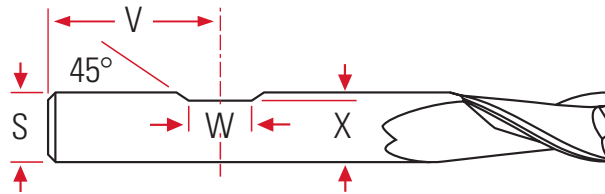
- 4, 5 and 6 flute square and corner radius chipbreakers
- 7 flute square and corner radius
- Post polished AlCrO-MAX coating covers a wide range of materials
- Precision Manufactured in the USA
- Used in all slotting, roughing, profiling and finishing applications
- High performance, chatter free machining provides versatility in use for all ferrous materials
- Designed for use in Alloy steels, Inconel, Cast Iron, Titanium, Stainless Steel, High Temp and all other exotic materials up to 50 Rc
- Enables higher SFM and heavier chip loads
- Eccentric relief on the cutting edge provides enhanced edge strength
- Available in 4, 5, 6, 7 Flute - stub, regular, long & extra long lengths
- Available in Square End, Ball Nose and various Corner Radius sizes
- 4 flute recommended for slotting up to 1 x Diameter

OUTPERFORM WITH CORNER RADIUS VI-PRO®

The sharp corner of an end mill is the weakest point on the tool. The corner radius design eliminates this vulnerability which reduces chipping and provides longer tool life. VI-PRO® tools are available with corner radii starting at .010" to .250". Longer tool life means increased productivity which has real impact on your bottom line.



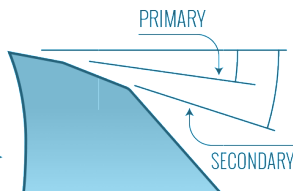
VI-PRO® WELDON FLAT SPECIFICATIONS



	Stub Length				Regular Length				Long Length				Extra Long Length			
S	V	W		X	V	W		X	V	W		X	V	W		X
Shank Dia.		Min.	Max.			Min.	Max.			Min.	Max.			Min.	Max.	
1/2 (1-1/4 LOC)	-	-	-	-	.750	.330	.332	.440	-	-	-	-	-	-	-	-
1/2 (2 LOC)	-	-	-	-	-	-	-	-	.875	.330	.332	.440	-	-	-	-
1/2	.750	.330	.332	.440	.875	.330	.332	.440	1.250	.330	.332	.440	1.500	.330	.332	.440
5/8 (1-1/4 LOC)	-	-	-	-	1.250	.400	.402	.560	-	-	-	-	-	-	-	-
5/8	.750	.400	.402	.560	.875	.400	.402	.560	1.250	.400	.402	.560	1.500	.400	.402	.560
3/4	.750	.455	.457	.675	.875	.455	.457	.675	1.250	.455	.457	.675	1.500	.455	.457	.675
1 (1-1/2 LOC)	-	-	-	-	1.375	.515	.517	.925	-	-	-	-	-	-	-	-
1	-	-	-	-	0.875	.515	.517	.925	1.250	.515	.517	0.925	1.500	.515	.517	0.925

TITAN's High-Performance VI-PRO® carbide end mills utilize an Eccentric Relief on the cutting edge to provide enhanced edge strength and a smoother cutting action.

General Purpose Standard Relief



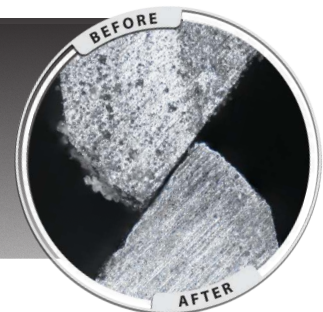
Most common relief for non-ferrous alloys. Includes a primary and secondary relief angle.

VI-PRO® Eccentric Relief



A powerful edge design for ferrous and tough material cutting. This design includes a primary relief measured radially along its edge.

4 on-site Otec Post Polish and Edge Prep machines

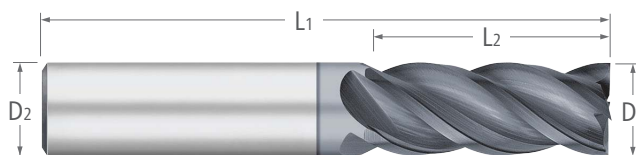


BENEFITS OF POST POLISHING

AlCrO-MAX by nature of the coating process leaves tiny "droplets" of the coating on the surface of the tool. Proven results have shown that the removal of these droplets provide a smoother tool surface which results in a better cut. Perhaps the most important benefit is that the tool is able to run at faster feed rates due to the smoothness of the flute area. This results in better chip evacuation and cooler temperatures resulting in longer tool life.

VI-PRO VARIABLE INDEX END MILLS

4 Flute - Square



- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Offered in stub, regular, long, and extra long length styles
- Delivers efficient, chatter-free machining in roughing, profiling, finishing, and slotting applications up to 1x diameter
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D1^{+.000}_{-.002}$ "	$D2$ (h6)	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC21133	17.20		
	1/8	3/8	1-1/2	TC21820	19.20		
	1/8	1/2	2	TC21821	20.65		
	1/8	3/4	2	TC23199	22.25		
	1/8	1	2-1/2	TC24404	26.40		
3/16	3/16	3/8	2	TC21136	22.25		
	3/16	9/16	2	TC21824	23.50		
	3/16	3/4	2	TC23200	25.00		
	3/16	1	2-1/2	TC24406	29.15		
1/4	1/4	3/8	2	TC21139	25.15		
	1/4	3/4	2-1/2	TC21827	29.80		
	1/4	1-1/8	3	TC23201	34.15		
	1/4	1-1/2	4	TC24408	40.50		
5/16	5/16	7/16	2	TC21142	36.50		
	5/16	13/16	2-1/2	TC21830	39.50		
	5/16	1-1/8	3	TC23204	46.85		
3/8	3/8	1/2	2	TC21145	40.30		
	3/8	1	2-1/2	TC21833	46.45		
	3/8	1-1/4	3	TC23207	63.30		
	3/8	2	4	TC24411	70.95		
7/16	7/16	5/8	2-1/2	TC21147	52.50		
	7/16	1	2-3/4	TC21835	57.50		
	7/16	2	4	TC23209	80.40		
	7/16	3	6	TC24413	117.10		
1/2	1/2	5/8	2-1/2	TC21148	60.25	TC21173	68.25
	1/2	1	3	TC21836	69.25	TC21863	77.25
	1/2	1-1/4	3	TC21839	69.25	TC21866	77.25
	1/2	1-1/2	4	TC23210	87.40	TC23331	95.45
	1/2	2	4	TC23213	96.40	TC23334	104.45
	1/2	3	6	TC24414	136.75	TC24543	144.70

NEW

continued on next page

For technical information, see page 118

VI-PRO VARIABLE INDEX END MILLS

4 Flute - Square (Cont.)

continued from previous page

CUTTER DIA.	SHANK DIA.	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
D1 ^{+0.000"} _{-0.003"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC21151	118.70	TC21176	129.00
	5/8	1-1/4	3-1/2	TC21841	123.00	TC21868	133.35
	5/8	1-5/8	3-1/2	TC21842	126.10	TC21869	136.40
	5/8	2-1/4	5	TC23216	179.35	TC23337	189.70
	5/8	3	6	TC24417	193.55	TC24546	203.85
3/4	3/4	1	3	TC21154	156.60	TC21179	169.15
	3/4	1-5/8	4	TC21845	174.20	TC21872	186.70
	3/4	2-1/4	5	TC23219	217.25	TC23340	229.75
	3/4	3	6	TC24420	256.75	TC24549	269.25
	3/4	4	7	TC24423	421.65	TC24552	434.20
1	1	1-1/2	4	TC21847	313.55	TC21874	329.50
	1	2	4	TC21848	323.55	TC21875	339.55
	1	2-1/4	5	TC23222	357.90	TC23343	373.90
	1	3	6	TC24426	418.55	TC24555	434.50
	1	4-1/4	7	TC24429	617.85	TC24558	633.80

**DID YOU
KNOW?**



Premature tool wear and breakage are easily avoidable, but can lead to poor part finish, machine downtime, and even scrapped parts.

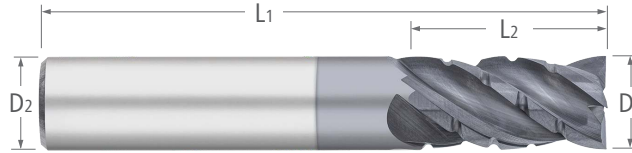
Read More : **End Mill and Milling Troubleshooting Guide**
on our technical blog, "In The Loupe"

harveyprecision.com/in-the-loupe/end-mill-troubleshooting-guide



VI-PRO VARIABLE INDEX END MILLS

4 Flute - Square - Chipbreaker



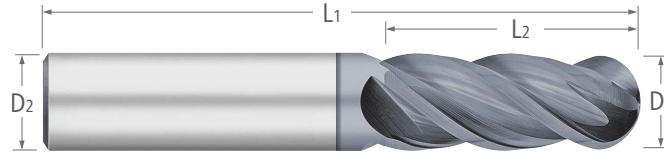
- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Engineered with chipbreaker geometry for optimal chip evacuation, reduced harmonics, and reduced tool pressure
- Offered in regular, long, and extra long length styles
- Delivers efficient, chatter-free machining in roughing, profiling, finishing, and slotting applications up to 1x diameter
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LENGTH OF CUT	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D1^{+0.000}_{-0.002}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	2	TC28050	18.90		
	1/8	3/4	2	TC28070	20.50		
	1/8	1	2-1/2	TC28086	24.60		
3/16	3/16	9/16	2	TC28051	21.75		
	3/16	3/4	2	TC28071	23.25		
	3/16	1	2-1/2	TC28087	27.50		
1/4	1/4	3/4	2-1/2	TC28052	28.00		
	1/4	1-1/8	3	TC28072	32.35		
	1/4	1-1/2	4	TC28088	38.80		
5/16	5/16	13/16	2-1/2	TC28053	37.45		
	5/16	1-1/8	3	TC28073	44.85		
3/8	3/8	1	2-1/2	TC28054	44.15		
	3/8	1-1/4	3	TC28074	61.00		
	3/8	2	4	TC28089	68.70		
7/16	7/16	1	2-3/4	TC28055	55.25		
	7/16	2	4	TC28075	78.05		
	7/16	3	6	TC28090	114.80		
1/2	1/2	1	3	TC28056	66.65	TC28063	74.70
	1/2	1-1/4	3	TC28057	66.65	TC28064	74.70
	1/2	1-1/2	4	TC28076	84.85	TC28081	92.85
	1/2	2	4	TC28077	93.85	TC28082	101.90
	1/2	3	6	TC28091	134.15	TC28097	142.10
$D1^{+0.000}_{-0.003}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	1-1/4	3-1/2	TC28058	120.45	TC28065	130.75
	5/8	1-5/8	3-1/2	TC28059	123.55	TC28066	133.80
	5/8	2-1/4	5	TC28078	176.85		
	5/8	3	6	TC28092	191.00	TC28098	201.30
3/4	3/4	1-5/8	4	TC28060	170.75	TC28067	183.30
	3/4	2-1/4	5	TC28079	213.80	TC28084	226.35
	3/4	3	6	TC28093	253.20	TC28099	265.85
	3/4	4	7	TC28094	418.20	TC28100	430.75
1	1	1-1/2	4	TC28061	309.00		
	1	3	6	TC28095	413.95	TC28101	429.95
	1	4-1/4	7	TC28096	613.20	TC28102	629.25

For technical information, see page 118

VI-PRO VARIABLE INDEX END MILLS

4 Flute - Ball



- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Offered in stub, regular, long, and extra long length styles
- Delivers efficient, chatter-free machining in roughing, profiling, finishing, and slotting applications up to 1x diameter
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

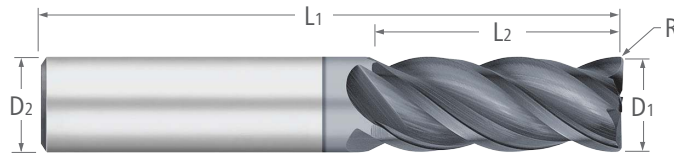
NEW

CUTTER DIA.	SHANK DIA.	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
D1 ^{+0.000} _{-0.002} "	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/4	1-1/2	TC25499	19.85		
	1/8	1/2	2	TC25547	28.30		
	1/8	3/4	2	TC25551	30.85		
3/16	3/16	3/8	2	TC25501	28.30		
	3/16	9/16	2	TC25549	31.35		
1/4	1/4	3/8	2	TC25502	32.15		
	1/4	3/4	2-1/2	TC25550	37.55		
	1/4	1-1/8	3	TC25602	39.25		
	1/4	1-1/2	4	TC25656	56.80		
5/16	5/16	7/16	2	TC25504	42.10		
	5/16	13/16	2-1/2	TC25552	45.70		
	5/16	1-1/8	3	TC25604	54.10		
3/8	3/8	1/2	2	TC25506	46.55		
	3/8	1	2-1/2	TC25554	53.55		
	3/8	1-1/4	3	TC25606	73.05		
	3/8	2	4	TC25658	82.30		
7/16	7/16	5/8	2-1/2	TC25507	62.90		
	7/16	1	2-3/4	TC25555	72.95		
	7/16	2	4	TC25607	91.10		
	7/16	3	6	TC25659	134.50		
1/2	1/2	5/8	2-1/2	TC25508	69.95	TC25514	77.95
	1/2	1	3	TC25556	79.95	TC25566	88.00
	1/2	1-1/4	3	TC25558	79.95	TC25568	88.00
	1/2	1-1/2	4	TC25608	100.45	TC25618	108.40
	1/2	2	4	TC25610	111.95	TC25620	119.95
	1/2	3	6	TC25660	157.75	TC25672	165.70
D1 ^{+0.000} _{-0.003} "	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC25510	137.70	TC25516	147.90
	5/8	1-5/8	3-1/2	TC25560	145.55	TC25570	155.80
	5/8	2-1/4	5	TC25612	207.10	TC25622	217.35
	5/8	3	6	TC25662	223.35		
3/4	3/4	1	3	TC25512	181.55	TC25518	194.15
	3/4	1-5/8	4	TC25562	199.95	TC25572	212.55
	3/4	2-1/4	5	TC25614	251.80	TC25624	264.35
	3/4	3	6	TC25664	294.80	TC25676	307.40
	3/4	4	7	TC25666	484.00	TC25678	496.65
1	1	2	4	TC25564	373.45	TC25574	389.40
	1	2-1/4	5	TC25616	412.95	TC25626	428.95
	1	3	6	TC25668	480.60	TC25680	496.65
	1	4-1/4	7	TC25670	709.50	TC25682	725.45

For technical information, see page 118

VI-PRO VARIABLE INDEX END MILLS

4 Flute - Corner Radius



- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Offered in stub, regular, long, and extra long length styles
- Corner radius for increased edge strength
- Delivers efficient, chatter-free machining in roughing, profiling, finishing, and slotting applications up to 1x diameter
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D_1^{+.000"_{-.002"}}$	D_2 (h6)	$R^{+.001"_{-.001"}}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.005	1/4	1-1/2	TC20960	23.15		
	1/8	.005	1/2	2	TC20984	23.15		
	1/8	.010	1/4	1-1/2	TC21503	23.15		
	1/8	.010	1/2	2	TC22617	23.15		
	1/8	.015	1/4	1-1/2	TC20961	23.15		
	1/8	.015	1/2	2	TC20985	23.15		
	1/8	.020	1/2	2	TC22620	23.15		
	1/8	.030	1/2	2	TC22623	23.15		
3/16	3/16	.005	3/8	2	TC20964	24.90		
	3/16	.005	9/16	2	TC20986	26.10		
	3/16	.010	3/8	2	TC21506	24.90		
	3/16	.010	9/16	2	TC22626	26.10		
	3/16	.015	3/8	2	TC20965	24.90		
	3/16	.015	9/16	2	TC20987	26.10		
	3/16	.020	9/16	2	TC22629	26.10		
	3/16	.030	9/16	2	TC22632	26.10		
1/4	1/4	.005	3/8	2	TC21300	29.35		
	1/4	.005	3/4	2-1/2	TC21306	32.40		
	1/4	.010	3/8	2	TC20968	29.35		
	1/4	.010	3/4	2-1/2	TC20988	32.40		
	1/4	.015	3/8	2	TC21509	29.35		
	1/4	.015	3/4	2-1/2	TC22635	32.40		
	1/4	.015	1-1/8	3	TC23820	36.70		
	1/4	.015	1-1/2	4	TC25217	44.60		
	1/4	.020	3/8	2	TC20969	29.35		
	1/4	.020	3/4	2-1/2	TC20989	32.40		
	1/4	.030	3/4	2-1/2	TC22638	32.40		
	1/4	.030	1-1/8	3	TC23823	36.70		
	1/4	.030	1-1/2	4	TC25220	44.60		
	1/4	.060	3/4	2-1/2	TC22641	32.40		
5/16	5/16	.010	7/16	2	TC20972	39.50		
	5/16	.010	13/16	2-1/2	TC20990	41.80		
	5/16	.015	7/16	2	TC21512	39.50		
	5/16	.015	13/16	2-1/2	TC22644	41.80		
	5/16	.015	1-1/8	3	TC23826	49.75		
	5/16	.020	7/16	2	TC21301	39.50		
	5/16	.020	13/16	2-1/2	TC21307	41.80		
	5/16	.030	13/16	2-1/2	TC22647	41.80		
	5/16	.030	1-1/8	3	TC23829	49.75		
	5/16	.060	13/16	2-1/2	TC22650	41.80		

For technical information, see page 118

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VI-PRO VARIABLE INDEX END MILLS

4 Flute - Corner Radius (Cont.)

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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
D ₁ ^{+.000"} - .002"	D ₂ (h6)	R ^{+.001"} - .001"	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
3/8	3/8	.010	1/2	2	TC20975	43.35		
	3/8	.010	1	2-1/2	TC20991	48.70		
	3/8	.015	1/2	2	TC21515	43.35		
	3/8	.015	1	2-1/2	TC22653	48.70		
	3/8	.020	1/2	2	TC21302	43.35		
	3/8	.020	1	2-1/2	TC21308	48.70		
	3/8	.030	1	2-1/2	TC22656	48.70		
	3/8	.030	1-1/4	3	TC23832	66.20		
	3/8	.030	2	4	TC25223	75.65		
	3/8	.060	1	2-1/2	TC22659	48.70		
	3/8	.060	1-1/4	3	TC23835	66.20		
	3/8	.060	2	4	TC25226	75.65		
7/16	7/16	.015	1	2-3/4	TC22660	63.95		
	7/16	.030	5/8	2-1/2	TC21517	55.35		
	7/16	.030	1	2-3/4	TC22661	63.95		
	7/16	.030	2	4	TC23836	84.55		
	7/16	.030	3	6	TC25227	119.25		
	7/16	.060	1	2-3/4	TC22663	63.95		
	7/16	.060	2	4	TC23837	84.55		
	7/16	.060	3	6	TC25228	119.25		
1/2	1/2	.010	5/8	2-1/2	TC20978	66.00	TC21024	73.95
	1/2	.010	1	3	TC20992	77.85	TC21030	85.80
	1/2	.010	1-1/4	3	TC20993	79.25	TC21031	87.20
	1/2	.015	1	3	TC22662	77.85	TC22801	85.80
	1/2	.015	1-1/4	3	TC22677	79.25	TC22816	87.20
	1/2	.020	5/8	2-1/2	TC21303	66.00	TC21313	73.95
	1/2	.020	1	3	TC21310	85.80	TC21111	77.85
	1/2	.020	1-1/4	3	TC21311	87.20	TC21112	79.25
	1/2	.030	5/8	2-1/2	TC21518	66.00	TC21541	73.95
	1/2	.030	1	3	TC22665	77.85	TC22804	85.80
	1/2	.030	1-1/4	3	TC22680	79.25	TC22819	87.20
	1/2	.030	1-1/2	4	TC23838	92.70	TC23905	100.65
	1/2	.030	2	4	TC23844	102.15	TC23911	110.10
	1/2	.030	3	6	TC25229	141.10	TC25302	149.05
	1/2	.060	1	3	TC22668	77.85	TC22807	85.80
	1/2	.060	1-1/4	3	TC22683	79.25	TC22822	87.20
	1/2	.060	1-1/2	4	TC23841	92.70	TC23908	100.65
	1/2	.060	2	4	TC23847	102.15	TC23914	110.10
	1/2	.060	3	6	TC25232	141.10	TC25305	149.05
	1/2	.090	1	3	TC22671	77.85	TC22810	85.80
	1/2	.090	1-1/4	3	TC22686	79.25	TC22825	87.20
	1/2	.120	1	3	TC22674	77.85	TC22813	85.80
	1/2	.120	1-1/4	3	TC22689	79.25	TC22828	87.20

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VI-PRO VARIABLE INDEX END MILLS

4 Flute - Corner Radius (Cont.)

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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
D ₁ ^{+.000"} - .003"	D ₂ (h6)	R ^{+.001"} - .001"	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.020	3/4	3	TC21304	125.05	TC21314	133.10
	5/8	.020	1-5/8	3-1/2	TC21309	131.25	TC21316	141.50
	5/8	.030	3/4	3	TC21521	125.05	TC21544	135.35
	5/8	.030	1-5/8	3-1/2	TC22692	131.25	TC22831	141.50
	5/8	.030	2-1/4	5	TC23850	186.05	TC23917	196.35
	5/8	.030	3	6	TC25235	197.80	TC25308	208.10
	5/8	.060	1-5/8	3-1/2	TC22695	131.25	TC22834	141.50
	5/8	.060	2-1/4	5	TC23853	186.05	TC23920	196.35
	5/8	.060	3	6	TC25238	197.80	TC25311	208.10
	5/8	.090	1-5/8	3-1/2	TC22698	131.25	TC22837	141.50
	5/8	.120	1-5/8	3-1/2	TC22701	131.25	TC22840	141.50
3/4	3/4	.015	1	3	TC21305	163.15	TC21315	173.35
	3/4	.015	1-5/8	4	TC21312	182.90	TC21317	195.40
	3/4	.030	1	3	TC21524	163.15	TC21547	175.65
	3/4	.030	1-5/8	4	TC22704	182.90	TC22843	195.40
	3/4	.030	2-1/4	5	TC23856	233.15	TC23923	245.75
	3/4	.030	3	6	TC25241	261.20	TC25314	273.70
	3/4	.030	4	7	TC25247	425.25	TC25320	437.85
	3/4	.060	1-5/8	4	TC22707	182.90	TC22846	195.40
	3/4	.060	2-1/4	5	TC23859	233.15	TC23926	245.75
	3/4	.060	3	6	TC25244	261.20	TC25317	273.70
	3/4	.060	4	7	TC25250	425.25	TC25323	437.85
	3/4	.090	1-5/8	4	TC22710	182.90	TC22849	195.40
	3/4	.120	1-5/8	4	TC22713	182.90	TC22852	195.40
	3/4	.190	1-5/8	4	TC22714	182.90	TC22853	195.40
	3/4	.250	1-5/8	4	TC22715	182.90	TC22854	195.40
1	1	.030	2	4	TC22716	332.25	TC22855	344.85
	1	.030	2-1/4	5	TC23862	365.35	TC23929	381.35
	1	.030	3	6	TC25253	429.50	TC25326	445.50
	1	.030	4-1/4	7	TC25259	623.75	TC25332	639.75
	1	.060	2	4	TC22719	332.25	TC22858	348.25
	1	.060	2-1/4	5	TC23865	363.60		
	1	.060	3	6	TC25256	427.55	TC25329	443.50
	1	.060	4-1/4	7	TC25262	620.75	TC25335	636.80
	1	.090	2	4	TC22722	332.25		
	1	.120	2	4			TC22864	348.25
	1	.190	2	4	TC22728	332.25	TC22867	348.25
	1	.250	2	4	TC22731	332.25	TC22870	348.25

For technical information, see page 118

VI-PRO VARIABLE INDEX END MILLS

4 Flute - Corner Radius - Chipbreaker



- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Engineered with chipbreaker geometry for optimal chip evacuation, reduced harmonics, and reduced tool pressure
- Offered in regular, long, and extra long length styles
- Corner radius for increased edge strength
- Delivers efficient, chatter-free machining in roughing, profiling, finishing, and slotting applications up to 1x diameter
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D1^{+.000}_{-.002}$	$D2 (h6)$	$R^{+.001}_{-.001}$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.010	1/2	2	TC28103	21.45		
	1/8	.020	1/2	2	TC28104	21.45		
	1/8	.030	1/2	2	TC28105	21.45		
3/16	3/16	.010	9/16	2	TC28106	24.40		
	3/16	.020	9/16	2	TC28107	24.40		
	3/16	.030	9/16	2	TC28108	24.40		
1/4	1/4	.015	3/4	2-1/2	TC28109	30.70		
	1/4	.015	1-1/8	3	TC28173	35.00		
	1/4	.015	1-1/2	4	TC28201	42.90		
	1/4	.030	3/4	2-1/2	TC28110	30.70		
	1/4	.030	1-1/8	3	TC28174	35.00		
	1/4	.030	1-1/2	4	TC28202	42.90		
	1/4	.060	3/4	2-1/2	TC28111	30.70		
5/16	5/16	.015	13/16	2-1/2	TC28112	39.70		
	5/16	.030	1-1/8	3	TC28176	47.70		
	5/16	.060	13/16	2-1/2	TC28114	39.70		
3/8	3/8	.015	1	2-1/2	TC28115	46.45		
	3/8	.030	1	2-1/2	TC28116	46.45		
	3/8	.030	1-1/4	3	TC28177	63.90		
	3/8	.030	2	4	TC28203	73.35		
	3/8	.060	1	2-1/2	TC28117	46.45		
	3/8	.060	2	4	TC28204	73.35		
7/16	7/16	.030	1	2-3/4	TC28119	61.65		
	7/16	.060	1	2-3/4	TC28120	61.65		

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VI-PRO VARIABLE INDEX END MILLS

4 Flute - Corner Radius - Chipbreaker (Cont.)

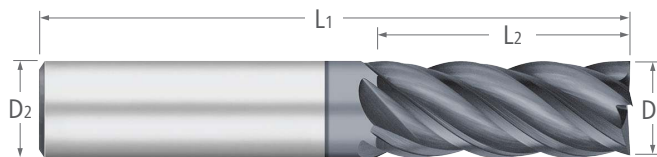
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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
D ₁ ^{+0.000"} -0.002"	D ₂ (h6)	R ^{+0.001"} -0.001"	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
1/2	1/2	.015	1	3	TC28121	75.25	TC28147	83.25
	1/2	.015	1-1/4	3	TC28126	76.60	TC28152	84.60
	1/2	.030	1	3	TC28122	75.25	TC28148	83.25
	1/2	.030	1-1/4	3	TC28127	76.60	TC28153	84.60
	1/2	.030	1-1/2	4	TC28181	90.10	TC28191	98.10
	1/2	.030	2	4	TC28183	99.55	TC28193	107.55
	1/2	.030	3	6	TC28207	138.45	TC28219	146.45
	1/2	.060	1	3	TC28123	75.25	TC28149	83.25
	1/2	.060	1-1/4	3	TC28128	76.60	TC28154	84.60
	1/2	.060	1-1/2	4	TC28182	90.10	TC28192	98.10
	1/2	.060	3	6	TC28208	138.45		
	1/2	.120	1-1/4	3			TC28156	84.60
D ₁ ^{+0.000"} -0.003"	D ₂ (h6)	R ^{+0.001"} -0.001"	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.030	1-5/8	3-1/2	TC28131	128.65	TC28157	138.95
	5/8	.030	2-1/4	5	TC28185	183.45		
	5/8	.060	1-5/8	3-1/2	TC28132	128.65	TC28158	138.95
	5/8	.060	2-1/4	5	TC28186	183.45	TC28196	193.75
	5/8	.090	1-5/8	3-1/2	TC28133	128.65		
3/4	3/4	.030	1-5/8	4	TC28135	179.35	TC28161	192.00
	3/4	.030	2-1/4	5	TC28187	229.75	TC28197	242.30
	3/4	.030	3	6	TC28211	257.65	TC28223	270.30
	3/4	.030	4	7	TC28213	421.85		
	3/4	.060	1-5/8	4	TC28136	179.35		
	3/4	.060	2-1/4	5	TC28188	229.75	TC28198	242.30
	3/4	.060	3	6	TC28212	257.65		
1	1	.030	4-1/4	7	TC28217	619.20		
	1	.060	2	4	TC28142	327.70		

For technical information, see page 118

VI-PRO VARIABLE INDEX END MILLS

5 Flute - Square



- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Offered in stub, regular, long, and extra long length styles
- Delivers efficient, chatter-free machining in roughing, profiling, finishing
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

VI-PRO End Mills

CUTTER DIA.	SHANK DIA.	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D_1^{+0.000}_{-0.002}$	D_2 (h6)	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
NEW 1/8	1/8	1/4	1-1/2	TC25807	18.95		
	1/8	3/8	2	TC25827	20.80		
	1/8	1/2	2	TC25829	22.70		
NEW 1/8	1/8	3/4	2	TC25941	24.90		
NEW 3/16	3/16	3/8	2	TC25809	24.40		
	3/16	9/16	2	TC25835	25.85		
	3/16	3/4	2	TC25833	28.35		
1/4	1/4	3/8	2	TC25796	27.50		
	1/4	3/4	2-1/2	TC25836	33.00		
	1/4	1-1/8	3	TC25888	37.55		
	1/4	1-1/2	4	TC25942	44.75		
5/16	5/16	7/16	2	TC25797	40.05		
	5/16	13/16	2-1/2	TC25838	43.55		
	5/16	1-1/8	3	TC25890	51.55		
3/8	3/8	1/2	2	TC25798	44.60		
	3/8	1	2-1/2	TC25840	51.00		
	3/8	1-1/4	3	TC25892	69.70		
	3/8	2	4	TC25944	78.05		
1/2	1/2	5/8	2-1/2	TC25799	66.30	TC25802	74.30
	1/2	1	3	TC25842	76.55	TC25852	84.55
	1/2	1-1/4	3	TC25844	76.55	TC25854	84.55
	1/2	1-1/2	4	TC25894	95.80	TC25904	103.75
	1/2	2	4	TC25896	106.70	TC25906	114.70
	1/2	3	6	TC25946	150.40	TC25958	158.40

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VI-PRO VARIABLE INDEX END MILLS

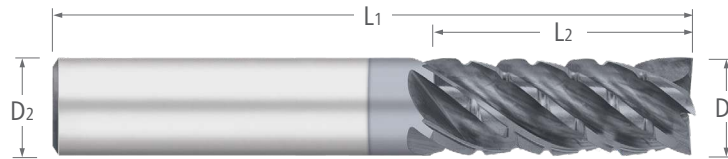
5 Flute - Square (Cont.)

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CUTTER DIA.	SHANK DIA.	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
D1 ^{+0.000"} -0.003"	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC25800	130.55	TC25803	140.85
	5/8	1-5/8	3-1/2	TC25846	138.00	TC25856	148.30
	5/8	2-1/4	5	TC25898	198.40	TC25908	208.65
	5/8	3	6	TC25948	212.90	TC25960	223.15
3/4	3/4	1	3	TC25801	173.15	TC25804	185.70
	3/4	1-5/8	4	TC25848	190.75	TC25858	203.25
	3/4	2-1/4	5	TC25900	240.00	TC25910	252.60
	3/4	3	6	TC25950	281.05	TC25962	293.55
	3/4	4	7	TC25952	463.75	TC25964	476.30
1	1	2	4	TC25850	355.95	TC25860	372.00
	1	2-1/4	5	TC25902	395.55	TC25912	411.60
	1	3	6	TC25954	460.35	TC25966	476.30
	1	4-1/4	7	TC25956	679.65	TC25968	695.55

VI-PRO VARIABLE INDEX END MILLS

5 Flute - Square - Chipbreaker

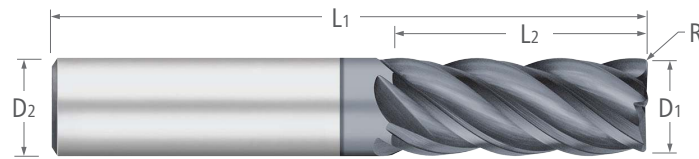


- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Engineered with chipbreaker geometry for optimal chip evacuation, reduced harmonics, and reduced tool pressure
- Offered in regular, long, and extra long length styles
- Delivers efficient, chatter-free machining in roughing, profiling, and finishing applications
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D1^{+.000}_{-.002}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	1/2	2	TC13270	21.00		
3/16	3/16	9/16	2	TC13271	24.20		
1/4	1/4	3/4	2-1/2	TC13272	31.30		
	1/4	1-1/8	3	TC13285	35.85		
	1/4	1-1/2	4	TC13298	43.00		
5/16	5/16	13/16	2-1/2	TC13273	41.50		
	5/16	1-1/8	3	TC13286	49.55		
3/8	3/8	1	2-1/2	TC13274	48.70		
	3/8	1-1/4	3	TC13287	67.45		
	3/8	2	4	TC13299	75.75		
1/2	1/2	1	3	TC13275	74.00	TC13280	82.00
	1/2	1-1/4	3	TC13276	74.00	TC13281	82.00
	1/2	1-1/2	4	TC13288	93.20	TC13293	101.15
	1/2	2	4	TC13289	104.15	TC13294	112.10
	1/2	3	6	TC13300	147.85	TC13306	155.85
$D1^{+.000}_{-.003}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	1-5/8	3-1/2	TC13277	135.40	TC13282	145.70
	5/8	2-1/4	5	TC13290	195.80	TC13295	206.05
	5/8	3	6	TC13301	210.30	TC13307	220.60
3/4	3/4	1-5/8	4	TC13278	187.30	TC13283	199.85
	3/4	2-1/4	5	TC13291	236.60	TC13296	249.15
	3/4	3	6	TC13302	277.60	TC13308	290.15
	3/4	4	7	TC13303	460.30	TC13309	472.90
1	1	2	4	TC13279	351.45	TC13284	367.40
	1	2-1/4	5	TC13292	391.00	TC13297	407.00
	1	3	6	TC13304	455.75	TC13310	471.75
	1	4-1/4	7	TC13305	675.00	TC13311	691.00

VI-PRO VARIABLE INDEX END MILLS

5 Flute - Corner Radius



- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Offered in stub, regular, long, and extra long length styles
- Corner radius for increased edge strength
- Delivers efficient, chatter-free machining in roughing, profiling, and finishing applications
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D1^{+.000}_{-.002}$	$D2 (h6)$	$R^{+.001}_{-.001}$	$L2$	$L1$	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.005	1/4	1-1/2	TC21318	21.85		
	1/8	.005	1/2	2	TC21330	26.10		
	1/8	.010	1/4	1-1/2	TC25995	21.85		
	1/8	.010	1/2	2	TC26404	26.10		
	1/8	.015	1/4	1-1/2	TC21319	21.85		
	1/8	.015	1/2	2	TC21331	26.10		
	1/8	.020	1/2	2	TC26406	26.10		
	1/8	.030	1/2	2	TC26408	26.10		
3/16	3/16	.005	3/8	2	TC21320	27.15		
	3/16	.005	9/16	2	TC21332	30.85		
	3/16	.010	3/8	2	TC25996	27.15		
	3/16	.010	9/16	2	TC26410	30.85		
	3/16	.015	3/8	2	TC21321	27.15		
	3/16	.015	9/16	2	TC21333	30.85		
	3/16	.020	9/16	2	TC26412	30.85		
	3/16	.030	9/16	2	TC26414	30.85		
1/4	1/4	.005	3/8	2	TC21322	32.30		
	1/4	.005	3/4	2-1/2	TC21334	35.60		
	1/4	.010	3/8	2	TC21045	32.30		
	1/4	.010	3/4	2-1/2	TC21067	35.60		
	1/4	.015	3/8	2	TC25986	32.30		
	1/4	.015	3/4	2-1/2	TC26416	35.60		
	1/4	.015	1-1/8	3	TC27109	40.15		
	1/4	.015	1-1/2	4	TC27928	48.85		
	1/4	.020	3/8	2	TC21323	32.30		
	1/4	.020	3/4	2-1/2	TC21335	35.60		
	1/4	.030	3/4	2-1/2	TC26419	35.60		
	1/4	.030	1-1/8	3	TC27112	40.15		
	1/4	.030	1-1/2	4	TC27931	48.85		
	1/4	.060	3/4	2-1/2	TC26422	35.60		

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VI-PRO VARIABLE INDEX END MILLS

5 Flute - Corner Radius (Cont.)

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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D1 \begin{smallmatrix} +.000" \\ -.002" \end{smallmatrix}$	D2 (h6)	$R \begin{smallmatrix} +.001" \\ -.001" \end{smallmatrix}$	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/16	5/16	.010	7/16	2	TC21048	43.35		
	5/16	.010	13/16	2-1/2	TC21068	46.25		
	5/16	.015	7/16	2	TC25987	43.35		
	5/16	.015	13/16	2-1/2	TC26425	46.25		
	5/16	.015	1-1/8	3	TC27115	54.75		
	5/16	.020	7/16	2	TC21324	43.35		
	5/16	.020	13/16	2-1/2	TC21336	46.25		
	5/16	.030	13/16	2-1/2	TC26428	46.25		
	5/16	.030	1-1/8	3	TC27118	54.75		
	5/16	.060	13/16	2-1/2	TC26431	46.25		
3/8	3/8	.010	1/2	2	TC21051	47.70		
	3/8	.010	1	2-1/2	TC21069	53.65		
	3/8	.015	1/2	2	TC25988	47.70		
	3/8	.015	1	2-1/2	TC26434	53.65		
	3/8	.020	1/2	2	TC21325	47.70		
	3/8	.020	1	2-1/2	TC21337	53.65		
	3/8	.030	1	2-1/2	TC26437	53.65		
	3/8	.030	1-1/4	3	TC27121	72.80		
	3/8	.030	2	4	TC27934	82.85		
	3/8	.060	1	2-1/2	TC26440	53.65		
	3/8	.060	1-1/4	3	TC27124	72.80		
	3/8	.060	2	4	TC27937	82.85		
1/2	1/2	.010	5/8	2-1/2	TC21326	72.95	TC21342	80.95
	1/2	.010	1	3	TC21338	75.30	TC21346	83.30
	1/2	.015	1	3	TC26443	75.30	TC26625	83.30
	1/2	.015	1-1/4	3	TC26458	77.05	TC26640	85.05
	1/2	.020	5/8	2-1/2	TC21327	72.95	TC21343	80.95
	1/2	.020	1	3	TC21339	75.30	TC21347	83.30
	1/2	.030	5/8	2-1/2	TC25989	72.95	TC25992	80.95
	1/2	.030	1	3	TC26446	75.30	TC26628	83.30
	1/2	.030	1-1/4	3	TC26461	77.05	TC26643	85.05
	1/2	.030	2	4	TC27127	112.95	TC27262	121.00
	1/2	.030	3	6	TC27940	154.45	TC28002	162.40
	1/2	.060	1	3	TC26449	75.30	TC26631	83.30
	1/2	.060	1-1/4	3	TC26464	77.05	TC26646	85.05
	1/2	.060	2	4	TC27130	112.95	TC27265	121.00
	1/2	.060	3	6	TC27943	154.45	TC28005	162.40
	1/2	.090	1	3	TC26452	75.30	TC26634	83.30
	1/2	.090	1-1/4	3	TC26467	77.05	TC26649	85.05
	1/2	.120	1	3	TC26455	75.30	TC26637	83.30
	1/2	.120	1-1/4	3	TC26470	77.05	TC26652	85.05

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VI-PRO VARIABLE INDEX END MILLS

5 Flute - Corner Radius (Cont.)

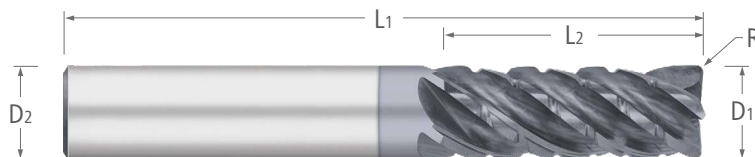
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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
D1 ^{+0.000"} -0.003"	D2 (h6)	R ^{+0.001"} -0.001"	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.020	3/4	3	TC21328	136.85	TC21344	147.15
	5/8	.020	1-5/8	3-1/2	TC21340	144.40	TC21348	154.65
	5/8	.030	3/4	3	TC25990	136.85	TC25993	147.15
	5/8	.030	1-5/8	3-1/2	TC26473	144.40	TC26655	154.65
	5/8	.030	2-1/4	5	TC27133	203.80	TC27268	214.05
	5/8	.030	3	6	TC27946	217.65	TC28008	227.95
	5/8	.060	1-5/8	3-1/2	TC26476	144.40	TC26658	154.65
	5/8	.060	2-1/4	5	TC27136	203.80	TC27271	214.05
	5/8	.060	3	6	TC27949	217.65	TC28011	227.95
	5/8	.090	1-5/8	3-1/2	TC26479	144.40	TC26661	154.65
	5/8	.120	1-5/8	3-1/2	TC26482	144.40	TC26664	154.65
3/4	3/4	.015	1	3	TC21329	179.35	TC21345	192.00
	3/4	.015	1-5/8	4	TC21341	200.15	TC21349	212.75
	3/4	.030	1	3	TC25991	179.35	TC25994	192.00
	3/4	.030	1-5/8	4	TC26485	200.15	TC26667	212.75
	3/4	.030	2-1/4	5	TC27139	256.45	TC27274	269.00
	3/4	.030	3	6	TC27952	287.25	TC28014	299.85
	3/4	.030	4	7			TC28020	428.35
	3/4	.060	1-5/8	4	TC26488	200.15	TC26670	212.75
	3/4	.060	2-1/4	5	TC27142	256.45	TC27277	269.00
	3/4	.060	3	6	TC27955	287.25	TC28017	299.85
	3/4	.060	4	7	TC27961	467.90		
	3/4	.090	1-5/8	4	TC26491	200.15	TC26673	212.75
	3/4	.120	1-5/8	4	TC26494	200.15	TC26676	212.75
	3/4	.190	1-5/8	4	TC26495	200.15		
	3/4	.250	1-5/8	4	TC26496	200.15	TC26678	212.75
1	1	.030	2	4	TC26497	365.45	TC26679	381.45
	1	.030	2-1/4	5	TC27145	355.55		
	1	.030	3	6	TC27964	470.25	TC28026	486.25
	1	.030	4-1/4	7	TC27970	682.95	TC28032	698.85
	1	.060	2	4	TC26500	365.45		
	1	.060	2-1/4	5	TC27148	400.00		
	1	.060	3	6	TC27967	470.25	TC28029	486.25
	1	.060	4-1/4	7			TC28035	698.85
	1	.120	2	4	TC26506	365.45		
	1	.250	2	4	TC26508	365.45	TC26690	381.45

For technical information, see page 119

VI-PRO VARIABLE INDEX END MILLS

5 Flute - Corner Radius - Chipbreaker



- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Engineered with chipbreaker geometry for optimal chip evacuation, reduced harmonics, and reduced tool pressure
- Offered in regular, long, and extra long length styles
- Delivers efficient, chatter free machining in light profiling, High Efficiency Milling (HEM), and finishing applications
- Corner radius for increased edge strength
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D_1^{+.000" \atop -.002"}$	$D_2 (h6)$	$R^{+.001" \atop -.001"}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/8	1/8	.010	1/2	2	TC13312	24.40		
	1/8	.020	1/2	2	TC13313	24.40		
	1/8	.030	1/2	2	TC13314	24.40		
3/16	3/16	.010	9/16	2	TC13315	29.10		
	3/16	.020	9/16	2	TC13316	29.10		
	3/16	.030	9/16	2	TC13317	29.10		
1/4	1/4	.015	3/4	2-1/2	TC13318	33.85		
	1/4	.015	1-1/8	3	TC13379	38.45		
	1/4	.015	1-1/2	4	TC13401	47.10		
	1/4	.030	3/4	2-1/2	TC13319	33.85		
	1/4	.030	1-1/8	3	TC13380	38.45		
	1/4	.030	1-1/2	4	TC13402	47.10		
	1/4	.060	3/4	2-1/2	TC13320	33.85		
5/16	5/16	.015	13/16	2-1/2	TC13321	44.15		
	5/16	.015	1-1/8	3	TC13381	52.75		
	5/16	.030	13/16	2-1/2	TC13322	44.15		
	5/16	.030	1-1/8	3	TC13382	52.75		
	5/16	.060	13/16	2-1/2	TC13323	44.15		
3/8	3/8	.015	1	2-1/2	TC13324	51.35		
	3/8	.030	1	2-1/2	TC13325	51.35		
	3/8	.030	1-1/4	3	TC13383	70.55		
	3/8	.030	2	4	TC13403	80.55		
	3/8	.060	1	2-1/2	TC13326	51.35		
	3/8	.060	1-1/4	3	TC13384	70.55		
	3/8	.060	2	4	TC13404	80.55		

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VI-PRO VARIABLE INDEX END MILLS

5 Flute - Corner Radius - Chipbreaker (Cont.)

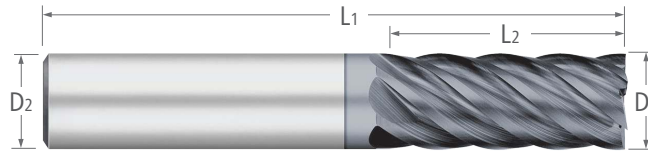
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CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
D1 ^{+0.000"} -0.002"	D2 (h6)	R ^{+0.001"} -0.001"	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/2	1/2	.015	1	3	TC13327	72.75	TC13353	80.75
	1/2	.015	1-1/4	3	TC13332	74.45	TC13358	82.45
	1/2	.030	1	3	TC13328	72.75	TC13354	80.75
	1/2	.030	1-1/4	3	TC13333	74.45	TC13359	82.45
	1/2	.030	2	4	TC13385	110.40	TC13393	118.45
	1/2	.030	3	6	TC13405	151.85	TC13417	159.85
	1/2	.060	1	3	TC13329	72.75	TC13355	80.75
	1/2	.060	1-1/4	3	TC13334	74.45	TC13360	82.45
	1/2	.060	2	4	TC13386	110.40	TC13394	118.45
	1/2	.060	3	6	TC13406	151.85	TC13418	159.85
	1/2	.090	1	3	TC13330	72.75	TC13356	80.75
	1/2	.090	1-1/4	3	TC13335	74.45	TC13361	82.45
	1/2	.120	1	3	TC13331	72.75	TC13357	80.75
	1/2	.120	1-1/4	3	TC13336	74.45	TC13362	82.45
5/8	5/8	.030	1-5/8	3-1/2	TC13337	141.80	TC13363	152.05
	5/8	.030	2-1/4	5	TC13387	201.15	TC13395	211.45
	5/8	.030	3	6	TC13407	215.10	TC13419	225.35
	5/8	.060	1-5/8	3-1/2	TC13338	141.80	TC13364	152.05
	5/8	.060	2-1/4	5	TC13388	201.15	TC13396	211.45
	5/8	.060	3	6	TC13408	215.10	TC13420	225.35
	5/8	.090	1-5/8	3-1/2	TC13339	141.80	TC13365	152.05
	5/8	.120	1-5/8	3-1/2	TC13340	141.80	TC13366	152.05
3/4	3/4	.030	1-5/8	4	TC13341	196.75	TC13367	209.30
	3/4	.030	2-1/4	5	TC13389	253.00	TC13397	265.60
	3/4	.030	3	6	TC13409	283.85	TC13421	296.40
	3/4	.030	4	7	TC13411	412.35	TC13423	424.95
	3/4	.060	1-5/8	4	TC13342	196.75	TC13368	209.30
	3/4	.060	2-1/4	5	TC13390	253.00	TC13398	265.60
	3/4	.060	3	6	TC13410	283.85	TC13422	296.40
	3/4	.060	4	7	TC13412	464.40	TC13424	476.95
	3/4	.090	1-5/8	4	TC13343	196.75	TC13369	209.30
	3/4	.120	1-5/8	4	TC13344	196.75	TC13370	209.30
	3/4	.190	1-5/8	4	TC13345	196.75	TC13371	209.30
	3/4	.250	1-5/8	4	TC13346	196.75	TC13372	209.30
1	1	.030	2	4	TC13347	360.90	TC13373	376.90
	1	.030	2-1/4	5	TC13391	350.95	TC13399	366.95
	1	.030	3	6	TC13413	465.70	TC13425	481.70
	1	.030	4-1/4	7	TC13415	678.30	TC13427	694.30
	1	.060	2	4	TC13348	360.90	TC13374	376.90
	1	.060	2-1/4	5	TC13392	395.45	TC13400	411.45
	1	.060	3	6	TC13414	465.70	TC13426	481.70
	1	.060	4-1/4	7	TC13416	678.30	TC13428	694.30
	1	.090	2	4	TC13349	360.90	TC13375	376.90
	1	.120	2	4	TC13350	360.90	TC13376	376.90
	1	.190	2	4	TC13351	360.90	TC13377	376.90
	1	.250	2	4	TC13352	360.90	TC13378	376.90

For technical information, see page 119

VI-PRO VARIABLE INDEX END MILLS

6 Flute - Square

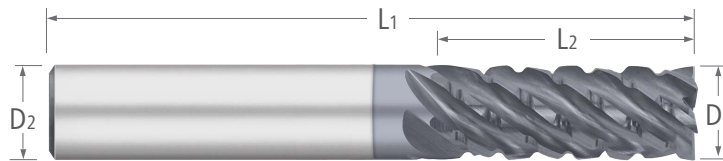


- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Offered in stub, regular, long, and extra long length styles
- Delivers efficient, chatter-free machining in High Efficiency Milling (HEM), profiling, and finishing applications
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
D1 ^{+0.000"} _{-.002"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/4	1/4	3/8	2	TC64404	29.45		
	1/4	3/4	2-1/2	TC64516	35.70		
	1/4	1-1/8	3	TC61316	40.95		
5/16	5/16	7/16	2	TC64406	43.40		
	5/16	13/16	2-1/2	TC64520	46.65		
	5/16	1-1/8	3	TC61320	55.45		
3/8	3/8	1/2	2	TC64408	48.35		
	3/8	1	2-1/2	TC64524	55.05		
	3/8	1-1/4	3	TC61324	74.90		
1/2	1/2	5/8	2-1/2	TC64410	71.75	TC64416	79.70
	1/2	1-1/4	3	TC64532	86.10	TC64579	94.15
	1/2	2	4	TC61332	115.75	TC61384	123.70
D1 ^{+0.000"} _{-.003"}	D2 (h6)	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	3/4	3	TC64412	139.30	TC64418	149.60
	5/8	1-5/8	3-1/2	TC64540	152.10	TC64581	162.35
	5/8	2-1/4	5	TC61340	209.15	TC61386	219.50
3/4	3/4	1	3	TC64414	182.55	TC64420	195.10
	3/4	1-5/8	4	TC64548	201.10	TC64583	213.65
	3/4	2-1/4	5	TC61348	257.40	TC61388	270.00
1	1	2	4	TC64564	383.40	TC64585	399.45
	1	3	6	TC61364	482.70	TC61390	498.70

VI-PRO VARIABLE INDEX END MILLS

6 Flute - Square - Chipbreaker



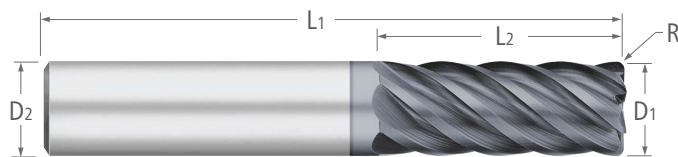
- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Engineered with chipbreaker geometry for optimal chip evacuation, reduced harmonics, and reduced tool pressure
- Offered in regular, long, and extra long length styles
- Delivers efficient, chatter free machining in light profiling, High Efficiency Milling (HEM), and finishing applications
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D_1^{+0.000}_{-0.002}$	D_2 (h6)	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/4	1/4	3/4	2-1/2	TC13429	56.85		
	1/4	1-1/8	3	TC13440	62.50		
5/16	5/16	13/16	2-1/2	TC13430	67.10		
	5/16	1-1/8	3	TC13441	72.80		
3/8	3/8	1	2-1/2	TC13431	72.25		
	3/8	1-1/4	3	TC13442	83.20		
1/2	1/2	1-1/4	3	TC13432	97.65	TC13436	105.60
	1/2	2	4	TC13443	129.80	TC13447	137.85
$D_1^{+0.000}_{-0.003}$	D_2 (h6)	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	1-5/8	3-1/2	TC13433	163.50	TC13437	173.80
	5/8	2-1/4	5	TC13444	203.10	TC13448	213.40
3/4	3/4	1-5/8	4	TC13434	204.95	TC13438	217.55
	3/4	2-1/4	5	TC13445	253.40	TC13449	265.95
1	1	2	4	TC13435	314.65	TC13439	330.65
	1	3	6	TC13446	516.10	TC13450	532.10

For technical information, see page 120

VI-PRO VARIABLE INDEX END MILLS

6 Flute - Corner Radius



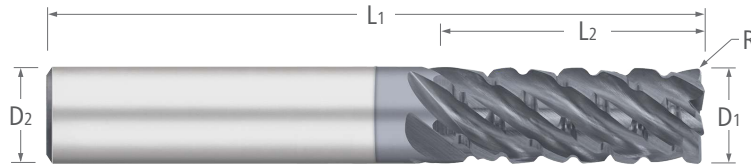
- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Offered in stub, regular, long, and extra long length styles
- Corner radius for increased edge strength
- Delivers efficient, chatter-free machining in High Efficiency Milling (HEM), profiling, and finishing applications
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D1^{+.000}_{-.002}$	D2 (h6)	$R^{+.001}_{-.001}$	L2	L1	TOOL #	USD\$	TOOL #	USD\$
1/4	1/4	.015	3/8	2	TC64426	31.85		
	1/4	.015	3/4	2-1/2	TC67116	37.05		
	1/4	.015	1-1/8	3	TC61216	42.25		
5/16	5/16	.015	7/16	2	TC64428	45.10		
	5/16	.015	13/16	2-1/2	TC67120	47.95		
3/8	3/8	.015	1/2	2	TC64430	49.85		
	3/8	.015	1	2-1/2	TC67124	56.35		
	3/8	.015	1-1/4	3	TC61224	77.05		
1/2	1/2	.030	5/8	2-1/2	TC64432	75.05	TC64438	83.00
	1/2	.030	1-1/4	3	TC67132	86.30	TC67184	94.35
	1/2	.030	2	4	TC61232	118.85	TC61287	126.85
$D1^{+.000}_{-.003}$	D2 (h6)	$R^{+.001}_{-.001}$	L2	L1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.030	3/4	3	TC64434	142.45	TC64440	152.75
	5/8	.030	1-5/8	3-1/2	TC67140	155.25	TC67186	165.55
	5/8	.030	2-1/4	5	TC61240	211.90	TC61289	222.15
3/4	3/4	.030	1	3	TC64436	184.05	TC64442	196.55
	3/4	.060	1-5/8	4	TC67148	205.80	TC67188	218.40
	3/4	.060	2-1/4	5	TC61248	265.70	TC61291	278.20
1	1	.060	2	4	TC67164	388.20	TC67190	404.15
	1	.060	3	6	TC61264	487.75	TC61293	503.65

For technical information, see page 120

VI-PRO VARIABLE INDEX END MILLS

6 Flute - Corner Radius - Chipbreaker



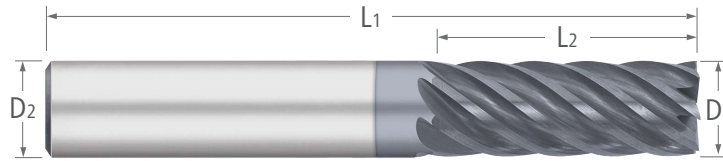
- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Engineered with chipbreaker geometry for optimal chip evacuation, reduced harmonics, and reduced tool pressure
- Offered in stub, regular, long, and extra long length styles
- Delivers efficient, chatter-free machining in High Efficiency Milling (HEM), profiling, and finishing applications
- Corner radius for increased edge strength
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	AlCrO-MAX COATED		AlCrO-MAX COATED + WELDON FLAT	
$D_1^{+.000''}_{-.002''}$	D_2 (h6)	$R^{+.001''}_{-.001''}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
1/4	1/4	.015	3/4	2-1/2	TC13451	35.30		
	1/4	.015	1-1/8	3	TC13462	40.60		
5/16	5/16	.015	13/16	2-1/2	TC13452	45.90		
	5/16	.015	1-1/8	3	TC13463	55.00		
3/8	3/8	.015	1	2-1/2	TC13453	54.05		
	3/8	.015	1-1/4	3	TC13464	74.75		
1/2	1/2	.030	1-1/4	3	TC13454	83.80	TC13458	91.75
	1/2	.030	2	4	TC13465	116.30	TC13469	124.30
$D_1^{+.000''}_{-.003''}$	D_2 (h6)	$R^{+.001''}_{-.001''}$	L_2	L_1	TOOL #	USD\$	TOOL #	USD\$
5/8	5/8	.030	1-5/8	3-1/2	TC13455	152.70	TC13459	162.95
	5/8	.030	2-1/4	5	TC13466	209.30	TC13470	219.60
3/4	3/4	.060	1-5/8	4	TC13456	202.45	TC13460	214.95
	3/4	.060	2-1/4	5	TC13467	262.20	TC13471	274.80
1	1	.060	2	4	TC13457	383.60	TC13461	399.60
	1	.060	3	6	TC13468	483.15	TC13472	499.10

For technical information, see page 120

VI-PRO VARIABLE INDEX END MILLS

7 Flute - Square

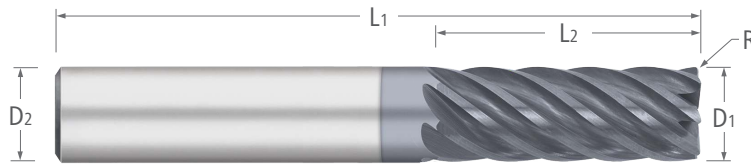


- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Offered in regular, long, and extra long length styles
- Delivers efficient, chatter free machining in light profiling, High Efficiency Milling (HEM), and finishing applications
- Large core and eccentric relief for improved tool life
- Post-polished AlCrO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	LOC	OAL	AlCrO-MAX COATED	
$D1^{+0.000}_{-0.002}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$
1/4	1/4	3/8	2	TC64800	31.35
	1/4	3/4	2-1/2	TC64806	38.50
	1/4	1-1/8	3	TC64813	44.40
5/16	5/16	7/16	2	TC64801	46.75
	5/16	13/16	2-1/2	TC64807	49.75
	5/16	1-1/8	3	TC64814	59.40
3/8	3/8	1/2	2	TC64802	52.05
	3/8	1	2-1/2	TC64808	58.95
	3/8	1-1/4	3	TC64815	79.95
1/2	1/2	5/8	2-1/2	TC64803	77.15
	1/2	1-1/4	3	TC64809	95.65
	1/2	2	4	TC64816	124.75
$D1^{+0.000}_{-0.003}$	$D2 (h6)$	$L2$	$L1$	TOOL #	USD\$
5/8	5/8	3/4	3	TC64804	148.05
	5/8	1-5/8	3-1/2	TC64810	166.20
	5/8	2-1/4	5	TC64817	220.05
3/4	3/4	1	3	TC64805	192.00
	3/4	1-5/8	4	TC64811	211.55
	3/4	2-1/4	5	TC64818	274.85
1	1	2	4	TC64812	410.90
	1	3	6	TC64819	505.20

VI-PRO VARIABLE INDEX END MILLS

7 Flute - Corner Radius



- VI-Pro® variable index geometry offers outstanding performance in a wide range of materials, including high temp alloys, stainless steels, alloy steels, cast iron, and titanium
- Offered in regular, long, and extra long length styles
- Delivers efficient, chatter free machining in light profiling, High Efficiency Milling (HEM), and finishing applications
- Corner radius for increased edge strength
- Large core and eccentric relief for improved tool life
- Post-polished ALCRO-MAX coating increases wear and high heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	SHANK DIA.	RADIUS	LOC	OAL	ALCRO-MAX COATED	
$D_1 \begin{smallmatrix} +.000" \\ -.002" \end{smallmatrix}$	$D_2 \text{ (h6)}$	$R \begin{smallmatrix} +.001" \\ -.001" \end{smallmatrix}$	L_2	L_1	TOOL #	USD\$
1/4	1/4	.015	3/8	2	TC64820	36.60
	1/4	.015	3/4	2-1/2	TC64826	40.65
	1/4	.015	1-1/8	3	TC64833	45.70
5/16	5/16	.015	7/16	2	TC64821	48.95
	5/16	.015	13/16	2-1/2	TC64827	52.25
	5/16	.015	1-1/8	3	TC64834	61.15
3/8	3/8	.015	1/2	2	TC64822	53.90
	3/8	.015	1	2-1/2	TC64828	59.60
	3/8	.015	1-1/4	3	TC64835	76.90
1/2	1/2	.030	5/8	2-1/2	TC64823	82.75
	1/2	.030	1-1/4	3	TC64829	96.65
	1/2	.030	2	4	TC64836	123.40
$D_1 \begin{smallmatrix} +.000" \\ -.003" \end{smallmatrix}$	$D_2 \text{ (h6)}$	$R \begin{smallmatrix} +.001" \\ -.001" \end{smallmatrix}$	L_2	L_1	TOOL #	USD\$
5/8	5/8	.030	3/4	3	TC64824	151.55
	5/8	.030	1-5/8	3-1/2	TC64830	185.35
	5/8	.030	2-1/4	5	TC64837	228.50
3/4	3/4	.060	1	3	TC64825	197.25
	3/4	.060	1-5/8	4	TC64831	231.60
	3/4	.060	2-1/4	5	TC64838	285.30
1	1	.060	2	4	TC64832	410.65
	1	.060	3	6	TC64839	524.90

For technical information, see page 120

GENERAL PURPOSE END MILLS - CARBIDE - ROUGHING

Technical Information

Carbide Fine Pitch Roughers									
Material Guide		SFM	Feed Per Tooth						
			1/8" - 1/4"	1/4" - 5/16"	5/16" - 3/8"	3/8" - 1/2"	1/2" - 5/8"	5/8" - 3/4"	3/4" - 1"
COBALT BASE ALLOYS	Stellite, HS - 21, Haynes 25/188, X - 40, L - 605	85 - 120	.0002 - .0004 .0002 - .0005	.0004 - .0006 .0005 - .0007	.0006 - .0008 .0008 - .0009	.0008 - .0012 .0009 - .0014	.0012 - .0015 .0014 - .0018	.0015 - .0018 .0018 - .0022	.0018 - .0025 .0022 - .0029
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	60 - 85	.0001 - .0003 .0003 - .0004	.0003 - .0005 .0004 - .0006	.0005 - .0006 .0006 - .0007	.0006 - .0010 .0007 - .0011	.0010 - .0012 .0011 - .0014	.0012 - .0015 .0014 - .0017	.0015 - .0020 .0017 - .0023
IRON BASE ALLOYS	Incoloy 800 - 802, Multimet N - 155, Timken 16 - 25 - 6, Carpenter 22 - b3	70 - 100	.0002 - .0004 .0002 - .0005	.0004 - .0006 .0005 - .0007	.0006 - .0008 .0008 - .0009	.0008 - .0012 .0009 - .0014	.0012 - .0015 .0014 - .0018	.0015 - .0018 .0018 - .0022	.0018 - .0025 .0022 - .0029
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17 - 4	175 - 245	.0006 - .0011 .0009 - .0015	.0011 - .0013 .0015 - .0016	.0013 - .0016 .0016 - .0022	.0016 - .0022 .0022 - .0030	.0022 - .0028 .0030 - .0039	.0028 - .0034 .0039 - .0047	.0034 - .0046 .0047 - .0063
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	225 - 315	.0007 - .0013 .0010 - .0018	.0013 - .0017 .0018 - .0023	.0017 - .0020 .0023 - .0028	.0020 - .0027 .0028 - .0037	.0027 - .0034 .0037 - .0047	.0034 - .0041 .0047 - .0056	.0041 - .0055 .0056 - .0075
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	200 - 280	.0009 - .0014 .0014 - .0019	.0014 - .0018 .0019 - .0023	.0018 - .0021 .0023 - .0029	.0021 - .0029 .0029 - .0040	.0029 - .0036 .0040 - .0050	.0036 - .0043 .0050 - .0060	.0043 - .0059 .0060 - .0081
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	225 - 315	.0007 - .0013 .0010 - .0018	.0013 - .0017 .0018 - .0023	.0017 - .0020 .0023 - .0028	.0020 - .0027 .0028 - .0037	.0027 - .0034 .0037 - .0047	.0034 - .0041 .0047 - .0056	.0041 - .0055 .0056 - .0075
MEDIUM ALLOY STEELS	200, 250, 300	250 - 350	.0007 - .0013 .0010 - .0018	.0013 - .0017 .0018 - .0023	.0017 - .0020 .0023 - .0028	.0020 - .0027 .0028 - .0037	.0027 - .0034 .0037 - .0047	.0034 - .0041 .0047 - .0056	.0041 - .0055 .0056 - .0075
CARBON STEELS	1000's, 1100's, 1300's	265 - 370	.0007 - .0013 .0010 - .0018	.0013 - .0017 .0018 - .0023	.0017 - .0020 .0023 - .0028	.0020 - .0027 .0028 - .0037	.0027 - .0034 .0037 - .0047	.0034 - .0041 .0047 - .0056	.0041 - .0055 .0056 - .0075

Slotting @ $\leq .5 \times D$ Profiling @ $2 \times D$ Axial / $\leq .5D$ Radial

GENERAL PURPOSE END MILLS - COBALT - ROUGHING

Technical Information

General Purpose Cobalt Roughing End Mills

Material Guide		Rc	SFM	Feed Per Tooth						
				1/4"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
COBALT BASE ALLOYS	Stellite, HS-21, Haynes 25/188, X-40, L-605	< 32	5-25	.0009 - .0011	.0012 - .0014	.0018 - .0020	.0026 - .0029	.0033 - .0037	.0040 - .0045	.0053 - .0059
NICKEL BASE ALLOYS	Inconel-625/718, Waspalloy, Rene, Hastelloy	< 32	10-20	.0009 - .0011	.0012 - .0014	.0018 - .0020	.0026 - .0029	.0033 - .0037	.0040 - .0045	.0053 - .0059
IRON BASE ALLOYS	Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3	< 32	15-35	.0009 - .0011	.0012 - .0014	.0018 - .0020	.0026 - .0029	.0033 - .0037	.0040 - .0045	.0053 - .0059
MONEL	Monel-65% Nickel		10-20	.0009 - .0011	.0012 - .0014	.0018 - .0020	.0026 - .0029	.0033 - .0037	.0040 - .0045	.0053 - .0059
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		50-90	.0015 - .0017	.0020 - .0022	.0028 - .0030	.0040 - .0045	.0052 - .0057	.0062 - .0067	.0080 - .0090
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17-4, AM-350/355	< 32	60-80	.0011 - .0015	.0016 - .0020	.0026 - .0029	.0036 - .0040	.0046 - .0050	.0054 - .0060	.0070 - .0075
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 316, 304L, 316L	< 32	60-80	.0015 - .0019	.0020 - .0025	.0030 - .0034	.0045 - .0049	.0056 - .0061	.0067 - .0074	.0090 - .0098
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	< 32	60-100	.0015 - .0019	.0020 - .0025	.0030 - .0034	.0045 - .0049	.0056 - .0061	.0067 - .0074	.0090 - .0098
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	< 32	50-80	.0011 - .0015	.0015 - .0020	.0025 - .0028	.0035 - .0039	.0045 - .0050	.0053 - .0059	.0071 - .0079
MEDIUM ALLOY STEELS	200, 250, 300	< 32	60-120	.0016 - .0020	.0023 - .0027	.0033 - .0040	.0050 - .0054	.0032 - .0070	.0075 - .0082	.0093 - .0110
CARBON STEELS	1000's, 1100's, 1300's	< 32	70-150	.0018 - .0022	.0025 - .0029	.0037 - .0042	.0053 - .0059	.0068 - .0074	.0080 - .0090	.0100 - .0115
DUCTILE	Ductile Cast Irons		40-80	.0015 - .0018	.0019 - .0024	.0030 - .0034	.0042 - .0048	.0056 - .0061	.0065 - .0073	.0087 - .0093
CAST IRONS	Gray Cast Irons		60-150	.0010 - .0014	.0014 - .0018	.0024 - .0027	.0034 - .0038	.0044 - .0050	.0053 - .0058	.0070 - .0078
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded		400-650	.0024 - .0027	.0058 - .0063	.0067 - .0076	.0103 - .0110	.0112 - .0120	.0180 - .0205	.0210 - .0260

These values are a starting point based on an uncoated tool.

For AlTiN Coated tools increase SFM values by up to +40%

GENERAL PURPOSE END MILLS - CARBIDE

Technical Information

General Purpose Carbide End Mills											
Material Guide		Rc	SFM				Suggested Chip Load Per Tooth				
			2 Flute		3 & 4 Flute						
			Stub, Std	Long, X-Long	Stub, Std	Long, X-Long	1/32" - 1/8"	1/8" - 1/4"	1/4" - 1/2"	1/2" - 1"	1" - 1 - 1/4"
COBALT BASE ALLOYS	Stellite, HS-21, Haynes 25/188, X-40, L-605	under 32 over 32			175 - 225 125 - 175	140 - 180 100 - 140	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
NICKEL BASE ALLOYS	Inconel-625/718, Waspalloy, Rene, Hastelloy	under 32 over 32			125 - 175 70 - 115	100 - 140 55 - 95	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
IRON BASE ALLOYS	Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3	under 32 over 32			175 - 225 125 - 175	140 - 180 100 - 140	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
MONEL	Monel-65% Nickel		175 - 300	125 - 175	175 - 300	140 - 240	.0007 - .0015	.0010 - .0025	.0015 - .0040	.0030 - .0050	.0040 - .0060
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		200 - 300	125 - 250	200 - 300	160 - 240	.0007 - .0015	.0010 - .0025	.0015 - .0040	.0030 - .0050	.0040 - .0060
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17-4	under 32 over 32			150 - 250 125 - 175	120 - 200 100 - 140	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	under 32 over 32			200 - 250 150 - 200	160 - 200 120 - 160	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	under 32 over 32			150 - 250 125 - 175	120 - 200 100 - 140	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, O1	under 32 over 32			150 - 225 60 - 125	120 - 180 50 - 100	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
MEDIUM ALLOY STEELS	200, 250, 300	under 32 over 32			200 - 250 125 - 175	160 - 200 100 - 140	.0007 - .0015 .0005 - .0010	.0010 - .0025 .0008 - .0020	.0015 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040	.0040 - .0060 .0030 - .0050
CARBON STEELS	1000's, 1100's, 1300's	under 32 over 32			200 - 250 125 - 175	160 - 200 100 - 140	.0007 - .0015 .0005 - .0010	.0010 - .0025 .0008 - .0020	.0015 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040	.0040 - .0060 .0030 - .0050
DUCTILE	Ductile Cast Irons		200 - 300	125 - 200	200 - 300	160 - 240	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0030 - .0080
CAST IRONS	Gray Cast Irons		225 - 325	175 - 250	250 - 350	200 - 280	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0050 - .0100
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded		300 - 500	300 - 500	300 - 500	240 - 400	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0030 - .0150
MAGNESIUM			300 - 500	300 - 500	300 - 500	240 - 400	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0050 - .0100
COPPER, COPPER ALLOYS			400 - 500	250 - 350	300 - 400	240 - 320	.0007 - .0015	.0010 - .0025	.0015 - .0035	.0020 - .0080	.0040 - .0100
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		300 - 400	200 - 300	250 - 350	200 - 280	.0007 - .0015	.0010 - .0025	.0015 - .0035	.0020 - .0080	.0040 - .0100
COMPOSITES	G-10 Fiberglass, Graphite, Graphite/Epoxy, Plastics		250 - 1000	250 - 1000	250 - 1000	200 - 800	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0050 - .0100

These values are a starting point based on an uncoated tool.

For AlTiN Coated tools increase SFM values by up to +40%

GENERAL PURPOSE END MILLS - CARBIDE

45° & 60° Helix - Technical Information

General Purpose Carbide 45° & 60° Helix End Mills

Material Guide		Rc	SFM			Feed Per Tooth			
			2, 3 Flute	3 Flute	5 Flute				
			45° Helix Aluminum	45°,60° Helix	45° Helix	UP TO 1/8"	1/8" - 1/4"	1/4" - 1/2"	1/2" - 1"
COBALT BASE ALLOYS	Stellite, HS - 21, Haynes 25/188, X - 40, L - 605	under 32 over 32		200 - 275 125 - 175	200 - 275 125 - 175	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	under 32 over 32		150 - 200 90 - 125	150 - 200 90 - 125	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030
IRON BASE ALLOYS	Incoloy 800 - 802, Multimet N - 155, Timken 16 - 25 - 6, Carpenter 22 - b3	under 32 over 32		200 - 300 150 - 200	200 - 300 150 - 200	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030
MONEL	Monel - 65% Nickel			200 - 300	200 - 300	.0007 - .0015	.0010 - .0025	.0015 - .0040	.0030 - .0050
TITANIUM ALLOYS	Commercially Pure, 6AL - 4V, Astm 1/2/3, 6AL - 25N - 4Zr - 2Mo - Si		125 - 400	150 - 300	150 - 300	.0007 - .0015	.0010 - .0025	.0015 - .0040	.0030 - .0050
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17 - 4, AM - 350/355	under 32 over 32		200 - 300 150 - 200	200 - 300 150 - 200	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 316, 304L, 316L	under 32 over 32		250 - 350 175 - 275	250 - 350 175 - 275	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	under 32 over 32		200 - 300 150 - 200	200 - 300 150 - 200	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	under 32 over 32		225 - 300 125 - 200	225 - 300 125 - 200	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030
MEDIUM ALLOY STEELS	200, 250, 300	under 32 over 32		250 - 350 150 - 200	250 - 350 150 - 200	.0007 - .0015 .0005 - .0010	.0010 - .0025 .0008 - .0020	.0015 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
CARBON STEELS	1000's, 1100's, 1300's	under 32 over 32		250 - 350 150 - 200	250 - 350 150 - 200	.0007 - .0015 .0005 - .0010	.0010 - .0025 .0008 - .0020	.0015 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
DUCTILE	Ductile Cast Irons			200 - 300	200 - 300	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100
CAST IRONS	Gray Cast Irons			175 - 250	175 - 250	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded		300 - 500	200 - 400	200 - 400	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0150
MAGNESIUM			200 - 500	200 - 300	200 - 300	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100
COPPER, COPPER ALLOYS			200 - 500	200 - 300	200 - 300	.0007 - .0015	.0010 - .0025	.0015 - .0035	.0020 - .0080
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		200 - 500	200 - 300	200 - 300	.0007 - .0015	.0010 - .0025	.0015 - .0035	.0020 - .0080

These values are a starting point based on an uncoated tool.

For AlTiN Coated tools increase SFM values by up to +40%

GENERAL PURPOSE END MILLS - COBALT & HIGH SPEED STEEL

Technical Information

General Purpose Cobalt & HSS End Mills									
Material Guide		Rc	SFM	Feed Per Tooth					
				1/8"	1/8" - 1/4"	1/4" - 1/2"	1/2" - 1"	1" - 1 - 3/8"	1-1/2" - 2"
COBALT BASE ALLOYS	Stellite, HS - 21, Haynes 25/188, X - 40, L - 605	<32	5 - 10	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	<32	10 - 15	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
IRON BASE ALLOYS	Incoloy 800 - 802, Multimet N - 155, Timken 16 - 25 - 6, Carpenter 22 - b3	<32	15 - 20	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
MONEL	Monel - 65% Nickel	<32	10 - 15	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
TITANIUM ALLOYS	Commercially Pure, 6AL - 4V, Astm 1/2/3, 6Al - 25N - 4Zr - 2Mo - Si	<32	15 - 20	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17 - 4	<32	15 - 20	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	<32	20 - 40	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	<32	40 - 60	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	<32	20 - 40	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
MEDIUM ALLOY STEELS	200, 250, 300	<32	60 - 80	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
CARBON STEELS	1000's, 1100's, 1300's		80 - 100	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
DUCTILE	Ductile Cast Irons		40 - 60	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
CAST IRONS	Gray Cast Irons		80 - 100	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
ALUMINUM	2014, 2024, 6061 - (T1 - T6), 7075, Die Cast, Extruded		200 - 500	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
COPPER, COPPER ALLOYS			150 - 250	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		100 - 200	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060
COMPOSITES	G - 10 Fiberglass, Graphite, Graphite/ Epoxy, Plastics		200 - 500	.0002 - .0006	.0002 - .0010	.0002 - .0010	.0005 - .0030	.0010 - .0040	.0030 - .0060

These values are a starting point based on an uncoated tool.

For AlTiN Coated tools increase SFM values by up to +40%

VI-PRO VARIABLE INDEX END MILLS

4 Flute - Technical Information

VI-Pro Variable Index End Mills - 4 Flute

Material Guide		Rc	SFM		Feed Per Tooth									
			Stub, Reg Length	Long, Xlong Length	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
COBALT BASE ALLOYS	Stellite, HS - 21, Haynes 25/188, X - 40, L - 605	under 32 over 32	275 - 350 175 - 250	220 - 280 140 - 200	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	under 32 over 32	200 - 300 125 - 200	160 - 240 100 - 160	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
IRON BASE ALLOYS	Incoloy 800 - 802, Multimet N - 155, Timken 16 - 25 - 6, Carpenter 22 - b3	under 32 over 32	250 - 350 200 - 250	200 - 280 160 - 200	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
MONEL	Monel - 65% Nickel		275 - 350	220 - 280	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0019 - .0021	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
TITANIUM ALLOYS	Commercially Pure, 6AL - 4V, Astm 1/2/3, 6Al - 25N - 4Zr - 2Mo - Si		250 - 400	200 - 320	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0019 - .0021	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17 - 4, AM - 350/355	under 32 over 32	250 - 300 200 - 250	200 - 240 160 - 200	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	under 32 over 32	250 - 375 200 - 250	200 - 300 160 - 200	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440		250 - 300	200 - 240	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	under 32 over 32	250 - 350 150 - 200	200 - 280 120 - 160	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
MEDIUM ALLOY STEELS	200, 250, 300	under 32 over 32	210 - 300 130 - 170	170 - 240 100 - 135	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
CARBON STEELS	1000's, 1100's, 1300's		420 - 450	335 - 360	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
DUCTILE	Ductile Cast Irons		420 - 450	335 - 360	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
CAST IRONS	Gray Cast Irons		420 - 450	335 - 360	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056

VI-PRO VARIABLE INDEX END MILLS

5 Flute - Technical Information

VI-Pro Variable Index End Mills - 5 Flute														
Material Guide		Rc	SFM		Feed Per Tooth									
			Stub, Reg Length	Long, Xlong Length	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
COBALT BASE ALLOYS	Stellite, HS - 21, Haynes 25/188, X - 40, L - 605	under 32 over 32	315 - 400 200 - 290	250 - 320 160 - 230	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	under 32 over 32	230 - 345 145 - 230	185 - 275 115 - 185	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
IRON BASE ALLOYS	Incoloy 800 - 802, Multimet N - 155, Timken 16 - 25 - 6, Carpenter 22 - b3	under 32 over 32	290 - 400 230 - 290	230 - 320 185 - 230	.0004 - .0008	.0005 - .0011	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0014 - .0021	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
MONEL	Monel - 65% Nickel		315 - 400	250 - 320	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0019 - .0021	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
TITANIUM ALLOYS	Commercially Pure, 6AL - 4V, Astm 1/2/3, 6Al - 25N - 4Zr - 2Mo - Si		290 - 460	230 - 370	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0019 - .0021	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17 - 4	under 32 over 32	290 - 345 230 - 290	230 - 275 185 - 230	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (AUSTENTIC)	200 Series, 302, 303, 304, 304L, 316, 316L	under 32 over 32	290 - 430 230 - 290	230 - 345 185 - 230	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440		290 - 345	230 - 275	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	under 32 over 32	290 - 400 170 - 230	230 - 420 135 - 185	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
MEDIUM ALLOY STEELS	200, 250, 300	under 32 over 32	240 - 345 150 - 200	190 - 275 120 - 160	.0004 - .0008	.0009 - .0011	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0019 - .0031	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
CARBON STEELS	1000's, 1100's, 1300's		480 - 510	385 - 405	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
DUCTILE	Ductile Cast Irons		480 - 510	385 - 405	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
CAST IRONS	Gray Cast Irons		480 - 510	385 - 405	.0004 - .0008	.0011 - .0013	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0033 - .0035	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056

VI-PRO VARIABLE INDEX END MILLS

6 & 7 Flute - Technical Information

VI-Pro Variable Index End Mills - 6 & 7 Flute

Material Guide		Rc	Reg Length	Long Length	Suggested Chip Load Per Tooth						
					1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
COBALT BASE ALLOYS	Stellite, HS - 21, Haynes 25/188, X - 40, L - 605	under 32 over 32	360 - 460 235 - 300	290 - 370 190 - 240	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	under 32 over 32	265 - 400 170 - 260	210 - 320 135 - 210	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
IRON BASE ALLOYS	Incoloy 800 - 802, Multimet N - 155, Timken 16 - 25 - 6, Carpenter 22 - b3	under 32 over 32	335 - 460 215 - 300	270 - 370 170 - 240	.0009 - .0016	.0010 - .0018	.0012 - .0019	.0016 - .0028	.0019 - .0031	.0024 - .0037	.0029 - .0041
MONEL	Monel - 65% Nickel		360 - 460	290 - 370	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
TITANIUM ALLOYS	Commercially Pure, 6AL - 4V, Astm 1/2/3, 6Al - 25N - 4Zr - 2Mo - Si		335 - 530	270 - 425	.0014 - .0016	.0015 - .0017	.0017 - .0019	.0026 - .0028	.0029 - .0031	.0035 - .0037	.0039 - .0041
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17 - 4	under 32 over 32	335 - 400 270 - 320	270 - 320 215 - 260	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	under 32 over 32	335 - 500 270 - 400	270 - 400 215 - 320	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440		335 - 400	270 - 320	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	under 32 over 32	335 - 460 215 - 300	270 - 370 170 - 240	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
MEDIUM ALLOY STEELS	200, 250, 300	under 32 over 32	275 - 400 180 - 260	220 - 320 145 - 210	.0014 - .0016	.0016 - .0020	.0017 - .0025	.0026 - .0032	.0029 - .0037	.0035 - .0039	.0039 - .0041
CARBON STEELS	1000's, 1100's, 1300's		550 - 585	440 - 470	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
DUCTILE	Ductile Cast Irons		550 - 585	440 - 470	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056
CAST IRONS	Gray Cast Irons		550 - 585	440 - 470	.0018 - .0020	.0024 - .0026	.0030 - .0032	.0035 - .0037	.0039 - .0041	.0041 - .0043	.0054 - .0056

MICRO END MILLS

2 Flute - Square - 30° Helix - Stub & Regular Flute



- Offered in stub and regular flute styles
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D1^{+0.0005"}_{-0.0005"}$	L2	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0050	.008	1/8	1-1/2	TC52005	33.87	TC52205	51.90
	.015	1/8	1-1/2	TC56005	40.75	TC56205	45.75
.0060	.018	1/8	1-1/2	TC56006	40.75	TC56206	45.75
.0070	.021	1/8	1-1/2	TC56007	40.75	TC56207	45.75
.0080	.024	1/8	1-1/2	TC56008	40.75	TC56208	45.75
.0090	.027	1/8	1-1/2	TC56009	36.70	TC56209	41.80
.0100	.015	1/8	1-1/2	TC52010	41.90	TC52210	46.90
	.030	1/8	1-1/2	TC56010	36.50	TC56210	41.55
.0110	.033	1/8	1-1/2	TC56011	33.00	TC56211	38.00
.0120	.036	1/8	1-1/2	TC56012	32.75	TC56212	37.70
.0130	.039	1/8	1-1/2	TC56013	27.15	TC56213	32.10
.0140	.042	1/8	1-1/2	TC56014	27.15	TC56214	32.10
.0150	.023	1/8	1-1/2	TC52015	26.35	TC52215	31.35
	.045	1/8	1-1/2	TC56015	22.95	TC56215	27.40
.0160	.048	1/8	1-1/2	TC56016	23.05	TC56216	28.10
.0170	.051	1/8	1-1/2	TC56017	22.95	TC56217	27.40
.0180	.054	1/8	1-1/2	TC56018	22.95	TC56218	28.00
.0190	.057	1/8	1-1/2	TC56019	22.95	TC56219	28.00
.0200	.030	1/8	1-1/2	TC52020	23.90	TC52220	28.70
	.060	1/8	1-1/2	TC56020	20.80	TC56220	24.95
.0210	.063	1/8	1-1/2	TC56021	20.90	TC56221	18.87
.0220	.066	1/8	1-1/2	TC56022	20.80	TC56222	24.95
.0230	.069	1/8	1-1/2	TC56023	20.80	TC56223	24.95
.0240	.072	1/8	1-1/2	TC56024	20.80	TC56224	25.80
.0250	.038	1/8	1-1/2	TC52025	23.90	TC52225	28.70
	.075	1/8	1-1/2	TC56025	20.80	TC56225	24.95
.0260	.078	1/8	1-1/2	TC56026	19.55	TC56226	23.50
.0270	.081	1/8	1-1/2	TC56027	19.55	TC56227	23.50
.0280	.084	1/8	1-1/2	TC56028	19.55	TC56228	24.50
.0290	.087	1/8	1-1/2	TC56029	19.55	TC56229	23.50
.0300	.045	1/8	1-1/2	TC52030	22.40	TC52230	26.90
	.090	1/8	1-1/2	TC56030	19.55	TC56230	23.50
.0310	.047	1/8	1-1/2	TC52031	21.05	TC52231	25.20
	.093	1/8	1-1/2	TC56031	18.10	TC56231	21.90
.0320	.096	1/8	1-1/2	TC56032	18.10	TC56232	21.50
.0330	.099	1/8	1-1/2	TC56033	18.40	TC56233	23.40
.0340	.102	1/8	1-1/2	TC56034	18.50	TC56234	23.55

continued on next page

For technical information, see page 155

MICRO END MILLS

2 Flute - Square - 30° Helix - Stub & Regular Flute (Cont.)

continued from previous page

CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+.0005"} _{-.0005"}	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0350	.053	1/8	1-1/2	TC52035	21.05	TC52235	25.20
	.105	1/8	1-1/2	TC56035	18.10	TC56235	21.90
.0360	.108	1/8	1-1/2	TC56036	18.40	TC56236	23.40
.0370	.111	1/8	1-1/2	TC56037	13.17	TC56237	23.10
.0380	.114	1/8	1-1/2	TC56038	18.10	TC56238	21.90
.0390	.117	1/8	1-1/2	TC56039	18.10	TC56239	21.90
.0400	.060	1/8	1-1/2	TC52040	21.05	TC52240	25.20
	.120	1/8	1-1/2	TC56040	18.10	TC56240	21.90
.0410	.123	1/8	1-1/2	TC56041	18.40	TC56241	16.97
.0420	.126	1/8	1-1/2	TC56042	18.40	TC56242	16.97
.0430	.129	1/8	1-1/2	TC56043	18.40	TC56243	16.97
.0440	.132	1/8	1-1/2	TC56044	17.75	TC56244	16.57
.0450	.068	1/8	1-1/2	TC52045	20.60	TC52245	25.55
	.135	1/8	1-1/2	TC56045	17.75	TC56245	21.45
.0460	.138	1/8	1-1/2	TC56046	17.80	TC56246	16.57
.0470	.071	1/8	1-1/2	TC52047	20.60	TC52247	24.65
	.141	1/8	1-1/2	TC56047	17.75	TC56247	21.45
.0480	.144	1/8	1-1/2	TC56048	12.87	TC56248	21.45
.0490	.147	1/8	1-1/2	TC56049	17.80	TC56249	16.57
.0500	.075	1/8	1-1/2	TC52050	20.60	TC52250	24.65
	.150	1/8	1-1/2	TC56050	17.75	TC56250	21.45
.0510	.153	1/8	1-1/2	TC56051	17.80	TC56251	16.57
.0520	.156	1/8	1-1/2	TC56052	17.75	TC56252	22.75
.0530	.159	1/8	1-1/2	TC56053	17.85	TC56253	22.85
.0540	.162	1/8	1-1/2	TC56054	17.85	TC56254	21.45
.0550	.083	1/8	1-1/2	TC52055	20.60	TC52255	24.65
	.165	1/8	1-1/2	TC56055	17.75	TC56255	21.45
.0560	.168	1/8	1-1/2	TC56056	12.87	TC56256	22.95
.0570	.171	1/8	1-1/2	TC56057	17.75	TC56257	22.75
.0580	.174	1/8	1-1/2	TC56058	17.75		
.0590	.177	1/8	1-1/2	TC56059	17.75	TC56259	15.47
.0600	.090	1/8	1-1/2	TC52060	20.60	TC52260	24.65
	.180	1/8	1-1/2	TC56060	17.75	TC56260	15.47
.0610	.183	1/8	1-1/2	TC56061	17.75	TC56261	15.47
.0620	.093	1/8	1-1/2	TC52062	20.60	TC52262	24.65
	.186	1/8	1-1/2	TC56062	17.75	TC56262	21.45
.0630	.189	1/8	1-1/2	TC56063	17.85	TC56263	22.85
.0640	.192	1/8	1-1/2	TC56064	17.75	TC56264	22.75
.0650	.098	1/8	1-1/2	TC52065	20.60	TC52265	24.65
	.195	1/8	1-1/2	TC56065	17.75	TC56265	21.45
.0660	.198	1/8	1-1/2	TC56066	17.90	TC56266	22.95
.0670	.201	1/8	1-1/2	TC56067	17.75	TC56267	15.47
.0680	.204	1/8	1-1/2	TC56068	17.85	TC56268	21.45
.0690	.207	1/8	1-1/2	TC56069	17.85	TC56269	16.67
.0700	.105	1/8	1-1/2	TC52070	20.75	TC52270	25.75
	.210	1/8	1-1/2	TC56070	17.75	TC56270	21.45
.0710	.213	1/8	1-1/2	TC56071	17.75	TC56271	16.57

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For technical information, see page 155

MICRO END MILLS

2 Flute - Square - 30° Helix - Stub & Regular Flute (Cont.)

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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_{1 \pm .0005}^{+ .0005}$	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0720	.216	1/8	1-1/2	TC56072	17.75	TC56272	21.45
.0730	.219	1/8	1-1/2	TC56073	17.75	TC56273	21.45
.0740	.222	1/8	1-1/2	TC56074	17.75	TC56274	22.75
.0750	.113	1/8	1-1/2	TC52075	20.65	TC52275	25.60
	.225	1/8	1-1/2	TC56075	17.75	TC56275	21.45
.0760	.228	1/8	1-1/2	TC56076	17.75	TC56276	22.75
.0770	.231	1/8	1-1/2	TC56077	17.85	TC56277	16.67
.0780	.117	1/8	1-1/2	TC52078	20.60	TC52278	24.65
	.234	1/8	1-1/2	TC56078	17.75	TC56278	21.45
.0790	.237	1/8	1-1/2	TC56079	17.75	TC56279	22.75
.0800	.120	1/8	1-1/2	TC52080	14.87	TC52280	25.70
	.240	1/8	1-1/2	TC56080	17.75	TC56280	22.75
.0810	.243	1/8	1-1/2	TC56081	17.75	TC56281	16.57
.0820	.246	1/8	1-1/2	TC56082	12.77	TC56282	16.57
.0830	.249	1/8	1-1/2	TC56083	17.75	TC56283	22.75
.0840	.252	1/8	1-1/2	TC56084	17.85	TC56284	16.67
.0850	.128	1/8	1-1/2	TC52085	20.60	TC52285	25.55
	.255	1/8	1-1/2	TC56085	17.85	TC56285	22.85
.0860	.258	1/8	1-1/2	TC56086	17.85	TC56286	22.85
.0870	.261	1/8	1-1/2	TC56087	17.75	TC56287	22.75
.0880	.264	1/8	1-1/2	TC56088	17.85	TC56288	22.85
.0890	.267	1/8	1-1/2	TC56089	17.75	TC56289	21.45
.0900	.135	1/8	1-1/2	TC52090	20.60	TC52290	24.65
	.270	1/8	1-1/2	TC56090	17.75	TC56290	22.75
.0910	.273	1/8	1-1/2	TC56091	17.75	TC56291	16.57
.0920	.276	1/8	1-1/2	TC56092	17.85	TC56292	16.67
.0930	.140	1/8	1-1/2	TC52093	20.60	TC52293	24.65
	.279	1/8	1-1/2	TC56093	17.75	TC56293	21.45
.0940	.282	1/8	1-1/2	TC56094	17.75	TC56294	21.45
.0950	.143	1/8	1-1/2	TC52095	14.97		
	.285	1/8	1-1/2	TC56095	12.87	TC56295	16.67
.0960	.288	1/8	1-1/2	TC56096	17.85	TC56296	22.85
.0970	.291	1/8	1-1/2	TC56097	17.75	TC56297	22.75
.0980	.294	1/8	1-1/2	TC56098	17.75	TC56298	21.45
.0990	.297	1/8	1-1/2	TC56099	17.75	TC56299	22.75
.1000	.150	1/8	1-1/2	TC52100	20.60	TC52300	24.65
	.300	1/8	1-1/2	TC56100	17.75	TC56300	21.45
.1010	.303	1/8	1-1/2	TC56101	12.87	TC56301	22.95
.1020	.306	1/8	1-1/2	TC56102	17.75		
.1030	.309	1/8	1-1/2	TC56103	12.87	TC56303	16.67
.1040	.312	1/8	1-1/2	TC56104	17.80	TC56304	16.57
.1050	.315	1/8	1-1/2	TC56105	17.85		
.1060	.318	1/8	1-1/2	TC56106	17.75	TC56306	16.57
.1070	.321	1/8	1-1/2	TC56107	17.90	TC56307	22.95
.1080	.324	1/8	1-1/2	TC56108	17.75	TC56308	16.57
.1090	.327	1/8	1-1/2	TC56109	17.85	TC56309	22.85
.1100	.330	1/8	1-1/2	TC56110	17.75	TC56310	22.75
.1150	.345	1/8	1-1/2	TC56115	17.75	TC56315	21.45
.1200	.360	1/8	1-1/2	TC56120	17.75	TC56320	21.45

For technical information, see page 155

MICRO END MILLS

2 Flute - Ball - 30° Helix - Stub & Regular Flute



- Offered in stub and regular flute styles
- Center cutting
- TiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		TiN COATED	
$D1^{+0.0005}_{-0.0005}$	L2	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0050	.008	1/8	1-1/2	TC53005	58.75	TC53205	63.80
	.015	1/8	1-1/2	TC57005	50.90	TC57205	40.47
.0060	.018	1/8	1-1/2	TC57006	50.90	TC57206	56.35
.0070	.021	1/8	1-1/2	TC57007	50.90	TC57207	40.77
.0080	.024	1/8	1-1/2	TC57008	50.90	TC57208	55.90
.0090	.027	1/8	1-1/2	TC57009	46.00	TC57209	50.95
.0100	.015	1/8	1-1/2	TC53010	52.60	TC53210	59.50
	.030	1/8	1-1/2	TC57010	45.65	TC57210	51.75
.0110	.033	1/8	1-1/2	TC57011	29.77		
.0120	.036	1/8	1-1/2	TC57012	41.00	TC57212	46.50
.0130	.039	1/8	1-1/2	TC57013	34.20	TC57213	39.20
.0140	.042	1/8	1-1/2	TC57014	33.95	TC57214	39.25
.0150	.023	1/8	1-1/2	TC53015	32.85	TC53215	38.20
	.045	1/8	1-1/2	TC57015	28.50	TC57215	33.90
.0160	.048	1/8	1-1/2	TC57016	28.50	TC57216	33.90
.0170	.051	1/8	1-1/2	TC57017	20.87		
.0180	.054	1/8	1-1/2	TC57018	28.50	TC57218	24.47
.0200	.030	1/8	1-1/2	TC53020	29.90	TC53220	35.25
	.060	1/8	1-1/2	TC57020	26.05	TC57220	31.15
.0210	.063	1/8	1-1/2	TC57021	26.05	TC57221	31.05
.0220	.066	1/8	1-1/2	TC57022	26.05	TC57222	31.05
.0230	.069	1/8	1-1/2	TC57023	18.87	TC57223	22.67
.0240	.072	1/8	1-1/2	TC57024	18.77	TC57224	31.10
.0250	.038	1/8	1-1/2	TC53025	29.90	TC53225	35.25
	.075	1/8	1-1/2	TC57025	26.05	TC57225	31.15
.0260	.078	1/8	1-1/2	TC57026	24.30	TC57226	28.30
.0270	.081	1/8	1-1/2	TC57027	24.40	TC57227	29.85
.0280	.084	1/8	1-1/2	TC57028	17.67	TC57228	29.80
.0290	.087	1/8	1-1/2	TC57029	17.77		
.0300	.045	1/8	1-1/2	TC53030	27.95	TC53230	33.35
	.090	1/8	1-1/2	TC57030	24.30	TC57230	29.15
.0310	.047	1/8	1-1/2	TC53031	26.35	TC53231	31.35
	.093	1/8	1-1/2	TC57031	22.95	TC57231	27.40
.0320	.096	1/8	1-1/2	TC57032	22.95	TC57232	27.40
.0330	.099	1/8	1-1/2	TC57033	16.67		
.0340	.102	1/8	1-1/2	TC57034	22.95	TC57234	20.27

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MICRO END MILLS

2 Flute - Ball - 30° Helix - Stub & Regular Flute (Cont.)

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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D1 ^{+0.005"} _{-0.005"}	L2	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0350	.053	1/8	1-1/2	TC53035	26.40	TC53235	31.40
	.105	1/8	1-1/2	TC57035	22.95		
.0360	.108	1/8	1-1/2	TC57036	22.95	TC57236	20.27
.0370	.111	1/8	1-1/2	TC57037	16.57	TC57237	28.05
.0380	.114	1/8	1-1/2	TC57038	22.95	TC57238	28.00
.0390	.117	1/8	1-1/2	TC57039	22.95	TC57239	27.40
.0400	.060	1/8	1-1/2	TC53040	26.35	TC53240	31.35
	.120	1/8	1-1/2	TC57040	22.95	TC57240	27.40
.0410	.123	1/8	1-1/2	TC57041	23.05		
.0420	.126	1/8	1-1/2	TC57042	16.57	TC57242	28.05
.0430	.129	1/8	1-1/2	TC57043	16.67	TC57243	28.15
.0440	.132	1/8	1-1/2			TC57244	19.87
.0450	.068	1/8	1-1/2	TC53045	18.57	TC53245	30.70
	.135	1/8	1-1/2	TC57045	22.30		
.0460	.138	1/8	1-1/2	TC57046	22.45	TC57246	27.50
.0470	.071	1/8	1-1/2	TC53047	25.65	TC53247	30.70
	.141	1/8	1-1/2	TC57047	22.30	TC57247	19.27
.0480	.144	1/8	1-1/2	TC57048	16.17	TC57248	19.87
.0490	.147	1/8	1-1/2	TC57049	16.17	TC57249	19.87
.0500	.075	1/8	1-1/2	TC53050	25.65	TC53250	30.70
	.150	1/8	1-1/2	TC57050	22.30	TC57250	26.80
.0510	.153	1/8	1-1/2	TC57051	22.30	TC57251	19.77
.0520	.156	1/8	1-1/2	TC57052	22.30	TC57252	19.77
.0530	.159	1/8	1-1/2	TC57053	16.17	TC57253	19.87
.0540	.162	1/8	1-1/2	TC57054	16.17	TC57254	19.87
.0550	.083	1/8	1-1/2	TC53055	25.80		
	.165	1/8	1-1/2	TC57055	22.30	TC57255	19.77
.0560	.168	1/8	1-1/2	TC57056	22.30		
.0570	.171	1/8	1-1/2	TC57057	22.30		
.0580	.174	1/8	1-1/2	TC57058	22.30	TC57258	19.77
.0590	.177	1/8	1-1/2	TC57059	22.40	TC57259	26.80
.0600	.090	1/8	1-1/2	TC53060	25.65	TC53260	30.70
	.180	1/8	1-1/2	TC57060	22.30	TC57260	26.80
.0610	.183	1/8	1-1/2	TC57061	16.17	TC57261	27.50
.0620	.093	1/8	1-1/2	TC53062	25.65	TC53262	30.70
	.186	1/8	1-1/2	TC57062	22.30	TC57262	26.80
.0630	.189	1/8	1-1/2	TC57063	22.30	TC57263	26.80
.0640	.192	1/8	1-1/2	TC57064	16.17	TC57264	26.80
.0650	.098	1/8	1-1/2	TC53065	18.67	TC53265	30.80
	.195	1/8	1-1/2	TC57065	22.30	TC57265	19.77
.0660	.198	1/8	1-1/2	TC57066	16.17	TC57266	19.87
.0670	.201	1/8	1-1/2	TC57067	22.30	TC57267	26.80
.0680	.204	1/8	1-1/2	TC57068	22.40	TC57268	26.80
.0690	.207	1/8	1-1/2	TC57069	16.17		
.0700	.105	1/8	1-1/2	TC53070	25.65	TC53270	30.70
	.210	1/8	1-1/2	TC57070	22.30	TC57270	19.27
.0710	.213	1/8	1-1/2	TC57071	16.17	TC57271	27.50
.0720	.216	1/8	1-1/2	TC57072	16.17	TC57272	26.80

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For technical information, see page 155

MICRO END MILLS

2 Flute - Ball - 30° Helix - Stub & Regular Flute (Cont.)

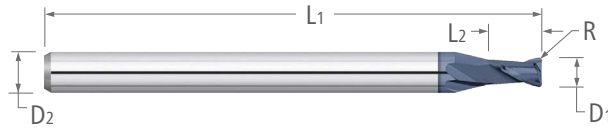
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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+0.0005"} -0.0005"	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0730	.219	1/8	1-1/2	TC57073	22.30	TC57273	27.35
.0750	.113	1/8	1-1/2	TC53075	18.67	TC53275	22.37
	.225	1/8	1-1/2	TC57075	22.40	TC57275	26.80
.0760	.228	1/8	1-1/2	TC57076	16.17	TC57276	27.45
.0770	.231	1/8	1-1/2	TC57077	16.17	TC57277	19.87
.0780	.117	1/8	1-1/2	TC53078	25.65	TC53278	30.70
	.234	1/8	1-1/2	TC57078	16.17	TC57278	19.87
.0790	.237	1/8	1-1/2	TC57079	22.30	TC57279	26.80
.0800	.120	1/8	1-1/2	TC53080	18.57	TC53280	30.70
	.240	1/8	1-1/2	TC57080	22.30	TC57280	19.77
.0810	.243	1/8	1-1/2	TC57081	16.17	TC57281	19.87
.0820	.246	1/8	1-1/2	TC57082	22.40	TC57282	19.27
.0830	.249	1/8	1-1/2	TC57083	22.40	TC57283	26.80
.0840	.252	1/8	1-1/2	TC57084	16.17	TC57284	19.87
.0850	.128	1/8	1-1/2	TC53085	18.67	TC53285	30.90
	.255	1/8	1-1/2			TC57285	27.50
.0860	.258	1/8	1-1/2	TC57086	22.30	TC57286	26.80
.0870	.261	1/8	1-1/2	TC57087	22.30	TC57287	26.80
.0880	.264	1/8	1-1/2	TC57088	22.40	TC57288	26.80
.0890	.267	1/8	1-1/2	TC57089	22.40	TC57289	27.45
.0900	.135	1/8	1-1/2	TC53090	25.85	TC53290	22.37
.0910	.273	1/8	1-1/2	TC57091	22.40	TC57291	27.45
.0920	.276	1/8	1-1/2	TC57092	16.17	TC57292	27.45
.0930	.140	1/8	1-1/2	TC53093	25.65	TC53293	31.00
	.279	1/8	1-1/2	TC57093	22.30	TC57293	26.80
.0940	.282	1/8	1-1/2	TC57094	16.17	TC57294	27.50
.0950	.285	1/8	1-1/2	TC57095	22.45		
.0960	.288	1/8	1-1/2	TC57096	22.30	TC57296	26.80
.0970	.291	1/8	1-1/2	TC57097	22.40	TC57297	26.80
.0980	.294	1/8	1-1/2	TC57098	22.40	TC57298	26.80
.0990	.297	1/8	1-1/2	TC57099	16.17	TC57299	19.87
.1000	.150	1/8	1-1/2	TC53100	18.67	TC53300	30.80
	.300	1/8	1-1/2	TC57100	22.30		
.1010	.303	1/8	1-1/2	TC57101	22.45		
.1020	.306	1/8	1-1/2	TC57102	16.17	TC57302	19.87
.1030	.309	1/8	1-1/2	TC57103	16.17	TC57303	27.50
.1040	.312	1/8	1-1/2	TC57104	16.17	TC57304	26.80
.1050	.315	1/8	1-1/2	TC57105	22.40	TC57305	27.45
.1060	.318	1/8	1-1/2	TC57106	22.30	TC57306	26.80
.1070	.321	1/8	1-1/2	TC57107	16.17	TC57307	27.50
.1080	.324	1/8	1-1/2	TC57108	16.17	TC57308	19.87
.1090	.327	1/8	1-1/2	TC57109	16.17	TC57309	19.87
.1100	.330	1/8	1-1/2			TC57310	19.87
.1150	.345	1/8	1-1/2	TC57115	16.17		
.1200	.360	1/8	1-1/2	TC57120	22.30	TC57320	26.80

For technical information, see page 155

MICRO END MILLS

2 Flute - Corner Radius - 30° Helix - Stub & Regular Flute



- Offered in stub and regular flute styles
- Corner radius for increased edge strength
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LENGTH OF CUT	RADIUS	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D1 ^{+0.0005"} _{-0.0005"}	L2	R ^{+0.0002"} _{-0.0002"}	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0150	.023	.003	1/8	1 - 1/2	TC50100	55.90	TC50330	60.95
	.045	.003	1/8	1 - 1/2	TC50725	55.95	TC50925	60.95
.0200	.030	.005	1/8	1 - 1/2	TC50101	52.10	TC50331	57.10
	.060	.005	1/8	1 - 1/2	TC50726	52.10	TC50926	57.10
.0250	.038	.005	1/8	1 - 1/2	TC50102	52.40	TC50332	57.40
	.075	.005	1/8	1 - 1/2	TC50727	52.10	TC50927	57.10
.0300	.045	.005	1/8	1 - 1/2	TC50103	37.05	TC50333	42.00
	.090	.005	1/8	1 - 1/2	TC50728	37.20	TC50928	42.15
	.045	.010	1/8	1 - 1/2	TC50104	37.40	TC50334	42.35
	.090	.010	1/8	1 - 1/2	TC50729	37.20	TC50929	42.15
.0310	.047	.005	1/8	1 - 1/2	TC50105	37.20	TC50335	42.15
	.093	.005	1/8	1 - 1/2	TC50730	37.10	TC50930	42.05
	.047	.010	1/8	1 - 1/2	TC50106	37.25	TC50336	42.20
	.093	.010	1/8	1 - 1/2	TC50731	37.10	TC50931	42.05
.0350	.053	.005	1/8	1 - 1/2	TC50107	37.40	TC50337	42.35
	.105	.005	1/8	1 - 1/2	TC50732	37.20	TC50932	42.15
	.053	.010	1/8	1 - 1/2	TC50108	37.40	TC50338	42.35
	.105	.010	1/8	1 - 1/2	TC50733	37.40	TC50933	42.35
.0400	.060	.005	1/8	1 - 1/2	TC50109	37.20	TC50339	42.15
	.120	.005	1/8	1 - 1/2	TC50734	37.20	TC50934	42.15
	.060	.010	1/8	1 - 1/2	TC50110	37.10	TC50340	42.05
	.120	.010	1/8	1 - 1/2	TC50735	37.20	TC50935	42.15
.0450	.068	.005	1/8	1 - 1/2	TC50111	37.25	TC50341	42.20
	.135	.005	1/8	1 - 1/2	TC50736	37.40	TC50936	42.35
	.068	.010	1/8	1 - 1/2	TC50112	37.40	TC50342	42.35
	.135	.010	1/8	1 - 1/2	TC50737	37.40	TC50937	42.35
	.068	.015	1/8	1 - 1/2	TC50113	37.40	TC50343	42.35
	.135	.015	1/8	1 - 1/2	TC50738	37.40	TC50938	42.35
.0470	.071	.005	1/8	1 - 1/2	TC50114	37.05	TC50344	42.00
	.141	.005	1/8	1 - 1/2	TC50739	37.05	TC50939	42.00
	.071	.010	1/8	1 - 1/2	TC50115	37.20	TC50345	42.15
	.141	.010	1/8	1 - 1/2	TC50740	37.25	TC50940	42.20
	.071	.015	1/8	1 - 1/2	TC50116	37.40	TC50346	42.35
	.141	.015	1/8	1 - 1/2	TC50741	37.25	TC50941	42.20

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For technical information, see page 155

MICRO END MILLS

2 Flute - Corner Radius - 30° Helix - Stub & Regular Flute (Cont.)

2 Flute

continued from previous page

CUTTER DIA.	LENGTH OF CUT	RADIUS	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+0.0005"} _{-0.0005"}	L ₂	R ^{+0.0002"} _{-0.0002"}	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0500	.075	.005	1/8	1 - 1/2	TC50117	37.10	TC50347	42.05
	.150	.005	1/8	1 - 1/2	TC50742	37.10	TC50942	42.05
	.075	.010	1/8	1 - 1/2	TC50118	37.20	TC50348	42.15
	.150	.010	1/8	1 - 1/2	TC50743	37.10	TC50943	42.05
	.075	.015	1/8	1 - 1/2	TC50119	37.25	TC50349	42.20
	.150	.015	1/8	1 - 1/2	TC50744	37.10	TC50944	42.05
.0600	.090	.005	1/8	1 - 1/2	TC50120	37.20	TC50350	42.15
	.180	.005	1/8	1 - 1/2	TC50745	37.10	TC50945	42.05
	.090	.010	1/8	1 - 1/2	TC50121	37.25	TC50351	42.20
	.180	.010	1/8	1 - 1/2	TC50746	37.25	TC50946	42.20
	.090	.015	1/8	1 - 1/2	TC50122	37.20	TC50352	42.15
	.180	.015	1/8	1 - 1/2	TC50747	37.20	TC50947	42.15
.0620	.093	.005	1/8	1 - 1/2	TC50123	37.25	TC50353	42.20
	.186	.005	1/8	1 - 1/2	TC50748	37.25	TC50948	42.20
	.093	.010	1/8	1 - 1/2	TC50124	37.10	TC50354	42.05
	.186	.010	1/8	1 - 1/2	TC50749	37.10	TC50949	42.05
	.093	.015	1/8	1 - 1/2	TC50125	37.25	TC50355	42.20
	.186	.015	1/8	1 - 1/2	TC50750	37.10	TC50950	42.05
.0750	.113	.005	1/8	1 - 1/2	TC50126	37.40	TC50356	42.35
	.225	.005	1/8	1 - 1/2	TC50751	37.40	TC50951	42.35
	.113	.010	1/8	1 - 1/2	TC50127	37.05	TC50357	42.00
	.225	.010	1/8	1 - 1/2	TC50752	37.40	TC50952	42.35
	.113	.015	1/8	1 - 1/2	TC50128	37.20	TC50358	42.15
	.225	.015	1/8	1 - 1/2	TC50753	37.40	TC50953	42.40
.0780	.117	.005	1/8	1 - 1/2	TC50129	37.10	TC50359	42.05
	.234	.005	1/8	1 - 1/2	TC50754	37.05	TC50954	42.00
	.117	.010	1/8	1 - 1/2	TC50130	37.25	TC50360	42.20
	.234	.010	1/8	1 - 1/2	TC50755	37.25	TC50955	42.20
	.117	.015	1/8	1 - 1/2	TC50131	37.20	TC50361	42.15
	.234	.015	1/8	1 - 1/2	TC50756	37.25	TC50956	42.20
.0900	.135	.005	1/8	1 - 1/2	TC50132	37.20	TC50362	42.15
	.270	.005	1/8	1 - 1/2	TC50757	37.20	TC50957	42.15
	.135	.010	1/8	1 - 1/2	TC50133	37.40	TC50363	42.35
	.270	.010	1/8	1 - 1/2	TC50758	37.20	TC50958	42.15
	.135	.015	1/8	1 - 1/2	TC50134	37.20	TC50364	42.15
	.270	.015	1/8	1 - 1/2	TC50759	37.25	TC50959	42.20
.0930	.140	.005	1/8	1 - 1/2	TC50135	37.25	TC50365	42.20
	.279	.005	1/8	1 - 1/2	TC50760	37.10	TC50960	42.05
	.140	.010	1/8	1 - 1/2	TC50136	37.25	TC50366	42.20
	.279	.010	1/8	1 - 1/2	TC50761	37.10	TC50961	42.05
	.140	.015	1/8	1 - 1/2	TC50137	37.25	TC50367	42.20
	.279	.015	1/8	1 - 1/2	TC50762	37.10	TC50962	42.05
.1000	.150	.005	1/8	1 - 1/2	TC50138	37.25	TC50368	42.20
	.300	.005	1/8	1 - 1/2	TC50763	37.40	TC50963	42.40
	.150	.010	1/8	1 - 1/2	TC50139	37.25	TC50369	42.20
	.300	.010	1/8	1 - 1/2	TC50764	37.20	TC50964	42.15
	.150	.015	1/8	1 - 1/2	TC50140	37.05	TC50370	42.00
	.300	.015	1/8	1 - 1/2	TC50765	37.20	TC50965	42.15

For technical information, see page 155

MICRO END MILLS

3 Flute - Square - 30° Helix - Stub & Regular Flute



- Offered in stub and regular flute styles
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0005''}_{-.0005''}$	$L2$	$D2 (h6)$	$L1$	TOOL #	USD\$	TOOL #	USD\$
.0050	.008	1/8	1-1/2	TC30800	41.90	TC30824	46.90
	.015	1/8	1-1/2	TC30848	36.50	TC30872	41.55
.0100	.015	1/8	1-1/2	TC30801	41.90	TC30825	46.90
	.030	1/8	1-1/2	TC30849	36.50	TC30873	41.55
.0150	.023	1/8	1-1/2	TC30802	26.35	TC30826	31.35
	.045	1/8	1-1/2	TC30850	22.95	TC30874	28.00
.0200	.030	1/8	1-1/2	TC30803	23.90	TC30827	28.85
	.060	1/8	1-1/2	TC30851	20.80	TC30875	25.80
.0250	.038	1/8	1-1/2	TC30804	23.90	TC30828	28.85
	.075	1/8	1-1/2	TC30852	20.80	TC30876	25.80
.0300	.045	1/8	1-1/2	TC30805	22.40	TC30829	27.45
	.090	1/8	1-1/2	TC30853	19.55	TC30877	24.50
.0350	.053	1/8	1-1/2	TC30806	21.05	TC30830	26.05
	.105	1/8	1-1/2	TC30854	18.10	TC30878	23.15
.0400	.060	1/8	1-1/2	TC30807	21.05	TC30831	26.05
	.120	1/8	1-1/2	TC30855	18.10	TC30879	23.15
.0450	.068	1/8	1-1/2	TC30808	20.65	TC30832	25.60
	.135	1/8	1-1/2	TC30856	17.75	TC30880	22.75
.0500	.075	1/8	1-1/2	TC30809	20.60	TC30833	25.55
	.150	1/8	1-1/2	TC30857	17.75	TC30881	22.75
.0550	.083	1/8	1-1/2	TC30810	20.60	TC30834	25.55
	.165	1/8	1-1/2	TC30858	17.75	TC30882	22.75
.0600	.090	1/8	1-1/2	TC30811	20.65	TC30835	25.60
	.180	1/8	1-1/2	TC30859	17.75	TC30883	22.75
.0650	.098	1/8	1-1/2	TC30812	20.60	TC30836	25.55
	.195	1/8	1-1/2	TC30860	17.75	TC30884	22.75
.0700	.105	1/8	1-1/2	TC30813	20.60	TC30837	25.55
	.210	1/8	1-1/2	TC30861	17.75	TC30885	22.75
.0750	.113	1/8	1-1/2	TC30814	20.60	TC30838	25.55
	.225	1/8	1-1/2	TC30862	17.75	TC30886	22.75
.0800	.120	1/8	1-1/2	TC30815	20.60	TC30839	25.55
	.240	1/8	1-1/2	TC30863	17.75	TC30887	22.75
.0850	.128	1/8	1-1/2	TC30816	20.65	TC30840	25.60
	.255	1/8	1-1/2	TC30864	17.75	TC30888	22.75

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MICRO END MILLS**3 Flute - Square - 30° Helix - Stub & Regular Flute (Cont.)**

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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005"}_{-.0005"}$	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0900	.135	1/8	1-1/2	TC30817	20.60	TC30841	25.55
	.270	1/8	1-1/2	TC30865	17.75	TC30889	22.75
.0950	.143	1/8	1-1/2	TC30818	20.60	TC30842	25.55
	.285	1/8	1-1/2	TC30866	17.75	TC30890	22.75
.1000	.150	1/8	1-1/2	TC30819	20.60	TC30843	25.55
	.300	1/8	1-1/2	TC30867	17.75	TC30891	22.75
.1050	.160	1/8	1-1/2	TC30820	20.60	TC30844	25.55
	.315	1/8	1-1/2	TC30868	17.85	TC30892	22.85
.1100	.165	1/8	1-1/2	TC30821	20.60	TC30845	25.55
	.330	1/8	1-1/2	TC30869	17.75	TC30893	22.75
.1150	.170	1/8	1-1/2	TC30822	20.60	TC30846	25.55
	.345	1/8	1-1/2	TC30870	17.75	TC30894	22.75
.1200	.180	1/8	1-1/2	TC30823	20.60	TC30847	25.55
	.360	1/8	1-1/2	TC30871	17.75	TC30895	22.75

3 Flute

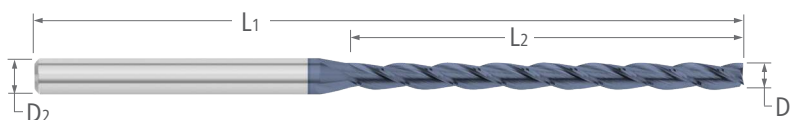


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MICRO END MILLS

3 Flute - Square - 30° Helix - Long Flute



- Long flute design for deep cavities
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005"}$ $D_1^{-.0005"}$	L2	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0100	.050 (5x)	1/8	2-1/2	TC53420	47.55	TC53602	38.27
	.080 (8x)	1/8	2-1/2	TC53421	79.75		
	.120 (12x)	1/8	2-1/2	TC53422	94.75	TC53604	100.10
.0150	.078 (5x)	1/8	2-1/2	TC53423	43.95	TC53605	49.30
	.125 (8x)	1/8	2-1/2	TC53424	75.80	TC53606	58.87
	.187 (12x)	1/8	2-1/2	TC53425	93.90	TC53607	72.27
.0200	.100 (5x)	1/8	2-1/2	TC53426	37.90	TC53608	43.30
	.160 (8x)	1/8	2-1/2	TC53427	68.75	TC53609	53.77
	.250 (12x)	1/8	2-1/2	TC53428	90.10	TC53610	95.45
.0250	.125 (5x)	1/8	2-1/2	TC53429	36.15	TC53611	30.07
	.203 (8x)	1/8	2-1/2			TC53612	73.55
	.312 (12x)	1/8	2-1/2	TC53431	57.87	TC53613	85.40
.0300	.150 (5x)	1/8	2-1/2	TC53432	34.60	TC53614	40.45
	.250 (8x)	1/8	2-1/2	TC53433	58.40	TC53615	63.70
	.375 (12x)	1/8	2-1/2	TC53434	75.50	TC53616	58.67
.0310	.156 (5x)	1/8	2-1/2	TC53435	34.85	TC53617	40.20
	.250 (8x)	1/8	2-1/2	TC53436	55.90	TC53618	63.10
	.375 (12x)	1/8	2-1/2	TC53437	75.25	TC53619	80.65
.0350	.175 (5x)	1/8	2-1/2	TC53438	25.07	TC53620	40.15
	.280 (8x)	1/8	2-1/2	TC53439	40.67	TC53621	44.77
	.425 (12x)	1/8	2-1/2	TC53440	54.67	TC53622	80.95
.0400	.200 (5x)	1/8	2-1/2	TC53441	34.60	TC53623	40.45
	.325 (8x)	1/8	2-1/2	TC53442	55.90	TC53624	63.10
	.480 (12x)	1/8	2-1/2	TC53443	75.25	TC53625	80.65
.0450	.225 (5x)	1/8	2-1/2	TC53444	34.60	TC53626	29.17
	.375 (8x)	1/8	2-1/2	TC53445	56.35	TC53627	44.77
	.550 (12x)	1/8	2-1/2	TC53446	54.37	TC53628	80.55
.0470	.250 (5x)	1/8	2-1/2	TC53447	34.60	TC53629	40.45
	.375 (8x)	1/8	2-1/2	TC53448	55.90	TC53630	63.10
	.570 (12x)	1/8	2-1/2	TC53449	75.15		
.0500	.250 (5x)	1/8	2-1/2	TC53450	34.85	TC53632	40.20
	.400 (8x)	1/8	2-1/2	TC53451	56.10	TC53633	63.10
	.600 (12x)	1/8	2-1/2	TC53452	54.97	TC53634	81.35
.0550	.275 (5x)	1/8	2-1/2	TC53453	25.07	TC53635	40.15
	.440 (8x)	1/8	2-1/2	TC53454	40.67	TC53636	61.70
	.660 (12x)	1/8	2-1/2	TC53455	54.67	TC53637	58.67
.0600	.312 (5x)	1/8	2-1/2	TC53456	30.85	TC53638	36.55
	.500 (8x)	1/8	2-1/2	TC53457	34.60	TC53639	40.45
	.720 (12x)	1/8	2-1/2	TC53458	75.25	TC53640	80.65

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For technical information, see page 155

MICRO END MILLS

3 Flute - Square - 30° Helix - Long Flute (Cont.)

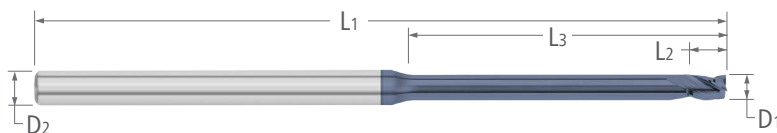
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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005"}_{-.0005"}$	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0620	.312 (5x)	1/8	2-1/2	TC53459	30.85	TC53641	36.55
	.500 (8x)	1/8	2-1/2	TC53460	34.50	TC53642	40.30
	.750 (12x)	1/8	2-1/2	TC53461	58.85	TC53643	66.90
	.950 (15x)	1/8	2-1/2	TC53462	80.70	TC53644	86.50
.0650	.325 (5x)	1/8	2-1/2	TC53463	30.85	TC53645	36.55
	.500 (8x)	1/8	2-1/2	TC53464	34.50	TC53646	40.30
.0700	.375 (5x)	1/8	2-1/2	TC53466	22.37	TC53648	36.30
	.560 (8x)	1/8	2-1/2	TC53467	34.60	TC53649	40.05
	.850 (12x)	1/8	2-1/2	TC53468	43.07	TC53650	47.07
.0750	.375 (5x)	1/8	2-1/2	TC53469	31.00	TC53651	36.35
	.625 (8x)	1/8	2-1/2	TC53470	34.60	TC53652	40.05
	.900 (12x)	1/8	2-1/2	TC53471	58.85	TC53653	64.25
.0780	.406 (5x)	1/8	2-1/2	TC53472	30.85	TC53654	36.55
	.625 (8x)	1/8	2-1/2	TC53473	34.50	TC53655	40.30
	.940 (12x)	1/8	2-1/2	TC53474	59.45	TC53656	66.90
	1.187 (15x)	1/8	2-1/2	TC53475	80.70	TC53657	86.50
.0800	.750 (8x)	1/8	2-1/2	TC53477	34.50	TC53659	40.30
	.960 (12x)	1/8	2-1/2	TC53478	42.87	TC53660	64.60
.0850	.425 (5x)	1/8	2-1/2	TC53479	31.00	TC53661	36.35
	.750 (8x)	1/8	2-1/2	TC53480	34.85	TC53662	29.17
	1.020 (12x)	1/8	2-1/2	TC53481	43.07		
.0900	.450 (5x)	1/8	2-1/2	TC53482	22.37	TC53664	35.75
	.750 (8x)	1/8	2-1/2	TC53483	34.50	TC53665	40.30
	1.080 (12x)	1/8	2-1/2	TC53484	43.07	TC53666	47.07
.0930	.500 (5x)	1/8	2-1/2	TC53485	30.85	TC53667	36.55
	.750 (8x)	1/8	2-1/2	TC53486	34.50	TC53668	40.30
	1.125 (12x)	1/8	2-1/2	TC53487	58.85	TC53669	66.90
	1.400 (15x)	1/8	2-1/2	TC53488	83.95	TC53670	89.30
.0950	.500 (5x)	1/8	2-1/2	TC53489	30.85	TC53671	36.55
	.750 (8x)	1/8	2-1/2	TC53490	34.60	TC53672	40.05
	1.140 (12x)	1/8	2-1/2	TC53491	42.87	TC53673	64.60
.1000	.500 (5x)	1/8	2-1/2	TC53492	30.85	TC53674	36.55
	.800 (8x)	1/8	2-1/2	TC53493	34.50	TC53675	40.30
	1.200 (12x)	1/8	2-1/2	TC53494	43.07	TC53676	65.00
.1090	.570 (5x)	1/8	2-1/2	TC53495	30.85	TC53677	36.55
	.900 (8x)	1/8	2-1/2	TC53496	24.97	TC53678	40.05
	1.320 (12x)	1/8	2-1/2	TC53497	59.65	TC53679	47.07
.1180	.625 (5x)	1/8	2-1/2	TC53498	30.85	TC53680	36.55
	.950 (8x)	1/8	2-1/2	TC53499	24.97	TC53681	28.97
	1.375 (12x)	1/8	2-1/2	TC53500	43.07	TC53682	47.07
.1200	.600 (5x)	1/8	2-1/2	TC53501	30.85	TC53683	26.37
	1.000 (8x)	1/8	2-1/2	TC53502	34.50	TC53684	40.30
	1.500 (12x)	1/8	2-1/2	TC53503	58.85	TC53685	66.90

For technical information, see page 155

MICRO END MILLS

3 Flute - Square - 30° Helix - Long Reach, Stub Flute



- Long reach design for deep cavities
- Center cutting
- Solid carbide
- Stub flutes for maximum rigidity
- AlTiN coating offers increased wear and heat resistance
- Precision manufactured in the USA

CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+0.005''}_{-0.005''}$	L2	$L_3^{+0.10''}_{-0.000''}$	D_2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0100	.015	.030 (3x)	1/8	2-1/2	TC54310	42.27		
	.015	.080 (8x)	1/8	2-1/2	TC54316	42.27	TC59507	46.37
	.015	.125 (12x)	1/8	2-1/2			TC59510	50.07
.0150	.022	.045 (3x)	1/8	2-1/2			TC59513	38.87
	.022	.078 (5x)	1/8	2-1/2	TC54325	48.25	TC59516	38.97
	.022	.125 (8x)	1/8	2-1/2	TC54328	47.95	TC59519	53.40
	.022	.187 (12x)	1/8	2-1/2	TC54331	36.27	TC59522	55.55
.0200	.030	.060 (3x)	1/8	2-1/2	TC54334	46.55	TC59525	37.67
	.030	.100 (5x)	1/8	2-1/2	TC54337	46.10	TC59528	51.40
	.030	.160 (8x)	1/8	2-1/2	TC54340	33.47		
	.030	.250 (12x)	1/8	2-1/2	TC54343	34.57	TC59534	53.15
.0250	.037	.075 (3x)	1/8	2-1/2			TC59537	36.37
	.037	.125 (5x)	1/8	2-1/2	TC54349	32.27	TC59540	50.05
	.037	.203 (8x)	1/8	2-1/2	TC54352	32.17	TC59543	49.75
	.037	.312 (12x)	1/8	2-1/2	TC54355	33.37	TC59546	37.37
.0300	.045	.090 (3x)	1/8	2-1/2	TC54358	32.27	TC59549	36.37
	.045	.156 (5x)	1/8	2-1/2	TC54361	44.50	TC59552	49.85
	.045	.250 (8x)	1/8	2-1/2	TC54364	44.25		
	.045	.375 (12x)	1/8	2-1/2	TC54367	46.25	TC59558	37.37
.0310	.046	.093 (3x)	1/8	2-1/2	TC54370	31.97	TC59561	49.60
	.046	.156 (5x)	1/8	2-1/2	TC54373	44.25	TC59564	49.65
	.046	.250 (8x)	1/8	2-1/2	TC54376	44.25	TC59567	49.65
	.046	.375 (12x)	1/8	2-1/2	TC54379	45.70	TC59570	51.15
.0350	.052	.105 (3x)	1/8	2-1/2			TC59573	36.37
	.052	.187 (5x)	1/8	2-1/2	TC54385	32.27	TC59576	50.05
	.052	.281 (8x)	1/8	2-1/2			TC59579	49.65
	.052	.425 (12x)	1/8	2-1/2	TC54391	33.27	TC59582	37.17
.0400	.060	.120 (3x)	1/8	2-1/2			TC59585	49.75
	.060	.203 (5x)	1/8	2-1/2	TC54397	31.97	TC59588	49.60
	.060	.325 (8x)	1/8	2-1/2	TC54400	31.97	TC59591	49.60
	.060	.480 (12x)	1/8	2-1/2	TC54403	45.70	TC59594	51.15
.0450	.067	.225 (5x)	1/8	2-1/2	TC54409	31.57	TC59600	49.10
	.067	.375 (8x)	1/8	2-1/2	TC54412	31.37	TC59603	48.90
	.067	.550 (12x)	1/8	2-1/2	TC54415	32.67	TC59606	36.67
.0470	.070	.141 (3x)	1/8	2-1/2	TC54418	31.57		
	.070	.250 (5x)	1/8	2-1/2	TC54421	31.27	TC59612	49.15
	.070	.375 (8x)	1/8	2-1/2	TC54424	43.30	TC59615	49.15
	.070	.570 (12x)	1/8	2-1/2	TC54427	32.27	TC59618	50.05
.0500	.075	.150 (3x)	1/8	2-1/2	TC54430	43.80	TC59621	35.67
	.075	.250 (5x)	1/8	2-1/2	TC54433	31.57	TC59624	49.10
	.075	.400 (8x)	1/8	2-1/2	TC54436	43.30	TC59627	49.15
	.075	.600 (12x)	1/8	2-1/2	TC54439	44.65	TC59630	50.05
.0550	.082	.275 (5x)	1/8	2-1/2			TC59636	49.15
	.082	.450 (8x)	1/8	2-1/2	TC54448	31.37	TC59639	48.95

For technical information, see page 155

continued on next page

MICRO END MILLS

3 Flute - Square - 30° Helix - Long Reach, Stub Flute (Cont.)

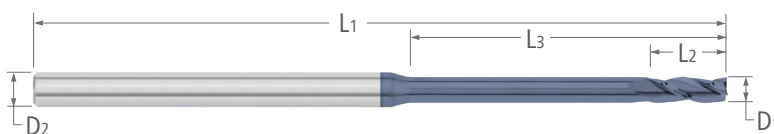
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CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005^+}_{-.0005^-}$	L ₂	$L_3^{+.010^+}_{-.000^+}$	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0600	.090	.180 (3x)	1/8	2-1/2	TC54454	31.37	TC59645	48.95
	.090	.500 (8x)	1/8	2-1/2	TC54460	43.30	TC59651	49.15
	.090	.720 (12x)	1/8	2-1/2	TC54463	44.95	TC59654	50.25
	.093	.186 (3x)	1/8	2-1/2	TC54466	43.50	TC59657	48.95
.0620	.093	.312 (5x)	1/8	2-1/2	TC54469	43.30	TC59660	49.15
	.093	.500 (8x)	1/8	2-1/2	TC54472	43.30	TC59663	49.15
	.093	.750 (12x)	1/8	2-1/2	TC54475	44.65	TC59666	50.05
	.097	.195 (3x)	1/8	2-1/2	TC54478	31.57		
.0650	.097	.325 (5x)	1/8	2-1/2	TC54481	43.80		
	.097	.530 (8x)	1/8	2-1/2	TC54484	43.30	TC59675	35.57
	.105	.210 (3x)	1/8	2-1/2			TC59681	35.57
	.105	.375 (5x)	1/8	2-1/2	TC54493	31.57		
.0700	.105	.570 (8x)	1/8	2-1/2	TC54496	43.80	TC59687	49.15
	.105	.850 (12x)	1/8	2-1/2	TC54499	32.67		
	.112	.225 (3x)	1/8	2-1/2	TC54502	31.57		
	.112	.375 (5x)	1/8	2-1/2	TC54505	43.80		
.0750	.112	.625 (8x)	1/8	2-1/2	TC54508	43.50	TC59699	48.95
	.112	.900 (12x)	1/8	2-1/2			TC59702	36.67
	.117	.234 (3x)	1/8	2-1/2	TC54514	31.37	TC59705	48.95
	.117	.406 (5x)	1/8	2-1/2	TC54517	43.50	TC59708	48.95
.0780	.117	.625 (8x)	1/8	2-1/2	TC54520	43.30	TC59711	49.15
	.117	.940 (12x)	1/8	2-1/2	TC54523	45.00	TC59714	50.35
.0800	.120	.240 (3x)	1/8	2-1/2	TC54526	43.80		
	.120	.406 (5x)	1/8	2-1/2	TC54529	31.57		
	.120	.650 (8x)	1/8	2-1/2			TC59723	35.67
	.120	.960 (12x)	1/8	2-1/2	TC54535	32.47	TC59726	36.57
.0850	.127	.700 (8x)	1/8	2-1/2	TC54544	31.57	TC59735	35.67
	.127	1.020 (12x)	1/8	2-1/2	TC54547	32.47	TC59738	36.57
.0900	.135	.270 (3x)	1/8	2-1/2	TC54550	43.50		
	.135	.450 (5x)	1/8	2-1/2	TC54553	43.50	TC59744	48.95
	.135	.750 (8x)	1/8	2-1/2	TC54556	43.30	TC59747	49.15
	.135	1.080 (12x)	1/8	2-1/2	TC54559	32.47	TC59750	36.57
.0930	.139	.279 (3x)	1/8	2-1/2	TC54562	43.30	TC59753	49.15
	.139	.500 (5x)	1/8	2-1/2	TC54565	43.30	TC59756	49.15
	.139	.750 (8x)	1/8	2-1/2	TC54568	43.30	TC59759	49.15
	.139	1.125 (12x)	1/8	2-1/2	TC54571	44.65	TC59762	50.05
.0950	.142	.750 (8x)	1/8	2-1/2	TC54580	31.57	TC59771	49.10
.1000	.150	.300 (3x)	1/8	2-1/2	TC54586	31.57	TC59777	35.67
	.150	.500 (5x)	1/8	2-1/2	TC54589	31.37	TC59780	48.90
	.150	.800 (8x)	1/8	2-1/2	TC54592	43.30	TC59783	49.15
	.150	1.200 (12x)	1/8	2-1/2	TC54595	44.65	TC59786	36.37

For technical information, see page 155

MICRO END MILLS

3 Flute - Square - 30° Helix - Long Reach, Regular Flute



- Long reach design for deep cavities
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005''}_{-.0005''}$	L2	$L_3^{+.010''}_{-.000''}$	D_2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0100	.030	.050 (5x)	1/8	2-1/2	TC57400	42.27	TC57701	63.80
	.030	.080 (8x)	1/8	2-1/2	TC57403	57.90	TC57704	45.87
	.030	.125 (12x)	1/8	2-1/2	TC57406	61.50	TC57707	66.80
.0150	.045	.078 (5x)	1/8	2-1/2	TC57409	34.97	TC57710	39.07
	.045	.128 (8x)	1/8	2-1/2	TC57412	47.95	TC57713	53.40
	.045	.187 (12x)	1/8	2-1/2	TC57415	50.10	TC57716	40.27
.0200	.060	.100 (5x)	1/8	2-1/2	TC57418	46.30	TC57719	51.65
	.060	.170 (8x)	1/8	2-1/2	TC57421	46.10		
	.060	.250 (12x)	1/8	2-1/2	TC57424	48.10	TC57725	53.45
.0250	.075	.125 (5x)	1/8	2-1/2	TC57427	32.17	TC57728	49.80
	.075	.213 (8x)	1/8	2-1/2	TC57430	44.25	TC57731	49.65
	.075	.312 (12x)	1/8	2-1/2	TC57433	33.57	TC57734	37.57
.0300	.090	.156 (5x)	1/8	2-1/2	TC57436	32.27	TC57737	36.37
	.090	.270 (9x)	1/8	2-1/2	TC57439	44.25	TC57740	49.65
	.090	.375 (12x)	1/8	2-1/2	TC57442	46.05	TC57743	51.35
.0310	.093	.156 (5x)	1/8	2-1/2	TC57445	31.97	TC57746	49.60
	.093	.279 (9x)	1/8	2-1/2	TC57448	44.25	TC57749	49.65
	.093	.375 (12x)	1/8	2-1/2	TC57451	46.05	TC57752	51.35
.0350	.105	.315 (9x)	1/8	2-1/2	TC57457	44.45	TC57758	36.27
	.105	.420 (12x)	1/8	2-1/2	TC57460	33.37	TC57761	37.37
.0400	.120	.203 (5x)	1/8	2-1/2	TC57463	44.45	TC57764	49.80
	.120	.360 (9x)	1/8	2-1/2	TC57466	44.25	TC57767	36.07
	.120	.480 (12x)	1/8	2-1/2	TC57469	33.07	TC57770	51.15
.0450	.135	.225 (5x)	1/8	2-1/2	TC57472	31.37	TC57773	48.95
	.135	.405 (9x)	1/8	2-1/2	TC57475	43.45	TC57776	35.47
	.135	.540 (12x)	1/8	2-1/2	TC57478	46.25	TC57779	37.37
.0470	.141	.250 (5x)	1/8	2-1/2	TC57481	43.30	TC57782	49.15
	.141	.423 (9x)	1/8	2-1/2	TC57484	43.30	TC57785	49.15
	.141	.570 (12x)	1/8	2-1/2	TC57487	32.57	TC57788	50.30
.0500	.150	.250 (5x)	1/8	2-1/2	TC57490	43.50	TC57791	35.57
	.150	.400 (8x)	1/8	2-1/2	TC57493	43.30	TC57794	35.57
	.150	.600 (12x)	1/8	2-1/2	TC57496	45.00	TC57797	50.35
.0550	.165	.275 (5x)	1/8	2-1/2	TC57499	31.57		
	.165	.440 (8x)	1/8	2-1/2	TC57502	43.30	TC57803	49.15
	.165	.660 (12x)	1/8	2-1/2	TC57505	32.67		
.0600	.180	.312 (5x)	1/8	2-1/2			TC57809	48.55
	.180	.500 (8x)	1/8	2-1/2	TC57511	43.30	TC57812	49.15
	.180	.720 (12x)	1/8	2-1/2	TC57514	32.47	TC57815	50.20

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For technical information, see page 155

MICRO END MILLS

3 Flute - Square - 30° Helix - Long Reach, Regular Flute (Cont.)

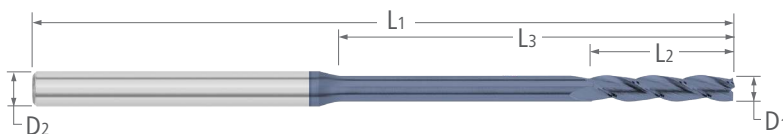
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CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0005"}_{-.0005"}$	L ₂	$L3^{+.010"}_{-.000"}$	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0620	.186	.312 (5x)	1/8	2-1/2	TC57517	43.30	TC57818	49.15
	.186	.500 (8x)	1/8	2-1/2	TC57520	43.30	TC57821	49.15
	.186	.750 (12x)	1/8	2-1/2	TC57523	44.65	TC57824	50.05
.0650	.195	.325 (5x)	1/8	2-1/2	TC57526	31.57	TC57827	35.67
	.195	.500 (8x)	1/8	2-1/2	TC57529	43.30	TC57830	49.15
	.195	.780 (12x)	1/8	2-1/2	TC57532	32.67		
.0700	.210	.350 (5x)	1/8	2-1/2	TC57535	43.50	TC57836	35.57
	.210	.560 (8x)	1/8	2-1/2	TC57538	43.30	TC57839	49.15
	.210	.850 (12x)	1/8	2-1/2			TC57842	50.30
.0750	.225	.600 (8x)	1/8	2-1/2	TC57547	43.45	TC57848	35.47
.0780	.234	.390 (5x)	1/8	2-1/2	TC57553	31.57	TC57854	49.10
	.234	.624 (8x)	1/8	2-1/2	TC57556	43.30	TC57857	49.15
	.234	.940 (12x)	1/8	2-1/2	TC57559	45.00	TC57860	36.57
.0800	.240	.400 (5x)	1/8	2-1/2	TC57562	31.37	TC57863	48.95
	.240	.640 (8x)	1/8	2-1/2	TC57565	43.30	TC57866	35.57
	.240	.960 (12x)	1/8	2-1/2	TC57568	32.57	TC57869	36.57
.0850	.255	.425 (5x)	1/8	2-1/2	TC57571	31.57		
	.255	.680 (8x)	1/8	2-1/2	TC57574	43.45		
.0900	.270	.450 (5x)	1/8	2-1/2	TC57580	31.37		
	.270	.720 (8x)	1/8	2-1/2	TC57583	31.37		
	.270	1.080 (12x)	1/8	2-1/2	TC57586	32.67		
.0930	.279	.500 (5x)	1/8	2-1/2	TC57589	43.30	TC57890	49.15
	.279	.744 (8x)	1/8	2-1/2	TC57592	43.30	TC57893	49.15
	.279	1.125 (12x)	1/8	2-1/2	TC57595	45.15	TC57896	50.55
.0950	.285	.760 (8x)	1/8	2-1/2	TC57601	43.45		
	.285	1.140 (12x)	1/8	2-1/2			TC57905	36.67
.1000	.300	.500 (5x)	1/8	2-1/2	TC57607	43.50	TC57908	35.57
	.300	.800 (8x)	1/8	2-1/2	TC57610	43.30	TC57911	49.15
	.300	1.200 (12x)	1/8	2-1/2	TC57613	32.67	TC57914	50.55

For technical information, see page 155

MICRO END MILLS

3 Flute - Square - 30° Helix - Long Reach, Long Flute



- Long flute and long reach design for deep cavities
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005" \atop -.0005"}$	L_2	$L_3^{+.010" \atop -.000"}$	D_2 (h6)	L_1	TOOL #	USD\$	TOOL #	USD\$
.0100	.050	.100 (10x)	1/8	2-1/2	TC54650	42.67	TC54801	64.55
.0150	.075	.150 (10x)	1/8	2-1/2	TC54656	35.87	TC54807	55.00
	.075	.225 (15x)	1/8	2-1/2	TC54659	45.47		
.0200	.100	.200 (10x)	1/8	2-1/2	TC54662	47.35		
	.100	.300 (15x)	1/8	2-1/2	TC54665	60.30	TC54816	47.67
.0250	.125	.250 (10x)	1/8	2-1/2			TC54819	36.77
	.125	.375 (15x)	1/8	2-1/2			TC54822	46.57
.0300	.150	.300 (10x)	1/8	2-1/2	TC54674	45.70	TC54825	36.97
	.150	.450 (15x)	1/8	2-1/2	TC54677	58.40		
.0310	.155	.310 (10x)	1/8	2-1/2	TC54680	45.25	TC54831	50.65
	.155	.470 (15x)	1/8	2-1/2	TC54683	58.40	TC54834	63.70
.0350	.175	.350 (10x)	1/8	2-1/2	TC54686	32.97		
	.175	.525 (15x)	1/8	2-1/2	TC54689	58.60	TC54840	46.47
.0400	.200	.400 (10x)	1/8	2-1/2	TC54692	32.77	TC54843	50.60
	.200	.600 (15x)	1/8	2-1/2	TC54695	58.60	TC54846	46.47
.0450	.225	.450 (10x)	1/8	2-1/2	TC54698	44.45	TC54849	49.80
	.225	.675 (15x)	1/8	2-1/2			TC54852	44.57
.0470	.250	.500 (10x)	1/8	2-1/2	TC54704	44.90	TC54855	36.47
	.250	.710 (15x)	1/8	2-1/2	TC54707	55.45	TC54858	60.85
.0500	.300	.500 (10x)	1/8	2-1/2	TC54710	32.47	TC54861	36.47
	.300	.750 (15x)	1/8	2-1/2	TC54713	40.27	TC54864	61.25
.0550	.385	.550 (10x)	1/8	2-1/2	TC54716	44.45		
.0600	.312	.625 (10x)	1/8	2-1/2	TC54722	44.60	TC54873	50.00
	.500	1.000 (16x)	1/8	2-1/2	TC54725	44.60	TC54876	50.00
.0620	.312	.625 (10x)	1/8	2-1/2	TC54728	44.45	TC54879	49.80
	.500	1.000 (16x)	1/8	2-1/2	TC54731	44.45	TC54882	49.80
.0650	.325	.650 (10x)	1/8	2-1/2			TC54885	36.47
	.500	1.000 (15x)	1/8	2-1/2	TC54737	32.47	TC54888	50.15
.0700	.500	1.000 (14x)	1/8	2-1/2	TC54743	44.60	TC54894	36.37
.0750	.500	1.000 (13x)	1/8	2-1/2			TC54900	36.47
.0780	.406	.800 (10x)	1/8	2-1/2	TC54752	44.60	TC54903	36.37
	.406	1.187 (15x)	1/8	2-1/2	TC54755	44.60	TC54906	50.00
.0800	.400	.800 (10x)	1/8	2-1/2	TC54758	32.17	TC54909	50.00
	.750	1.250 (15x)	1/8	2-1/2	TC54761	32.47	TC54912	50.15
.0850	.425	.850 (10x)	1/8	2-1/2	TC54764	44.90	TC54915	36.47
.0900	.750	1.250 (13x)	1/8	2-1/2	TC54773	32.17	TC54924	50.00

continued on next page

MICRO END MILLS**3 Flute - Square - 30° Helix - Long Reach, Long Flute (Cont.)**

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CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1 \begin{smallmatrix} +.0005" \\ -.0005" \end{smallmatrix}$	L ₂	L ₃ $\begin{smallmatrix} +.010" \\ -.000" \end{smallmatrix}$	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0930	.500	.950 (10x)	1/8	2-1/2	TC54776	44.60	TC54927	50.00
	.500	1.400 (15x)	1/8	2-1/2	TC54779	32.17	TC54930	49.75
.0950	.500	.950 (10x)	1/8	2-1/2			TC54933	36.37
	.750	1.250 (13x)	1/8	2-1/2			TC54936	36.37
.1000	.500	1.000 (10x)	1/8	2-1/2	TC54788	44.60	TC54939	36.37
	.750	1.250 (12x)	1/8	2-1/2	TC54791	32.17	TC54942	36.37

3 Flute

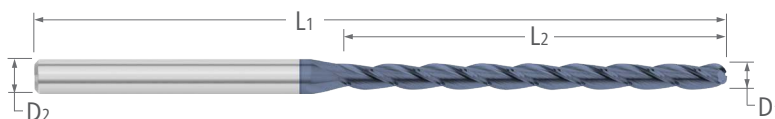


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MICRO END MILLS

3 Flute - Ball - 30° Helix - Long Flute



- Long flute design for deep cavities
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005" / -.0005"}$	L2	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0100	.050 (5x)	1/8	2-1/2	TC53730	39.57	TC53861	43.47
	.080 (8x)	1/8	2-1/2	TC53731	65.87	TC53862	69.87
	.120 (12x)	1/8	2-1/2		96.85	TC53863	111.85
.0150	.078 (5x)	1/8	2-1/2	TC53733	50.40		
	.125 (8x)	1/8	2-1/2			TC53865	67.67
	.187 (12x)	1/8	2-1/2	TC53735	77.97		
.0200	.100 (5x)	1/8	2-1/2	TC53736	43.30	TC53867	35.57
	.160 (8x)	1/8	2-1/2	TC53737	58.57	TC53868	62.77
	.250 (12x)	1/8	2-1/2	TC53738	101.60	TC53869	106.75
.0250	.125 (5x)	1/8	2-1/2			TC53870	33.87
	.203 (8x)	1/8	2-1/2	TC53740	79.60		
.0300	.150 (5x)	1/8	2-1/2	TC53742	39.95	TC53873	45.30
	.375 (12x)	1/8	2-1/2	TC53744	69.97		
.0310	.156 (5x)	1/8	2-1/2	TC53745	39.95	TC53876	45.30
	.250 (8x)	1/8	2-1/2	TC53746	62.80	TC53877	49.27
	.375 (12x)	1/8	2-1/2	TC53747	86.40		
.0350	.281 (8x)	1/8	2-1/2			TC53880	51.57
	.425 (12x)	1/8	2-1/2	TC53750	63.07		
.0400	.200 (5x)	1/8	2-1/2	TC53751	39.95	TC53882	45.30
	.325 (8x)	1/8	2-1/2	TC53752	65.10	TC53883	70.50
	.480 (12x)	1/8	2-1/2	TC53753	86.85	TC53884	92.00
.0450	.225 (5x)	1/8	2-1/2	TC53754	40.05		
	.375 (8x)	1/8	2-1/2	TC53755	47.67		
	.550 (12x)	1/8	2-1/2			TC53887	67.17
.0470	.250 (5x)	1/8	2-1/2	TC53757	39.95		
	.375 (8x)	1/8	2-1/2	TC53758	65.40	TC53889	51.37
.0500	.250 (5x)	1/8	2-1/2	TC53760	28.87	TC53891	45.35
.0550	.275 (5x)	1/8	2-1/2	TC53763	25.67	TC53894	29.87
.0600	.312 (5x)	1/8	2-1/2	TC53766	25.57	TC53897	40.70
	.500 (8x)	1/8	2-1/2	TC53767	28.97	TC53898	45.60
	.720 (12x)	1/8	2-1/2	TC53768	73.65	TC53899	79.00
.0620	.312 (5x)	1/8	2-1/2	TC53769	35.15	TC53900	40.50
	.500 (8x)	1/8	2-1/2	TC53770	39.45	TC53901	44.80
	.750 (12x)	1/8	2-1/2	TC53771	67.60	TC53902	76.65
	.950 15	1/8	2-1/2	TC53772	93.10	TC53903	98.50
.0650	.325 (5x)	1/8	2-1/2	TC53773	25.67	TC53904	29.87
	.500 (8x)	1/8	2-1/2	TC53774	28.77		
	.780 (12x)	1/8	2-1/2	TC53775	49.37		

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MICRO END MILLS

3 Flute - Ball - 30° Helix - Long Flute (Cont.)

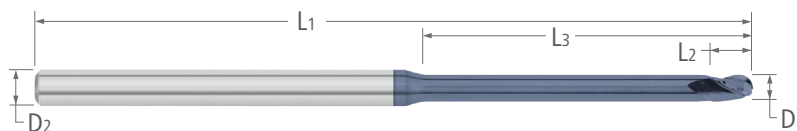
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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005''}_{-.0005''}$	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0700	.375 (5x)	1/8	2-1/2	TC53776	35.70	TC53907	41.05
	.560 (8x)	1/8	2-1/2	TC53777	39.55	TC53908	32.57
.0750	.375 (5x)	1/8	2-1/2			TC53910	29.87
	.625 (8x)	1/8	2-1/2			TC53911	32.67
.0780	.406 (5x)	1/8	2-1/2	TC53782	35.50	TC53913	40.85
	.625 (8x)	1/8	2-1/2	TC53783	28.57	TC53914	44.85
	.940 (12x)	1/8	2-1/2	TC53784	49.27		
	1.187 15	1/8	2-1/2	TC53785	67.67	TC53916	71.77
.0800	.406 (5x)	1/8	2-1/2	TC53786	35.70	TC53917	41.05
	.750 (8x)	1/8	2-1/2			TC53918	32.67
	.960 (12x)	1/8	2-1/2	TC53788	49.37		
.0850	.425 (5x)	1/8	2-1/2			TC53920	29.87
.0900	.450 (5x)	1/8	2-1/2	TC53792	25.67	TC53923	41.00
	.750 (8x)	1/8	2-1/2			TC53924	32.67
	1.080 (12x)	1/8	2-1/2			TC53925	73.75
.0930	.500 (5x)	1/8	2-1/2	TC53795	35.15	TC53926	40.50
	.750 (8x)	1/8	2-1/2	TC53796	39.55	TC53927	44.90
	1.125 (12x)	1/8	2-1/2	TC53797	49.37	TC53928	53.57
	1.400 15	1/8	2-1/2	TC53798	95.00	TC53929	100.40
.1000	.500 (5x)	1/8	2-1/2	TC53802	35.70	TC53933	29.87
	.800 (8x)	1/8	2-1/2	TC53803	28.77		
	1.200 (12x)	1/8	2-1/2	TC53804	49.37		
.1090	.570 (5x)	1/8	2-1/2	TC53805	35.50		
	.900 (8x)	1/8	2-1/2	TC53806	28.77	TC53937	32.67
	1.320 (12x)	1/8	2-1/2			TC53938	53.57
.1180	.625 (5x)	1/8	2-1/2			TC53939	29.87
	.950 (8x)	1/8	2-1/2	TC53809	28.77	TC53940	32.67
	1.375 (12x)	1/8	2-1/2			TC53941	73.45
.1200	.600 (5x)	1/8	2-1/2	TC53811	25.67	TC53942	41.00
	1.000 (8x)	1/8	2-1/2			TC53943	32.57
	1.500 (12x)	1/8	2-1/2	TC53813	49.37		

For technical information, see page 155

MICRO END MILLS

3 Flute - Ball - 30° Helix - Long Reach, Stub Flute



- Long reach design for deep cavities
- Center cutting
- Solid carbide
- Stub flutes for maximum rigidity
- AlTiN coating offers increased wear and heat resistance
- Precision manufactured in the USA

CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0005"}_{-.0005"}$	L2	$L3^{+.010"}_{-.000"}$	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0100	.015	.030 (3x)	1/8	2-1/2			TC55701	57.07
	.015	.050 (5x)	1/8	2-1/2	TC55403	53.07		
	.015	.080 (8x)	1/8	2-1/2	TC55406	55.17	TC55707	81.65
	.015	.125 (12x)	1/8	2-1/2	TC55409	61.97	TC55710	66.17
.0150	.022	.078 (5x)	1/8	2-1/2	TC55415	45.27	TC55716	49.27
	.022	.125 (8x)	1/8	2-1/2	TC55418	45.47	TC55719	68.20
	.022	.187 (12x)	1/8	2-1/2	TC55421	63.80	TC55722	69.15
	.030	.060 (3x)	1/8	2-1/2	TC55424	60.50		
.0200	.030	.100 (5x)	1/8	2-1/2	TC55427	60.50	TC55728	68.20
	.030	.160 (8x)	1/8	2-1/2	TC55430	43.97	TC55731	66.15
	.030	.250 (12x)	1/8	2-1/2	TC55433	61.90	TC55734	70.15
	.037	.125 (5x)	1/8	2-1/2	TC55439	37.87	TC55740	42.07
.0250	.037	.203 (8x)	1/8	2-1/2	TC55442	37.87	TC55743	42.07
	.037	.312 (12x)	1/8	2-1/2	TC55445	38.97		
	.045	.090 (3x)	1/8	2-1/2	TC55448	37.87		
	.045	.156 (5x)	1/8	2-1/2	TC55451	37.87	TC55752	57.50
.0300	.045	.250 (8x)	1/8	2-1/2	TC55454	37.87	TC55755	42.07
	.045	.375 (12x)	1/8	2-1/2	TC55457	39.07	TC55758	59.45
	.046	.093 (3x)	1/8	2-1/2	TC55460	37.87	TC55761	57.50
	.046	.156 (5x)	1/8	2-1/2	TC55463	37.87	TC55764	57.95
.0310	.046	.250 (8x)	1/8	2-1/2	TC55466	37.57	TC55767	58.90
	.046	.375 (12x)	1/8	2-1/2	TC55469	53.65	TC55770	60.60
	.052	.105 (3x)	1/8	2-1/2	TC55472	52.60		
	.052	.187 (5x)	1/8	2-1/2	TC55475	37.87		
.0350	.052	.281 (8x)	1/8	2-1/2			TC55779	42.07
	.052	.425 (12x)	1/8	2-1/2			TC55782	43.07
	.060	.120 (3x)	1/8	2-1/2	TC55484	37.87	TC55785	57.50
	.060	.203 (5x)	1/8	2-1/2			TC55788	57.50
.0400	.060	.325 (8x)	1/8	2-1/2	TC55490	37.87	TC55791	41.87
	.060	.480 (12x)	1/8	2-1/2	TC55493	53.65	TC55794	58.95
	.067	.225 (5x)	1/8	2-1/2	TC55499	36.97	TC55800	41.07
	.067	.375 (8x)	1/8	2-1/2			TC55803	56.65
.0450	.070	.250 (5x)	1/8	2-1/2	TC55511	36.87	TC55812	56.45
	.070	.375 (8x)	1/8	2-1/2	TC55514	36.77	TC55815	56.15
	.070	.570 (12x)	1/8	2-1/2	TC55517	52.10	TC55818	57.45
	.075	.150 (3x)	1/8	2-1/2			TC55821	41.07
.0500	.075	.250 (5x)	1/8	2-1/2	TC55523	36.97	TC55824	41.07
	.075	.400 (8x)	1/8	2-1/2	TC55526	51.20		
	.075	.600 (12x)	1/8	2-1/2	TC55529	37.97	TC55830	58.05
	.082	.165 (3x)	1/8	2-1/2			TC55833	41.07
.0550	.082	.450 (8x)	1/8	2-1/2	TC55538	36.87		
	.082	.660 (12x)	1/8	2-1/2	TC55541	37.97	TC55842	42.07

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MICRO END MILLS

3 Flute - Ball - 30° Helix - Long Reach, Stub Flute (Cont.)

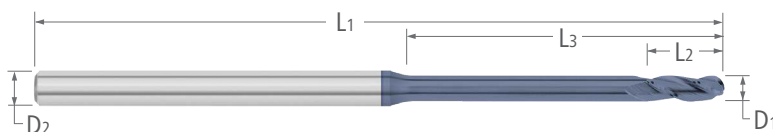
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CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0005}_{-.0005}$	L ₂	$L3^{+.010}_{-.000}$	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0600	.090	.180 (3x)	1/8	2-1/2	TC55544	36.97	TC55845	56.65
	.090	.312 (5x)	1/8	2-1/2	TC55547	51.05	TC55848	40.97
	.090	.500 (8x)	1/8	2-1/2			TC55851	56.45
	.090	.720 (12x)	1/8	2-1/2	TC55553	37.87	TC55854	59.10
.0620	.093	.186 (3x)	1/8	2-1/2	TC55556	51.05	TC55857	56.45
	.093	.312 (5x)	1/8	2-1/2	TC55559	50.85	TC55860	57.50
	.093	.500 (8x)	1/8	2-1/2	TC55562	50.85	TC55863	57.50
	.093	.750 (12x)	1/8	2-1/2	TC55565	52.10	TC55866	59.10
.0650	.097	.780 (12x)	1/8	2-1/2			TC55878	58.05
.0700	.105	.210 (3x)	1/8	2-1/2	TC55580	36.97	TC55881	56.65
	.105	.375 (5x)	1/8	2-1/2	TC55583	36.97	TC55884	56.65
	.105	.570 (8x)	1/8	2-1/2	TC55586	36.97		
	.105	.840 (12x)	1/8	2-1/2			TC55890	42.07
.0750	.112	.375 (5x)	1/8	2-1/2	TC55595	51.05		
	.112	.900 (12x)	1/8	2-1/2	TC55601	37.97		
.0780	.117	.234 (3x)	1/8	2-1/2	TC55604	36.97	TC55905	56.65
	.117	.406 (5x)	1/8	2-1/2	TC55607	50.85	TC55908	57.50
	.117	.625 (8x)	1/8	2-1/2	TC55610	51.05	TC55911	56.45
	.117	.940 (12x)	1/8	2-1/2	TC55613	52.50	TC55914	41.97
.0800	.120	.650 (8x)	1/8	2-1/2	TC55622	36.97		
	.120	.960 (12x)	1/8	2-1/2	TC55625	37.97	TC55926	58.05
.0850	.127	.255 (3x)	1/8	2-1/2	TC55628	51.05		
	.127	.425 (5x)	1/8	2-1/2	TC55631	51.05		
	.127	1.020 (12x)	1/8	2-1/2	TC55637	37.97		
.0900	.135	.270 (3x)	1/8	2-1/2	TC55640	36.97	TC55941	56.65
	.135	.450 (5x)	1/8	2-1/2	TC55643	36.97	TC55944	56.65
	.135	.750 (8x)	1/8	2-1/2			TC55947	41.07
.0930	.139	.500 (5x)	1/8	2-1/2	TC55655	50.85	TC55956	57.50
	.139	.750 (8x)	1/8	2-1/2	TC55658	50.85	TC55959	57.50
	.139	1.125 (12x)	1/8	2-1/2	TC55661	37.87		
.0950	.142	.500 (5x)	1/8	2-1/2	TC55667	36.97		
.1000	.150	.300 (3x)	1/8	2-1/2	TC55676	36.97	TC55977	41.07
	.150	.500 (5x)	1/8	2-1/2	TC55679	36.87		
	.150	.800 (8x)	1/8	2-1/2	TC55682	36.87	TC55983	56.45
	.150	1.200 (12x)	1/8	2-1/2			TC55986	42.07

For technical information, see page 155

MICRO END MILLS

3 Flute - Ball - 30° Helix - Long Reach, Regular Flute



- Long reach design for deep cavities
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0005"}$ $D1_{-.0005"}$	L2	$L3^{+.010"}$ $L3_{-.000"}$	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0100	.030	.050 (5x)	1/8	2-1/2	TC58400	57.37	TC58701	61.27
	.030	.080 (8x)	1/8	2-1/2			TC58704	61.07
.0150	.045	.078 (5x)	1/8	2-1/2	TC58409	45.97	TC58710	69.05
	.045	.128 (8x)	1/8	2-1/2	TC58412	63.00	TC58713	49.57
	.045	.187 (12x)	1/8	2-1/2	TC58415	46.97	TC58716	70.25
.0200	.060	.100 (5x)	1/8	2-1/2	TC58418	61.05	TC58719	48.17
	.060	.170 (8x)	1/8	2-1/2	TC58421	60.75	TC58722	47.97
	.060	.250 (12x)	1/8	2-1/2	TC58424	62.60	TC58725	67.90
.0250	.075	.125 (5x)	1/8	2-1/2	TC58427	40.37	TC58728	44.47
	.075	.213 (8x)	1/8	2-1/2	TC58430	55.35	TC58731	44.07
	.075	.312 (12x)	1/8	2-1/2			TC58734	45.47
.0300	.090	.270 (9x)	1/8	2-1/2	TC58439	40.07	TC58740	60.65
	.090	.375 (12x)	1/8	2-1/2	TC58442	57.05	TC58743	64.25
.0310	.093	.156 (5x)	1/8	2-1/2	TC58445	55.35	TC58746	60.70
	.093	.279 (9x)	1/8	2-1/2	TC58448	55.55	TC58749	60.95
	.093	.375 (12x)	1/8	2-1/2			TC58752	62.40
.0350	.105	.280 (8x)	1/8	2-1/2	TC58457	55.35		
	.105	.420 (12x)	1/8	2-1/2	TC58460	41.27	TC58761	62.40
.0400	.120	.320 (8x)	1/8	2-1/2	TC58466	55.55		
	.120	.480 (12x)	1/8	2-1/2	TC58469	57.05	TC58770	62.40
.0450	.135	.225 (5x)	1/8	2-1/2	TC58472	38.97	TC58773	59.10
	.135	.360 (8x)	1/8	2-1/2	TC58475	38.97	TC58776	42.97
	.135	.540 (12x)	1/8	2-1/2	TC58478	39.97		
.0470	.141	.250 (5x)	1/8	2-1/2	TC58481	53.85	TC58782	59.15
	.141	.376 (8x)	1/8	2-1/2	TC58484	53.85		
	.141	.570 (12x)	1/8	2-1/2			TC58788	43.97
.0500	.150	.250 (5x)	1/8	2-1/2	TC58490	38.97		
	.150	.400 (8x)	1/8	2-1/2	TC58493	53.65		
	.150	.600 (12x)	1/8	2-1/2	TC58496	39.97	TC58797	60.55
.0550	.165	.275 (5x)	1/8	2-1/2			TC58800	59.45
	.165	.440 (8x)	1/8	2-1/2	TC58502	54.05		
	.165	.660 (12x)	1/8	2-1/2	TC58505	40.07	TC58806	60.75
.0600	.180	.300 (5x)	1/8	2-1/2	TC58508	39.07	TC58809	43.07
	.180	.500 (8x)	1/8	2-1/2	TC58511	53.65	TC58812	60.60
	.180	.720 (12x)	1/8	2-1/2	TC58514	39.97	TC58815	60.55
.0620	.186	.312 (5x)	1/8	2-1/2	TC58517	53.65	TC58818	60.60
	.186	.500 (8x)	1/8	2-1/2	TC58520	53.65	TC58821	60.60
	.186	.750 (12x)	1/8	2-1/2	TC58523	54.90	TC58824	60.20

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MICRO END MILLS

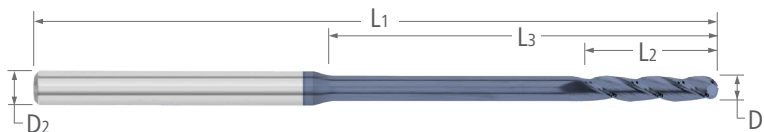
3 Flute - Ball - 30° Helix - Long Reach, Regular Flute (Cont.)

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CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0005}_{-.0005}$	L2	$L3^{+.010}_{-.000}$	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0650	.195	.325 (5x)	1/8	2-1/2	TC58526	54.05	TC58827	43.07
	.195	.500 (8x)	1/8	2-1/2	TC58529	39.07		
.0700	.210	.560 (8x)	1/8	2-1/2	TC58538	39.07		
.0750	.225	.600 (8x)	1/8	2-1/2	TC58547	54.05		
.0780	.234	.390 (5x)	1/8	2-1/2			TC58854	59.45
	.234	.624 (8x)	1/8	2-1/2	TC58556	38.77	TC58857	60.60
	.234	.940 (12x)	1/8	2-1/2	TC58559	39.97	TC58860	60.55
.0800	.240	.400 (5x)	1/8	2-1/2			TC58863	59.10
	.240	.640 (8x)	1/8	2-1/2	TC58565	54.05		
.0850	.255	.680 (8x)	1/8	2-1/2	TC58574	39.07		
.0900	.270	.450 (5x)	1/8	2-1/2			TC58881	59.10
	.270	.720 (8x)	1/8	2-1/2	TC58583	38.97		
.0930	.279	.744 (8x)	1/8	2-1/2	TC58592	53.85	TC58893	59.15
	.279	1.125 (12x)	1/8	2-1/2	TC58595	55.20	TC58896	60.55
.0950	.285	.760 (8x)	1/8	2-1/2	TC58601	39.07		
.1000	.300	.800 (8x)	1/8	2-1/2	TC58610	38.97	TC58911	59.10
	.300	1.200 (12x)	1/8	2-1/2			TC58914	60.20

MICRO END MILLS

3 Flute - Ball - 30° Helix - Long Reach, Long Flute



- Long flute, long reach
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LOC	OVERALL REACH	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D1^{+.0005}_{-.0005}$	L2	$L3^{+.010}_{-.000}$	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0150	.075	.150 (10x)	1/8	2-1/2	TC52756	46.17	TC52904	69.15
	.075	.225 (15x)	1/8	2-1/2	TC52759	46.17	TC52906	69.15
.0200	.100	.200 (10x)	1/8	2-1/2	TC52762	61.50	TC52908	69.20
	.100	.300 (15x)	1/8	2-1/2	TC52765	44.47	TC52910	69.20
.0250	.125	.250 (10x)	1/8	2-1/2	TC52768	53.20	TC52912	42.47
.0300	.150	.300 (10x)	1/8	2-1/2	TC52774	38.67	TC52916	58.85
	.150	.450 (15x)	1/8	2-1/2	TC52777	38.57	TC52918	60.00
.0310	.155	.310 (10x)	1/8	2-1/2	TC52780	38.17	TC52920	58.40
	.155	.470 (15x)	1/8	2-1/2	TC52783	38.17	TC52922	58.40
.0400	.200	.400 (10x)	1/8	2-1/2	TC52792	38.57	TC52928	58.55
	.200	.600 (15x)	1/8	2-1/2	TC52795	38.67	TC52930	42.67
.0470	.250	.500 (10x)	1/8	2-1/2	TC52804	51.75	TC52936	57.10
.0550	.385	.550 (10x)	1/8	2-1/2	TC52816	37.57		
	.385	.825 (15x)	1/8	2-1/2	TC52819	37.57		
.0600	.312	.625 (10x)	1/8	2-1/2	TC52822	37.57	TC52948	41.77
	.500	1.000 (16x)	1/8	2-1/2	TC52825	51.75	TC52950	58.40
.0620	.312	.625 (10x)	1/8	2-1/2	TC52828	51.75	TC52952	58.40
	.500	1.000 (16x)	1/8	2-1/2	TC52831	51.55	TC52954	58.40
.0650	.325	.650 (10x)	1/8	2-1/2			TC52956	41.77
.0700	.500	1.000 (14x)	1/8	2-1/2	TC52843	37.57	TC52962	57.35
.0750	.375	.750 (10x)	1/8	2-1/2			TC52964	41.77
.0780	.406	.800 (10x)	1/8	2-1/2	TC52852	37.57	TC52968	57.35
	.406	1.187 (15x)	1/8	2-1/2	TC52855	37.57		
.0800	.400	.800 (10x)	1/8	2-1/2			TC52972	41.77
	.750	1.250 (15x)	1/8	2-1/2			TC52974	41.77
.0900	.450	.900 (10x)	1/8	2-1/2			TC52980	57.35
.0930	.500	.950 (10x)	1/8	2-1/2	TC52876	51.75		
	.500	1.400 (15x)	1/8	2-1/2	TC52879	37.47	TC52986	57.05
.1000	.750	1.250 (12x)	1/8	2-1/2	TC52891	37.57	TC52994	41.77

For technical information, see page 155

MICRO END MILLS

4 Flute - Square - 30° Helix - Stub & Regular Flute



- Offered in stub and regular flute styles
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005}_{-.0005}$	L2	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0100	.008	1/8	1-1/2	TC54009	41.90	TC54209	46.90
	.015	1/8	1-1/2	TC54010	41.90	TC54210	46.90
	.030	1/8	1-1/2	TC58010	36.50	TC58210	41.55
.0110	.033	1/8	1-1/2	TC58011	32.85	TC58211	37.85
.0120	.036	1/8	1-1/2	TC58012	32.75	TC58212	37.70
.0130	.039	1/8	1-1/2	TC58013	27.25	TC58213	32.20
.0140	.042	1/8	1-1/2	TC58014	27.25	TC58214	32.20
.0150	.012	1/8	1-1/2	TC54014	26.35	TC54214	31.35
	.023	1/8	1-1/2	TC54015	26.35	TC54215	31.35
	.045	1/8	1-1/2	TC58015	22.95	TC58215	27.40
.0160	.048	1/8	1-1/2	TC58016	23.05	TC58216	27.40
.0170	.051	1/8	1-1/2	TC58017	22.95	TC58217	27.40
.0180	.054	1/8	1-1/2	TC58018	22.95	TC58218	27.40
.0190	.057	1/8	1-1/2	TC58019	23.05	TC58219	27.40
.0200	.030	1/8	1-1/2	TC54020	23.90	TC54220	28.70
	.016	1/8	1-1/2	TC54019	23.90	TC54219	28.85
	.060	1/8	1-1/2	TC58020	20.80	TC58220	24.95
.0210	.063	1/8	1-1/2	TC58021	15.07	TC58221	17.97
.0220	.066	1/8	1-1/2	TC58022	20.80	TC58222	24.95
.0230	.069	1/8	1-1/2	TC58023	20.80	TC58223	24.95
.0240	.072	1/8	1-1/2	TC58024	20.80	TC58224	24.95
.0250	.020	1/8	1-1/2	TC54024	23.90	TC54224	28.85
	.038	1/8	1-1/2	TC54025	23.90	TC54225	28.70
	.075	1/8	1-1/2	TC58025	20.80	TC58225	24.95
.0260	.078	1/8	1-1/2	TC58026	19.60	TC58226	23.50
.0270	.081	1/8	1-1/2	TC58027	19.60	TC58227	23.50
.0280	.084	1/8	1-1/2	TC58028	19.55	TC58228	23.50
.0290	.087	1/8	1-1/2	TC58029	14.17	TC58229	24.65
.0300	.024	1/8	1-1/2	TC54029	22.40	TC54232	27.45
	.045	1/8	1-1/2	TC54030	22.40	TC54230	26.90
	.090	1/8	1-1/2	TC58030	19.55	TC58230	23.50
.0310	.047	1/8	1-1/2	TC54031	21.05	TC54231	25.20
	.093	1/8	1-1/2	TC58031	18.10	TC58231	21.90
.0320	.096	1/8	1-1/2	TC58032	18.10	TC58232	21.90
.0330	.099	1/8	1-1/2	TC58033	18.40	TC58233	23.40
.0340	.102	1/8	1-1/2	TC58034	18.10	TC58234	23.15

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For technical information, see page 155

MICRO END MILLS

4 Flute - Square - 30° Helix - Stub & Regular Flute (Cont.)

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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+0.0005"} _{-0.0005"}	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0350	.028	1/8	1-1/2	TC54034	21.05	TC54234	26.05
	.053	1/8	1-1/2	TC54035	21.05	TC54235	25.20
	.105	1/8	1-1/2	TC58035	18.10	TC58235	21.05
.0360	.108	1/8	1-1/2	TC58036	18.10	TC58236	21.90
.0370	.111	1/8	1-1/2	TC58037	18.10	TC58237	21.90
.0380	.114	1/8	1-1/2	TC58038	18.10	TC58238	23.15
.0390	.117	1/8	1-1/2	TC58039	18.10	TC58239	21.90
.0400	.032	1/8	1-1/2	TC54039	21.05	TC54239	26.05
	.060	1/8	1-1/2	TC54040	21.05	TC54240	25.20
	.120	1/8	1-1/2	TC58040	18.10	TC58240	21.90
.0410	.123	1/8	1-1/2	TC58041	13.37	TC58241	23.55
.0420	.126	1/8	1-1/2	TC58042	18.40	TC58242	21.90
.0430	.129	1/8	1-1/2	TC58043	18.40	TC58243	21.90
.0440	.132	1/8	1-1/2	TC58044	17.75	TC58244	21.45
.0450	.036	1/8	1-1/2	TC54044	20.65	TC54244	25.60
	.068	1/8	1-1/2	TC54045	20.65	TC54245	24.65
	.135	1/8	1-1/2	TC58045	17.75	TC58245	21.45
.0460	.138	1/8	1-1/2	TC58046	17.75	TC58246	21.45
.0470	.071	1/8	1-1/2	TC54047	20.65	TC54247	24.65
	.141	1/8	1-1/2	TC58047	17.75	TC58247	21.45
.0480	.144	1/8	1-1/2	TC58048	17.85	TC58248	21.45
.0490	.147	1/8	1-1/2	TC58049	17.75	TC58249	21.45
.0500	.040	1/8	1-1/2	TC54049	20.60	TC54249	25.55
	.075	1/8	1-1/2	TC54050	20.60	TC54250	24.65
	.150	1/8	1-1/2	TC58050	17.75	TC58250	21.45
.0510	.153	1/8	1-1/2	TC58051	12.87	TC58251	21.45
.0520	.156	1/8	1-1/2	TC58052	17.75	TC58252	21.45
.0530	.159	1/8	1-1/2	TC58053	17.75	TC58253	16.57
.0540	.162	1/8	1-1/2	TC58054	12.87	TC58254	21.45
.0550	.044	1/8	1-1/2	TC54054	20.60	TC54254	25.55
	.083	1/8	1-1/2	TC54055	20.60	TC54255	24.65
	.165	1/8	1-1/2	TC58055	17.75	TC58255	21.45
.0560	.168	1/8	1-1/2	TC58056	17.85	TC58256	21.45
.0570	.171	1/8	1-1/2	TC58057	12.87	TC58257	21.45
.0580	.174	1/8	1-1/2	TC58058	17.85	TC58258	21.45
.0590	.177	1/8	1-1/2	TC58059	17.75	TC58259	21.45
.0600	.048	1/8	1-1/2	TC54059	20.65	TC54259	25.60
	.090	1/8	1-1/2	TC54060	20.65	TC54260	24.65
	.180	1/8	1-1/2	TC58060	17.75	TC58260	21.45
.0610	.183	1/8	1-1/2	TC58061	17.85	TC58261	22.85
.0620	.093	1/8	1-1/2	TC54062	20.60	TC54262	24.65
	.186	1/8	1-1/2	TC58062	17.75	TC58262	21.45
.0630	.189	1/8	1-1/2	TC58063	17.75	TC58263	21.45
.0640	.192	1/8	1-1/2	TC58064	17.85	TC58264	22.85

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For technical information, see page 155

MICRO END MILLS

4 Flute - Square - 30° Helix - Stub & Regular Flute (Cont.)

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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D1 ^{+.0005"} D1 _{-.0005"}	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0650	.052	1/8	1-1/2	TC54064	20.60	TC54264	25.55
	.098	1/8	1-1/2	TC54065	20.60	TC54265	24.65
	.195	1/8	1-1/2	TC58065	17.75	TC58265	21.45
.0660	.198	1/8	1-1/2	TC58066	17.75	TC58266	21.45
.0670	.201	1/8	1-1/2	TC58067	17.75	TC58267	21.45
.0680	.204	1/8	1-1/2	TC58068	17.90	TC58268	22.95
.0690	.207	1/8	1-1/2	TC58069	12.87	TC58269	21.45
.0700	.056	1/8	1-1/2	TC54069	20.60	TC54269	25.55
	.105	1/8	1-1/2	TC54070	20.60	TC54270	24.65
	.210	1/8	1-1/2	TC58070	17.75	TC58270	21.45
.0710	.213	1/8	1-1/2	TC58071	17.85	TC58271	21.45
.0720	.216	1/8	1-1/2	TC58072	17.75	TC58272	21.45
.0730	.219	1/8	1-1/2	TC58073	17.75	TC58273	21.45
.0740	.222	1/8	1-1/2	TC58074	12.77	TC58274	22.75
.0750	.060	1/8	1-1/2	TC54074	20.60	TC54274	25.55
	.113	1/8	1-1/2	TC54075	20.60	TC54275	24.65
	.225	1/8	1-1/2	TC58075	17.75	TC58275	21.45
.0760	.228	1/8	1-1/2	TC58076	12.87	TC58276	21.45
.0770	.231	1/8	1-1/2	TC58077	17.85	TC58277	22.85
.0780	.117	1/8	1-1/2	TC54078	14.87	TC54278	24.65
	.234	1/8	1-1/2	TC58078	17.75	TC58278	21.45
.0790	.237	1/8	1-1/2	TC58079	17.85	TC58279	22.85
.0800	.064	1/8	1-1/2	TC54079	20.65	TC54279	25.60
	.120	1/8	1-1/2	TC54080	14.87	TC54280	24.65
	.240	1/8	1-1/2	TC58080	17.75	TC58280	21.45
.0810	.243	1/8	1-1/2	TC58081	17.75	TC58281	22.75
.0820	.246	1/8	1-1/2	TC58082	17.75	TC58282	21.45
.0830	.249	1/8	1-1/2	TC58083	17.75	TC58283	21.45
.0840	.252	1/8	1-1/2	TC58084	17.85	TC58284	21.45
.0850	.068	1/8	1-1/2	TC54084	20.65	TC54284	25.60
	.128	1/8	1-1/2	TC54085	20.65	TC54285	24.65
	.255	1/8	1-1/2	TC58085	17.75	TC58285	21.45
.0860	.258	1/8	1-1/2	TC58086	17.75	TC58286	21.45
.0870	.261	1/8	1-1/2	TC58087	17.75	TC58287	21.45
.0880	.264	1/8	1-1/2	TC58088	17.85	TC58288	21.45
.0890	.267	1/8	1-1/2	TC58089	17.75	TC58289	21.45
.0900	.072	1/8	1-1/2	TC54089	20.60	TC54289	25.55
	.135	1/8	1-1/2	TC54090	20.60	TC54290	24.65
	.270	1/8	1-1/2	TC58090	17.75	TC58290	21.45
.0910	.273	1/8	1-1/2	TC58091	17.75	TC58291	21.45
.0920	.276	1/8	1-1/2	TC58092	17.75	TC58292	16.57
.0930	.140	1/8	1-1/2	TC54093	20.60	TC54293	24.65
	.279	1/8	1-1/2	TC58093	17.75	TC58293	21.45
.0940	.282	1/8	1-1/2	TC58094	12.87	TC58294	21.45

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MICRO END MILLS

4 Flute - Square - 30° Helix - Stub & Regular Flute (Cont.)

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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005"}_{-.0005"}$	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0950	.076	1/8	1-1/2	TC54094	20.60	TC54294	25.55
	.143	1/8	1-1/2	TC54095	20.60	TC54295	24.65
	.285	1/8	1-1/2	TC58095	17.75	TC58295	22.75
.0960	.288	1/8	1-1/2	TC58096	17.75	TC58296	21.45
.0970	.291	1/8	1-1/2	TC58097	17.80	TC58297	22.80
.0980	.294	1/8	1-1/2	TC58098	17.75	TC58298	21.45
.0990	.297	1/8	1-1/2	TC58099	17.75	TC58299	15.47
.1000	.080	1/8	1-1/2	TC54099	20.60	TC54299	25.55
	.150	1/8	1-1/2	TC54100	20.60	TC54300	24.65
	.300	1/8	1-1/2	TC58100	17.75	TC58300	21.45
.1010	.303	1/8	1-1/2	TC58101	17.85	TC58301	21.45
.1020	.306	1/8	1-1/2	TC58102	17.75	TC58302	21.60
.1030	.309	1/8	1-1/2	TC58103	17.80	TC58303	22.80
.1040	.312	1/8	1-1/2	TC58104	17.85	TC58304	21.45
.1050	.084	1/8	1-1/2	TC58009	17.85	TC58209	22.85
	.315	1/8	1-1/2	TC58105	17.85	TC58305	21.45
.1060	.318	1/8	1-1/2	TC58106	17.80	TC58306	22.80
.1070	.321	1/8	1-1/2	TC58107	17.75	TC58307	21.45
.1080	.324	1/8	1-1/2	TC58108	17.75	TC58308	16.57
.1090	.327	1/8	1-1/2	TC58109	17.75	TC58309	21.45
.1100	.088	1/8	1-1/2	TC58008	17.75	TC58208	22.75
	.330	1/8	1-1/2	TC58110	17.75	TC58310	21.45
.1150	.092	1/8	1-1/2	TC58114	17.75	TC58314	22.75
	.345	1/8	1-1/2	TC58115	17.75	TC58315	21.45
.1180	.354	1/8	1-1/2	TC58117	17.75	TC58317	22.75
.1200	.096	1/8	1-1/2	TC58119	17.75	TC58319	22.75
	.360	1/8	1-1/2	TC58120	17.75	TC58320	21.45

4 Flute

For technical information, see page 155

MICRO END MILLS

4 Flute - Ball - 30° Helix - Stub & Regular Flute



- Offered in stub and regular flute styles
- Center cutting
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D1^{+0.0005"}_{-0.0005"}$	L2	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0100	.015	1/8	1-1/2	TC55010	45.95	TC55210	59.50
	.030	1/8	1-1/2	TC59010	45.65	TC59210	51.75
.0110	.033	1/8	1-1/2	TC59011	29.87	TC59211	33.57
.0120	.036	1/8	1-1/2	TC59012	40.85	TC59212	45.90
.0130	.039	1/8	1-1/2			TC59213	39.15
.0140	.042	1/8	1-1/2	TC59014	24.57	TC59214	28.27
.0150	.023	1/8	1-1/2	TC55015	28.50	TC55215	37.20
	.045	1/8	1-1/2	TC59015	28.50	TC59215	33.90
.0160	.048	1/8	1-1/2	TC59016	28.50	TC59216	33.90
.0180	.054	1/8	1-1/2	TC59018	20.67	TC59218	33.55
.0190	.057	1/8	1-1/2	TC59019	20.87	TC59219	33.80
.0200	.030	1/8	1-1/2	TC55020	26.05	TC55220	33.85
	.060	1/8	1-1/2	TC59020	26.05	TC59220	31.15
.0210	.063	1/8	1-1/2	TC59021	18.87	TC59221	31.30
.0220	.066	1/8	1-1/2	TC59022	18.77	TC59222	31.00
.0230	.069	1/8	1-1/2	TC59023	18.87	TC59223	31.10
.0240	.072	1/8	1-1/2	TC59024	26.05	TC59224	31.15
.0250	.038	1/8	1-1/2	TC55025	26.05	TC55225	33.85
	.075	1/8	1-1/2	TC59025	26.05	TC59225	31.15
.0260	.078	1/8	1-1/2	TC59026	24.30	TC59226	29.35
.0270	.081	1/8	1-1/2	TC59027	24.40	TC59227	29.45
.0280	.084	1/8	1-1/2	TC59028	17.67	TC59228	29.15
.0290	.087	1/8	1-1/2	TC59029	24.40	TC59229	29.20
.0300	.045	1/8	1-1/2	TC55030	24.30	TC55230	31.70
	.090	1/8	1-1/2	TC59030	24.30	TC59230	29.15
.0310	.047	1/8	1-1/2	TC55031	22.95	TC55231	29.85
	.093	1/8	1-1/2	TC59031	22.95	TC59231	27.40
.0320	.096	1/8	1-1/2	TC59032	23.05	TC59232	27.40
.0330	.099	1/8	1-1/2	TC59033	16.67	TC59233	20.47
.0340	.102	1/8	1-1/2	TC59034	23.15	TC59234	28.20
.0350	.053	1/8	1-1/2	TC55035	16.47	TC55235	29.85
	.105	1/8	1-1/2	TC59035	22.95	TC59235	27.40
.0360	.108	1/8	1-1/2	TC59036	16.67	TC59236	28.15
.0370	.111	1/8	1-1/2	TC59037	16.67	TC59237	28.15
.0380	.114	1/8	1-1/2	TC59038	16.67	TC59238	20.47
.0390	.117	1/8	1-1/2	TC59039	22.95	TC59239	27.40

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MICRO END MILLS

4 Flute - Ball - 30° Helix - Stub & Regular Flute (Cont.)

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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D1 ^{+0.0005"} -0.0005"	L2	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0400	.060	1/8	1-1/2	TC55040	22.95	TC55240	29.85
	.120	1/8	1-1/2	TC59040	22.95	TC59240	27.40
.0410	.123	1/8	1-1/2	TC59041	16.57	TC59241	27.40
.0420	.126	1/8	1-1/2	TC59042	16.57	TC59242	27.40
.0430	.129	1/8	1-1/2	TC59043	16.57	TC59243	28.05
.0440	.132	1/8	1-1/2			TC59244	19.87
.0450	.068	1/8	1-1/2	TC55045	16.17	TC55245	27.45
	.135	1/8	1-1/2	TC59045	22.30	TC59245	27.35
.0460	.138	1/8	1-1/2	TC59046	16.17	TC59246	26.80
.0470	.071	1/8	1-1/2	TC55047	22.40	TC55247	27.45
	.141	1/8	1-1/2	TC59047	22.30	TC59247	26.80
.0480	.144	1/8	1-1/2	TC59048	22.40	TC59248	26.80
.0490	.147	1/8	1-1/2			TC59249	19.87
.0500	.075	1/8	1-1/2	TC55050	16.17	TC55250	27.45
	.150	1/8	1-1/2	TC59050	22.30	TC59250	26.80
.0510	.153	1/8	1-1/2			TC59251	26.80
.0520	.156	1/8	1-1/2	TC59052	22.35	TC59252	27.40
.0530	.159	1/8	1-1/2	TC59053	16.17	TC59253	27.45
.0540	.162	1/8	1-1/2	TC59054	16.17	TC59254	26.80
.0550	.083	1/8	1-1/2	TC55055	16.17	TC55255	27.45
	.165	1/8	1-1/2	TC59055	22.30	TC59255	26.80
.0560	.168	1/8	1-1/2	TC59056	16.17	TC59256	19.87
.0570	.171	1/8	1-1/2	TC59057	22.40	TC59257	19.87
.0580	.174	1/8	1-1/2	TC59058	16.17	TC59258	27.50
.0590	.177	1/8	1-1/2	TC59059	22.40	TC59259	26.80
.0600	.090	1/8	1-1/2	TC55060	22.30	TC55260	29.05
	.180	1/8	1-1/2	TC59060	22.30	TC59260	26.80
.0610	.183	1/8	1-1/2	TC59061	16.17		
.0620	.093	1/8	1-1/2	TC55062	22.30	TC55262	29.05
	.186	1/8	1-1/2	TC59062	22.30	TC59262	26.80
.0630	.189	1/8	1-1/2	TC59063	15.97	TC59263	26.80
.0640	.192	1/8	1-1/2	TC59064	16.17	TC59264	27.50
.0650	.098	1/8	1-1/2	TC55065	22.30	TC55265	29.05
	.195	1/8	1-1/2	TC59065	22.40	TC59265	26.80
.0660	.198	1/8	1-1/2	TC59066	16.17	TC59266	26.80
.0670	.201	1/8	1-1/2	TC59067	22.45	TC59267	19.87
.0680	.204	1/8	1-1/2	TC59068	22.40	TC59268	26.80
.0700	.105	1/8	1-1/2	TC55070	22.30	TC55270	29.05
	.210	1/8	1-1/2	TC59070	22.30	TC59270	26.80
.0710	.213	1/8	1-1/2	TC59071	22.40	TC59271	19.87
.0720	.216	1/8	1-1/2	TC59072	22.30	TC59272	26.80
.0730	.219	1/8	1-1/2	TC59073	22.40	TC59273	26.80
.0740	.222	1/8	1-1/2	TC59074	16.17	TC59274	27.45
.0750	.113	1/8	1-1/2	TC55075	22.40	TC55275	27.45
	.225	1/8	1-1/2	TC59075	22.30		
.0760	.228	1/8	1-1/2	TC59076	16.17	TC59276	19.87
.0770	.231	1/8	1-1/2			TC59277	19.87

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For technical information, see page 155

MICRO END MILLS

4 Flute - Ball - 30° Helix - Stub & Regular Flute (Cont.)

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CUTTER DIA.	LENGTH OF CUT	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
$D_1^{+.0005"}_{-.0005"}$	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
.0780	.117	1/8	1-1/2	TC55078	22.30	TC55278	29.05
	.234	1/8	1-1/2	TC59078	15.97	TC59278	26.80
.0790	.237	1/8	1-1/2	TC59079	16.17	TC59279	19.87
.0800	.120	1/8	1-1/2	TC55080	16.17	TC55280	27.45
	.240	1/8	1-1/2	TC59080	22.30	TC59280	26.80
.0810	.243	1/8	1-1/2			TC59281	27.45
.0820	.246	1/8	1-1/2			TC59282	27.45
.0830	.249	1/8	1-1/2	TC59083	16.17	TC59283	27.50
.0840	.252	1/8	1-1/2	TC59084	22.40	TC59284	27.45
.0850	.128	1/8	1-1/2	TC55085	16.17	TC55285	27.50
	.255	1/8	1-1/2	TC59085	16.17	TC59285	27.00
.0860	.258	1/8	1-1/2	TC59086	22.45	TC59286	27.50
.0870	.261	1/8	1-1/2	TC59087	16.17	TC59287	27.50
.0880	.264	1/8	1-1/2	TC59088	16.17	TC59288	27.45
.0890	.267	1/8	1-1/2	TC59089	16.17	TC59289	27.45
.0900	.135	1/8	1-1/2	TC55090	16.17	TC55290	27.45
	.270	1/8	1-1/2	TC59090	22.40	TC59290	19.87
.0910	.273	1/8	1-1/2	TC59091	16.17	TC59291	27.45
.0920	.276	1/8	1-1/2	TC59092	16.17	TC59292	19.87
.0930	.140	1/8	1-1/2	TC55093	16.17	TC55293	27.45
	.279	1/8	1-1/2	TC59093	22.30	TC59293	26.80
.0940	.282	1/8	1-1/2	TC59094	16.17	TC59294	27.45
.0950	.143	1/8	1-1/2	TC55095	16.17	TC55295	27.45
	.285	1/8	1-1/2	TC59095	15.97	TC59295	27.35
.0960	.288	1/8	1-1/2	TC59096	16.17	TC59296	26.80
.0970	.291	1/8	1-1/2	TC59097	16.17	TC59297	19.87
.0980	.294	1/8	1-1/2	TC59098	22.30	TC59298	26.80
.0990	.297	1/8	1-1/2	TC59099	16.17	TC59299	26.80
.1000	.150	1/8	1-1/2	TC55100	22.40	TC55300	27.45
	.300	1/8	1-1/2	TC59100	22.30	TC59300	26.80
.1010	.303	1/8	1-1/2	TC59101	16.17	TC59301	19.87
.1020	.306	1/8	1-1/2	TC59102	16.17	TC59302	27.45
.1030	.309	1/8	1-1/2			TC59303	26.80
.1040	.312	1/8	1-1/2	TC59104	22.40	TC59304	27.45
.1050	.315	1/8	1-1/2			TC59305	19.87
.1060	.318	1/8	1-1/2			TC59306	26.80
.1070	.321	1/8	1-1/2	TC59107	16.17	TC59307	19.87
.1080	.324	1/8	1-1/2			TC59308	19.87
.1090	.327	1/8	1-1/2	TC59109	16.17	TC59309	26.80
.1100	.330	1/8	1-1/2	TC59110	16.17	TC59310	26.80
.1150	.345	1/8	1-1/2	TC59115	16.17	TC59315	27.45
.1200	.360	1/8	1-1/2	TC59120	22.40	TC59320	27.45

For technical information, see page 155

MICRO END MILLS

4 Flute - Corner Radius - 30° Helix - Stub & Regular Flute



- Offered in stub and regular flute styles
- Corner radius for increased edge strength

- Center cutting
- AlTiN coating offers increased wear and heat resistance

- Solid carbide
- Precision manufactured in the USA

CUTTER DIA.	LENGTH OF CUT	RADIUS	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D1 ^{+0.0005"} _{-0.0005"}	L2	R ^{+0.0002"} _{-0.0002"}	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0150	.023	.003	1/8	1 - 1/2	TC50203	40.37	TC50404	64.95
	.045	.003	1/8	1 - 1/2	TC50603	55.95	TC50804	64.95
.0200	.030	.005	1/8	1 - 1/2	TC50205	37.67	TC50406	57.10
	.060	.005	1/8	1 - 1/2	TC50605	52.10	TC50806	57.10
.0250	.038	.005	1/8	1 - 1/2	TC50207	37.87	TC50408	41.57
	.075	.005	1/8	1 - 1/2	TC50607	37.67	TC50808	41.47
.0300	.045	.005	1/8	1 - 1/2	TC50209	26.77	TC50410	42.00
	.090	.005	1/8	1 - 1/2	TC50609	26.87	TC50810	43.40
	.045	.010	1/8	1 - 1/2			TC50412	42.35
	.090	.010	1/8	1 - 1/2	TC50611	26.87	TC50812	42.15
.0310	.047	.005	1/8	1 - 1/2	TC50213	26.87	TC50414	43.40
	.093	.005	1/8	1 - 1/2	TC50613	37.10	TC50814	43.40
	.047	.010	1/8	1 - 1/2	TC50215	37.25	TC50416	43.40
	.093	.010	1/8	1 - 1/2	TC50615	37.10	TC50816	43.40
.0350	.053	.005	1/8	1 - 1/2	TC50217	26.97	TC50418	43.40
	.105	.005	1/8	1 - 1/2	TC50617	26.87	TC50818	43.40
	.053	.010	1/8	1 - 1/2			TC50420	43.40
	.105	.010	1/8	1 - 1/2			TC50820	43.40
.0400	.060	.005	1/8	1 - 1/2			TC50422	43.40
	.120	.005	1/8	1 - 1/2	TC50621	26.87	TC50822	43.40
	.060	.010	1/8	1 - 1/2	TC50223	37.10	TC50424	43.40
	.120	.010	1/8	1 - 1/2	TC50623	26.87	TC50824	42.15
.0450	.068	.005	1/8	1 - 1/2	TC50225	37.25	TC50426	43.40
	.135	.005	1/8	1 - 1/2	TC50625	26.97	TC50826	31.27
	.068	.010	1/8	1 - 1/2	TC50227	26.97	TC50428	42.35
	.135	.010	1/8	1 - 1/2			TC50828	43.40
	.068	.015	1/8	1 - 1/2			TC50430	42.35
	.135	.015	1/8	1 - 1/2			TC50830	30.77
.0470	.071	.005	1/8	1 - 1/2	TC50231	26.77	TC50432	43.40
	.141	.005	1/8	1 - 1/2	TC50631	26.77	TC50832	43.40
	.071	.010	1/8	1 - 1/2	TC50233	26.87	TC50434	43.40
	.141	.010	1/8	1 - 1/2	TC50633	37.25	TC50834	43.40
	.071	.015	1/8	1 - 1/2	TC50235	26.97	TC50436	43.40
	.141	.015	1/8	1 - 1/2	TC50635	37.25	TC50836	43.40
.0500	.075	.005	1/8	1 - 1/2	TC50237	37.10	TC50438	43.40
	.150	.005	1/8	1 - 1/2	TC50637	37.10	TC50838	43.40
	.075	.010	1/8	1 - 1/2	TC50239	26.87	TC50440	43.40
	.150	.010	1/8	1 - 1/2	TC50639	37.10	TC50840	43.40
	.075	.015	1/8	1 - 1/2	TC50241	37.25	TC50442	43.40
	.150	.015	1/8	1 - 1/2	TC50641	37.10	TC50842	43.40

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MICRO END MILLS

4 Flute - Corner Radius - 30° Helix - Stub & Regular Flute (Cont.)

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CUTTER DIA.	LENGTH OF CUT	RADIUS	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
D1 ^{+0.0005"} _{-0.0005"}	L2	R ^{+0.0002"} _{-0.0002"}	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.0600	.090	.005	1/8	1 - 1/2	TC50249	26.87	TC50450	43.40
	.180	.005	1/8	1 - 1/2	TC50649	37.10	TC50850	43.40
	.090	.010	1/8	1 - 1/2	TC50251	37.25	TC50452	43.40
	.180	.010	1/8	1 - 1/2	TC50651	37.25	TC50852	43.40
	.090	.015	1/8	1 - 1/2	TC50253	26.87	TC50454	43.40
	.180	.015	1/8	1 - 1/2	TC50653	26.87	TC50854	43.40
.0620	.050	.005	1/8	1-1/2			TC50455	42.20
	.093	.005	1/8	1 - 1/2	TC50255	37.25	TC50456	43.40
	.186	.005	1/8	1 - 1/2	TC50655	37.25	TC50856	43.40
	.050	.010	1/8	1 - 1/2			TC50457	42.20
	.093	.010	1/8	1 - 1/2	TC50257	37.10	TC50458	43.40
	.186	.010	1/8	1 - 1/2	TC50657	37.10	TC50858	43.40
	.093	.015	1/8	1 - 1/2	TC50259	37.25	TC50460	42.20
	.186	.015	1/8	1 - 1/2	TC50659	37.10	TC50860	43.40
.0750	.113	.005	1/8	1 - 1/2	TC50273	26.97		
	.225	.005	1/8	1 - 1/2	TC50673	26.97		
	.113	.010	1/8	1 - 1/2	TC50275	26.77	TC50476	30.47
	.225	.010	1/8	1 - 1/2	TC50675	26.97	TC50876	42.35
	.113	.015	1/8	1 - 1/2			TC50478	43.40
	.225	.015	1/8	1 - 1/2	TC50677	37.40	TC50878	30.77
.0780	.117	.005	1/8	1 - 1/2	TC50279	37.10	TC50480	43.40
	.234	.005	1/8	1 - 1/2	TC50679	26.77	TC50880	43.40
	.117	.010	1/8	1 - 1/2	TC50281	37.25	TC50482	43.40
	.234	.010	1/8	1 - 1/2	TC50681	37.25	TC50882	43.40
	.117	.015	1/8	1 - 1/2	TC50283	26.87	TC50484	43.40
	.234	.015	1/8	1 - 1/2	TC50683	37.25	TC50884	43.40
.0900	.135	.005	1/8	1 - 1/2	TC50297	26.87	TC50498	42.15
	.270	.005	1/8	1 - 1/2	TC50697	26.87	TC50898	43.40
	.135	.010	1/8	1 - 1/2	TC50299	26.97	TC50500	43.40
	.270	.010	1/8	1 - 1/2	TC50699	26.87	TC50900	43.40
	.135	.015	1/8	1 - 1/2	TC50301	26.87	TC50502	42.15
	.270	.015	1/8	1 - 1/2	TC50701	37.25	TC50902	43.40
.0930	.074	.005	1/8	1 - 1/2			TC50497	42.20
	.140	.005	1/8	1 - 1/2	TC50303	37.25	TC50504	43.40
	.279	.005	1/8	1 - 1/2	TC50703	37.10	TC50904	43.40
	.074	.010	1/8	1 - 1/2			TC50496	42.20
	.140	.010	1/8	1 - 1/2	TC50305	37.25	TC50506	43.40
	.279	.010	1/8	1 - 1/2	TC50705	37.10	TC50906	43.40
	.140	.015	1/8	1 - 1/2	TC50307	37.25	TC50508	43.40
	.279	.015	1/8	1 - 1/2	TC50707	37.10	TC50908	43.40
.1000	.150	.005	1/8	1 - 1/2	TC50315	37.25	TC50516	43.40
	.300	.005	1/8	1 - 1/2	TC50715	37.40	TC50916	43.40
	.150	.010	1/8	1 - 1/2	TC50317	37.25	TC50518	43.40
	.300	.010	1/8	1 - 1/2	TC50717	26.87	TC50918	42.15
	.150	.015	1/8	1 - 1/2	TC50319	26.77	TC50520	43.40
	.300	.015	1/8	1 - 1/2	TC50719	26.87	TC50920	42.15

For technical information, see page 155

MICRO END MILLS

Technical Information

General Purpose Carbide Micro End Mills

Material Guide		Conditions	SFM	Feed Per Tooth							
				.005"	.015"	.003"	.045"	.060"	.075"	.090"	.105"
				.015"	.003"	.045"	.060"	.075"	.090"	.105"	.125"
COBALT BASE ALLOYS	Stellite, HS-21, Haynes 25/188, X-40, L-605	Slotting at ≤7% of D	50	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0004
		Profiling at 5% of D Axial/≤20% of D Radial	80	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0004
NICKEL BASE ALLOYS	Inconel-625/718, Waspalloy, Rene, Hastelloy	Slotting at ≤7% of D	40	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0004
		Profiling at 5% of D Axial/≤20% of D Radial	60	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0004
IRON BASE ALLOYS	Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3	Slotting at ≤7% of D	80	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0004
		Profiling at 5% of D Axial/≤20% of D Radial	100	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0004
MONEL	Monel-65% Nickel	Slotting at ≤7% of D	40	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0004
		Profiling at 5% of D Axial/≤20% of D Radial	60	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0004
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si	Slotting at ≤15% of D	125	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
		Profiling at 6% of D Axial/≤20% of D Radial	250	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17-4, AM-350/355	Slotting at ≤10% of D	90	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
		Profiling at 6% of D Axial/≤20% of D Radial	250	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 316, 304L, 316L	Slotting at ≤15% of D	100	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
		Profiling at 6% of D Axial/≤30% of D Radial	250	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	Slotting at ≤15% of D	100	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
		Profiling at 6% of D Axial/≤30% of D Radial	250	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	Slotting at ≤15% of D	100	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
		Profiling at 6% of D Axial/≤30% of D Radial	180	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0005
MEDIUM ALLOY STEELS	200, 250, 300	Slotting at ≤15% of D	125	.0003	.0003	.0004	.0004	.0005	.0005	.0006	.0006
		Profiling at 6% of D Axial/≤30% of D Radial	250	.0003	.0003	.0004	.0004	.0005	.0005	.0006	.0006
CARBON STEELS	A36, 12L14, 12L15, 1005, 1018, 1020, 1108- 1119, 1213-1215, 1513-1518, 4012, 5015, 9310	Slotting at ≤15% of D	150	.0004	.0004	.0005	.0005	.0006	.0006	.0007	.0007
		Profiling at 6% of D Axial/≤35% of D Radial	300	.0004	.0004	.0005	.0005	.0006	.0006	.0007	.0007
DUCTILE	Ductile Cast Irons	Slotting at ≤15% of D	100	.0004	.0004	.0005	.0005	.0006	.0006	.0007	.0007
		Profiling at 10% of D Axial/≤25% of D Radial	250	.0004	.0004	.0005	.0005	.0006	.0006	.0007	.0007
CAST IRONS	Gray Cast Irons	Slotting at ≤25% of D	125	.0004	.0004	.0005	.0005	.0008	.0008	.0010	.0010
		Profiling at 10% of D Axial/≤35% of D Radial	400	.0004	.0004	.0005	.0005	.0008	.0008	.0010	.0010
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded	Slotting at ≤15% of D	650	.0004	.0004	.0005	.0006	.0008	.0008	.0010	.0010
		Profiling at 10% of D Axial/≤35% of D Radial	775	.0004	.0004	.0005	.0006	.0008	.0008	.0010	.0010

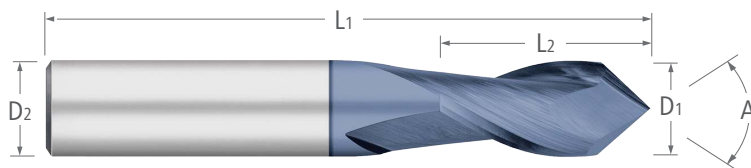
Technical

These values are a starting point based on an uncoated tool.

For AlTiN Coated tools increase SFM values by up to +40%

DRILL / END MILLS

2 Flute



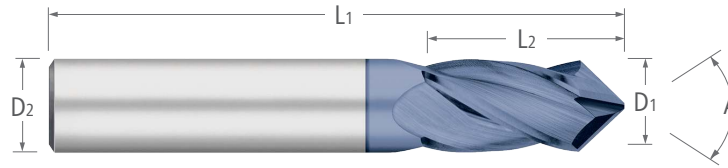
- Versatile tool engineered for drilling, chamfering, countersinking, spotting, and profiling applications
- Offered in 60°, 90°, and 120° point angles
- AltIn coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		ALTIN COATED	
A	D ₁ ^{+0.000} _{-0.002} "	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	1/32	1/8	1/8	1-1/2	TC31602	18.65	TC31802	23.60
	1/16	3/16	1/8	1-1/2	TC31604	18.80	TC31804	23.60
	3/32	3/8	1/8	1-1/2	TC31606	18.80	TC31806	23.60
	1/8	1/2	1/8	1-1/2	TC31608	17.90	TC31808	22.65
	3/16	5/8	3/16	2	TC31612	25.40	TC31812	31.05
	1/4	3/4	1/4	2-1/2	TC31616	31.70	TC31816	38.90
	5/16	13/16	5/16	2-1/2	TC31620	39.40	TC31820	48.05
	3/8	1	3/8	2-1/2	TC31624	49.40	TC31824	59.70
	7/16	1	7/16	2-3/4	TC31628	48.17	TC31828	79.40
	1/2	1	1/2	3	TC31632	82.05	TC31832	97.40
90°	1/32	1/8	1/8	1-1/2	TC32002	18.65	TC32202	23.60
	3/64	9/64	1/8	1-1/2	TC32003	18.70	TC32203	23.75
	1/16	3/16	1/8	1-1/2	TC32004	18.80	TC32204	23.60
	5/64	1/4	1/8	1-1/2	TC32005	18.80	TC32205	23.80
	3/32	3/8	1/8	1-1/2	TC32006	18.80	TC32206	22.80
	1/8	1/2	1/8	1-1/2	TC32008	17.90	TC32208	22.65
	5/32	9/16	3/16	1-1/2	TC32010	17.90	TC32210	22.90
	3/16	5/8	3/16	2	TC32012	25.40	TC32212	31.05
	1/4	3/4	1/4	2-1/2	TC32016	31.70	TC32216	38.90
	5/16	13/16	5/16	2-1/2	TC32020	39.40	TC32220	48.05
	3/8	1	3/8	2-1/2	TC32024	49.40	TC32224	59.70
	7/16	1	7/16	2-3/4	TC32028	66.55	TC32228	79.40
	1/2	1	1/2	3	TC32032	82.05	TC32232	97.40
120°	1/32	1/8	1/8	1-1/2	TC31702	18.65	TC31902	23.70
	1/16	3/16	1/8	1-1/2	TC31704	18.80	TC31904	23.80
	3/32	3/8	1/8	1-1/2	TC31706	18.80	TC31906	23.80
	1/8	1/2	1/8	1-1/2	TC31708	17.90	TC31908	22.90
	3/16	5/8	3/16	2	TC31712	25.40	TC31912	31.05
	1/4	3/4	1/4	2-1/2	TC31716	31.70	TC31916	38.90
	3/8	1	3/8	2-1/2	TC31724	49.40	TC31924	59.70
	7/16	1	7/16	2-3/4	TC31728	66.55	TC31928	78.60
	1/2	1	1/2	3	TC31732	82.05	TC31932	96.10
A	D ₁ ^{+0.000} _{-0.003} "	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	5/8	1-1/4	5/8	3-1/2	TC31640	156.00	TC31840	185.90
	3/4	1-1/2	3/4	4	TC31648	230.85	TC31848	273.70
90°	5/8	1-1/4	5/8	3-1/2	TC32040	156.00	TC32240	185.90
	3/4	1-1/2	3/4	4	TC32048	230.85	TC32248	273.70
120°	5/8	1-1/4	5/8	3-1/2	TC31740	156.00	TC31940	173.30
	3/4	1-1/2	3/4	4	TC31748	230.85	TC31948	251.65

For technical information, see page 177

DRILL / END MILLS

4 Flute



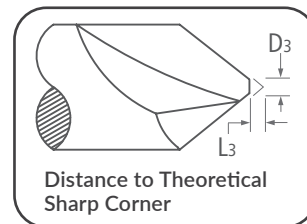
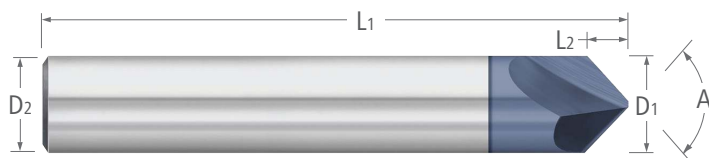
- Versatile tool engineered for drilling, chamfering, countersinking, spotting, and profiling applications
- Offered in 60°, 90°, and 120° point angles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A	$D_1^{+0.000}_{-0.002}$	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	1/32	1/8	1/8	1-1/2	TC34702	13.47	TC34902	23.60
	1/16	3/16	1/8	1-1/2	TC34704	18.80	TC34904	23.60
	3/32	3/8	1/8	1-1/2	TC34706	18.80	TC34906	23.60
	1/8	1/2	1/8	1-1/2	TC34708	17.90	TC34908	22.65
	3/16	5/8	3/16	2	TC34712	25.40	TC34912	31.05
	1/4	3/4	1/4	2-1/2	TC34716	31.70	TC34916	38.90
	5/16	13/16	5/16	2-1/2	TC34720	39.40	TC34920	47.75
	3/8	1	3/8	2-1/2	TC34724	49.40	TC34924	59.70
	7/16	1	7/16	2-3/4	TC34728	66.55	TC34928	79.40
	1/2	1	1/2	3	TC34732	82.05	TC34932	97.40
90°	1/32	1/8	1/8	1-1/2	TC34102	18.65	TC34302	23.60
	3/64	9/64	1/8	1-1/2	TC34103	18.70	TC34303	23.75
	1/16	3/16	1/8	1-1/2	TC34104	18.80	TC34304	23.60
	5/64	1/4	1/8	1-1/2	TC34105	18.80	TC34305	23.80
	3/32	3/8	1/8	1-1/2	TC34106	18.80	TC34306	23.60
	1/8	1/2	1/8	1-1/2	TC34108	17.90	TC34308	22.65
	5/32	9/16	3/16	1-1/2	TC34110	17.90	TC34310	22.90
	3/16	5/8	3/16	2	TC34112	25.40	TC34312	31.05
	1/4	3/4	1/4	2-1/2	TC34116	31.70	TC34316	38.90
	5/16	13/16	5/16	2-1/2	TC34120	39.40	TC34320	48.05
	3/8	1	3/8	2-1/2	TC34124	49.40	TC34324	59.70
	7/16	1	7/16	2-3/4	TC34128	66.55	TC34328	79.40
	1/2	1	1/2	3	TC34132	82.05	TC34332	97.40
120°	1/32	1/8	1/8	1-1/2	TC34802	18.65	TC35102	23.70
	1/16	3/16	1/8	1-1/2	TC34804	18.80	TC35104	23.80
	3/32	3/8	1/8	1-1/2	TC34806	18.80	TC35106	23.80
	1/8	1/2	1/8	1-1/2	TC34808	17.90	TC35108	22.90
	3/16	5/8	3/16	2	TC34812	25.40	TC35112	31.05
	1/4	3/4	1/4	2-1/2	TC34816	31.70	TC35116	38.90
	5/16	13/16	5/16	2-1/2	TC34820	39.40	TC35120	48.05
	3/8	1	3/8	2-1/2	TC34824	49.40	TC35124	59.70
	7/16	1	7/16	2-3/4	TC34828	66.55	TC35128	78.60
	1/2	1	1/2	3	TC34832	82.05	TC35132	96.10
A	$D_1^{+0.000}_{-0.003}$	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	5/8	1-1/4	5/8	3-1/2	TC34740	112.87	TC34940	185.90
	3/4	1-1/2	3/4	4	TC34748	230.85	TC34948	273.70
90°	5/8	1-1/4	5/8	3-1/2	TC34140	156.00	TC34340	185.90
	3/4	1-1/2	3/4	4	TC34148	230.85	TC34348	273.70
120°	5/8	1-1/4	5/8	3-1/2	TC34840	156.00	TC35140	173.30
	3/4	1-1/2	3/4	4	TC34848	230.85	TC35148	251.65

For technical information, see page 177

CHAMFER MILLS

2 Flute - Flat Tip



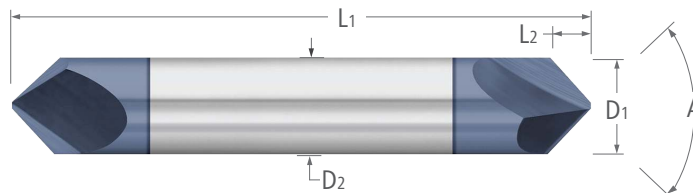
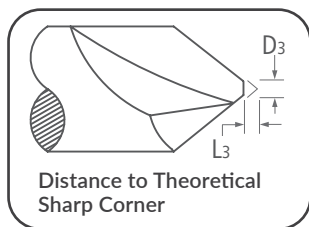
- Flat tip (non-cutting) design for increased strength in chamfering and profiling applications
- Fully stocked in 60°, 82°, 90°, 100°, and 120° styles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	CUTTER DIA.	LENGTH OF CUT	TIP DIA.	THEORETICAL TIP LENGTH	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A	D ₁	L ₂	D ₃	L ₃	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	1/8	.091	.020	.017	1/8	1-1/2	TC87600	16.00	TC87660	20.15
	3/16	.137	.030	.026	3/16	2-1/2	TC87601	22.20	TC87661	28.25
	1/4	.178	.044	.038	1/4	2-1/2	TC87603	28.40	TC87663	35.50
	5/16	.219	.060	.052	5/16	2-1/2	TC87604	35.50		
	3/8	.273	.060	.052	3/8	2-1/2	TC87606	43.95	TC87666	54.25
	1/2	.364	.080	.069	1/2	3	TC87609	73.15	TC87669	87.15
82°	1/8	.060	.020	.012	1/8	1-1/2	TC87612	16.00	TC87672	20.15
	3/16	.091	.030	.017	3/16	2-1/2	TC87613	22.20		
	1/4	.119	.044	.025	1/4	2-1/2	TC87615	28.40	TC87675	35.50
	5/16	.145	.060	.035	5/16	2-1/2			TC87676	44.10
	3/8	.181	.060	.035	3/8	2-1/2	TC87618	43.95	TC87678	54.25
	1/2	.242	.080	.046	1/2	3	TC87621	73.15	TC87681	87.15
90°	1/8	.053	.020	.010	1/8	1-1/2	TC87624	16.00	TC87684	20.15
	3/16	.079	.030	.015	3/16	2-1/2	TC87625	22.20	TC87685	27.90
	1/4	.103	.044	.022	1/4	2-1/2	TC87627	28.40	TC87687	35.50
	5/16	.126	.060	.030	5/16	2-1/2			TC87688	44.10
	3/8	.158	.060	.030	3/8	2-1/2	TC87630	43.95	TC87690	54.25
	1/2	.210	.080	.040	1/2	3	TC87633	73.15	TC87693	87.15
100°	1/8	.052	.020	.008	1/8	1-1/2	TC87636	16.00	TC87696	15.37
	3/16	.066	.030	.013	3/16	2-1/2	TC87637	22.20		
	1/4	.086	.044	.019	1/4	2-1/2	TC87639	28.40	TC87699	35.50
	5/16	.106	.060	.025	5/16	2-1/2	TC87640	35.50	TC87700	44.10
	3/8	.132	.060	.025	3/8	2-1/2	TC87642	43.95	TC87702	54.25
	1/2	.176	.080	.034	1/2	3	TC87645	73.15	TC87705	87.15
120°	1/8	.030	.020	.006	1/8	1-1/2	TC87648	16.00	TC87708	21.05
	3/16	.045	.030	.009	3/16	2-1/2	TC87649	22.20	TC87709	28.25
	1/4	.059	.044	.013	1/4	2-1/2	TC87651	28.40	TC87711	35.50
	5/16	.073	.060	.017	5/16	2-1/2	TC87652	35.50	TC87712	44.10
	3/8	.091	.060	.017	3/8	2-1/2	TC87654	43.95	TC87714	54.25
	1/2	.121	.080	.023	1/2	3	TC87657	73.15	TC87717	87.15

For technical information, see page 178

CHAMFER MILLS

2 Flute - Flat Tip - Double Ended



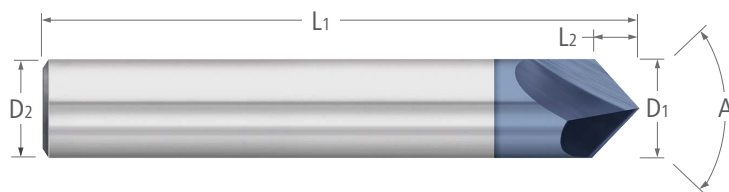
- Flat tip (non-cutting) design for increased strength in chamfering and profiling applications
- Double-ended
- Fully stocked in 60°, 82°, 90°, 100°, and 120° styles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	CUTTER DIA.	LENGTH OF CUT	TIP DIA.	THEORETICAL TIP LENGTH	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A	D ₁	L ₂	D ₃	L ₃	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	1/8	.091	.020	.017	1/8	2	TC87840	28.85	TC87930	34.30
	3/16	.137	.030	.026	3/16	2-1/2	TC87843	28.47	TC87933	47.25
	1/4	.178	.044	.038	1/4	2-1/2	TC87846	50.90	TC87936	60.30
	5/16	.219	.060	.052	5/16	2-1/2	TC87849	46.97		
	3/8	.273	.060	.052	3/8	2-1/2	TC87852	79.10	TC87942	94.30
	1/2	.364	.080	.069	1/2	3	TC87855	94.87	TC87945	156.15
82°	1/8	.060	.020	.012	1/8	2	TC87858	28.85	TC87948	24.77
	3/16	.091	.028	.017	3/16	2-1/2	TC87861	28.47	TC87951	47.25
	1/4	.119	.044	.025	1/4	2-1/2	TC87864	50.75	TC87954	43.57
	5/16	.145	.060	.035	5/16	2-1/2	TC87867	46.97	TC87957	77.85
	3/8	.181	.060	.035	3/8	2-1/2	TC87870	79.55	TC87960	94.30
	1/2	.242	.080	.046	1/2	3	TC87873	94.87	TC87963	156.15
90°	1/8	.053	.020	.010	1/8	2	TC87876	28.85	TC87966	34.30
	3/16	.079	.028	.015	3/16	2-1/2	TC87879	39.60	TC87969	47.30
	1/4	.103	.044	.022	1/4	2-1/2	TC87882	50.90	TC87972	60.30
	5/16	.126	.060	.030	5/16	2-1/2	TC87885	64.85	TC87975	77.25
	3/8	.158	.060	.030	3/8	2-1/2	TC87888	79.55	TC87978	94.30
	1/2	.210	.080	.040	1/2	3	TC87891	130.95	TC87981	156.15
100°	1/8	.052	.020	.008	1/8	2	TC87894	20.77	TC87984	26.57
	3/16	.066	.028	.013	3/16	2-1/2	TC87897	28.47	TC87987	35.47
	1/4	.086	.044	.019	1/4	2-1/2	TC87900	36.67	TC87990	61.55
	5/16	.106	.060	.025	5/16	2-1/2			TC87993	53.57
	3/8	.132	.060	.025	3/8	2-1/2	TC87906	57.27	TC87996	68.87
	1/2	.176	.080	.034	1/2	3	TC87909	130.95	TC87999	110.57
120°	1/8	.030	.020	.006	1/8	2	TC87912	20.77	TC88002	34.30
	3/16	.045	.028	.009	3/16	2-1/2	TC87915	28.47	TC88005	34.07
	1/4	.059	.044	.013	1/4	2-1/2	TC87918	36.67	TC88008	60.25
	5/16	.073	.060	.017	5/16	2-1/2	TC87921	46.97		
	3/8	.091	.060	.017	3/8	2-1/2	TC87924	57.27	TC88014	94.25
	1/2	.121	.080	.023	1/2	3	TC87927	94.87	TC88017	156.15

For technical information, see page 178

CHAMFER MILLS

2 Flute - Pointed Tip



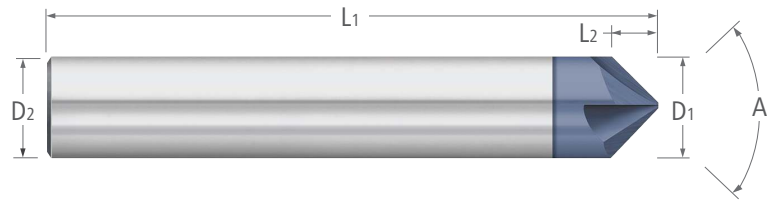
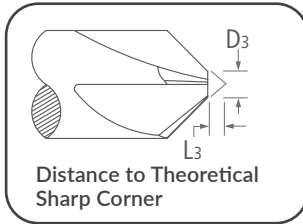
- Pointed tip geometry for general purpose chamfering and deburring applications in narrow grooves, slots, and small holes
- Fully stocked in 60°, 82°, 90°, 100°, and 120° styles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	CUTTER DIAMETER	LENGTH OF CUT	TIP DIAMETER	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A	D ₁	L ₂	D ₃	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	1/8	.108	.010	1/8	1-1/2	TC85100	16.00	TC85300	21.05
	3/16	.163	.010	3/16	2-1/2	TC85102	22.25	TC85302	27.90
	1/4	.216	.010	1/4	2-1/2	TC85104	28.10	TC85304	35.40
	5/16	.271	.010	5/16	2-1/2	TC85106	35.50	TC85306	44.10
	3/8	.325	.010	3/8	2-1/2	TC85108	43.95	TC85308	54.25
	1/2	.433	.010	1/2	3	TC85110	72.90	TC85310	86.90
82°	1/8	.072	.010	1/8	1-1/2	TC85112	16.00	TC85312	21.05
	3/16	.108	.010	3/16	2-1/2	TC85114	22.25	TC85314	28.30
	1/4	.144	.010	1/4	2-1/2	TC85116	28.10	TC85316	35.40
	5/16	.180	.010	5/16	2-1/2	TC85118	35.50	TC85318	44.10
	3/8	.216	.010	3/8	2-1/2	TC85120	43.95	TC85320	54.25
	1/2	.288	.010	1/2	3	TC85122	72.90	TC85322	86.90
90°	1/8	.063	.010	1/8	1-1/2	TC85124	16.00	TC85324	20.15
	3/16	.094	.010	3/16	2-1/2	TC85126	22.25	TC85326	27.90
	1/4	.125	.010	1/4	2-1/2	TC85128	28.10	TC85328	35.40
	5/16	.156	.010	5/16	2-1/2	TC85130	35.50	TC85330	44.10
	3/8	.188	.010	3/8	2-1/2	TC85132	43.95	TC85332	53.65
	1/2	.250	.010	1/2	3	TC85134	72.90	TC85334	86.90
100°	1/8	.052	.010	1/8	1-1/2	TC85136	16.00		
	3/16	.079	.010	3/16	2-1/2	TC85138	22.25		
	1/4	.105	.010	1/4	2-1/2	TC85140	28.10	TC85340	35.40
	5/16	.131	.010	5/16	2-1/2	TC85142	35.50		
	3/8	.157	.010	3/8	2-1/2	TC85144	43.95	TC85344	54.25
	1/2	.210	.010	1/2	3	TC85146	72.90	TC85346	86.90
120°	1/8	.036	.010	1/8	1-1/2			TC85348	21.05
	3/16	.054	.010	3/16	2-1/2	TC85150	22.25	TC85350	28.30
	1/4	.072	.010	1/4	2-1/2	TC85152	28.10	TC85352	35.40
	5/16	.090	.010	5/16	2-1/2	TC85154	35.50	TC85354	44.10
	3/8	.108	.010	3/8	2-1/2	TC85156	43.95	TC85356	54.25
	1/2	.144	.010	1/2	3	TC85158	72.90	TC85358	86.90

For technical information, see page 178

CHAMFER MILLS

4 Flute - Flat Tip



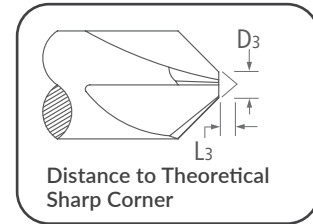
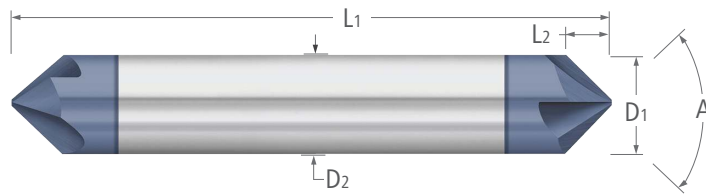
- Flat tip (non-cutting) design for increased strength in chamfering and profiling applications
- Fully stocked in 60°, 82°, 90°, 100°, and 120° styles
- Solid carbide
- Precision manufactured in the USA
- AlTiN coating offers increased wear and heat resistance

INCLUDED ANGLE	CUTTER DIA.	LENGTH OF CUT	TIP DIA.	THEORETICAL TIP LENGTH	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A	D ₁	L ₂	D ₃	L ₃	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	1/8	.091	.020	.017	1/8	1-1/2	TC87720	16.00	TC87780	20.15
	3/16	.137	.030	.026	3/16	2-1/2	TC87721	22.20	TC87781	28.25
	1/4	.178	.044	.038	1/4	2-1/2	TC87723	28.40	TC87783	35.50
	5/16	.219	.060	.052	5/16	2-1/2			TC87784	44.10
	3/8	.273	.060	.052	3/8	2-1/2	TC87726	43.95	TC87786	54.25
	1/2	.364	.080	.069	1/2	3	TC87729	73.15	TC87789	87.15
82°	1/8	.060	.020	.012	1/8	1-1/2	TC87732	16.00	TC87792	20.15
	3/16	.091	.030	.017	3/16	2-1/2	TC87733	22.20	TC87793	28.25
	1/4	.119	.044	.025	1/4	2-1/2	TC87735	28.40	TC87795	35.50
	5/16	.145	.060	.035	5/16	2-1/2	TC87736	35.50	TC87796	44.10
	3/8	.181	.060	.035	3/8	2-1/2	TC87738	43.95	TC87798	54.25
	1/2	.242	.080	.046	1/2	3	TC87741	73.15	TC87801	87.15
90°	1/8	.053	.020	.010	1/8	1-1/2	TC87744	16.00	TC87804	20.15
	3/16	.079	.030	.015	3/16	2-1/2	TC87745	22.20	TC87805	27.90
	1/4	.103	.044	.022	1/4	2-1/2	TC87747	28.40	TC87807	35.50
	5/16	.126	.060	.030	5/16	2-1/2	TC87748	35.50	TC87808	44.10
	3/8	.158	.060	.030	3/8	2-1/2	TC87750	43.95	TC87810	54.25
	1/2	.210	.080	.040	1/2	3	TC87753	73.15	TC87813	87.15
100°	1/8	.052	.020	.008	1/8	1-1/2	TC87756	16.00	TC87816	14.57
	3/16	.066	.030	.013	3/16	2-1/2	TC87757	22.20	TC87817	28.25
	1/4	.086	.044	.019	1/4	2-1/2	TC87759	28.40	TC87819	35.50
	5/16	.106	.060	.025	5/16	2-1/2			TC87820	44.10
	3/8	.132	.060	.025	3/8	2-1/2	TC87762	43.95	TC87822	54.25
	1/2	.176	.080	.034	1/2	3	TC87765	73.15	TC87825	87.15
120°	1/8	.030	.020	.006	1/8	1-1/2	TC87768	11.57	TC87828	20.15
	3/16	.045	.030	.009	3/16	2-1/2	TC87770	22.20	TC87829	28.25
	1/4	.059	.044	.013	1/4	2-1/2	TC87771	28.40	TC87831	35.50
	5/16	.073	.060	.017	5/16	2-1/2	TC87772	35.50	TC87832	44.10
	3/8	.091	.060	.017	3/8	2-1/2	TC87774	43.95	TC87834	53.65
	1/2	.121	.080	.023	1/2	3	TC87777	73.15	TC87837	87.15

For technical information, see page 178

CHAMFER MILLS

4 Flute - Flat Tip - Double-Ended



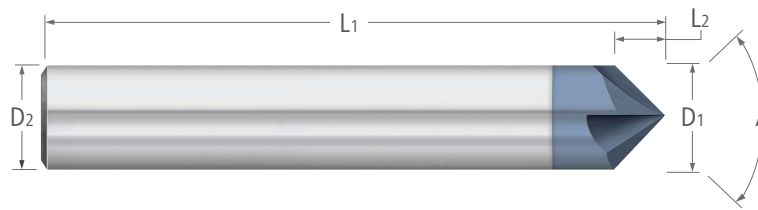
- Flat tip (non-cutting) design for increased strength in chamfering and profiling applications
- Fully stocked in 60°, 82°, 90°, 100°, and 120° styles
- Double-ended
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	CUTTER DIA.	LENGTH OF CUT	TIP DIA.	THEORETICAL TIP LENGTH	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A	D ₁	L ₂	D ₃	L ₃	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	1/8	.091	.020	.017	1/8	2	TC88020	20.77	TC88110	34.30
	3/16	.137	.030	.026	3/16	2-1/2	TC88023	39.60	TC88113	47.30
	1/4	.178	.044	.038	1/4	2-1/2	TC88026	50.90	TC88116	60.30
	5/16	.219	.060	.052	5/16	2-1/2	TC88029	46.97	TC88119	73.90
	3/8	.273	.060	.052	3/8	2-1/2	TC88032	79.55	TC88122	94.30
	1/2	.364	.080	.069	1/2	3	TC88035	130.95	TC88125	156.15
82°	1/8	.060	.020	.012	1/8	2	TC88038	20.77	TC88128	34.30
	3/16	.091	.030	.017	3/16	2-1/2	TC88041	28.47	TC88131	47.25
	1/4	.119	.044	.025	1/4	2-1/2	TC88044	50.75	TC88134	60.30
	5/16	.145	.060	.035	5/16	2-1/2	TC88047	46.97	TC88137	73.90
	3/8	.181	.060	.035	3/8	2-1/2	TC88050	79.55	TC88140	94.30
	1/2	.242	.080	.046	1/2	3	TC88053	130.95	TC88143	156.15
90°	1/8	.053	.020	.010	1/8	2	TC88056	28.85	TC88146	34.30
	3/16	.079	.030	.015	3/16	2-1/2	TC88059	39.60	TC88149	47.30
	1/4	.103	.044	.022	1/4	2-1/2	TC88062	50.90	TC88152	60.30
	5/16	.126	.060	.030	5/16	2-1/2	TC88065	64.85	TC88155	77.25
	3/8	.158	.060	.030	3/8	2-1/2	TC88068	79.55	TC88158	94.30
	1/2	.210	.080	.040	1/2	3	TC88071	130.95	TC88161	156.15
100°	1/8	.052	.020	.008	1/8	2	TC88074	28.85	TC88164	34.30
	3/16	.066	.030	.013	3/16	2-1/2	TC88077	28.47	TC88167	47.25
	1/4	.086	.044	.019	1/4	2-1/2	TC88080	50.90	TC88170	60.30
	5/16	.106	.060	.025	5/16	2-1/2	TC88083	46.97	TC88173	53.57
	3/8	.132	.060	.025	3/8	2-1/2	TC88086	79.55	TC88176	94.30
	1/2	.176	.080	.034	1/2	3	TC88089	130.95	TC88179	156.15
120°	1/8	.030	.020	.006	1/8	2	TC88092	20.77	TC88182	34.30
	3/16	.045	.030	.009	3/16	2-1/2	TC88095	39.60	TC88185	47.30
	1/4	.059	.044	.013	1/4	2-1/2	TC88098	50.90	TC88188	60.30
	5/16	.073	.060	.017	5/16	2-1/2	TC88101	46.97	TC88191	73.90
	3/8	.091	.060	.017	3/8	2-1/2	TC88104	79.55	TC88194	94.30
	1/2	.121	.080	.023	1/2	3	TC88107	130.95	TC88197	156.15

For technical information, see page 178

CHAMFER MILLS

4 Flute - Pointed Tip

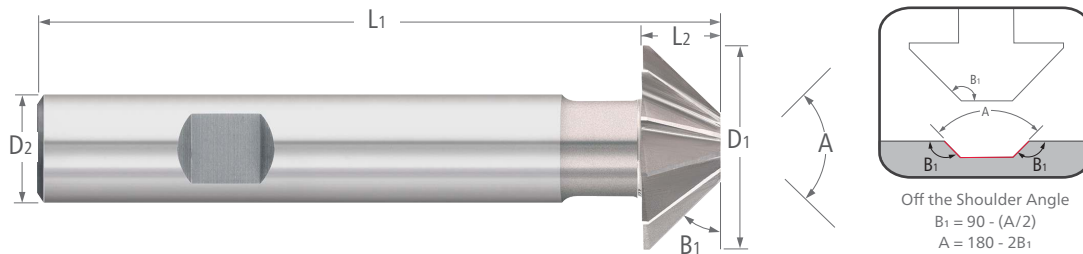


- Pointed tip geometry for general purpose chamfering and deburring application in narrow grooves, slots, and small holes
- Fully stocked in 60° and 90° styles
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	CUTTER DIA.	LENGTH OF CUT	TIP DIA.	SHANK DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
A	D ₁	L ₂	D ₃	D ₂ (h6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
60°	1/4	.216	.010	1/4	2-1/2	TC95418	28.10	TC95436	35.40
	3/8	.325	.010	3/8	2-1/2	TC95420	43.95	TC95438	54.25
	1/2	.433	.010	1/2	3	TC95421	72.90	TC95439	86.90
90°	1/8	.063	.010	1/8	1-1/2	TC95422	16.00	TC95440	21.05
	1/4	.125	.010	1/4	2-1/2	TC95424	28.10	TC95442	35.40
	3/8	.188	.010	3/8	2-1/2	TC95426	43.95	TC95444	54.25
	1/2	.250	.010	1/2	3	TC95427	72.90	TC95445	86.90

CHAMFER MILLS

Reduced Shank - Flat Tip - High Speed Steel



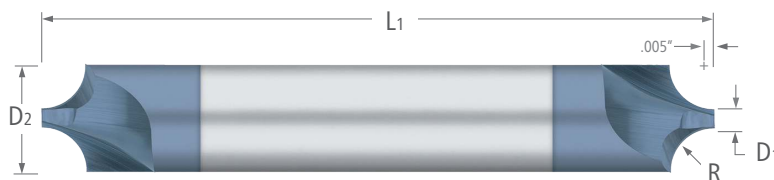
- Flat tip (non-cutting) design for increased strength in chamfering and profiling applications
- Fully stocked in 60° & 90° included styles
- Reduced shank design for use with larger diameter cutters in standard collets and toolholders
- Weldon Flat
- High speed steel
- Precision manufactured in the USA

INCLUDED ANGLE	WALL PART ANGLE	CUTTING DIA.	CUTTER WIDTH	SHANK DIA	FLUTES	OVERALL LENGTH	UNCOATED	
A	B ₁	D ₁	L ₂	D ₂ (h6)		L ₁	TOOL #	USD\$
60°	60°	1/2	7/32	3/8	8	2-1/8	KS91918	88.95
	60°	3/4	5/16	3/8	8	2-1/8	KS91920	104.15
	60°	1	7/16	1/2	10	2-1/2	KS91922	128.85
	60°	1-1/2	5/8	3/4	12	2-3/4	KS91924	164.05
90°	45°	1/2	1/8	3/8	8	2-1/8	KS91910	88.95
	45°	3/4	3/16	3/8	8	2-1/8	KS91912	104.15
	45°	1	5/16	1/2	10	2-1/2	KS91914	128.85
	45°	1-1/2	1/2	3/4	12	2-3/4	KS91916	164.05

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CORNER ROUNDING END MILLS

2 Flute - Unflared - Double-Ended - Carbide

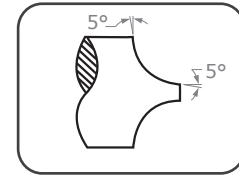
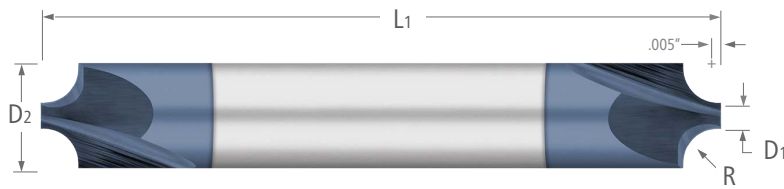


- Unflared shoulder and pilot for full radius form
- Axial depth of cut = radius plus .005"
- Solid carbide
- Double-ended
- End cutting
- Precision manufactured in the USA

RADIUS	PILOT DIA.	SHANK DIA.	OAL	UNCOATED		AITiN COATED	
R $\begin{smallmatrix} +.0005" \\ -.0005" \end{smallmatrix}$	D1	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.005	.047	1/8	1-1/2	TC95370	39.85	TC95390	47.40
.010	.047	1/8	1-1/2	TC95371	39.10	TC95391	46.65
.015	.047	1/8	1-1/2	TC95372	39.10	TC95392	46.65
.020	.047	1/8	1-1/2	TC95373	39.10	TC95393	46.65
.025	.047	1/8	1-1/2	TC95374	39.10	TC95394	46.65
.030	.047	1/8	1-1/2	TC95375	39.85	TC95395	47.40
.031	.047	1/8	1-1/2	TC95376	39.10	TC95396	46.65
.039	.047	1/8	1-1/2	TC95377	44.15	TC95397	51.65
.047	.047	3/16	2	TC95378	51.70	TC95398	60.20
.050	.047	3/16	2	TC95379	51.70	TC95399	60.20
.060	.047	3/16	2	TC95380	53.40	TC95400	61.90
.062	.047	3/16	2	TC95381	52.55	TC95401	61.00
.078	.047	1/4	2	TC95382	60.40	TC95402	70.60
.093	.047	1/4	2	TC95383	61.35	TC95403	71.55
.100	.047	1/4	2	TC95384	60.40	TC95404	70.60
.118	.060	5/16	2-1/2	TC95385	85.25	TC95405	98.25
.125	.060	5/16	2-1/2	TC95386	85.25	TC95406	98.25
.156	.060	3/8	2-1/2	TC95387	105.80	TC95407	121.30
.187	.060	7/16	2-1/2	TC95388	179.25	TC95408	197.30
.250	.110	5/8	3-1/2	TC95389	319.10	TC95409	345.25

CORNER ROUNDING END MILLS

2 Flute - Flared - Double-Ended - Carbide



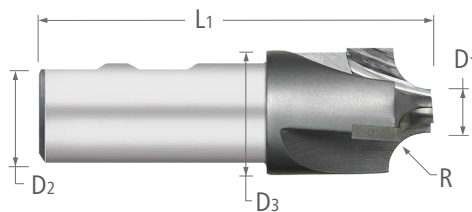
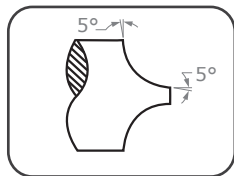
- Flared profile offers precision rounding with controlled cutting depth for finished edges
- Double-ended
- Axial depth of cut = radius plus .005"
- End cutting
- Solid carbide
- Precision manufactured in the USA

RADIUS	PILOT DIA.	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
R $\begin{smallmatrix} +.0005" \\ -.0005" \end{smallmatrix}$	D1	D2 (h6)	L1	TOOL #	USD\$	TOOL #	USD\$
.005	.046	1/8	1-1/2	TC46500	38.15	TC46600	45.60
.010	.046	1/8	1-1/2	TC46501	38.15	TC46601	45.60
.015	.046	1/8	1-1/2	TC46502	38.15	TC46602	45.60
.020	.046	1/8	1-1/2	TC46503	38.15	TC46603	45.60
.025	.046	1/8	1-1/2	TC46504	38.15	TC46604	45.60
.030	.046	1/8	1-1/2	TC46505	38.15	TC46605	45.60
.031	.046	1/8	1-1/2	TC46506	38.15	TC46606	45.60
.039	.046	1/8	1-1/2	TC46507	38.15	TC46607	45.60
.047	.046	3/16	2	TC46508	48.50	TC46608	57.00
.050	.046	3/16	2	TC46509	48.50	TC46609	57.00
.060	.046	3/16	2	TC46510	48.50	TC46610	57.00
.062	.046	3/16	2	TC46511	48.50	TC46611	57.00
.078	.046	1/4	2	TC46512	55.65	TC46612	65.90
.093	.045	1/4	2	TC46513	55.65	TC46613	65.90
.100	.045	1/4	2	TC46514	55.65	TC46614	65.90
.118	.058	5/16	2-1/2	TC46515	85.25	TC46615	98.25
.125	.058	5/16	2-1/2	TC46516	85.25	TC46616	98.25
.156	.058	3/8	2-1/2	TC46517	102.30	TC46617	117.70
.187	.058	7/16	2-1/2	TC46518	154.35	TC46618	172.35
.250	.107	5/8	3-1/2	TC46519	243.00	TC46619	269.15

For technical information, see page 179

CORNER ROUNDING END MILLS

3 Flute - Flared - Carbide Tipped

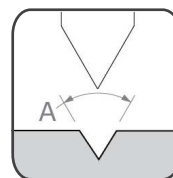


- Carbide tipped – cutting of radius and flares only
- 5° flares tangent to radius at pilot and shoulder to avoid steps
- 3 flutes
- Weldon flats
- Precision manufactured in the USA

RADIUS	PILOT DIA.	HEAD DIA.	SHANK DIA.	OAL	UNCOATED	
R	D ₁	D ₃	D ₂	L ₁	TOOL #	USD\$
.250	13/32	1	3/4	3-1/4	TC95410	258.40
.312	13/32	1-1/8	7/8	3-1/2	TC95411	264.90
.375	13/32	1-1/4	7/8	3-3/4	TC95412	274.55
.437	13/32	1-3/8	1	4	TC95413	308.05
.500	13/32	1-1/2	1	4	TC95414	341.15
.625	21/32	2	1-1/4	4-1/4	TC95415	424.20

ENGRAVING CUTTERS

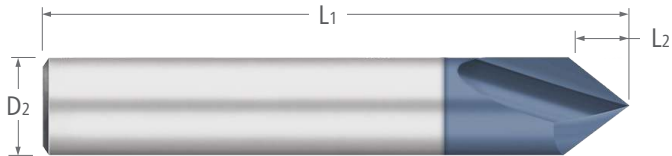
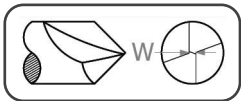
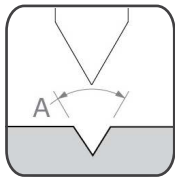
Pointed



- Pointed Tip Ideal for detailed and intricate engraving work
- Suitable for engraving on a variety of materials including metals, plastics, and wood
- Compatible with most engraving machines
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	LENGTH OF CUT	SHANK DIA.	OAL	AlTiN COATED	
$A \begin{smallmatrix} +1^\circ \\ -1^\circ \end{smallmatrix}$	L2	D2 (h6)	L1	TOOL #	USD\$
60°	.108	1/8	1-1/2	TC82210	24.05
	.162	3/16	2	TC82213	29.85
	.216	1/4	2-1/2	TC82216	31.45
90°	.062	1/8	1-1/2	TC82219	24.05
	.093	3/16	2	TC82222	29.85
	.125	1/4	2-1/2	TC82225	37.80

ENGRAVING CUTTERS
Marking

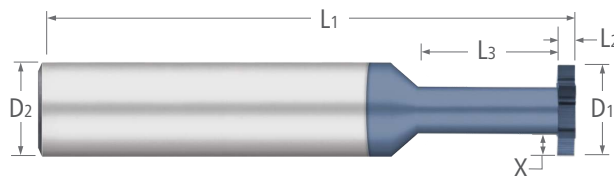


- Designed for milling clear part numbers in challenging materials
- Burr-free, 2-flute cutting design offers enhanced strength compared to single-point engravers
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	WEB THICKNESS	LENGTH OF CUT	SHANK DIA.	OAL	AlTiN COATED	
A ^{+1°} _{-1°}	W	L ₂	D ₂ (h6)	L ₁	TOOL #	USD\$
60°	.005	.104	1/8	1-1/2	TC82064	28.40
	.005	.212	1/4	2-1/2	TC82070	48.10
90°	.005	.062	1/8	1-1/2	TC82072	28.40
	.005	.093	3/16	2	TC82075	34.40
	.005	.125	1/4	2-1/2	TC82079	48.10

KEYSEAT CUTTERS

Square - Carbide



- Square tooth profile produces precision grooves, slots, and keyways with sharp edges
- Both sides of cutter are dished for clearance
- Solid carbide
- Precision manufactured in the USA

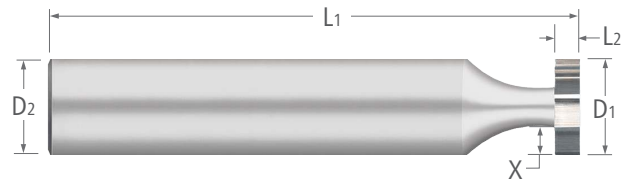
CUTTER DIA.	CUTTER WIDTH		NECK DIA.	NECK LENGTH	RADIAL DOC*	FLUTES	SHANK DIA.	OAL	AlTiN COATED	
D1 ^{+0.000"} _{-.002"}	L2 ^{+0.0005"} _{-.0005"}	size		L3 ^{+0.020"} _{-.000"}	X		D2	L1	TOOL #	USD\$
1/8	.031	(1/32)	1/16	3/16	.022	6	1/8	1-1/2	TC43900	52.15
	.062	(1/16)	1/16	3/16	.022	6	1/8	1-1/2	TC43902	52.15
5/32	.062	(1/16)	5/64	1/4	.029	6	3/16	2	TC43904	52.15
3/16	.015	(1/64)	3/32	9/32	.037	6	3/16	2	TC43906	52.15
	.031	(1/32)	3/32	9/32	.037	6	3/16	2	TC43908	52.15
	.062	(1/16)	3/32	9/32	.037	6	3/16	2	TC43910	52.15
	.078	(5/64)	3/32	9/32	.037	6	3/16	2	TC43912	52.15
	.093	(3/32)	3/32	9/32	.037	6	3/16	2	TC43914	52.15
	.125	(1/8)	3/32	9/32	.037	6	3/16	2	TC43916	52.15
1/4	.031	(1/32)	1/8	3/8	.053	6	1/4	2-1/2	TC43918	60.30
	.047	(3/64)	1/8	3/8	.053	6	1/4	2-1/2	TC43920	60.30
	.062	(1/16)	1/8	3/8	.053	6	1/4	2-1/2	TC43922	60.30
	.078	(5/64)	1/8	3/8	.053	6	1/4	2-1/2	TC43924	60.30
	.093	(3/32)	1/8	3/8	.053	6	1/4	2-1/2	TC43926	60.30
	.125	(1/8)	1/8	3/8	.053	6	1/4	2-1/2	TC43928	60.30
5/16	.062	(1/16)	5/32	1/2	.068	6	5/16	2-1/2	TC43930	78.85
	.078	(5/64)	5/32	1/2	.068	6	5/16	2-1/2	TC43932	78.85
	.093	(3/32)	5/32	1/2	.068	6	5/16	2-1/2	TC43934	78.85
	.156	(5/32)	5/32	1/2	.068	6	5/16	2-1/2	TC43936	78.85
3/8	.031	(1/32)	3/16	9/16	.084	8	3/8	2-1/2	TC43938	88.55
	.047	(3/64)	3/16	9/16	.084	8	3/8	2-1/2	TC43940	88.55
	.062	(1/16)	3/16	9/16	.084	8	3/8	2-1/2	TC43942	88.55
	.078	(5/64)	3/16	9/16	.084	8	3/8	2-1/2	TC43944	88.55
	.093	(3/32)	3/16	9/16	.084	8	3/8	2-1/2	TC43946	88.55
	.125	(1/8)	3/16	9/16	.084	8	3/8	2-1/2	TC43948	88.55
	.187	(3/16)	3/16	9/16	.084	8	3/8	2-1/2	TC43950	88.55
1/2	.047	(3/64)	1/4	3/4	.115	8	1/2	3	TC43952	94.95
	.062	(1/16)	1/4	3/4	.115	8	1/2	3	TC43954	94.95
	.078	(5/64)	1/4	3/4	.115	8	1/2	3	TC43956	94.95
	.093	(3/32)	1/4	3/4	.115	8	1/2	3	TC43958	94.95
	.125	(1/8)	1/4	3/4	.115	8	1/2	3	TC43960	94.95
	.187	(3/16)	1/4	3/4	.115	8	1/2	3	TC43962	94.95
	.250	(1/4)	1/4	3/4	.115	8	1/2	3	TC43964	94.95
	.312	(5/16)	1/4	3/4	.115	8	1/2	3	TC43966	94.95

*Radial DOC accounts for max transition radius at neck

For technical information, see page 181

KEYSEAT CUTTERS

Woodruff - Straight Tooth - High Speed Steel



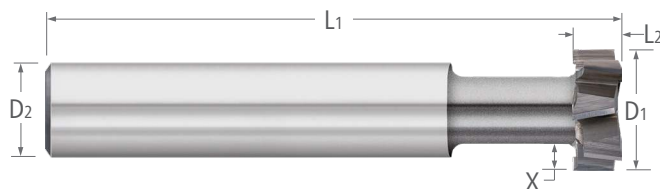
- Straight tooth design promotes smooth, efficient cutting with minimal tool deflection
- Woodruff profile ensures accurate fit and reliable performance for precise keyways
- High speed steel
- Precision manufactured in the USA

AMERICAN STANDARD	CUTTER DIA.	CUTTER WIDTH	RADIAL DOC	FLUTES	SHANK DIA.	OAL	UNCOATED	
	$D_1^{+.010^{\circ}}_{-.015^{\circ}}$	$L_2^{+.0000^{\circ}}_{-.0005^{\circ}}$	X		$D_2^{+.0000^{\circ}}_{-.0005^{\circ}}$	L1	TOOL #	USD\$
202	1/4	1/16	.0750	8	1/2	2-1/16	KS13902	38.15
202 1/2	5/16	1/16	.1063	8	1/2	2-1/16	KS13904	38.15
302 1/2	5/16	3/32	.1063	8	1/2	2-3/32	KS13906	38.15
203	3/8	1/16	.1375	8	1/2	2-1/16	KS13908	38.15
303	3/8	3/32	.1375	8	1/2	2-3/32	KS13910	38.15
403	3/8	1/8	.1275	8	1/2	2-1/8	KS13912	38.15
204	1/2	1/16	.1900	10	1/2	2-1/16	KS13914	38.15
304	1/2	3/32	.1750	10	1/2	2-3/32	KS13916	38.15
404	1/2	1/8	.1595	10	1/2	2-1/8	KS13918	38.15
406	3/4	1/8	.2685	10	1/2	2-1/8	KS13920	40.15
606	3/4	3/16	.2405	10	1/2	2-3/16	KS13922	40.15
806	3/4	1/4	.2405	10	1/2	2-1/4	KS13924	40.15
	$D_1^{+.012^{\circ}}_{-.017^{\circ}}$	$L_2^{+.0000^{\circ}}_{-.0005^{\circ}}$	X		$D_2^{+.0000^{\circ}}_{-.0005^{\circ}}$	L1	TOOL #	USD\$
608	1	3/16	.3665	12	1/2	2-3/16	KS13926	48.10
808	1	1/4	.3350	12	1/2	2-1/4	KS13928	48.50
1008	1	5/16	.3055	12	1/2	2-5/16	KS13930	64.25
1208	1	3/8	.3055	12	1/2	2-3/8	KS13932	49.85
	$D_1^{+.015^{\circ}}_{-.020^{\circ}}$	$L_2^{+.0000^{\circ}}_{-.0005^{\circ}}$	X		$D_2^{+.0000^{\circ}}_{-.0005^{\circ}}$	L1	TOOL #	USD\$
610	1-1/4	3/16	.4765	14	1/2	2-3/16	KS13934	60.30
810	1-1/4	1/4	.4550	14	1/2	2-1/4	KS13936	62.15
1010	1-1/4	5/16	.4150	14	1/2	2-5/16	KS13938	64.65
1210	1-1/4	3/8	.3990	14	1/2	2-3/8	KS13940	64.65
1012	1-1/2	5/16	.5240	16	1/2	2-5/16	KS13942	74.80
1212	1-1/2	3/8	.5240	16	1/2	2-3/8	KS13944	77.15

For technical information, see page 182

KEYSEAT CUTTERS

T-Slot Cutters - High Speed Steel



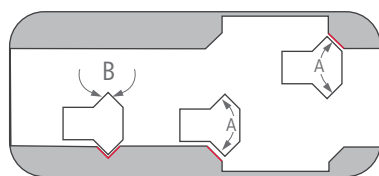
- T-slot cutter profile produces precision T-shaped slots for secure mechanical retention
- Staggered tooth design with alternating RH / LH shear flutes, RH cut
- Undercutting geometry provides clearance beneath slot openings
- Design improves shearing action and finish while minimizing chip dragging and recutting and decrease vibration
- High speed steel
- Precision manufactured in the USA

CUTTER DIA.	CUTTER WIDTH	RADIAL DOC	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.000" \\ -.010" \end{smallmatrix}$	$L_2 \begin{smallmatrix} +.000" \\ -.005" \end{smallmatrix}$	X		D_2	L_1	TOOL #	USD\$
9/16	15/64	.1484	8	1/2	2-19/32	KS92500	121.30
21/32	17/64	.1641	8	1/2	2-11/16	KS92501	129.80
25/32	21/64	.1875	8	3/4	3-1/4	KS92502	189.60
31/32	25/64	.2188	8	3/4	3-7/16	KS92503	214.20
1	3/32	.2500	8	3/4	3-1/8	KS92504	211.00
	1/8	.2500	8	3/4	3-1/8	KS92505	215.35
	5/32	.2500	8	3/4	3-3/16	KS92506	217.05
	3/16	.2500	8	3/4	3-3/16	KS92507	222.25
	1/4	.2500	8	3/4	3-1/4	KS92508	221.60
	5/16	.2500	8	3/4	3-5/16	KS92509	223.15
	3/8	.2500	8	3/4	3-3/8	KS92510	228.60
	1/2	.2500	8	3/4	3-1/2	KS92511	228.20
1-1/4	31/64	.2969	8	1	3-15/16	KS92512	290.85
1-15/32	5/8	.3438	8	1	4-7/16	KS92513	343.75
1-1/2	3/32	.3750	8	1	4-1/8	KS92514	315.00
	1/8	.3750	8	1	4-1/8	KS92515	312.00
	5/32	.3750	8	1	4-3/16	KS92516	314.20
	3/16	.3750	8	1	4-3/16	KS92517	315.50
	1/4	.3750	8	1	4-1/4	KS92518	328.10
	5/16	.3750	8	1	4-5/16	KS92519	329.75
	3/8	.3750	8	1	4-3/8	KS92520	347.60
	1/2	.3750	8	1	4-1/2	KS92521	345.80

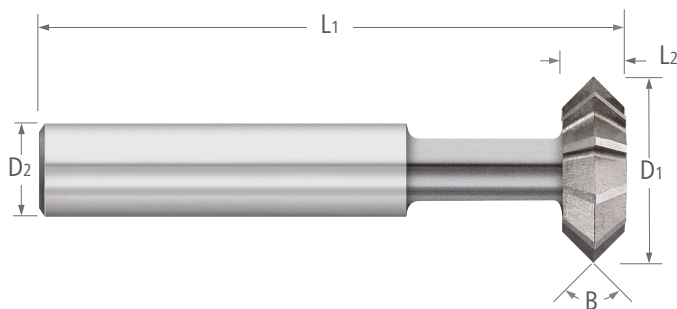
For technical information, see page 182

DOUBLE ANGLE SHANK CUTTERS

High Speed Steel



Included Angle
 $B = 180 - A$



- Double angle cutter geometry produces accurate features for slotting and undercutting applications
- Offered in 60° and 90° included angle options
- Shank-type design for use in standard milling toolholders and collets
- High speed steel
- Precision manufactured in the USA

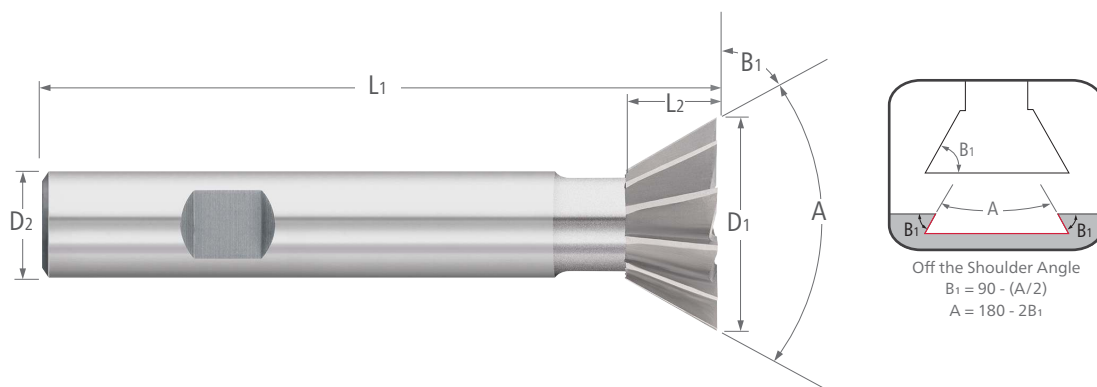
	INCLUDED ANGLE	CUTTER DIA.	CUTTER WIDTH	TEETH	SHANK DIA.	OAL	UNCOATED	
	B	$D_1 \begin{smallmatrix} +.015'' \\ -.015'' \end{smallmatrix}$	$L_2 \begin{smallmatrix} +.015'' \\ -.015'' \end{smallmatrix}$		$D_2 \begin{smallmatrix} +.0001'' \\ -.0005'' \end{smallmatrix}$	L_1	TOOL #	USD\$
NEW	60°	3/4	3/16	10	3/8	2-3/8	KS91600	64.80
NEW		1	5/16	12	1/2	2-27/32	KS91602	103.95
NEW		1-3/8	7/16	14	5/8	3-7/32	KS91604	137.95
NEW		1-1/2	1/2	14	5/8	3-3/8	KS91606	180.15
NEW		1-7/8	5/8	16	3/4	3-25/32	KS91608	209.85
NEW		2-1/4	1/2	16	3/4	3-1/8	KS91612	245.90
NEW		2-1/4	3/4	18	7/8	4-5/32	KS91610	304.45
NEW	90°	3/4	1/4	10	3/8	2-7/16	KS91614	64.80
NEW		1	3/8	12	1/2	2-29/32	KS91616	103.95
NEW		1-3/8	1/2	14	5/8	3-9/32	KS91618	137.95
NEW		1-1/2	9/16	14	5/8	3-7/16	KS91620	180.15
NEW		1-7/8	5/8	16	3/4	3-25/32	KS91622	209.85
NEW		2-1/4	1/2	16	3/4	3-1/8	KS91626	245.90
NEW		2-1/4	3/4	18	7/8	4-5/32	KS91624	304.45

Double Angle Shank Cutters

For technical information, see page 183

DOVETAIL CUTTERS

High Speed Steel



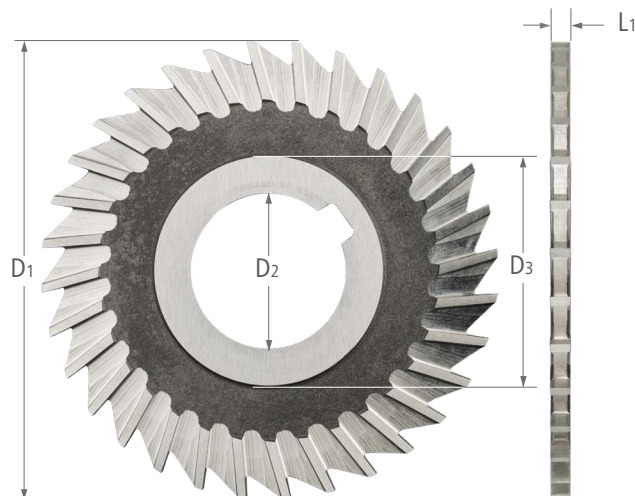
- Single angle cutter geometry produces accurate features for slotting and undercutting applications
- Offered with sharp corners
- Offered in 60° and 90° included angle options
- Shank-type design for use in standard milling toolholders and collets
- High speed steel
- Precision manufactured in the USA

INCLUDED ANGLE	PART WALL ANGLE	CUTTER DIA.	CUTTER WIDTH	TEETH	SHANK DIA.	OVERALL LENGTH	UNCOATED	
A	B ₁	D ₁ ^{+0.015"} _{-0.015"}	L ₂ ^{+0.015"} _{-0.015"}		D ₂ ^{+0.0001"} _{-0.0005"}	L ₁	TOOL #	USD\$
60°	60°	3/8	3/16	8	3/8	2-1/8	KS91886	72.50
	60°	1/2	7/32	8	3/8	2-1/8	KS91888	72.50
	60°	3/4	5/16	8	3/8	2-1/8	KS91890	71.50
	60°	1	7/16	10	1/2	2-1/2	KS91892	88.50
	60°	1-3/8	9/16	12	5/8	2-7/8	KS91894	128.50
	60°	1-7/8	13/16	12	7/8	3-1/4	KS91896	279.50
	60°	2-1/4	1-1/16	12	1	3-3/4	KS91898	333.50
	60°	2-1/2	1-1/8	12	1	3-3/4	KS91900	394.50
90°	45°	3/8	1/8	6	3/8	2-1/8	KS91870	70.50
	45°	1/2	1/8	8	3/8	2-1/8	KS91872	70.50
	45°	3/4	3/16	8	3/8	2-1/8	KS91874	76.50
	45°	1	1/4	10	1/2	2-1/2	KS91876	81.50
	45°	1-3/8	3/8	10	5/8	2-7/8	KS91878	119.50
	45°	1-7/8	1/2	12	7/8	3-1/4	KS91880	279.50
	45°	2-1/4	11/16	12	1	3-3/4	KS91882	299.50
	45°	2-1/2	3/4	12	1	3-3/4	KS91884	394.50

For technical information, see page 183

SIDE MILLING CUTTERS

High Speed Steel - Square - Straight Tooth



- Straight tooth cutter geometry delivers stable cutting action for slotting and side milling operations
- Square profile produces accurate slot widths and flat-bottom features
- High speed steel
- Precision manufactured in the USA

	CUTTER DIAMETER	CUTTER WIDTH	ARBOR HOLE DIAMETER	MAX DEPTH OF CUT	TEETH	HUB DIAMETER	WIDTH OF HUB	UNCOATED	
	$D_1 \begin{smallmatrix} +.015" \\ -.015" \end{smallmatrix}$	$L_1 \begin{smallmatrix} +.002" \\ -.001" \end{smallmatrix}$	$D_2 \begin{smallmatrix} +.00075" \\ -.00000" \end{smallmatrix}$			D_3		TOOL #	USD\$
NEW	3	.0625	1	.7188	32	1-1/2	1/16	KS48000	124.00
NEW	3	.0938	1	.7188	32	1-1/2	3/32	KS48004	124.00
NEW	3	.1250	1	.7188	32	1-1/2	1/8	KS48008	124.00
NEW	4	.0625	1	1.2188	36	1-1/2	1/16	KS48012	164.00
NEW	4	.0938	1	1.2188	36	1-1/2	3/32	KS48016	164.00
NEW	4	.1250	1	1.2188	36	1-1/2	1/8	KS48020	164.00

Side Milling Cutters

For technical information, see page 184

MILLING
Arbors - Straight Shank



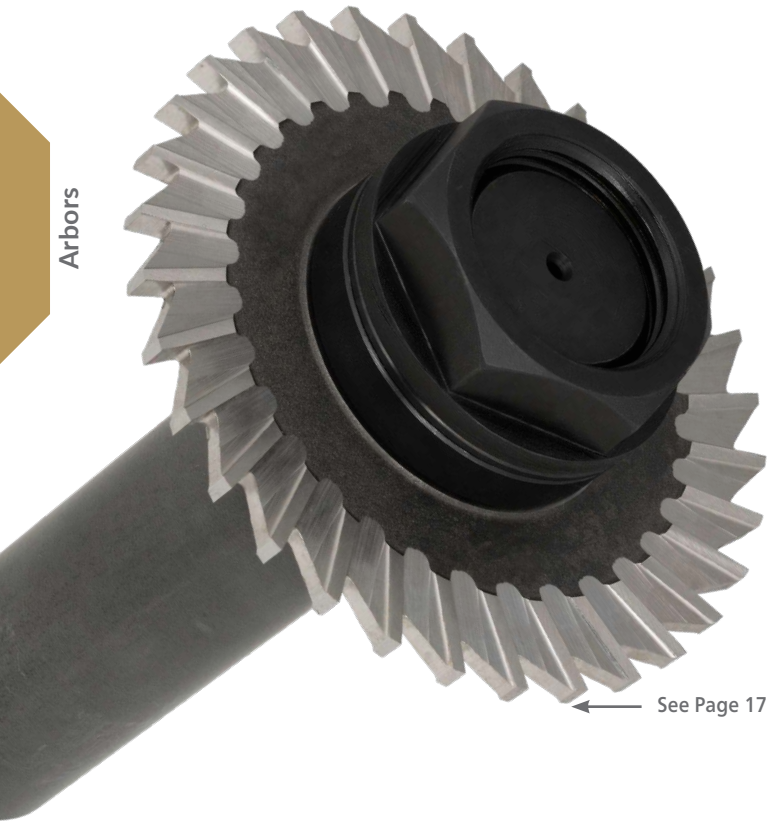
- Straight shank allows for chucking at multiple depths
- Spacers included with arbor are .0625, .1875, & .250
- Key included
- Hardened alloy steel, precision ground, black oxide coated
- Precision manufactured in the USA

ARBOR DIAMETER	ARBOR LENGTH	SHANK DIA	SHANK LENGTH	HUB DIAMETER	NUT DIAMETER	NUT LENGTH	BLACK OXIDE COATED	
D ₁	L ₁	D ₂	L ₂ *	D ₃	D ₄	L ₄	TOOL #	USD\$
1.000	1/2	1.000	3-1/2	1.480	1.480	.440	KS99990	595.00

*Shank Length is inclusive of flange length

NEW

Arbors



See Page 175 For Side Milling Cutters

DRILL / END MILLS - CARBIDE

Technical Information

Drill / End Mills											
Material Guide		Rc	SFM				Suggested Chip Load Per Tooth				
			2 Flute		3 & 4 Flute						
			Stub, Std	Long, X-Long	Stub, Std	Long, X-Long	1/32" - 1/8"	1/8" - 1/4"	1/4" - 1/2"	1/2" - 1"	1" - 1 - 1/4"
COBALT BASE ALLOYS	Stellite, HS-21, Haynes 25/188, X-40, L-605	under 32 over 32			175 - 225 125 - 175	140 - 180 100 - 140	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
NICKEL BASE ALLOYS	Inconel-625/718, Waspalloy, Rene, Hastelloy	under 32 over 32			125 - 175 70 - 115	100 - 140 55 - 95	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
IRON BASE ALLOYS	Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3	under 32 over 32			175 - 225 125 - 175	140 - 180 100 - 140	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
MONEL	Monel-65% Nickel		175 - 300	125 - 175	175 - 300	140 - 240	.0007 - .0015	.0010 - .0025	.0015 - .0040	.0030 - .0050	.0040 - .0060
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		200 - 300	125 - 250	200 - 300	160 - 240	.0007 - .0015	.0010 - .0025	.0015 - .0040	.0030 - .0050	.0040 - .0060
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17-4	under 32 over 32			150 - 250 125 - 175	120 - 200 100 - 140	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	under 32 over 32			200 - 250 150 - 200	160 - 200 120 - 160	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	under 32 over 32			150 - 250 125 - 175	120 - 200 100 - 140	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, O1	under 32 over 32			150 - 225 60 - 125	120 - 180 50 - 100	.0005 - .0010 .0003 - .0005	.0008 - .0020 .0005 - .0015	.0010 - .0030 .0010 - .0020	.0020 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040
MEDIUM ALLOY STEELS	200, 250, 300	under 32 over 32			200 - 250 125 - 175	160 - 200 100 - 140	.0007 - .0015 .0005 - .0010	.0010 - .0025 .0008 - .0020	.0015 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040	.0040 - .0060 .0030 - .0050
CARBON STEELS	1000's, 1100's, 1300's	under 32 over 32			200 - 250 125 - 175	160 - 200 100 - 140	.0007 - .0015 .0005 - .0010	.0010 - .0025 .0008 - .0020	.0015 - .0040 .0010 - .0030	.0030 - .0050 .0020 - .0040	.0040 - .0060 .0030 - .0050
DUCTILE	Ductile Cast Irons		200 - 300	125 - 200	200 - 300	160 - 240	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0030 - .0080
CAST IRONS	Gray Cast Irons		225 - 325	175 - 250	250 - 350	200 - 280	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0050 - .0100
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded		300 - 500	300 - 500	300 - 500	240 - 400	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0030 - .0150
MAGNESIUM			300 - 500	300 - 500	300 - 500	240 - 400	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0050 - .0100
COPPER, COPPER ALLOYS			400 - 500	250 - 350	300 - 400	240 - 320	.0007 - .0015	.0010 - .0025	.0015 - .0035	.0020 - .0080	.0040 - .0100
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		300 - 400	200 - 300	250 - 350	200 - 280	.0007 - .0015	.0010 - .0025	.0015 - .0035	.0020 - .0080	.0040 - .0100
COMPOSITES	G-10 Fiberglass, Graphite, Graphite/ Epoxy, Plastics		250 - 1000	250 - 1000	250 - 1000	200 - 800	.0010 - .0020	.0015 - .0040	.0020 - .0060	.0030 - .0100	.0050 - .0100

These values are a starting point based on an uncoated tool.

For AlTiN Coated tools increase SFM values by up to +40%

CHAMFER MILLS

Technical Information

Chamfer Mills									
Material Guide		Rc	SFM	Feed Per Tooth					
				UP TO 1/8"	1/8" - 3/16"	3/16" - 1/4"	1/4" - 5/16"	5/16" - 3/8"	3/8" - 1/2"
COBALT BASE ALLOYS	Stellite, H5-21, Haynes 25/188, X-40, L-605	< 32	30 - 50	.0004	.0005	.0010	.0010	.0010	.0010
NICKEL BASE ALLOYS	Inconel-625/718, Waspalloy, Rene, Hastelloy	< 32	30 - 50	.0004	.0005	.0010	.0010	.0010	.0010
IRON BASE ALLOYS	Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3	< 32	40 - 65	.0005	.0005	.0010	.0010	.0015	.0020
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		25 - 125	.0005	.0005	.0005	.0005	.0010	.0010
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17-4, AM-350/355	< 32	40 - 125	.0005	.0005	.0010	.0010	.0010	.0020
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 316, 304L, 316L	< 32	50 - 175	.0001	.0002	.0005	.0005	.0010	.0015
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	< 32	50 - 125	.0001	.0002	.0005	.0005	.0005	.0010
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, O1	< 32	25 - 150	.0005	.0005	.0010	.0010	.0010	.0010
MEDIUM ALLOY STEELS	200, 250, 300	< 32	75 - 175	.0005	.0005	.0010	.0010	.0020	.0025
CARBON STEELS	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	< 32	50 - 200	.0005	.0010	.0015	.0015	.0020	.0030
DUCTILE	Ductile Cast Irons		50 - 200	.0005	.0010	.0015	.0015	.0020	.0020
CAST IRONS	Gray Cast Irons		50 - 200	.0005	.0010	.0020	.0020	.0030	.0040
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded		500 - 1000	.0010	.0020	.0020	.0020	.0030	.0040
MAGNESIUM			450 - 650	.0010	.0020	.0020	.0020	.0030	.0040
COPPER, COPPER ALLOYS	Yellow Brass, High Lead Brass, Red Brass		400 - 750	.0010	.0010	.0020	.0020	.0025	.0030
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		400 - 500	.0010	.0010	.0020	.0020	.0025	.0030
PLASTICS	Acrylics, Phenolics		100 - 300	.0010	.0020	.0030	.0030	.0040	.0060
CARBON, GRAPHITES			100 - 200	.0040	.0040	.0060	.0060	.0080	.0100

These values are a starting point based on an uncoated tool.
For AlTiN Coated tools increase SFM values by up to +40%

CORNER ROUNDING END MILLS

Technical Information

Corner Rounding End Mills														
Material Guide		Hardness	SFM	Chip Load (IPT) By Effective Cutter Diameter										
				0.062	0.078	0.093	0.125	0.187	0.25	0.375	0.5	0.625	0.75	1
TITANIUM ALLOYS	Ti 3Al-2.5V, Ti 6Al-4V	29-37 Rc	150	.00016	.00020	.00024	.00032	.00048	.00064	.00096	.00128	.00160	.00192	.00257
		38-45 Rc	75	.00016	.00020	.00024	.00032	.00048	.00064	.00096	.00128	.00160	.00192	.00257
HIGH TEMP ALLOYS	Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	29-37 Rc	70	.00016	.00020	.00024	.00032	.00048	.00064	.00096	.00128	.00160	.00192	.00257
		38-45 Rc	50	.00016	.00020	.00024	.00032	.00048	.00064	.00096	.00128	.00160	.00192	.00257
STAINLESS STEEL	203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	29-37 Rc	450	.00028	.00035	.00042	.00056	.00084	.00112	.00168	.00224	.00281	.00337	.00449
	201, 202, 203, 205, 301, 302, 304, 304L	29-37 Rc	200	.00025	.00032	.00038	.00051	.00077	.00103	.00154	.00205	.00257	.00308	.00410
	314, 316, 316L, 317, 321, 403, 405, 409, 410, 413, 501, 502	38-45 Rc	100	.00025	.00032	.00038	.00051	.00077	.00103	.00154	.00205	.00257	.00308	.00410
	414, 431, 440A, 440B, 440C	29-37 Rc	150	.00016	.00020	.00024	.00032	.00048	.00064	.00096	.00128	.00160	.00192	.00257
	13-8, 15-5, 15-7, 17-4, 17-7	38-45 Rc	90	.00016	.00020	.00024	.00032	.00048	.00064	.00096	.00128	.00160	.00192	.00257
TOOL STEELS	A, L, O, P, W series	29-37 Rc	200	.00025	.00032	.00038	.00051	.00077	.00103	.00154	.00205	.00257	.00308	.00410
		38-45 Rc	100	.00025	.00032	.00038	.00051	.00077	.00103	.00154	.00205	.00257	.00308	.00410
	D, H, M, T, S series	29-37 Rc	150	.00016	.00020	.00024	.00032	.00048	.00064	.00096	.00128	.00160	.00192	.00257
		38-45 Rc	90	.00016	.00020	.00024	.00032	.00048	.00064	.00096	.00128	.00160	.00192	.00257
CARBON STEELS	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	29-37 Rc		.00028	.00035	.00042	.00056	.00084	.00112	.00168	.00224	.00281	.00337	.00449
	1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xxx, 3xxx, 4xxx & 4Lxx, 5xxx & 5Lxx, 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx & 52Lxxx		200	.00025	.00032	.00038	.00051	.00077	.00103	.00154	.00205	.00257	.00308	.00410
ALUMINUM ALLOYS	Casting (2xx, 5xx, 7xx, 8xx)	≤ 28 Rc	750	.00058	.00073	.00087	.00118	.00176	.00235	.00353	.00470	.00588	.00705	.00941
	Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	≤ 28 Rc	1000											
ALUMINUM ALLOYS (CASTINGS)	Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	≤ 28 Rc	750											
	Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)		700											
	Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)		650											
	Casting - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)		475											
ALUMINUM ALLOYS (WROUGHT)	Wrought - 5%-8% Si (4xxx)	≤ 28 Rc	1000											
	Wrought - 8%-12% Si (4xxx)		800											
MAGNESIUM ALLOYS		≤ 28 Rc	1500	.00052	.00065	.00078	.00105	.00156	.00209	.00314	.00418	.00523	.00627	.00836
ZINC ALLOYS			800											
COPPER ALLOYS	High Coppers - 90%+ (C1xxxx)	≤ 28 Rc	225											
BRASS	Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx)		500											
PHOSPHOR BRONZES	Phosphor Bronzes (Copper Tin alloys, C5xxxx)		225											
SILICON BRONZES	Silicon Bronzes (Copper Silicon alloys, C64700-C66100)		500											
COPPER NICKELS, NICKEL SILVERS	Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)		225											
CAST COPPER ALLOYS	(C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)		550											

MILLING PROCESS	HARDNESS	ADOC	RDOC
Non-Ferrous Corner Rounding	n/a	100%	2 Passes at Full Depth
Ferrous Corner Rounding	< 37 HRC	100%	3 Passes at Full Depth
	> 37 HRC	100%	4 Passes at Full Depth

All posted speed and feed parameters are suggested starting values that may be increased given optimal setup conditions. Chip loads reflect uncoated cutters and may be increased 10%-20% if coated. For ferrous materials with hardness ≤ 28 Rc, chip loads can be increased 10%-20%.

ENGRAVING CUTTERS

Technical Information

Engraving Cutters									
Material Guide		HRC	RPM	Engraving Cutters Pointed			Engraving Cutters Marking		
				Chip Load (IPT)			Chip Load (IPT)		
				60°	90°	Axial DOC	60°	90°	Axial DOC
NICKEL BASE ALLOYS	Inconel-625/718, Waspalloy, Rene, Hastelloy		6000+	.00048	.00530	< .010	.00045	.00049	< .010
IRON BASE ALLOYS	Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3		6000+	.00048	.00530	< .010	.00045	.00049	< .010
MONEL	Monel-65% Nickel		6000+	.00048	.00530	< .010	.00045	.00049	< .010
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si	< 32 32 < 45	6000+	.00060 .00030	.00066 .00033	< .010	.00056 .00028	.00062 .00031	< .010
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17-4, AM-350/355	< 32 32 < 45	6000+	.00060 .00030	.00066 .00034	< .010	.00056 .00028	.00062 .00031	< .010
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 316, 304L, 316L	< 32 32 < 45	6000+	.00060 .00030	.00066 .00035	< .010	.00056 .00028	.00062 .00031	< .010
STAINLESS STEEL (MARTENSITIC)	403,410,416,440	< 32 32 < 45	6000+	.00060 .00030	.00066 .00036	< .010	.00056 .00028	.00062 .00031	< .010
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	< 29 30 < 39 40 < 45	6000+	.00072 .00054 .00030	.00079 .00059 .00033	< .010	.00068 .00052 .00028	.00075 .00057 .00031	< .010
MEDIUM ALLOY STEELS	200,250,300	< 29 30 < 39 40 < 45	6000+	.00072 .00054 .00030	.00079 .00059 .00033	< .010	.00068 .00052 .00028	.00075 .00057 .00031	< .010
CARBON STEELS	1000's, 1100's, 1300's	< 29 30 < 39 40 < 45	6000+	.00072 .00054 .00030	.00079 .00059 .00033	< .010	.00068 .00052 .00028	.00075 .00057 .00031	< .010
DUCTILE	Ductile Cast Irons		6000+	.00060	.00066	< .010	.00056	.00062	< .010
CAST IRONS	Gray Cast Irons	< 30 30+	6000+	.0012 .00048	.00132 .00053	< .010	.00112 .00045	.00123 .00049	< .010
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded		6000+	.00120	.00132	< .010	.00112	.00123	< .010
COPPER, COPPER ALLOYS			6000+	.00120	.00132	< .010	.00112	.00123	< .010
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		6000+	.00120	.00132	< .010	.00112	.00123	< .010
PLASTICS	ACRYLICS, PHENOLICS		6000+	.00180	.00198	< .010	-	-	-
CARBON, GRAPHITES			6000+	.00180	.00198	< .010	-	-	-

All posted speed and feed parameters are suggested starting values that may be increased given optimal setup conditions (minimal runout is required for best results).

Suggested speed is 6000 rpm or more. Choose an rpm value that creates the least amount of internal machine vibration. In many cases, a speed increaser is helpful.

Posted chip loads reflect axial depths of cut up to .009. For depths of cut = .010"-.015", reduce posted chip loads by 20%. For depths of cut = .016"-.020", reduce posted chip loads by 30%.

Posted chip loads reflect uncoated cutters. Coating is better suited to prolong tool life rather than decrease cycle time.

Posted chip loads reflect HORIZONTAL milling conditions. For VERTICAL plunge milling to depth, reduce posted chip loads by 50% (ramping is preferred to maintain tip integrity).

KEYSEAT CUTTERS - CARBIDE

Technical Information

Keyseat Cutters - Carbide																	
Material Guide		Machinability	Hardness	SFM	Chip Load (IPT) By Effective Cutter Diameter												
					1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
COBALT BASE ALLOYS	Stellite, HS-21, Haynes 25/188, X-40, L-605	Difficult	29-37 38-45	70 50	.0008 .0007	.00010 .00009	.00012 .00010	.00016 .00014	.00024 .00021	.00032 .00028	.00039 .00035	.00047 .00042	.00055 .00049	.00063 .00056	.00079 .00070	.00095 .00084	.00126 .00111
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	Difficult	29-37 38-45	70 50	.0008 .0007	.00010 .00009	.00012 .00010	.00016 .00014	.00024 .00021	.00032 .00028	.00039 .00035	.00047 .00042	.00055 .00049	.00063 .00056	.00079 .00070	.00095 .00084	.00126 .00111
IRON BASE ALLOYS	Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3	Difficult	29-37 38-45	70 50	.0008 .0007	.00010 .00009	.00012 .00010	.00016 .00014	.00024 .00021	.00032 .00028	.00039 .00035	.00047 .00042	.00055 .00049	.00063 .00056	.00079 .00070	.00095 .00084	.00126 .00111
MONEL	Monel - 65% Nickel	Difficult	29-37 38-45	70 50	.0008 .0007	.00010 .00009	.00012 .00010	.00016 .00014	.00024 .00021	.00032 .00028	.00039 .00035	.00047 .00042	.00055 .00049	.00063 .00056	.00079 .00070	.00095 .00084	.00126 .00111
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, STM 1/2/3, 6AL-25N-4Zr-2Mo-Si	Difficult	29-37 38-45	150 75	.0008 .0007	.00010 .00009	.00012 .00010	.00016 .00014	.00024 .00021	.00032 .00028	.00039 .00035	.00047 .00042	.00055 .00049	.00063 .00056	.00079 .00070	.00095 .00084	.00126 .00111
STAINLESS STEEL (PH)	13/8, 15/5, 17-4	Difficult	29-37 38-45	150 90	.0008 .0007	.00010 .00009	.00012 .00010	.00016 .00014	.00024 .00021	.00032 .00028	.00039 .00035	.00047 .00042	.00055 .00049	.00063 .00056	.00079 .00070	.00095 .00084	.00126 .00111
STAINLESS STEEL (AUSTENITIC)	303, 303Se	Free-Machining	29-37	450	.00014	.00017	.00021	.00028	.00041	.00055	.00069	.00083	.00097	.00110	.00138	.00166	.00221
	304, 304L, 316, 316L, 200 Series	Difficult	29-37 38-45	200 100	.00013 .00011	.00016 .00014	.00019 .00017	.00025 .00022	.00038 .00033	.00050 .00045	.00063 .00056	.00076 .00067	.00088 .00078	.00100 .00089	.00126 .00111	.00151 .00134	.00200 .00178
STAINLESS STEEL (MARTENSITIC)	416	Free-Machining	29-37	450	.00014	.00017	.00021	.00028	.00041	.00055	.00069	.00083	.00097	.00110	.00138	.00166	.00221
	403, 410, 440	Difficult	29-37 38-45	200 100	.00013 .00011	.00016 .00014	.00019 .00017	.00025 .00022	.00038 .00033	.00050 .00045	.00063 .00056	.00076 .00067	.00088 .00078	.00100 .00089	.00126 .00111	.00151 .00134	.00200 .00178
HIGH STRENGTH TOOL STEELS	4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	Difficult	29-37 38-45	100-200 90-150	.00013 .00011	.00016 .00014	.00019 .00017	.00025 .00022	.00038 .00033	.00050 .00045	.00063 .00056	.00076 .00067	.00088 .00078	.00100 .00089	.00126 .00111	.00151 .00134	.00200 .00178
MEDIUM ALLOY STEELS	4140, 8620, 52100	Moderate	29-37	200	.00013	.00016	.00019	.00025	.00038	.00050	.00063	.00076	.00088	.00100	.00126	.00015	.00200
CARBON STEELS	1018, 1045, 1117, 1215, 1300 Series	Free-Machining	29-37	600	.00014	.00017	.00021	.00028	.00041	.00055	.00069	.00083	.00097	.00110	.00138	.00166	.00221
DUCTILE	Ductile Cast Irons	Moderate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAST IRONS	Gray Cast Irons	Moderate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALUMINUM	2014, 2024, 6061 - (T1 - T6), 7075, Die Cast, Extruded	Free-Machining	≤ 28	475-1000	.00037 .00038	.00042 .00047	.00051 .00056	.00068 .00076	.00102 .00113	.00136 .00151	.00170 .00189	.00204 .00227	.00238 .00265	.00272 .00303	.00340 .00408	.00408 .00454	.00545 .00605
MAGNESIUM	AZ31B, AZ61A, AZ91D, AM60	Free-Machining	≤ 28	1500	.00038	.00047	.00056	.00076	.00113	.00151	.00189	.00227	.00265	.00303	.00378	.00454	.00605
COPPER, COPPER ALLOYS	C101 (Oxygen-Free Copper), C110 (Electrolytic Tough-Pitch Copper)	Free-Machining	≤ 28	225-550	.00030	.00038	.00045	.00061	.00091	.00121	.00151	.00182	.00212	.00242	.00303	.00363	.00484
BRASS, BRONZE	Brass, C260 (Cartridge Brass), Alum/Bronze, Low Silicon Bronze	Free-Machining	≤ 28	225-550	.00030	.00038	.00045	.00061	.00091	.00121	.00151	.00182	.00212	.00242	.00303	.00363	.00484
COMPOSITES	G-10 Fiberglass, Graphite, Graphite/Epoxy, Plastics	Moderate/Difficult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

KEYSEAT CUTTERS - HIGH SPEED STEEL

Technical Information

Keyseat Cutters - Woodruff - Straight Tooth - High Speed Steel											
Material Guide		Machinability	HRc	SFM	Effective Cutter Diameter						
					≤ 1/16"	1/16"-1/8"	1/8"-1/4"	1/4"-3/8"	3/8"-1/2"	1/2"-3/4"	3/4"-1"
					Inch Per Tooth						
COBALT BASE ALLOYS	Stellite, HS-21, Haynes 25/188, X-40, L-605	Difficult	≤28	20-50	.0002-.0005	.0003-.0007	.0004-.0010	.0005-.0011	.0006-.0011	.0007-.0011	.0007-.0013
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	Difficult	≤28	20-50	.0002-.0005	.0003-.0007	.0004-.0010	.0005-.0011	.0006-.0011	.0007-.0011	.0007-.0013
IRON BASE ALLOYS	Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3	Difficult	≤28	20-50	.0002-.0005	.0003-.0007	.0004-.0010	.0005-.0011	.0006-.0011	.0007-.0011	.0007-.0013
MONEL	Monel - 65% Nickel	Difficult	-	-	-	-	-	-	-	-	-
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, STM 1/2/3, 6AL-25N-4Zr-2Mo-Si	Difficult	≤28	30-65	.0002-.0007	.0003-.0009	.0004-.0010	.0005-.0011	.0006-.0012	.0007-.0012	.0007-.0016
STAINLESS STEEL (PH)	13/8, 15/5, 17-4	Difficult	≤28	30-75	.0003-.0008	.0003-.0009	.0004-.0012	.0005-.0014	.0006-.0016	.0009-.0018	.0010-.0020
STAINLESS STEEL (AUSTENTIC)	303, 303Se	Free-Machining	≤28	50-100	.0002-.0009	.0003-.0009	.0004-.0012	.0005-.0014	.0006-.0016	.0009-.0018	.0010-.0022
	304, 304L, 316, 316L, 200 Series	Difficult	≤28	30-75	.0003-.0008	.0003-.0009	.0004-.0012	.0005-.0014	.0006-.0016	.0009-.0018	.0010-.0020
STAINLESS STEEL (MARTENSITIC)	416	Free-Machining	≤28	50-100	.0002-.0009	.0003-.0009	.0004-.0012	.0005-.0014	.0006-.0016	.0009-.0018	.0010-.0022
	403, 410, 440	Difficult	≤28	30-75	.0003-.0008	.0003-.0009	.0004-.0012	.0005-.0014	.0006-.0016	.0009-.0018	.0010-.0020
HIGH STRENGTH TOOL STEELS	4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	Difficult	≤55	30-65	.0002-.0009	.0003-.0009	.0004-.0012	.0005-.0014	.0007-.0016	.0009-.0018	.0010-.0025
MEDIUM ALLOY STEELS	4140, 8620, 52100	Moderate	≤40	60-150	.0003-.0009	.0003-.0009	.0004-.0011	.0005-.0012	.0006-.0013	.0009-.0015	.0010-.0030
CARBON STEELS	1018, 1045, 1117, 1215, 1300 Series	Free-Machining	≤28	80-200	.0003-.0009	.0003-.0009	.0004-.0011	.0005-.0012	.0006-.0013	.0009-.0015	.0010-.0030
DUCTILE	Ductile Cast Irons	Moderate	≤26	50-120	.0003-.0009	.0003-.0009	.0004-.0011	.0005-.0012	.0006-.0013	.0009-.0015	.0010-.0030
CAST IRONS	Gray Cast Irons	Moderate	≤19	60-180	.0002-.0009	.0003-.0010	.0004-.0012	.0005-.0014	.0007-.0016	.0009-.0018	.0010-.0025
ALUMINUM	2014, 2024, 6061 - (T1 - T6), 7075, Die Cast, Extruded	Free-Machining	≤28	70-300	.0003-.0009	.0003-.0011	.0004-.0013	.0005-.0015	.0006-.0017	.0009-.0020	.0010-.0035
MAGNESIUM	AZ31B, AZ61A, AZ91D, AM60	Free-Machining	-	-	-	-	-	-	-	-	-
COPPER, COPPER ALLOYS	C101 (Oxygen-Free Copper), C110 (Electrolytic Tough-Pitch Copper)	Free-Machining	-	70-300	.0003-.0009	.0003-.0011	.0004-.0013	.0005-.0015	.0006-.0017	.0009-.0020	.0010-.0035
BRASS, BRONZE	Brass, C260 (Cartridge Brass), Alum/Bronze, Low Silicon Bronze	Free-Machining	-	70-300	.0003-.0009	.0003-.0011	.0004-.0013	.0005-.0015	.0006-.0017	.0009-.0020	.0010-.0035
COMPOSITES	G-10 Fiberglass, Graphite, Graphite/Epoxy, Plastics	Moderate/ Difficult	-	-	-	-	-	-	-	-	-

MILLING - HIGH SPEED STEEL

Technical Information

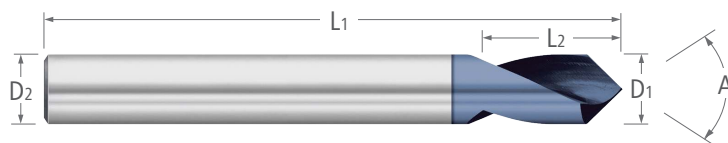
Milling - High Speed Steel									
Material Guide	Type	HRc	SFM	Feed Per tooth					
			30° Helix	1/8"	1/8" - 1/4"	1/4" - 1/2"	1/2" - 1"	1" - 1 3/8"	1-1/2" - 2-1/2"
STAINLESS STEEL (PH)	13/8, 15/5, 17-4	<32	10 - 15	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	<32	15 - 25	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	<32	25 - 35	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	<32	15 - 25	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
MEDIUM ALLOY STEELS	200, 250, 300	<32	35 - 50	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
CARBON STEELS	1000's, 1100's, 1300's		45 - 60	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
DUCTILE	Ductile Cast Irons		25 - 35	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
CAST IRONS	Gray Cast Irons		45 - 60	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
ALUMINUM	2014, 2024, 6061 - (T1 - T6), 7075, Die Cast, Extruded		120 - 300	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
COPPER, COPPER ALLOYS			90 - 150	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		60 - 120	.00015 - .0005	.00015 - .0008	.00015 - .0008	.0005 - .0025	.0008 - .0035	.0025 - .005

SIDE MILLING CUTTERS - HIGH SPEED STEEL

Technical Information

Side Milling Cutters - High Speed Steel				
Material Guide	Type	HRC	SFM	Feed Per tooth
			30° Helix	3"-4"
STAINLESS STEEL (PH)	13/8, 15/5, 17-4	<32	9 - 15	.003 - .006
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	<32	12 - 30	.003 - .006
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	<32	24 - 45	.003 - .006
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, O1	<32	12 - 30	.003 - .006
MEDIUM ALLOY STEELS	200, 250, 300	<32	36 - 60	.003 - .006
CARBON STEELS	1000's, 1100's, 1300's		48 - 75	.003 - .006
DUCTILE	Ductile Cast Irons		24 - 45	.003 - .006
CAST IRONS	Gray Cast Irons		48 - 75	.003 - .006
ALUMINUM	2014, 2024, 6061 - (T1 - T6), 7075, Die Cast, Extruded		120 - 375	.003 - .006
COPPER, COPPER ALLOYS			90 - 187	.003 - .006
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		60 - 150	.003 - .006

SPOT DRILLS - CARBIDE

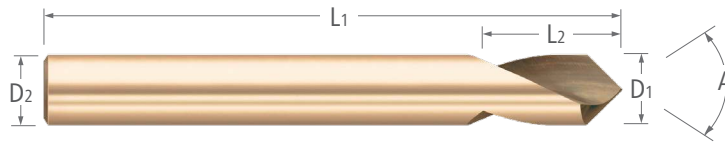


- Optimized for spotting applications to improve drilling accuracy
- 90°, 120°, 142° included angle options
- A point angle equal to or larger than a drill's point angle is recommended for optimal results
- Also effective in chamfering top of drilled holes
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIA.	FLUTE LENGTH	OAL	UNCOATED		AlTiN COATED	
A	D ₁	D ₂ (h6)	L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
90°	1/16	1/8	3/16	1-1/2	TC18702	19.65	TC28702	24.65
	3/32	1/8	9/32	1-1/2	TC18704	21.00	TC28705	26.00
	1/8	1/8	1/4	2	TC18708	22.50	TC28708	27.55
	3/16	3/16	3/8	2	TC18712	26.80	TC28712	32.50
	1/4	1/4	3/8	3	TC18716	32.40	TC28716	39.65
	3/8	3/8	1	3	TC18724	53.35	TC28724	63.65
	1/2	1/2	1	3	TC18732	86.15	TC28732	106.75
	5/8	5/8	1-1/4	3	TC18740	154.15	TC28740	186.75
	3/4	3/4	1-3/4	4	TC18748	206.75	TC28748	245.15
120°	1/16	1/8	3/16	1-1/2	TC18800	19.65	TC28800	24.65
	3/32	1/8	9/32	1-1/2	TC18806	21.00	TC28806	26.00
	1/8	1/8	1/4	2	TC18808	22.50	TC28808	27.35
	3/16	3/16	3/8	2	TC18812	26.80	TC28812	32.50
	1/4	1/4	3/8	3	TC18816	32.40	TC28816	39.65
	3/8	3/8	1	3	TC18824	53.35	TC28824	63.65
	1/2	1/2	1	3	TC18832	86.15	TC28832	106.75
	5/8	5/8	1-1/4	3	TC18840	154.15	TC28840	186.75
	3/4	3/4	1-3/4	4	TC18848	205.80	TC28848	245.15
142°	1/16	1/8	3/16	1-1/2	TC18900	19.65	TC28900	24.65
	3/32	1/8	9/32	1-1/2	TC18906	21.00	TC28906	26.00
	1/8	1/8	1/4	2	TC18908	22.50	TC28908	27.55
	3/16	3/16	3/8	2	TC18912	26.80	TC28912	32.50
	1/4	1/4	3/8	3	TC18916	32.40	TC28916	39.65
	3/8	3/8	1	3	TC18924	53.35	TC28924	63.65
	1/2	1/2	1	3	TC18932	86.15	TC28932	106.75
	5/8	5/8	1-1/4	3	TC18940	154.15	TC28940	186.75
	3/4	3/4	1-3/4	4	TC18948	206.75	TC28948	245.15

For technical information, see page 262

SPOT DRILLS - COBALT



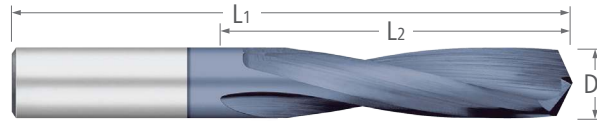
- Optimized for spotting applications to improve drilling accuracy
- 90°, 120°, 142° included angle options
- Gold Oxide finish extends tool life, improves lubricity, and reduces grinding stresses
- M42 Cobalt
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIA.	FLUTE LENGTH	OAL	GOLD OXIDE FINISH	
A	D1	D2 (h6)	L2	L1	TOOL #	USD\$
90°	1/4	1/4	1	2-1/2	TC95452	21.85
	3/8	3/8	1-1/8	3-1/8	TC95453	41.50
	1/2	1/2	1-1/2	3-3/4	TC95454	64.95
	5/8	5/8	1-5/8	4-1/4	TC95455	100.75
	3/4	3/4	1-3/4	5	TC95456	175.45
120°	1/4	1/4	1	2-1/2	TC95458	21.85
	3/8	3/8	1-1/8	3-1/8	TC95459	41.50
	1/2	1/2	1-1/2	3-3/4	TC95460	64.95
	5/8	5/8	1-5/8	4-1/4	TC95461	100.75
	3/4	3/4	1-3/4	5	TC95462	175.45
142°	1/4	1/4	1	2-1/2	TC95484	21.85
	3/8	3/8	1-1/8	3-1/8	TC95485	41.50
	1/2	1/2	1-1/2	3-3/4	TC95486	64.95

For technical information, see page 265

DRILLS - CARBIDE

Stub Length - 135° Split Point



- Stub length for increased rigidity
- 135° split point (diameters < .125" are not split)
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	UNCOATED		AlTiN COATED	
D1 +.0000" -.0005"		L2	L1	TOOL #	USD\$	TOOL #	USD\$
.0313	1/32	3/8	1-1/2	TC20002	13.60	TC29002	17.20
.0400	#60	3/8	1-1/2	TC20260	13.60	TC29260	17.20
.0410	#59	3/8	1-1/2	TC20259	13.60	TC29259	18.60
.0420	#58	3/8	1-1/2	TC20258	13.60	TC29258	17.20
.0430	#57	3/8	1-1/2	TC20257	13.60	TC29257	17.20
.0465	#56	3/8	1-1/2	TC20256	13.60	TC29256	17.20
.0469	3/64	3/8	1-1/2	TC20003	13.60	TC29003	17.20
.0520	#55	13/32	1-1/2	TC20255	13.60	TC29255	17.20
.0550	#54	13/32	1-1/2	TC20254	13.60	TC29254	17.20
.0595	#53	13/32	1-1/2	TC20253	13.60	TC29253	17.20
.0625	1/16	13/32	1-1/2	TC20004	13.10	TC29004	16.30
.0635	#52	7/16	1-1/2	TC20252	13.10	TC29252	16.30
.0670	#51	7/16	1-1/2	TC20251	13.10	TC29251	16.30
.0700	#50	7/16	1-1/2	TC20250	13.45	TC29250	16.85
.0730	#49	7/16	1-1/2	TC20249	13.45	TC29249	16.85
.0760	#48	7/16	1-1/2	TC20248	14.05	TC29248	17.65
.0781	5/64	7/16	1-1/2	TC20005	13.60	TC29005	17.20
.0785	#47	1/2	1-1/2	TC20247	14.05	TC29247	17.65
.0810	#46	1/2	1-1/2	TC20246	14.05	TC29246	17.65
.0820	#45	1/2	1-1/2	TC20245	14.05	TC29245	17.65
.0860	#44	1/2	1-1/2	TC20244	14.45	TC29244	18.20
.0890	#43	1/2	1-1/2	TC20243	15.40	TC29243	19.15
.0935	#42	1/2	1-1/2	TC20242	15.40	TC29242	19.15
.0938	3/32	1/2	1-1/2	TC20006	15.30	TC29006	19.00
.0960	#41	5/8	2	TC20241	15.65	TC29241	19.75
.0980	#40	5/8	2	TC20240	15.65	TC29240	19.75
.0995	#39	5/8	2	TC20239	16.40	TC29239	20.50
.1015	#38	5/8	2	TC20238	16.40	TC29238	20.50
.1040	#37	5/8	2	TC20237	16.55	TC29237	20.80
.1065	#36	5/8	2	TC20236	17.50	TC29236	21.95
.1094	7/64	5/8	2	TC20007	17.25	TC29007	21.60
.1100	#35	3/4	2	TC20235	17.50	TC29235	21.95
.1110	#34	3/4	2	TC20234	17.50	TC29234	21.95
.1130	#33	3/4	2	TC20233	17.60	TC29233	22.30

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For technical information, see page 262

DRILLS - CARBIDE

Stub Length - 135° Split Point (Cont.)

continued from previous page

DRILL DIAMETER		FLUTE LENGTH	OAL	UNCOATED		AlTiN COATED	
dec. equiv.	size			TOOL #	USD\$	TOOL #	USD\$
D1 ^{+0.0000"} _{-0.0005"}		L ₂	L ₁				
.1160	#32	3/4	2	TC20232	17.80	TC29232	22.45
.1200	#31	3/4	2	TC20231	17.80	TC29231	22.45
.1250	1/8	3/4	2	TC20008	18.15	TC29008	22.95
.1285	#30	3/4	2	TC20230	19.20	TC29230	24.10
.1360	#29	3/4	2	TC20229	20.15	TC29229	25.45
.1405	#28	3/4	2	TC20228	20.15	TC29228	25.45
.1406	9/64	3/4	2	TC20009	20.15	TC29009	25.45
.1440	#27	7/8	2	TC20227	21.25	TC29227	26.85
.1470	#26	7/8	2	TC20226	21.25	TC29226	26.85
.1495	#25	7/8	2	TC20225	21.25	TC29225	26.85
.1520	#24	7/8	2	TC20224	22.50	TC29224	28.20
.1540	#23	7/8	2	TC20223	22.70	TC29223	28.30
.1563	5/32	7/8	2	TC20010	22.70	TC29010	28.30
.1570	#22	7/8	2	TC20222	22.70	TC29222	28.30
.1590	#21	7/8	2	TC20221	23.50	TC29221	29.10
.1610	#20	7/8	2	TC20220	23.50	TC29220	29.10
.1660	#19	7/8	2	TC20219	24.70	TC29219	30.40
.1695	#18	7/8	2	TC20218	25.20	TC29218	30.85
.1719	11/64	7/8	2	TC20011	26.75	TC29011	32.40
.1730	#17	7/8	2	TC20217	26.75	TC29217	32.40
.1770	#16	7/8	2	TC20216	28.00	TC29216	33.65
.1800	#15	7/8	2	TC20215	28.00	TC29215	33.65
.1820	#14	7/8	2	TC20214	28.60	TC29214	34.25
.1850	#13	7/8	2	TC20213	29.60	TC29213	35.15
.1875	3/16	7/8	2	TC20012	27.60	TC29012	33.25
.1890	#12	1-1/8	2-1/2	TC20212	30.50	TC29212	37.70
.1910	#11	1-1/8	2-1/2	TC20211	30.50	TC29211	37.70
.1935	#10	1-1/8	2-1/2	TC20210	31.30	TC29210	38.60
.1960	#9	1-1/8	2-1/2	TC20209	31.30	TC29209	38.60
.1990	#8	1-1/8	2-1/2	TC20208	31.30	TC29208	38.60
.2010	#7	1-1/8	2-1/2	TC20207	31.40	TC29207	38.70
.2031	13/64	1-1/8	2-1/2	TC20013	31.75	TC29013	38.95
.2040	#6	1-1/8	2-1/2	TC20206	32.30	TC29206	39.50
.2055	#5	1-1/8	2-1/2	TC20205	32.30	TC29205	39.50
.2090	#4	1-1/8	2-1/2	TC20204	36.35	TC29204	43.60
.2130	#3	1-1/8	2-1/2	TC20203	36.65	TC29203	43.90
.2188	7/32	1-1/8	2-1/2	TC20014	35.25	TC29014	42.50
.2210	#2	1-1/4	2-1/2	TC20202	36.65	TC29202	43.90
.2280	#1	1-1/4	2-1/2	TC20201	36.65	TC29201	43.90
.2340	A	1-1/4	2-1/2	TC20101	40.55	TC29101	47.75
.2344	15/64	1-1/4	2-1/2	TC20015	39.95	TC29015	47.15
.2380	B	1-1/4	2-1/2	TC20102	42.25	TC29102	49.55
.2420	C	1-1/4	2-1/2	TC20103	42.30	TC29103	49.60
.2460	D	1-1/4	2-1/2	TC20104	42.90	TC29104	50.10
.2500	1/4	1-1/4	2-1/2	TC20016	42.25	TC29016	49.55

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For technical information, see page 262

DRILLS - CARBIDE

Stub Length - 135° Split Point (Cont.)

continued from previous page

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	UNCOATED		AlTiN COATED	
D ₁ ^{+0.000"} _{-0.005"}		L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
.2500	E	1-1/4	2-1/2	TC20105	42.00	TC29105	49.25
.2570	F	1-1/4	2-1/2	TC20106	47.00	TC29106	55.65
.2610	G	1-1/4	2-1/2	TC20107	49.55	TC29107	58.20
.2656	17/64	1-1/4	2-1/2	TC20017	47.35	TC29017	55.95
.2660	H	1-1/4	2-1/2	TC20108	50.75	TC29108	59.45
.2720	I	1-1/4	2-1/2	TC20109	51.45	TC29109	60.10
.2770	J	1-1/4	2-1/2	TC20110	52.95	TC29110	61.65
.2810	K	1-1/4	2-1/2	TC20111	53.65	TC29111	62.25
.2813	9/32	1-1/4	2-1/2	TC20018	49.40	TC29018	58.05
.2900	L	1-1/4	2-1/2	TC20112	56.35	TC29112	65.00
.2950	M	1-1/4	2-1/2	TC20113	57.60	TC29113	66.30
.2969	19/64	1-1/4	2-1/2	TC20019	55.25	TC29019	63.95
.3020	N	1-1/4	2-1/2	TC20114	61.35	TC29114	70.00
.3125	5/16	1-1/4	2-1/2	TC20020	58.35	TC29020	67.00
.3160	O	1-3/8	3	TC20115	64.25	TC29115	74.60
.3230	P	1-3/8	3	TC20116	67.20	TC29116	77.50
.3281	21/64	1-3/8	3	TC20021	63.90	TC29021	74.15
.3320	Q	1-3/8	3	TC20117	69.60	TC29117	79.95
.3390	R	1-3/8	3	TC20118	72.15	TC29118	82.50
.3438	11/32	1-3/8	3	TC20022	69.90	TC29022	80.20
.3480	S	1-3/8	3	TC20119	77.00	TC29119	87.30
.3580	T	1-3/8	3	TC20120	79.70	TC29120	90.05
.3594	23/64	1-3/8	3	TC20023	78.05	TC29023	88.35
.3680	U	1-3/8	3	TC20121	84.05	TC29121	94.40
.3750	3/8	1-3/8	3	TC20024	82.90	TC29024	93.25
.3770	V	1-3/8	3	TC20122	92.65	TC29122	104.70
.3860	W	1-3/8	3	TC20123	99.75	TC29123	112.70
.3906	25/64	1-3/8	3	TC20025	96.55	TC29025	108.65
.3970	X	1-3/8	3	TC20124	109.40	TC29124	121.45
.4040	Y	1-3/8	3	TC20125	112.55	TC29125	134.05
.4063	13/32	1-3/8	3	TC20026	106.20	TC29026	125.95
.4130	Z	1-3/8	3	TC20126	121.90	TC29126	134.00
.4219	27/64	1-3/8	3	TC20027	115.55	TC29027	136.95
.4375	7/16	1-3/8	3	TC20028	120.75	TC29028	143.20
.4531	29/64	1-3/8	3	TC20029	140.25	TC29029	166.30
.4688	15/32	1-3/8	3	TC20030	145.40	TC29030	173.25
.4844	31/64	1-3/8	3	TC20031	149.45	TC29031	178.15
.5000	1/2	1-3/8	3	TC20032	149.80	TC29032	178.50

 Drills
 Carbide
 Cobalt
 HSS

For technical information, see page 262

DRILLS - CARBIDE**Jobber Length - 118° Split Point**

- 118° split point jobber drills ideal for general purpose drilling (diameters < .125" are not split)
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

Drills

Carbide

Cobalt

HSS

DRILL DIAMETER			FLUTE LENGTH		OAL		UNCOATED		AlTiN COATED	
dec. equiv.	size	metric								
D1 ^{+0.000"} _{-.0005"}			L2	L1			TOOL #	USD\$	TOOL #	USD\$
.0276		0.7 mm	12 mm	31 mm			TC19307	15.95	TC79307	20.15
.0313	1/32		5/16	1-1/4			TC19002	13.05	TC79002	16.25
.0315		0.8 mm	12 mm	31 mm			TC19308	15.95	TC79308	20.15
.0354		0.9 mm	16 mm	38 mm			TC19309	15.95	TC79309	21.00
.0394		1 mm	16 mm	38 mm			TC19310	15.95	TC79310	20.15
.0400	#60		3/4	1-1/2			TC19260	13.05	TC79260	16.25
.0410	#59		3/4	1-1/2			TC19259	13.05	TC79259	18.00
.0420	#58		3/4	1-1/2			TC19258	13.05	TC79258	16.25
.0430	#57		3/4	1-1/2			TC19257	13.05	TC79257	16.25
.0433		1.1 mm	19 mm	38 mm			TC19311	15.95	TC79311	20.15
.0465	#56		3/4	1-1/2			TC19256	13.05	TC79256	16.25
.0469	3/64		3/4	1-1/2			TC19003	13.05	TC79003	16.25
.0472		1.2 mm	19 mm	38 mm			TC19312	15.95	TC79312	21.00
.0512		1.3 mm	19 mm	38 mm			TC19313	15.95	TC79313	20.15
.0520	#55		3/4	1-1/2			TC19255	13.05	TC79255	16.25
.0550	#54		3/4	1-1/2			TC19254	13.05	TC79254	16.25
.0551		1.4 mm	19 mm	38 mm			TC19314	15.95	TC79314	20.15
.0591		1.5 mm	19 mm	38 mm			TC19315	16.15	TC79315	20.40
.0595	#53		3/4	1-1/2			TC19253	13.05	TC79253	16.25
.0625	1/16		3/4	1-1/2			TC19004	12.15	TC79004	15.35
.0630		1.6 mm	19 mm	38 mm			TC19316	16.15	TC79316	21.10
.0635	#52		3/4	1-1/2			TC19252	12.15	TC79252	15.35
.0669		1.7 mm	19 mm	38 mm			TC19317	16.15	TC79317	20.40
.0670	#51		3/4	1-1/2			TC19251	12.15	TC79251	15.35
.0700	#50		7/8	1-3/4			TC19250	12.75	TC79250	15.85
.0709		1.8 mm	22 mm	38 mm			TC19318	16.15	TC79318	20.40
.0730	#49		7/8	1-3/4			TC19249	12.75	TC79249	15.85
.0748		1.9 mm	22 mm	38 mm			TC19319	16.15	TC79319	20.40
.0760	#48		7/8	1-3/4			TC19248	13.30	TC79248	16.65
.0781	5/64		7/8	1-3/4			TC19005	13.05	TC79005	16.25
.0785	#47		7/8	1-3/4			TC19247	13.30	TC79247	16.65
.0787		2 mm	22 mm	44 mm			TC19320	17.25	TC79320	21.60
.0810	#46		7/8	1-3/4			TC19246	13.30	TC79246	16.65
.0820	#45		7/8	1-3/4			TC19245	13.30	TC79245	16.65
.0827		2.1 mm	22 mm	44 mm			TC19321	17.25	TC79321	21.60
.0860	#44		1	2			TC19244	13.60	TC79244	17.10
.0866		2.2 mm	25 mm	50 mm			TC19322	17.25	TC79322	22.25

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For technical information, see page 262

DRILLS - CARBIDE

Jobber Length - 118° Split Point (Cont.)

continued from previous page

DRILL DIAMETER			FLUTE LENGTH		OAL		UNCOATED		AlTiN COATED	
dec. equiv.	size	metric								
D1 ^{+0.0001"} _{-.0005"}			L2	L1			TOOL #	USD\$	TOOL #	USD\$
.0890	#43		1	2			TC19243	14.30	TC79243	18.05
.0906		2.3 mm	25 mm	50 mm			TC19323	17.25	TC79323	21.60
.0935	#42		1	2			TC19242	14.30	TC79242	18.05
.0938	3/32		1	2			TC19006	14.20	TC79006	17.90
.0945		2.4 mm	25 mm	50 mm			TC19324	17.25	TC79324	21.60
.0960	#41		1	2			TC19241	14.80	TC79241	18.55
.0980	#40		1	2			TC19240	14.80	TC79240	18.55
.0984		2.5 mm	25 mm	50 mm			TC19325	19.80	TC79325	24.85
.0995	#39		1-1/4	2-1/4			TC19239	15.40	TC79239	19.30
.1015	#38		1-1/4	2-1/4			TC19238	15.40	TC79238	19.30
.1024		2.6 mm	32 mm	57 mm			TC19326	19.80	TC79326	25.15
.1040	#37		1-1/4	2-1/4			TC19237	15.60	TC79237	19.65
.1063		2.7 mm	32 mm	57 mm			TC19327	19.75	TC79327	24.85
.1065	#36		1-1/4	2-1/4			TC19236	16.55	TC79236	20.70
.1094	7/64		1-1/4	2-1/4			TC19007	16.15	TC79007	20.40
.1100	#35		1-1/4	2-1/4			TC19235	16.55	TC79235	20.70
.1102		2.8 mm	32 mm	57 mm			TC19328	19.80	TC79328	25.15
.1110	#34		1-1/4	2-1/4			TC19234	16.55	TC79234	20.70
.1130	#33		1-1/4	2-1/4			TC19233	16.65	TC79233	21.00
.1142		2.9 mm	32 mm	57 mm			TC19329	19.80	TC79329	24.85
.1160	#32		1-1/4	2-1/4			TC19232	16.75	TC79232	21.20
.1181		3 mm	32 mm	57 mm			TC19330	22.20	TC79330	27.55
.1200	#31		1-1/4	2-1/4			TC19231	16.75	TC79231	21.20
.1220		3.1 mm	32 mm	57 mm			TC19331	22.20	TC79331	27.55
.1250	1/8		1-1/4	2-1/4			TC19008	17.35	TC79008	21.65
.1260		3.2 mm	32 mm	57 mm			TC19332	22.20	TC79332	27.80
.1285	#30		1-1/4	2-1/4			TC19230	18.05	TC79230	22.70
.1299		3.3 mm	32 mm	57 mm			TC19333	22.20	TC79333	27.80
.1339		3.4 mm	35 mm	63 mm			TC19334	24.05	TC79334	30.20
.1360	#29		1-3/8	2-1/2			TC19229	19.10	TC79229	23.95
.1378		3.5 mm	35 mm	63 mm			TC19335	24.05	TC79335	30.20
.1405	#28		1-3/8	2-1/2			TC19228	19.10	TC79228	23.15
.1406	9/64		1-3/8	2-1/2			TC19009	19.10	TC79009	23.95
.1440	#27		1-3/8	2-1/2			TC19227	20.00	TC79227	25.25
.1470	#26		1-3/8	2-1/2			TC19226	20.00	TC79226	25.25
.1495	#25		1-3/8	2-1/2			TC19225	20.00	TC79225	25.25
.1520	#24		1-3/8	2-1/2			TC19224	21.15	TC79224	26.75
.1540	#23		1-3/8	2-1/2			TC19223	21.20	TC79223	27.00
.1563	5/32		1-3/8	2-1/2			TC19010	21.20	TC79010	27.00
.1570	#22		1-3/8	2-1/2			TC19222	21.20	TC79222	27.00
.1575		4 mm	35 mm	63 mm			TC19340	29.55	TC79340	35.70
.1590	#21		1-3/8	2-1/2			TC19221	22.25	TC79221	28.00
.1610	#20		1-3/8	2-1/2			TC19220	22.25	TC79220	28.00
.1660	#19		1-5/8	2-3/4			TC19219	23.15	TC79219	29.20
.1695	#18		1-5/8	2-3/4			TC19218	23.60	TC79218	29.90
.1719	11/64		1-5/8	2-3/4			TC19011	25.25	TC79011	31.25

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For technical information, see page 262

DRILLS - CARBIDE

Jobber Length - 118° Split Point (Cont.)

continued from previous page

dec. equiv.	DRILL DIAMETER		FLUTE LENGTH	OAL	UNCOATED		AlTiN COATED	
	size	metric			TOOL #	USD\$	TOOL #	USD\$
D1 $\begin{smallmatrix} +.0000" \\ -.0005" \end{smallmatrix}$			L2	L1				
.1730	#17		1-5/8	2-3/4	TC19217	25.25	TC79217	31.25
.1770	#16		1-5/8	2-3/4	TC19216	26.65	TC79216	32.70
.1772		4.5 mm	41 mm	70 mm	TC19345	31.65	TC79345	37.65
.1800	#15		1-5/8	2-3/4	TC19215	26.65	TC79215	32.70
.1820	#14		1-5/8	2-3/4	TC19214	26.90	TC79214	33.15
.1850	#13		1-5/8	2-3/4	TC19213	27.55	TC79213	33.60
.1875	3/16		1-5/8	2-3/4	TC19012	25.85	TC79012	31.95
.1890	#12		1-5/8	2-3/4	TC19212	28.85	TC79212	36.05
.1910	#11		1-5/8	2-3/4	TC19211	28.85	TC79211	36.05
.1935	#10		1-5/8	2-3/4	TC19210	29.60	TC79210	37.05
.1960	#9		1-3/4	3	TC19209	29.60	TC79209	37.05
.1969		5 mm	44 mm	75 mm	TC19350	35.00	TC79350	42.20
.1990	#8		1-3/4	3	TC19208	29.60	TC79208	37.05
.2010	#7		1-3/4	3	TC19207	29.70	TC79207	36.95
.2031	13/64		1-3/4	3	TC19013	29.90	TC79013	37.15
.2040	#6		1-3/4	3	TC19206	30.45	TC79206	37.25
.2055	#5		1-3/4	3	TC19205	30.45	TC79205	37.65
.2090	#4		1-3/4	3	TC19204	34.15	TC79204	41.40
.2130	#3		1-3/4	3	TC19203	34.30	TC79203	41.55
.2165		5.5 mm	44 mm	75 mm	TC19355	41.20	TC79355	49.15
.2188	7/32		1-3/4	3	TC19014	33.20	TC79014	40.45
.2210	#2		1-3/4	3	TC19202	34.30	TC79202	41.55
.2280	#1		1-3/4	3	TC19201	34.30	TC79201	41.55
.2340	A		2	3-1/4	TC19101	38.15	TC79101	45.90
.2344	15/64		2	3-1/4	TC19015	37.80	TC79015	45.55
.2362		6 mm	50 mm	82 mm	TC19360	43.55	TC79360	52.00
.2380	B		2	3-1/4	TC19102	39.75	TC79102	47.55
.2420	C		2	3-1/4	TC19103	40.05	TC79103	47.80
.2460	D		2	3-1/4	TC19104	40.55	TC79104	48.25
.2500	1/4		2	3-1/4	TC19016	39.75	TC79016	47.55
.2500	E		2	3-1/4	TC19105	39.75	TC79105	47.55
.2559		6.5 mm	50 mm	82 mm	TC19365	69.60	TC79365	82.85
.2570	F		2	3-1/4	TC19106	47.15	TC79106	55.45
.2610	G		2-1/8	3-1/2	TC19107	50.70	TC79107	58.75
.2656	17/64		2-1/8	3-1/2	TC19017	44.65	TC79017	54.35
.2660	H		2-1/8	3-1/2	TC19108	52.35	TC79108	60.10
.2720	I		2-1/8	3-1/2	TC19109	53.05	TC79109	61.10
.2756		7 mm	54 mm	89 mm	TC19370	76.25	TC79370	90.70
.2770	J		2-1/8	3-1/2	TC19110	56.45	TC79110	62.65
.2810	K		2-1/8	3-1/2	TC19111	56.55	TC79111	63.20
.2813	9/32		2-1/8	3-1/2	TC19018	46.35	TC79018	56.05
.2900	L		2-1/8	3-1/2	TC19112	56.75	TC79112	66.10
.2950	M		2-3/8	3-3/4	TC19113	57.15	TC79113	66.40
.2953		7.5 mm	60 mm	95 mm	TC19375	78.60	TC79375	88.35
.2969	19/64		2-3/8	3-3/4	TC19019	52.50	TC79019	61.75
.3020	N		2-3/8	3-3/4	TC19114	62.80	TC79114	72.10

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For technical information, see page 262

DRILLS - CARBIDE

Jobber Length - 118° Split Point (Cont.)

continued from previous page

dec. equiv. D1 ^{+0.0001"} -0.0005"	DRILL DIAMETER		FLUTE LENGTH	OAL	UNCOATED		AlTiN COATED	
	size	metric			TOOL #	USD\$	TOOL #	USD\$
.3125	5/16		2-3/8	3-3/4	TC19020	54.80	TC79020	65.35
.3150		8 mm	60 mm	95 mm	TC19380	83.70	TC79380	99.05
.3160	O		2-3/8	3-3/4	TC19115	66.30	TC79115	76.35
.3230	P		2-3/8	3-3/4	TC19116	68.45	TC79116	79.30
.3281	21/64		2-1/2	4	TC19021	60.25	TC79021	71.25
.3320	Q		2-1/2	4	TC19117	72.80	TC79117	82.25
.3346		8.5 mm	63 mm	100 mm	TC19385	103.35	TC79385	115.95
.3390	R		2-1/2	4	TC19118	74.95	TC79118	86.00
.3438	11/32		2-1/2	4	TC19022	65.40	TC79022	77.90
.3480	S		2-1/2	4	TC19119	80.40	TC79119	91.40
.3543		9 mm	70 mm	100 mm	TC19390	116.65	TC79390	138.90
.3580	T		2-3/4	4-1/4	TC19120	83.45	TC79120	94.70
.3594	23/64		2-3/4	4-1/4	TC19023	73.15	TC79023	87.20
.3680	U		2-3/4	4-1/4	TC19121	87.35	TC79121	97.00
.3740		9.5 mm	70 mm	108 mm	TC19395	96.37	TC79395	105.37
.3750	3/8		2-3/4	4-1/4	TC19024	78.00	TC79024	92.50
.3770	V		2-3/4	4-1/4	TC19122	94.65	TC79122	108.50
.3860	W		2-7/8	4-1/2	TC19123	98.95	TC79123	112.75
.3906	25/64		2-7/8	4-1/2	TC19025	91.30	TC79025	108.25
.3937		10 mm	73 mm	114 mm	TC19400	153.60	TC79400	182.05
.3970	X		2-7/8	4-1/2	TC19124	108.10	TC79124	121.95
.4040	Y		2-7/8	4-1/2	TC19125	112.00	TC79125	125.90
.4063	13/32		2-7/8	4-1/2	TC19026	100.05	TC79026	118.55
.4130	Z		2-7/8	4-1/2	TC19126	139.05	TC79126	144.85
.4134		10.5 mm	73 mm	114 mm	TC19405	123.77	TC79405	184.80
.4219	27/64		2-7/8	4-1/2	TC19027	108.65	TC79027	128.85
.4331		11 mm	73 mm	114 mm	TC19410	203.30	TC79410	217.25
.4375	7/16		2-7/8	4-1/2	TC19028	113.30	TC79028	134.90
.4528		11.5 mm	76 mm	120 mm	TC19415	151.57	TC79415	225.55
.4531	29/64		3	4-3/4	TC19029	132.00	TC79029	156.45
.4688	15/32		3	4-3/4	TC19030	137.65	TC79030	163.05
.4724		12 mm	76 mm	120 mm	TC19420	169.07		
.4844	31/64		3	4-3/4	TC19031	141.35	TC79031	167.65
.5000	1/2		3	4-3/4	TC19032	141.05	TC79032	168.00

Drills
Carbide
Cobalt
HSS

For technical information, see page 262

DRILLS - CARBIDE**Straight Flute - 140° Split Point**

- Straight flute style
- Engineered for excellent performance in high rockwell and difficult to machine materials
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	UNCOATED		AlTiN COATED	
D1 ^{+0.0001"} _{-.0005"}		L2	L1	TOOL #	USD\$	TOOL #	USD\$
.1250	1/8	3/4	2	TC19508	20.00	TC79508	25.05
.1285	#30	3/4	2	TC19730	21.25	TC79730	26.85
.1360	#29	3/4	2	TC19729	21.75	TC79729	27.35
.1405	#28	3/4	2	TC19728	22.20		
.1406	9/64	3/4	2	TC19509	22.95	TC79509	28.55
.1440	#27	7/8	2	TC19727	23.00	TC79727	28.65
.1470	#26	7/8	2	TC19726	23.35	TC79726	28.95
.1495	#25	7/8	2	TC19725	23.60	TC79725	29.25
.1520	#24	7/8	2	TC19724	24.35	TC79724	21.87
.1540	#23	7/8	2	TC19723	18.07	TC79723	30.55
.1563	5/32	7/8	2	TC19510	25.75	TC79510	31.45
.1570	#22	7/8	2	TC19722	26.20	TC79722	31.80
.1590	#21	7/8	2	TC19721	26.65	TC79721	32.30
.1610	#20	7/8	2	TC19720	26.80	TC79720	32.50
.1660	#19	7/8	2	TC19719	19.97	TC79719	33.25
.1695	#18	7/8	2	TC19718	27.85	TC79718	33.45
.1719	11/64	7/8	2	TC19511	28.50	TC79511	34.15
.1730	#17	7/8	2	TC19717	28.95	TC79717	34.60
.1770	#16	7/8	2	TC19716	29.55	TC79716	35.10
.1800	#15	7/8	2	TC19715	29.65	TC79715	35.25
.1820	#14	7/8	2	TC19714	29.85	TC79714	25.67
.1850	#13	7/8	2	TC19713	30.15	TC79713	35.85
.1875	3/16	7/8	2	TC19512	26.50	TC79512	32.10
.1890	#12	1-1/8	2-1/2	TC19712	22.07	TC79712	37.65
.1910	#11	1-1/8	2-1/2	TC19711	31.15	TC79711	38.40
.1935	#10	1-1/8	2-1/2	TC19710	31.80	TC79710	39.00
.1960	#9	1-1/8	2-1/2	TC19709	23.17	TC79709	39.45
.1990	#8	1-1/8	2-1/2	TC19708	23.97	TC79708	29.27
.2010	#7	1-1/8	2-1/2	TC19707	33.90	TC79707	41.05
.2031	13/64	1-1/8	2-1/2	TC19513	34.15	TC79513	41.40
.2040	#6	1-1/8	2-1/2	TC19706	34.95	TC79706	30.77
.2055	#5	1-1/8	2-1/2	TC19705	35.70	TC79705	43.00
.2090	#4	1-1/8	2-1/2	TC19704	35.15		
.2130	#3	1-1/8	2-1/2	TC19703	37.15	TC79703	44.35
.2188	7/32	1-1/8	2-1/2	TC19514	38.60	TC79514	45.85
.2210	#2	1-1/4	2-1/2	TC19702	38.95	TC79702	46.25
.2280	#1	1-1/4	2-1/2	TC19701	39.40	TC79701	46.60

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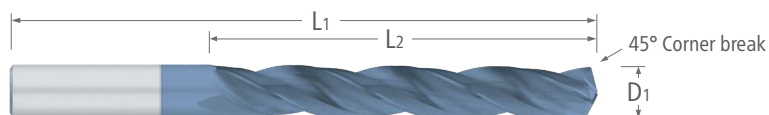
DRILLS - CARBIDE

Straight Flute - 140° Split Point (Cont.)

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DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	UNCOATED		AlTiN COATED	
$D_1^{+0.0000^-0.0005}$		L ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
.2340	A	1-1/4	2-1/2	TC19601	29.17	TC79601	47.75
.2344	15/64	1-1/4	2-1/2	TC19515	40.55	TC79515	47.75
.2380	B	1-1/4	2-1/2	TC19602	40.55	TC79602	47.75
.2420	C	1-1/4	2-1/2	TC19603	29.17		
.2460	D	1-1/4	2-1/2	TC19604	40.55	TC79604	34.67
.2500	1/4	1-1/4	2-1/2	TC19516	38.50	TC79516	45.70
.2500	E	1-1/4	2-1/2	TC19605	38.50	TC79605	45.70
.2570	F	1-1/4	2-1/2	TC19606	53.35	TC79606	62.00
.2610	G	1-1/4	2-1/2	TC19607	53.35	TC79607	62.00
.2656	17/64	1-1/4	2-1/2	TC19517	53.35	TC79517	62.00
.2660	H	1-1/4	2-1/2	TC19608	38.67	TC79608	45.17
.2720	I	1-1/4	2-1/2	TC19609	55.85	TC79609	64.50
.2770	J	1-1/4	2-1/2	TC19610	55.30	TC79610	46.47
.2810	K	1-1/4	2-1/2	TC19611	39.97	TC79611	63.95
.2813	9/32	1-1/4	2-1/2	TC19518	55.85	TC79518	64.50
.2900	L	1-1/4	2-1/2	TC19612	58.60	TC79612	67.30
.2950	M	1-1/4	2-1/2	TC19613	42.37	TC79613	48.87
.2969	19/64	1-1/4	2-1/2	TC19519	58.60	TC79519	67.30
.3020	N	1-1/4	2-1/2	TC19614	43.77	TC79614	69.35
.3125	5/16	1-1/4	2-1/2	TC19520	61.00	TC79520	69.65
.3160	O	1-3/8	3	TC19615	61.00	TC79615	71.35
.3230	P	1-3/8	3	TC19616	47.17	TC79616	75.55
.3281	21/64	1-3/8	3	TC19521	65.50	TC79521	75.85
.3320	Q	1-3/8	3	TC19617	72.40	TC79617	82.70
.3390	R	1-3/8	3	TC19618	72.80	TC79618	60.37
.3438	11/32	1-3/8	3	TC19522	72.80	TC79522	83.15
.3480	S	1-3/8	3	TC19619	57.37	TC79619	89.45
.3580	T	1-3/8	3	TC19620	79.20	TC79620	65.07
.3594	23/64	1-3/8	3	TC19523	79.20	TC79523	89.50
.3680	U	1-3/8	3	TC19621	87.95	TC79621	98.20
.3750	3/8	1-3/8	3	TC19524	78.50	TC79524	88.85
.3770	V	1-3/8	3			TC79622	72.67
.3860	W	1-3/8	3	TC19623	97.20		
.3906	25/64	1-3/8	3	TC19525	97.60	TC79525	106.40
.3970	X	1-3/8	3	TC19624	77.77	TC79624	86.77
.4040	Y	1-3/8	3	TC19625	81.67	TC79625	90.67
.4063	13/32	1-3/8	3	TC19526	93.00	TC79526	105.05
.4130	Z	1-3/8	3	TC19626	85.27	TC79626	94.27
.4219	27/64	1-3/8	3	TC19527	117.85	TC79527	94.27
.4375	7/16	1-3/8	3	TC19528	115.50	TC79528	127.50
.4688	15/32	1-3/8	3	TC19530	127.90	TC79530	141.95
.5000	1/2	1-3/8	3	TC19532	138.50	TC79532	165.10

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DRILLS - CARBIDE**3 Flute - 150° Point**

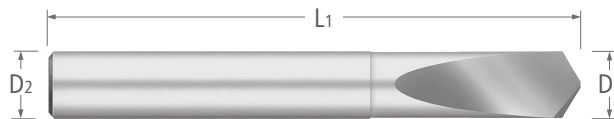
- 150° point angle aids in elimination of exit burs
- 3 flute geometry for simplified exit through angled surfaces
- Advanced drill point technology combines optimized facets, corner breaks, and precision edge preparation to deliver exceptional cutting strength
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

DRILL DIAMETER		FLUTE LENGTH	OAL	UNCOATED		AlTiN COATED	
dec. equiv.	size						
D1 ^{+0.0000"} _{-0.0005"}		L2	L1	TOOL #	USD\$	TOOL #	USD\$
.1250	1/8	1-1/4	2-1/4	TC20275	28.85	TC20375	34.25
.1406	9/64	1-3/8	2-1/2	TC20276	33.40	TC20376	39.45
.1563	5/32	1-3/8	2-1/2	TC20277	32.80	TC20377	38.80
.1719	11/64	1-5/8	2-3/4	TC20278	37.15	TC20378	43.15
.1875	3/16	1-5/8	2-3/4	TC20279	36.20	TC20379	42.20
.2031	13/64	1-3/4	3	TC20280	39.50	TC20380	46.70
.2188	7/32	1-3/4	3	TC20281	46.25	TC20381	53.50
.2344	15/64	2	3-1/4	TC20282	51.60	TC20382	59.35
.2500	1/4	2	3-1/4	TC20283	54.30	TC20383	62.05
.2656	17/64	2-1/8	3-1/2	TC20284	58.05	TC20384	67.30
.2813	9/32	2-1/8	3-1/2	TC20285	70.85	TC20385	80.15
.3125	5/16	2-3/8	3-3/4	TC20287	85.45	TC20387	94.80
.3438	11/32	2-1/2	4	TC20289	98.05	TC20389	109.15
.3750	3/8	2-3/4	4-1/4	TC20291	110.90	TC20391	122.95
.4063	13/32	2-7/8	4-1/2	TC20293	126.20	TC20393	140.10
.4375	7/16	2-7/8	4-1/2	TC20295	137.25	TC20395	151.20
.5000	1/2	3	4-3/4	TC20299	165.30	TC20399	181.45

For technical information, see page 262

DRILLS - CARBIDE

Spade Drill



- Designed for Spotting and Shallow Hole Drilling typically less than 2xD
- Great for both non-ferrous and ferrous hardened materials, including stainless steel up to RC 50
- Solid carbide
- Precision manufactured in the USA

DRILL DIAMETER		WEB THICKNESS	SHANK DIA.	OAL	UNCOATED	
dec. equiv.	size				TOOL #	USD\$
$D1 \begin{smallmatrix} +.0000" \\ -.0005" \end{smallmatrix}$		$W \begin{smallmatrix} +.002" \\ -.002" \end{smallmatrix}$	$D2 \text{ (h6)}$	$L1$		
.0313	1/32	.010	1/32	1-1/4	TC12402	16.55
.0625	1/16	.012	1/16	1-1/2	TC12404	17.05
.0938	3/32	.016	3/32	1-1/2	TC12406	17.60
.1250	1/8	.020	1/8	1-1/2	TC12408	19.25
.1563	5/32	.025	5/32	2	TC12410	21.00
.1875	3/16	.028	3/16	2	TC12412	24.50
.2500	1/4	.035	1/4	2	TC12414	33.10
.3125	5/16	.040	5/16	2-1/2	TC12416	45.70
.3750	3/8	.046	3/8	2-1/2	TC12418	55.05

Drills

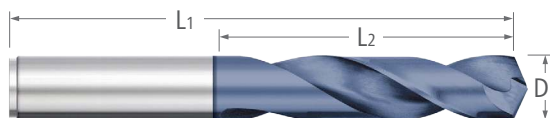
Carbide

Cobalt

HSS

DRILLS - COBALT

Stub Length - 135° Split Point



- Stub length for increased rigidity
- Optimized for drilling stainless steels, nickel-based alloys, and titanium alloys
- 135° split point, type "J" (diameters <.0625" are not split)

- Gold Oxide finish extends tool life, improves lubricity, and reduces grinding stresses
- AlTiN coating offers increased wear and heat resistance
- Commonly referred to as Screw

Machine Drills, constructed from M42 Cobalt (identification ring on shank)

- Precision manufactured in the USA

DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH		AlTiN COATED	
dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
D1			L2	L1					
.0394		1 mm	6 mm	26 mm	12	CD32745	4.60	CD60431	8.05
.0400	#60		1/2	1-3/8	12	CD32660	2.60	CD60360	4.45
.0410	#59		1/2	1-3/8	12	CD32659	2.60	CD60359	4.45
.0420	#58		1/2	1-3/8	12	CD32658	2.60	CD60358	7.65
.0430	#57		1/2	1-3/8	12	CD32657	2.50	CD60357	4.20
.0465	#56		1/2	1-3/8	12	CD32656	2.50	CD60356	4.20
.0520	#55		5/8	1-5/8	12	CD32655	2.50	CD60355	4.20
.0550	#54		5/8	1-5/8	12	CD32654	2.50	CD60354	4.20
.0591		1.5 mm	9 mm	32 mm	12	CD32746	3.60	CD60432	7.05
.0595	#53		5/8	1-5/8	12	CD32653	2.50	CD60353	4.20
.0625	1/16		5/8	1-5/8	12	CD32504	2.10	CD60204	3.65
.0635	#52		11/16	1-11/16	12	CD32652	2.15	CD60352	3.95
.0670	#51		11/16	1-11/16	12	CD32651	2.15	CD60351	3.95
.0700	#50		11/16	1-11/16	12	CD32650	2.15	CD60350	3.95
.0730	#49		11/16	1-11/16	12	CD32649	2.15	CD60349	3.95
.0760	#48		11/16	1-11/16	12	CD32648	2.15	CD60348	3.95
.0781	5/64		11/16	1-11/16	12	CD32505	2.10	CD60205	3.65
.0785	#47		11/16	1-11/16	12	CD32647	2.15	CD60347	3.95
.0787		2 mm	12 mm	38 mm	12	CD32747	2.40	CD60433	5.85
.0810	#46		3/4	1-3/4	12	CD32646	2.15	CD60346	3.95
.0820	#45		3/4	1-3/4	12	CD32645	2.15	CD60345	3.95
.0860	#44		3/4	1-3/4	12	CD32644	2.15	CD60344	3.95
.0890	#43		3/4	1-3/4	12	CD32643	2.15	CD60343	3.95
.0935	#42		3/4	1-3/4	12	CD32642	2.15	CD60342	3.95
.0938	3/32		3/4	1-3/4	12	CD32506	2.10	CD60206	3.65
.0960	#41		13/16	1-13/16	12	CD32641	2.15	CD60341	3.95
.0980	#40		13/16	1-13/16	12	CD32640	2.20	CD60340	3.95
.0984		2.5 mm	14 mm	43 mm	12	CD32748	2.45	CD60434	5.90
.0995	#39		13/16	1-13/16	12	CD32639	2.20	CD60339	3.95
.1015	#38		13/16	1-13/16	12	CD32638	2.20	CD60338	3.95
.1040	#37		13/16	1-13/16	12	CD32637	2.55	CD60337	4.30
.1065	#36		13/16	1-13/16	12	CD32636	2.55	CD60336	4.30
.1094	7/64		13/16	1-13/16	12	CD32507	2.35	CD60207	4.15
.1100	#35		7/8	1-7/8	12	CD32635	2.55	CD60335	4.30
.1110	#34		7/8	1-7/8	12	CD32634	2.55	CD60334	4.30

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For technical information, see page 264 - 265

DRILLS - COBALT

Stub Length - 135° Split Point (Cont.)

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	DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH		AlTiN COATED	
	dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
	D ₁			L ₂	L ₁					
	.1130	#33		7/8	1-7/8	12	CD32633	2.55	CD60333	4.30
	.1160	#32		7/8	1-7/8	12	CD32632	2.60	CD60332	4.45
	.1200	#31		7/8	1-7/8	12	CD32631	2.60	CD60331	4.45
	.1250	1/8		7/8	1-7/8	12	CD32508	2.70	CD60208	4.70
	.1285	#30		15/16	1-15/16	12	CD32630	2.60	CD60330	4.45
	.1360	#29		15/16	1-15/16	12	CD32629	2.70	CD60329	4.70
NEW	.1378		3.5 mm	20 mm	52 mm	12	CD32750	2.95	CD60436	7.10
	.1405	#28		15/16	1-15/16	12	CD32628	2.70	CD60328	4.70
	.1406	9/64		15/16	1-15/16	12	CD32509	2.70	CD60209	4.70
	.1440	#27		1	2-1/16	12	CD32627	2.95	CD60327	5.15
	.1470	#26		1	2-1/16	12	CD32626	2.95	CD60326	5.15
	.1495	#25		1	2-1/16	12	CD32625	2.95	CD60325	5.15
	.1520	#24		1	2-1/16	12	CD32624	3.15	CD60324	5.55
	.1540	#23		1	2-1/16	12	CD32623	3.15	CD60323	5.55
	.1563	5/32		1	2-1/16	12	CD32510	2.95	CD60210	5.15
NEW	.1570	#22		1-1/16	2-1/8	12	CD32622	3.15	CD60322	5.55
	.1575		4 mm	22 mm	55 mm	12	CD32751	3.40	CD60437	7.55
	.1590	#21		1-1/16	2-1/8	12	CD32621	3.15	CD60321	5.55
	.1610	#20		1-1/16	2-1/8	12	CD32620	3.15	CD60320	5.55
	.1660	#19		1-1/16	2-1/8	12	CD32619	3.15	CD60319	5.55
	.1695	#18		1-1/16	2-1/8	12	CD32618	3.35	CD60318	5.85
	.1719	11/64		1-1/16	2-1/8	12	CD32511	3.35	CD60211	5.85
	.1730	#17		1-1/8	2-3/16	12	CD32617	3.80	CD60317	6.90
	.1770	#16		1-1/8	2-3/16	12	CD32616	3.95	CD60316	7.10
NEW	.1772		4.5 mm	24 mm	58 mm	12	CD32752	4.20	CD60438	8.35
	.1800	#15		1-1/8	2-3/16	12	CD32615	3.95	CD60315	7.20
	.1820	#14		1-1/8	2-3/16	12	CD32614	3.95	CD60314	7.20
	.1850	#13		1-1/8	2-3/16	12	CD32613	3.95	CD60313	7.20
	.1875	3/16		1-1/8	2-3/16	12	CD32512	3.80	CD60212	6.90
	.1890	#12		1-3/16	2-1/4	12	CD32612	4.00	CD60312	7.25
	.1910	#11		1-3/16	2-1/4	12	CD32611	4.00	CD60311	7.25
	.1935	#10		1-3/16	2-1/4	12	CD32610	4.25	CD60310	7.50
	.1960	#9		1-3/16	2-1/4	12	CD32609	4.25	CD60309	7.50
NEW	.1969		5 mm	26 mm	62 mm	12	CD32753	4.50	CD60439	9.50
	.1990	#8		1-3/16	2-1/4	12	CD32608	4.25	CD60308	7.50
	.2010	#7		1-3/16	2-1/4	12	CD32607	4.25	CD60307	7.50
	.2031	13/64		1-3/16	2-1/4	12	CD32513	4.45	CD60213	7.85
	.2040	#6		1-1/4	2-3/8	12	CD32606	5.25	CD60306	9.55
	.2055	#5		1-1/4	2-3/8	12	CD32605	5.25	CD60305	9.55
	.2090	#4		1-1/4	2-3/8	12	CD32604	5.25	CD60304	9.55
	.2130	#3		1-1/4	2-3/8	12	CD32603	5.85	CD60303	10.65
NEW	.2165		5.5 mm	28 mm	66 mm	12	CD32754	5.00	CD60440	10.00
	.2188	7/32		1-1/4	2-3/8	12	CD32514	4.75	CD60214	8.70
	.2210	#2		1-5/16	2-7/16	12	CD32602	5.85	CD60302	10.65
	.2280	#1		1-5/16	2-7/16	12	CD32601	5.85	CD60301	10.65

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For technical information, see page 264 - 265

DRILLS - COBALT

Stub Length - 135° Split Point (Cont.)

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DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH		AlTiN COATED	
dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
D ₁			L ₂	L ₁					
.2340	A		1-5/16	2-7/16	12	CD32701	6.10	CD60401	11.10
.2344	15/64		1-5/16	2-7/16	12	CD32515	5.05	CD60215	9.30
.2362		6 mm	28 mm	66 mm	12	CD32755	6.70	CD60441	11.70
.2380	B		1-3/8	2-1/2	12	CD32702	6.45	CD60402	11.65
.2420	C		1-3/8	2-1/2	12	CD32703	6.45	CD60403	11.65
.2460	D		1-3/8	2-1/2	12	CD32704	6.45	CD60404	11.65
.2500	1/4		1-3/8	2-1/2	12	CD32516	5.35	CD60216	9.65
.2500	E		1-3/8	2-1/2	12	CD32705	5.90	CD60405	10.70
.2570	F		1-7/16	2-5/8	6	CD32706	6.80	CD60406	12.40
.2610	G		1-7/16	2-5/8	6	CD32707	6.80	CD60407	12.40
.2656	17/64		1-7/16	2-5/8	6	CD32517	6.00	CD60217	11.10
.2660	H		1-1/2	2-11/16	6	CD32708	7.15	CD60408	13.25
.2720	I		1-1/2	2-11/16	6	CD32709	7.15	CD60409	13.25
.2756		7 mm	34 mm	74 mm	6	CD32757	7.40	CD60443	13.40
.2770	J		1-1/2	2-11/16	6	CD32710	7.15	CD60410	13.25
.2810	K		1-1/2	2-11/16	6	CD32711	7.15	CD60411	13.25
.2813	9/32		1-1/2	2-11/16	6	CD32518	6.55	CD60218	12.00
.2900	L		1-9/16	2-3/4	6	CD32712	8.60	CD60412	14.80
.2950	M		1-9/16	2-3/4	6	CD32713	8.60	CD60413	14.80
.2969	19/64		1-9/16	2-3/4	6	CD32519	7.65	CD60219	13.90
.3020	N		1-5/8	2-13/16	6	CD32714	9.30	CD60414	15.65
.3125	5/16		1-5/8	2-13/16	6	CD32520	8.15	CD60220	14.50
.3150		8 mm	37 mm	79 mm	6	CD32759	10.45	CD60445	18.10
.3160	O		1-11/16	2-15/16	6	CD32715	10.20	CD60415	17.60
.3230	P		1-11/16	2-15/16	6	CD32716	10.20	CD60416	17.60
.3281	21/64		1-11/16	2-15/16	6	CD32521	9.10	CD60221	16.50
.3320	Q		1-11/16	3	6	CD32717	11.15	CD60417	20.15
.3346		8.5 mm	37 mm	79 mm	6	CD32760	11.40	CD60446	19.05
.3390	R		1-11/16	3	6	CD32718	11.15	CD60418	20.15
.3438	11/32		1-11/16	3	6	CD32522	9.75	CD60222	17.15
.3480	S		1-3/4	3-1/16	6	CD32719	13.75	CD60419	25.15
.3543		9 mm	40 mm	84 mm	6	CD32761	14.00	CD60447	21.65
.3580	T		1-3/4	3-1/16	6	CD32720	13.75	CD60420	25.15
.3594	23/64		1-3/4	3-1/16	6	CD32523	11.35	CD60223	19.30
.3680	U		1-13/16	3-1/8	6	CD32721	13.75	CD60421	25.15
.3750	3/8		1-13/16	3-1/8	6	CD32524	11.35	CD60224	19.30
.3770	V		1-7/8	3-1/4	6	CD32722	15.25	CD60422	27.90
.3860	W		1-7/8	3-1/4	6	CD32723	15.25	CD60423	27.90
.3906	25/64		1-7/8	3-1/4	6	CD32525	13.00	CD60225	22.20
.3937		10 mm	43 mm	89 mm	6	CD32763	15.50	CD60449	24.35
.3970	X		1-15/16	3-5/16	6	CD32724	15.25	CD60424	27.90
.4040	Y		1-15/16	3-5/16	6	CD32725	15.25	CD60425	27.90
.4063	13/32		1-15/16	3-5/16	6	CD32526	13.30	CD60226	24.30
.4130	Z		2	3-3/8	6	CD32726	17.60	CD60426	30.65
.4219	27/64		2	3-3/8	6	CD32527	14.75	CD60227	26.90
.4331		11 mm	47 mm	95 mm	6	CD32765	15.30	CD60451	24.15

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For technical information, see page 264 - 265

DRILLS - COBALT

Stub Length - 135° Split Point (Cont.)

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	DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH		AlTiN COATED	
	dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
	D ₁			L ₂	L ₁					
	.4375	7/16		1-1/16	3-7/16	6	CD32528	15.05	CD60228	27.60
	.4531	29/64		2-1/8	3-9/16	6	CD32529	18.25	CD60229	33.20
	.4688	15/32		2-1/8	3-5/8	6	CD32530	18.25	CD60230	33.20
NEW	.4724		12 mm	51 mm	102 mm	6	CD32767	18.50	CD60453	29.65
	.4844	31/64		2-3/16	3-11/16	6	CD32531	18.25	CD60231	33.20
	.5000	1/2		2-1/4	3-3/4	6	CD32532	18.25	CD60232	33.20
NEW	.5118		13 mm	51 mm	102 mm	6	CD32769	32.50	CD60455	45.45

Drills

Carbide

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DRILLS - COBALT

Jobber Length - 135° Split Point



- Jobber length for deeper drilling applications
- Optimized for drilling stainless steels, nickel-based alloys, and titanium alloys
- 135° split point, type "J" (diameters <.0625" are not split)
- Gold Oxide finish extends tool life, improves lubricity, and reduces grinding stresses
- AlTiN coating offers increased wear and heat resistance
- M42 cobalt (identification ring on shank)
- Precision manufactured in the USA

DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH		AlTiN COATED		
dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$	
D1			L2	L1						
.0394		1 mm	17 mm	41 mm	12	CD50372	3.15	CD60864	6.60	NEW
.0400	#60		11/16	1-5/8	12	CD50260	2.95	CD60860	5.15	
.0410	#59		11/16	1-5/8	12	CD50259	2.95	CD60859	5.15	
.0420	#58		11/16	1-5/8	12	CD50258	2.95	CD60858	5.15	
.0430	#57		3/4	1-3/4	12	CD50257	2.95	CD60857	5.15	
.0465	#56		3/4	1-3/4	12	CD50256	2.95	CD60856	5.15	
.0520	#55		7/8	1-7/8	12	CD50255	2.70	CD60855	4.65	NEW
.0550	#54		7/8	1-7/8	12	CD50254	2.70	CD60854	4.65	
.0591		1.5 mm	22 mm	48 mm	12	CD50373	2.90	CD60865	6.35	
.0595	#53		7/8	1-7/8	12	CD50253	2.70	CD60853	4.65	
.0625	1/16		7/8	1-7/8	12	CD50004	2.50	CD60704	4.20	
.0635	#52		7/8	1-7/8	12	CD50252	2.50	CD60852	4.30	
.0670	#51		1	2	12	CD50251	2.50	CD60851	4.30	NEW
.0700	#50		1	2	12	CD50250	2.50	CD60850	4.30	
.0730	#49		1	2	12	CD50249	2.50	CD60849	4.30	
.0760	#48		1	2	12	CD50248	2.50	CD60848	4.30	
.0781	5/64		1	2	12	CD50005	2.50	CD60705	4.20	
.0785	#47		1	2	12	CD50247	2.50	CD60847	4.30	
.0787		2 mm	25 mm	51 mm	12	CD50374	2.70	CD60866	6.40	NEW
.0810	#46		1-1/8	2-1/8	12	CD50246	2.50	CD60846	4.30	
.0820	#45		1-1/8	2-1/8	12	CD50245	2.50	CD60845	4.30	
.0860	#44		1-1/8	2-1/8	12	CD50244	2.50	CD60844	4.30	
.0890	#43		1-1/4	2-1/4	12	CD50243	2.50	CD60843	4.30	
.0935	#42		1-1/4	2-1/4	12	CD50242	2.50	CD60842	4.30	
.0938	3/32		1-1/4	2-1/4	12	CD50006	2.50	CD60706	4.20	NEW
.0960	#41		1-3/8	2-3/8	12	CD50241	2.50	CD60841	4.30	
.0980	#40		1-3/8	2-3/8	12	CD50240	2.55	CD60840	4.30	
.0984		2.5 mm	35 mm	60 mm	12	CD50375	2.75	CD60867	6.45	
.0995	#39		1-3/8	2-3/8	12	CD50239	2.55	CD60839	4.30	
.1015	#38		1-7/16	2-1/2	12	CD50238	2.55	CD60838	4.30	
.1040	#37		1-7/16	2-1/2	12	CD50237	2.65	CD60837	4.55	NEW
.1065	#36		1-7/16	2-1/2	12	CD50236	2.65	CD60836	4.55	
.1094	7/64		1-1/2	2-5/8	12	CD50007	2.60	CD60707	4.35	
.1100	#35		1-1/2	2-5/8	12	CD50235	2.70	CD60835	4.60	
.1110	#34		1-1/2	2-5/8	12	CD50234	2.70	CD60834	4.60	

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For technical information, see page 264 - 265

DRILLS - COBALT

Jobber Length - 135° Split Point (Cont.)

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	DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH		AlTiN COATED	
	dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
	D ₁			L ₂	L ₁					
NEW	.1130	#33		1-1/2	2-5/8	12	CD50233	2.70	CD60833	4.60
	.1160	#32		1-5/8	2-3/4	12	CD50232	2.80	CD60832	4.75
	.1181		3 mm	41 mm	70 mm	12	CD50376	3.00	CD60868	6.70
	.1200	#31		1-5/8	2-3/4	12	CD50231	2.80	CD60831	4.85
	.1250	1/8		1-5/8	2-3/4	12	CD50008	3.10	CD60708	5.35
NEW	.1285	#30		1-5/8	2-3/4	12	CD50230	2.90	CD60830	4.90
	.1360	#29		1-3/4	2-7/8	12	CD50229	3.00	CD60829	5.20
	.1378		3.5 mm	45 mm	73 mm	12	CD50377	3.30	CD60869	7.45
	.1405	#28		1-3/4	2-7/8	12	CD50228	3.10	CD60828	5.40
	.1406	9/64		1-3/4	2-7/8	12	CD50009	3.10	CD60709	5.35
NEW	.1440	#27		1-7/8	3	12	CD50227	3.25	CD60827	5.80
	.1470	#26		1-7/8	3	12	CD50226	3.25	CD60826	5.80
	.1495	#25		1-7/8	3	12	CD50225	3.35	CD60825	5.85
	.1520	#24		2	3-1/8	12	CD50224	3.55	CD60824	6.35
	.1540	#23		2	3-1/8	12	CD50223	3.55	CD60823	6.35
NEW	.1563	5/32		2	3-1/8	12	CD50010	3.40	CD60710	5.95
	.1570	#22		2	3-1/8	12	CD50222	3.55	CD60822	6.35
	.1575		4 mm	54 mm	83 mm	12	CD50378	3.75	CD60870	8.20
	.1590	#21		2-1/8	3-1/4	12	CD50221	3.55	CD60821	6.35
	.1610	#20		2-1/8	3-1/4	12	CD50220	3.55	CD60820	6.40
NEW	.1660	#19		2-1/8	3-1/4	12	CD50219	3.55	CD60819	6.40
	.1695	#18		2-1/8	3-1/4	12	CD50218	3.65	CD60818	6.55
	.1719	11/64		2-1/8	3-1/4	12	CD50011	3.55	CD60711	6.30
	.1730	#17		2-3/16	3-3/8	12	CD50217	4.00	CD60817	7.25
	.1770	#16		2-3/16	3-3/8	12	CD50216	4.20	CD60816	7.40
NEW	.1772		4.5 mm	56 mm	86 mm	12	CD50379	4.75	CD60871	9.20
	.1800	#15		2-3/16	3-3/8	12	CD50215	4.55	CD60815	8.10
	.1820	#14		2-3/16	3-3/8	12	CD50214	4.55	CD60814	8.10
	.1850	#13		2-5/16	3-1/2	12	CD50213	4.55	CD60813	8.10
	.1875	3/16		2-5/16	3-1/2	12	CD50012	3.95	CD60712	7.10
NEW	.1890	#12		2-5/16	3-1/2	12	CD50212	4.60	CD60812	8.30
	.1910	#11		2-5/16	3-1/2	12	CD50211	4.60	CD60811	8.30
	.1935	#10		2-7/16	3-5/8	12	CD50210	4.60	CD60810	8.30
	.1960	#9		2-7/16	3-5/8	12	CD50209	4.60	CD60809	8.30
	.1969		5 mm	62 mm	92 mm	12	CD50380	4.80	CD60872	10.15
NEW	.1990	#8		2-7/16	3-5/8	12	CD50208	4.60	CD60808	8.30
	.2010	#7		2-7/16	3-5/8	12	CD50207	4.60	CD60807	8.30
	.2031	13/64		2-7/16	3-5/8	12	CD50013	4.70	CD60713	8.60
	.2040	#6		2-1/2	3-3/4	12	CD50206	5.85	CD60806	10.65
	.2055	#5		2-1/2	3-3/4	12	CD50205	5.85	CD60805	10.65
NEW	.2090	#4		2-1/2	3-3/4	12	CD50204	5.85	CD60804	10.65
	.2130	#3		2-1/2	3-3/4	12	CD50203	5.85	CD60803	10.65
	.2165		5.5 mm	64 mm	95 mm	12	CD50381	5.40	CD60873	10.75
	.2188	7/32		2-1/2	3-3/4	12	CD50014	5.20	CD60714	9.30
	.2210	#2		2-5/8	3-7/8	12	CD50202	6.30	CD60802	11.40
	.2280	#1		2-5/8	3-7/8	12	CD50201	6.30	CD60801	11.40

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For technical information, see page 264 - 265

DRILLS - COBALT

Jobber Length - 135° Split Point (Cont.)

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DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH		AlTiN COATED	
dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
D1			L2	L1					
.2340	A		2-5/8	3-7/8	12	CD50301	6.25	CD60901	11.30
.2344	15/64		2-5/8	3-7/8	12	CD50015	5.45	CD60715	9.95
.2362		6 mm	70 mm	102 mm	12	CD50382	7.30	CD60874	13.05
.2380	B		2-3/4	4	12	CD50302	7.10	CD60902	12.70
.2420	C		2-3/4	4	12	CD50303	7.10	CD60903	12.70
.2460	D		2-3/4	4	12	CD50304	8.00	CD60904	13.60
.2500	1/4		2-3/4	4	12	CD50016	5.85	CD60716	10.65
.2500	E		2-3/4	4	12	CD50305	5.85	CD60905	10.65
.2559		6.5 mm	73 mm	105 mm	6	CD50383	7.30	CD60875	14.20
.2570	F		2-7/8	4-1/8	6	CD50306	7.10	CD60906	13.00
.2610	G		2-7/8	4-1/8	6	CD50307	7.10	CD60907	13.00
.2656	17/64		2-7/8	4-1/8	6	CD50017	6.60	CD60717	12.05
.2660	H		2-7/8	4-1/8	6	CD50308	8.00	CD60908	14.65
.2720	I		2-7/8	4-1/8	6	CD50309	8.00	CD60909	14.65
.2756		7 mm	73 mm	105 mm	6	CD50384	8.20	CD60876	15.10
.2770	J		2-7/8	4-1/8	6	CD50310	8.00	CD60910	14.65
.2810	K		2-15/16	4-1/4	6	CD50311	8.00	CD60911	14.65
.2813	9/32		2-15/16	4-1/4	6	CD50018	6.90	CD60718	12.55
.2900	L		2-15/16	4-1/4	6	CD50312	9.15	CD60912	16.35
.2950	M		3-1/16	4-3/8	6	CD50313	9.65	CD60913	16.80
.2953		7.5 mm	78 mm	111 mm	6	CD50385	8.70	CD60877	15.60
.2969	19/64		3-1/16	4-3/8	6	CD50019	8.50	CD60719	15.40
.3020	N		3-1/16	4-3/8	6	CD50314	9.65	CD60914	16.80
.3125	5/16		3-3/16	4-1/2	6	CD50020	9.10	CD60720	16.30
.3150		8 mm	81 mm	114 mm	6	CD50386	10.95	CD60878	19.20
.3160	O		3-3/16	4-1/2	6	CD50315	10.75	CD60915	19.30
.3230	P		3-5/16	4-5/8	6	CD50316	11.40	CD60916	20.00
.3281	21/64		3-5/16	4-5/8	6	CD50021	10.00	CD60721	17.20
.3320	Q		3-7/16	4-3/4	6	CD50317	11.70	CD60917	20.35
.3346		8.5 mm	87 mm	121 mm	6	CD50387	11.90	CD60879	20.15
.3390	R		3-7/16	4-3/4	6	CD50318	11.70	CD60918	20.30
.3438	11/32		3-7/16	4-3/4	6	CD50022	11.00	CD60722	19.60
.3480	S		3-1/2	4-7/8	6	CD50319	14.50	CD60919	25.00
.3543		9 mm	89 mm	124 mm	6	CD50388	14.70	CD60880	22.95
.3580	T		3-1/2	4-7/8	6	CD50320	14.50	CD60920	26.30
.3594	23/64		3-1/2	4-7/8	6	CD50023	12.55	CD60723	21.20
.3680	U		3-5/8	5	6	CD50321	14.50	CD60921	26.30
.3740		9.5 mm	92 mm	127 mm	6	CD50389	12.75	CD60881	21.00
.3750	3/8		3-5/8	5	6	CD50024	12.55	CD60724	21.20
.3770	V		3-5/8	5	6	CD50322	15.90	CD60922	28.95
.3860	W		3-3/4	5-1/8	6	CD50323	15.90	CD60923	28.95
.3906	25/64		3-3/4	5-1/8	6	CD50025	14.35	CD60725	25.10
.3937		10 mm	95 mm	130 mm	6	CD50390	16.10	CD60882	26.45
.3970	X		3-3/4	5-1/8	6	CD50324	15.90	CD60924	28.95

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For technical information, see page 264 - 265

DRILLS - COBALT

Jobber Length - 135° Split Point (Cont.)

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	DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH		AlTiN COATED	
	dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
	D1			L2	L1					
	.4040	Y		3-7/8	5-1/4	6	CD50325	16.85	CD60925	30.70
	.4063	13/32		3-7/8	5-1/4	6	CD50026	14.80	CD60726	25.60
	.4130	Z		3-7/8	5-1/4	6	CD50326	18.25	CD60926	33.40
NEW	.4134		10.5 mm	98 mm	133 mm	6	CD50391	16.65	CD60883	27.00
	.4219	27/64		3-15/16	5-3/8	6	CD50027	16.45	CD60727	29.90
NEW	.4331		11 mm	103 mm	140 mm	6	CD50392	17.00	CD60884	27.35
	.4375	7/16		4-1/16	5-1/2	6	CD50028	16.80	CD60728	30.65
NEW	.4528		11.5 mm	106 mm	143 mm	6	CD50393	20.25	CD60885	32.35
	.4531	29/64		4-3/16	5-5/8	6	CD50029	20.05	CD60729	36.65
	.4688	15/32		4-5/16	5-3/4	6	CD50030	20.60	CD60730	37.45
NEW	.4724		12 mm	111 mm	149 mm	6	CD50394	21.00	CD60886	33.10
	.4844	31/64		4-3/8	5-7/8	6	CD50031	20.80	CD60731	37.60
NEW	.4921		12.5 mm	114 mm	152 mm	6	CD50395	21.00	CD60887	33.10
	.5000	1/2		4-1/2	6	6	CD50032	20.80	CD60732	36.85
NEW	.5118		13 mm	114 mm	152 mm	6	CD50396	25.20	CD60888	35.00

 Drills
 Carbide
 Cobalt
 HSS

For technical information, see page 264 - 265

DRILLS - COBALT**Jobber Length - Parabolic Flute - 135° Split Point**

- Cobalt composition extends the life of the drill bit
- Versatile Jobber Length suitable for a wide range of drilling applications
- Parabolic Flute Design enhances chip evacuation and reduces clogging
- 135° Split Point
- Perfect for drilling through tough materials such as stainless steel and high-tensile alloy
- Precision manufactured in the USA

DRILL DIAMETER		FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH	
dec. equiv.	size				TOOL #	USD\$
$D1 \begin{smallmatrix} +.0000" \\ -.0005" \end{smallmatrix}$		L2	L1			
.0625	1/16	7/8	1-7/8	12	CD81500	4.20
.0635	#52	7/8	1-7/8	12	CD81452	4.20
.0670	#51	1	2	12	CD81451	4.20
.0700	#50	1	2	12	CD81450	4.20
.0730	#49	1	2	12	CD81449	4.20
.0760	#48	1	2	12	CD81448	4.20
.0781	5/64	1	2	12	CD81501	4.20
.0785	#47	1	2	12	CD81447	4.20
.0810	#46	1-1/8	2-1/8	12	CD81446	4.20
.0820	#45	1-1/8	2-1/8	12	CD81445	4.20
.0860	#44	1-1/8	2-1/8	12	CD81444	4.20
.0890	#43	1-1/4	2-1/4	12	CD81443	4.20
.0935	#42	1-1/4	2-1/4	12	CD81442	4.20
.0938	3/32	1-1/4	2-1/4	12	CD81502	4.20
.0960	#41	1-3/8	2-3/8	12	CD81441	4.20
.0980	#40	1-3/8	2-3/8	12	CD81440	4.30
.0995	#39	1-3/8	2-3/8	12	CD81439	4.30
.1015	#38	1-7/16	2-1/2	12	CD81438	4.30
.1040	#37	1-7/16	2-1/2	12	CD81437	4.45
.1065	#36	1-7/16	2-1/2	12	CD81436	4.45
.1094	7/64	1-1/2	2-5/8	12	CD81503	4.40
.1100	#35	1-1/2	2-5/8	12	CD81435	4.55
.1110	#34	1-1/2	2-5/8	12	CD81434	4.55
.1130	#33	1-1/2	2-5/8	12	CD81433	4.55
.1160	#32	1-5/8	2-3/4	12	CD81432	4.65
.1200	#31	1-5/8	2-3/4	12	CD81431	4.65
.1250	1/8	1-5/8	2-3/4	12	CD81504	5.15
.1285	#30	1-5/8	2-3/4	12	CD81430	4.80
.1360	#29	1-3/4	2-7/8	12	CD81429	5.00
.1405	#28	1-3/4	2-7/8	12	CD81428	5.15
.1406	9/64	1-3/4	2-7/8	12	CD81505	5.15
.1440	#27	1-7/8	3	12	CD81427	5.45
.1470	#26	1-7/8	3	12	CD81426	5.45
.1495	#25	1-7/8	3	12	CD81425	5.60
.1520	#24	2	3-1/8	12	CD81424	5.95
.1540	#23	2	3-1/8	12	CD81423	5.95
.1563	5/32	2	3-1/8	12	CD81506	5.70

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For technical information, see page 264 - 265

DRILLS - COBALT

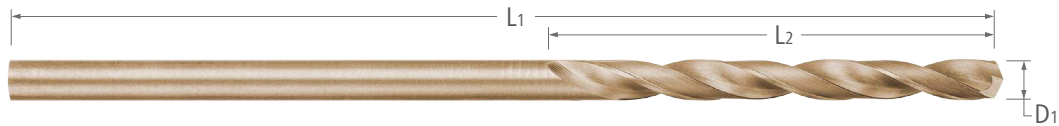
Jobber Length - Parabolic Flute - 135° Split Point (Cont.)

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DRILL DIAMETER		FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH	
dec. equiv.	size				TOOL #	USD\$
$D_1 \begin{smallmatrix} +.0000" \\ -.0005" \end{smallmatrix}$		L ₂	L ₁			
.1570	#22	2	3-1/8	12	CD81422	5.95
.1590	#21	2-1/8	3-1/4	12	CD81421	5.95
.1610	#20	2-1/8	3-1/4	12	CD81420	5.95
.1660	#19	2-1/8	3-1/4	12	CD81419	5.95
.1695	#18	2-1/8	3-1/4	12	CD81418	6.10
.1719	11/64	2-1/8	3-1/4	12	CD81507	5.95
.1730	#17	2-3/16	3-3/8	12	CD81417	6.65
.1770	#16	2-3/16	3-3/8	12	CD81416	6.95
.1800	#15	2-3/16	3-3/8	12	CD81415	7.60
.1820	#14	2-3/16	3-3/8	12	CD81414	7.60
.1850	#13	2-5/16	3-1/2	12	CD81413	7.60
.1875	3/16	2-5/16	3-1/2	12	CD81508	6.55
.1890	#12	2-5/16	3-1/2	12	CD81412	7.70
.1910	#11	2-5/16	3-1/2	12	CD81411	7.70
.1935	#10	2-7/16	3-5/8	12	CD81410	7.70
.1960	#9	2-7/16	3-5/8	12	CD81409	7.70
.1990	#8	2-7/16	3-5/8	12	CD81408	7.70
.2010	#7	2-7/16	3-5/8	12	CD81407	7.70
.2031	13/64	2-7/16	3-5/8	12	CD81509	7.85
.2040	#6	2-1/2	3-3/4	12	CD81406	9.85
.2055	#5	2-1/2	3-3/4	12	CD81405	9.85
.2090	#4	2-1/2	3-3/4	12	CD81404	9.85
.2130	#3	2-1/2	3-3/4	12	CD81403	9.85
.2188	7/32	2-1/2	3-3/4	12	CD81510	8.70
.2210	#2	2-5/8	3-7/8	12	CD81402	10.40
.2280	#1	2-5/8	3-7/8	12	CD81401	10.40
.2344	15/64	2-5/8	3-7/8	12	CD81511	9.00
.2500	1/4	2-3/4	4	12	CD81512	9.85
.2656	17/64	2-7/8	4-1/8	6	CD81513	11.00
.2813	9/32	2-15/16	4-1/4	6	CD81514	11.50
.2969	19/64	3-1/16	4-3/8	6	CD81515	14.10
.3125	5/16	3-3/16	4-1/2	6	CD81516	15.25
.3281	21/64	3-5/16	4-5/8	6	CD81517	16.65
.3438	11/32	3-7/16	4-3/4	6	CD81518	18.30
.3594	23/64	3-1/2	4-7/8	6	CD81519	21.00
.3750	3/8	3-5/8	5	6	CD81520	21.00
.3906	25/64	3-3/4	5-1/8	6	CD81521	23.80
.4063	13/32	3-7/8	5-1/4	6	CD81522	24.65
.4219	27/64	3-15/16	5-3/8	6	CD81523	27.30
.4375	7/16	4-1/16	5-1/2	6	CD81524	28.05
.4531	29/64	4-3/16	5-5/8	6	CD81525	33.45
.4688	15/32	4-5/16	5-3/4	6	CD81526	34.40
.4844	31/64	4-3/8	5-7/8	6	CD81527	34.60
.5000	1/2	4-1/2	6	6	CD81528	34.60

Drills
Carbide
Cobalt
HSS

For technical information, see page 264 - 265

DRILLS - COBALT**Aircraft Extension Drills - 135° Split Point**

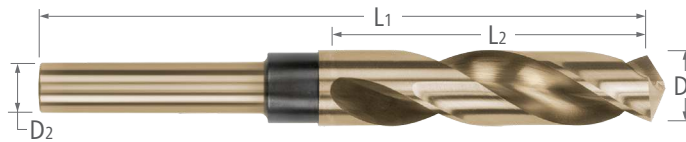
- 135° split point, type "J"
- M42 cobalt
- Offered in 6" and 12" overall lengths
- Gold Oxide finish extends tool life, improves lubricity, and reduces grinding stresses
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	PACKAGE QTY.	GOLD OXIDE FINISH	
D1		L2	L1		TOOL #	USD\$
.0938	3/32	1-1/4	6	6	CD67706	10.10
.0980	#40	1-5/8	6	6	CD67840	8.55
.0980	#40	1-3/8	12	6	CD68940	30.70
.1094	7/64	1-1/2	6	6	CD67707	11.45
.1250	1/8	1-5/8	6	6	CD67708	9.30
.1250	1/8	1-5/8	12	6	CD68808	28.75
.1285	#30	1-5/8	6	6	CD67830	9.30
.1285	#30	1-5/8	12	6	CD68930	27.85
.1360	#29	1-3/4	6	6	CD67829	13.65
.1360	#29	1-3/4	12	6	CD68929	30.70
.1406	9/64	1-3/4	6	6	CD67709	12.70
.1406	9/64	1-3/4	12	6	CD68809	31.50
.1563	5/32	2	6	6	CD67710	12.70
.1563	5/32	2	12	6	CD68810	28.95
.1590	#21	2-1/8	6	6	CD67821	12.35
.1590	#21	2-1/8	12	6	CD68921	29.60
.1610	#20	2-1/8	6	6	CD67820	12.35
.1610	#20	2-1/8	12	6	CD68920	29.50
.1719	11/64	2-1/8	6	6	CD67711	14.00
.1719	11/64	2-1/8	12	6	CD68811	31.35
.1875	3/16	2-5/16	6	6	CD67712	11.90
.1875	3/16	2-5/16	12	6	CD68812	30.45
.1910	#11	2-5/16	6	6	CD67811	13.10
.1910	#11	2-5/16	12	6	CD68911	31.85
.1935	#10	2-7/16	6	6	CD67810	13.55
.1935	#10	2-7/16	12	6	CD68910	33.20
.2031	13/64	2-7/16	6	6	CD67713	17.50
.2031	13/64	2-7/16	12	6	CD68813	39.95
.2188	7/32	2-1/2	6	6	CD67714	17.80
.2188	7/32	2-1/2	12	6	CD68814	36.10
.2210	#2	2-5/8	6	6	CD67802	19.90
.2280	#1	2-5/8	6	6	CD67801	19.90
.2280	#1	2-5/8	12	6	CD68901	42.90
.2344	15/64	2-5/8	6	6	CD67715	19.05
.2344	15/64	2-5/8	12	6	CD68815	38.30
.2500	1/4	2-3/4	6	6	CD67716	18.50
.2500	1/4	2-3/4	12	6	CD68816	35.40

For technical information, see page 264 - 265

DRILLS - COBALT

Silver & Deming - 135° Split Point



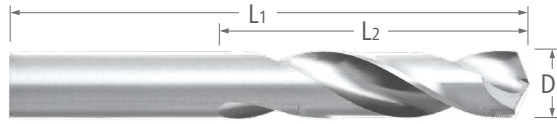
- 3" flute length
- 135° split point
- 1/2" shank
- Gold Oxide finish extends tool life, improves lubricity, and reduces grinding stresses
- M42 cobalt
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	SHANK DIA.	GOLD OXIDE FINISH	
D1		L2	L1	D2	TOOL #	USD\$
.5156	33/64	3	6	1/2	SD93633	50.80
.5313	17/32	3	6	1/2	SD93634	50.80
.5469	35/64	3	6	1/2	SD93635	61.20
.5625	9/16	3	6	1/2	SD93636	61.20
.5781	37/64	3	6	1/2	SD93637	63.65
.5938	19/32	3	6	1/2	SD93638	63.65
.6094	39/64	3	6	1/2	SD93639	65.25
.6250	5/8	3	6	1/2	SD93640	65.25
.6406	41/64	3	6	1/2	SD93641	68.15
.6563	21/32	3	6	1/2	SD93642	68.15
.6719	43/64	3	6	1/2	SD93643	69.90
.6875	11/16	3	6	1/2	SD93644	69.90
.7031	45/64	3	6	1/2	SD93645	73.70
.7188	23/32	3	6	1/2	SD93646	73.70
.7344	47/64	3	6	1/2	SD93647	76.50
.7500	3/4	3	6	1/2	SD93648	76.50
.7656	49/64	3	6	1/2	SD93649	80.40
.7813	25/32	3	6	1/2	SD93650	80.40
.7969	51/64	3	6	1/2	SD93651	82.10
.8125	13/16	3	6	1/2	SD93652	82.10
.8281	53/64	3	6	1/2	SD93653	88.70
.8438	27/32	3	6	1/2	SD93654	88.70
.8594	55/64	3	6	1/2	SD93655	88.70
.8750	7/8	3	6	1/2	SD93656	88.70
.8906	57/64	3	6	1/2	SD93657	92.65
.9063	29/32	3	6	1/2	SD93658	92.65
.9219	59/64	3	6	1/2	SD93659	96.15
.9375	15/16	3	6	1/2	SD93660	96.15
.9531	61/64	3	6	1/2	SD93661	101.45
.9688	31/32	3	6	1/2	SD93662	101.45
.9844	63/64	3	6	1/2	SD93663	115.10
1.0000	1	3	6	1/2	SD93664	115.10
NEW 1.1250	1-1/8	3	6	1/2	SD93665	148.00
NEW 1.2500	1-1/4	3	6	1/2	SD93666	202.00
NEW 1.5000	1-1/2	3	6	1/2	SD93667	222.00

For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Stub Length - 135° Split Point



- Stub length for increased rigidity
- 135° split point, type "C" (diameters < .0625" not split)
- Bright finish improves performance in plastics and other non-ferrous materials
- Black Oxide finish increases wear resistance and adds lubricity to improve chip flow
- Commonly referred to as Screw Machine Drills, constructed from high speed steel
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	PACKAGE QTY.	BRIGHT FINISH		BLACK OXIDE FINISH	
D1		L2	L1		TOOL #	USD\$	TOOL #	USD\$
.0400	#60	1/2	1-3/8	12	CD32388	1.75	CD30260	1.75
.0410	#59	1/2	1-3/8	12	CD32387	1.75	CD30259	1.75
.0420	#58	1/2	1-3/8	12	CD32386	1.75	CD30258	1.75
.0430	#57	1/2	1-3/8	12	CD32385	1.75	CD30257	1.75
.0465	#56	1/2	1-3/8	12	CD32384	1.75	CD30256	1.75
.0520	#55	5/8	1-5/8	12	CD32383	1.75	CD30255	1.75
.0550	#54	5/8	1-5/8	12	CD32382	1.75	CD30254	1.75
.0595	#53	5/8	1-5/8	12	CD32381	1.75	CD30253	1.75
.0625	1/16	5/8	1-5/8	12	CD32300	1.55	CD30004	1.55
.0635	#52	11/16	1-11/16	12	CD32380	1.75	CD30252	1.75
.0670	#51	11/16	1-11/16	12	CD32379	1.75	CD30251	1.75
.0700	#50	11/16	1-11/16	12	CD32378	1.75	CD30250	1.75
.0730	#49	11/16	1-11/16	12	CD32377	1.75	CD30249	1.75
.0760	#48	11/16	1-11/16	12	CD32376	1.75	CD30248	1.75
.0781	5/64	11/16	1-11/16	12	CD32301	1.60	CD30005	1.60
.0785	#47	11/16	1-11/16	12	CD32375	1.75	CD30247	1.75
.0810	#46	3/4	1-3/4	12	CD32374	1.75	CD30246	1.75
.0820	#45	3/4	1-3/4	12	CD32373	1.75	CD30245	1.75
.0860	#44	3/4	1-3/4	12	CD32372	1.75	CD30244	1.75
.0890	#43	3/4	1-3/4	12	CD32371	1.75	CD30243	1.75
.0935	#42	3/4	1-3/4	12	CD32370	1.75	CD30242	1.75
.0938	3/32	3/4	1-3/4	12	CD32302	1.60	CD30006	1.60
.0960	#41	13/16	1-13/16	12	CD32369	1.75	CD30241	1.75
.0980	#40	13/16	1-13/16	12	CD32368	1.75	CD30240	1.75
.0995	#39	13/16	1-13/16	12	CD32367	1.75	CD30239	1.75
.1015	#38	13/16	1-13/16	12	CD32366	1.75	CD30238	1.75
.1040	#37	13/16	1-13/16	12	CD32365	1.75	CD30237	1.75
.1065	#36	13/16	1-13/16	12	CD32364	1.75	CD30236	1.75
.1094	7/64	13/16	1-13/16	12	CD32303	1.60	CD30007	1.60
.1100	#35	7/8	1-7/8	12	CD32363	1.75	CD30235	1.75
.1110	#34	7/8	1-7/8	12	CD32362	1.75	CD30234	1.75
.1130	#33	7/8	1-7/8	12	CD32361	1.75	CD30233	1.75
.1160	#32	7/8	1-7/8	12	CD32360	1.75	CD30232	1.75
.1200	#31	7/8	1-7/8	12	CD32359	1.75	CD30231	1.75
.1250	1/8	7/8	1-7/8	12	CD32304	1.60	CD30008	1.60
.1285	#30	15/16	1-15/16	12	CD32358	1.75	CD30230	1.75

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For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Stub Length - 135° Split Point (Cont.)

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DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	PACKAGE QTY.	BRIGHT FINISH		BLACK OXIDE FINISH	
D ₁		L ₂	L ₁		TOOL #	USD\$	TOOL #	USD\$
.1360	#29	15/16	1-15/16	12	CD32357	2.20	CD30229	2.20
.1405	#28	15/16	1-15/16	12	CD32356	2.20	CD30228	2.20
.1406	9/64	15/16	1-15/16	12	CD32305	1.60	CD30009	1.60
.1440	#27	1	2-1/16	12	CD32355	2.20	CD30227	2.20
.1470	#26	1	2-1/16	12	CD32354	2.20	CD30226	2.20
.1495	#25	1	2-1/16	12	CD32353	2.20	CD30225	2.20
.1520	#24	1	2-1/16	12	CD32352	2.20	CD30224	2.20
.1540	#23	1	2-1/16	12	CD32351	2.20	CD30223	2.20
.1563	5/32	1	2-1/16	12	CD32306	1.75	CD30010	1.75
.1570	#22	1-1/16	2-1/8	12	CD32350	2.20	CD30222	2.20
.1590	#21	1-1/16	2-1/8	12	CD32349	2.30	CD30221	2.30
.1610	#20	1-1/16	2-1/8	12	CD32348	2.30	CD30220	2.30
.1660	#19	1-1/16	2-1/8	12	CD32347	2.30	CD30219	2.30
.1695	#18	1-1/16	2-1/8	12	CD32346	2.30	CD30218	2.30
.1719	11/64	1-1/16	2-1/8	12	CD32307	1.75	CD30011	1.75
.1730	#17	1-1/8	2-3/16	12	CD32345	2.40	CD30217	2.40
.1770	#16	1-1/8	2-3/16	12	CD32344	2.40	CD30216	2.40
.1800	#15	1-1/8	2-3/16	12	CD32343	2.40	CD30215	2.40
.1820	#14	1-1/8	2-3/16	12	CD32342	2.40	CD30214	2.40
.1850	#13	1-1/8	2-3/16	12	CD32341	2.40	CD30213	2.40
.1875	3/16	1-1/8	2-3/16	12	CD32308	1.95	CD30012	1.95
.1890	#12	1-3/16	2-1/4	12	CD32340	2.40	CD30212	2.40
.1910	#11	1-3/16	2-1/4	12	CD32339	2.40	CD30211	2.40
.1935	#10	1-3/16	2-1/4	12	CD32338	2.40	CD30210	2.40
.1960	#9	1-3/16	2-1/4	12	CD32337	2.40	CD30209	2.40
.1990	#8	1-3/16	2-1/4	12	CD32336	2.40	CD30208	2.40
.2010	#7	1-3/16	2-1/4	12	CD32335	2.40	CD30207	2.40
.2031	13/64	1-3/16	2-1/4	12	CD32309	2.00	CD30013	2.00
.2040	#6	1-1/4	2-3/8	12	CD32334	2.65	CD30206	2.65
.2055	#5	1-1/4	2-3/8	12	CD32333	2.65	CD30205	2.65
.2090	#4	1-1/4	2-3/8	12	CD32332	2.65	CD30204	2.65
.2130	#3	1-1/4	2-3/8	12	CD32331	2.65	CD30203	2.65
.2188	7/32	1-1/4	2-3/8	12	CD32310	2.35	CD30014	2.35
.2210	#2	1-5/16	2-7/16	12	CD32330	2.60	CD30202	2.60
.2280	#1	1-5/16	2-7/16	12	CD32329	2.60	CD30201	2.60
.2340	A	1-5/16	2-7/16	12	CD32389	3.15	CD30301	3.15
.2344	15/64	1-5/16	2-7/16	12	CD32311	2.60	CD30015	2.60
.2380	B	1-3/8	2-1/2	12	CD32390	3.25	CD30302	3.25
.2420	C	1-3/8	2-1/2	12	CD32391	3.25	CD30303	3.25
.2460	D	1-3/8	2-1/2	12	CD32392	3.30	CD30304	3.30
.2500	1/4	1-3/8	2-1/2	12	CD32312	2.85	CD30016	2.85
.2500	E	1-3/8	2-1/2	12	CD32393	3.30	CD30305	3.30
.2570	F	1-7/16	2-5/8	6	CD32394	4.20	CD30306	4.20
.2610	G	1-7/16	2-5/8	6	CD32395	4.40	CD30307	4.40
.2656	17/64	1-7/16	2-5/8	6	CD32313	2.90	CD30017	2.90
.2660	H	1-1/2	2-11/16	6	CD32396	4.50	CD30308	4.50

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For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Stub Length - 135° Split Point (Cont.)

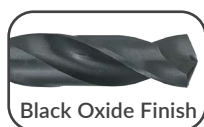
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DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	PACKAGE QTY.	BRIGHT FINISH		BLACK OXIDE FINISH	
D ₁		L ₂	L ₁		TOOL #	USD\$	TOOL #	USD\$
.2720	I	1-1/2	2-11/16	6	CD32397	4.55	CD30309	4.55
.2770	J	1-1/2	2-11/16	6	CD32398	4.60	CD30310	4.60
.2810	K	1-1/2	2-11/16	6	CD32399	4.65	CD30311	4.65
.2813	9/32	1-1/2	2-11/16	6	CD32314	3.15	CD30018	3.15
.2900	L	1-9/16	2-3/4	6	CD32400	4.80	CD30312	4.80
.2950	M	1-9/16	2-3/4	6	CD32401	5.05	CD30313	5.05
.2969	19/64	1-9/16	2-3/4	6	CD32315	3.35	CD30019	3.35
.3020	N	1-5/8	2-13/16	6	CD32402	5.25	CD30314	5.25
.3125	5/16	1-5/8	2-13/16	6	CD32316	3.50	CD30020	3.50
.3160	O	1-11/16	2-15/16	6	CD32403	5.90	CD30315	5.90
.3230	P	1-11/16	2-15/16	6	CD32404	6.00	CD30316	6.00
.3281	21/64	1-11/16	2-15/16	6	CD32317	3.90	CD30021	3.90
.3320	Q	1-11/16	3	6	CD32405	6.35	CD30317	6.35
.3390	R	1-11/16	3	6	CD32406	6.45	CD30318	6.45
.3438	11/32	1-11/16	3	6	CD32318	4.25	CD30022	4.25
.3480	S	1-3/4	3-1/16	6	CD32407	6.80	CD30319	6.80
.3580	T	1-3/4	3-1/16	6	CD32408	6.90	CD30320	6.90
.3594	23/64	1-3/4	3-1/16	6	CD32319	4.45	CD30023	4.45
.3680	U	1-13/16	3-1/8	6	CD32409	7.50	CD30321	7.50
.3750	3/8	1-13/16	3-1/8	6	CD32320	4.80	CD30024	4.80
.3770	V	1-7/8	3-1/4	6	CD32410	7.90	CD30322	7.90
.3860	W	1-7/8	3-1/4	6	CD32411	8.15	CD30323	8.15
.3906	25/64	1-7/8	3-1/4	6	CD32321	5.05	CD30025	5.05
.3970	X	1-15/16	3-5/16	6	CD32412	8.75	CD30324	8.75
.4040	Y	1-15/16	3-5/16	6	CD32413	8.90	CD30325	8.90
.4063	13/32	1-15/16	3-5/16	6	CD32322	5.55	CD30026	5.55
.4130	Z	2	3-3/8	6	CD32414	9.20	CD30326	9.20
.4219	27/64	2	3-3/8	6	CD32323	5.85	CD30027	5.85
.4375	7/16	2-1/16	3-7/16	6	CD32324	6.40	CD30028	6.40
.4531	29/64	2-1/8	3-9/16	6	CD32325	6.85	CD30029	6.85
.4688	15/32	2-1/8	3-5/8	6	CD32326	7.55	CD30030	7.55
.4844	31/64	2-3/16	3-11/16	6	CD32327	7.75	CD30031	7.75
.5000	1/2	2-1/4	3-3/4	6	CD32328	8.10	CD30032	8.10

For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Jobber Length - 135° Split Point



- Jobber length for deeper drilling applications
- 135° split point, type "B" (diameters < .0625" not split)
- Black Oxide and Black & Gold Oxide finishes available for increased wear resistance and added lubricity for improved chip flow
- High speed steel
- Precision manufactured in the USA

	DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH		BLACK AND GOLD OXIDE FINISH	
	dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
	D1			L2	L1					
NEW	.0394		1 mm	17 mm	41 mm	12			CD44764	3.25
	.0400	#60		11/16	1-5/8	12	CD44260	1.80	CD44760	2.05
	.0410	#59		11/16	1-5/8	12	CD44259	1.80	CD44759	2.05
	.0420	#58		11/16	1-5/8	12	CD44258	1.80	CD44758	2.05
	.0430	#57		3/4	1-3/4	12	CD44257	1.80	CD44757	2.05
	.0465	#56		3/4	1-3/4	12	CD44256	1.80	CD44756	2.05
	.0520	#55		7/8	1-7/8	12	CD44255	1.80	CD44755	2.05
	.0550	#54		7/8	1-7/8	12	CD44254	1.80	CD44754	2.00
NEW	.0591		1.5 mm	22 mm	48 mm	12			CD44765	2.35
	.0595	#53		7/8	1-7/8	12	CD44253	1.80	CD44753	2.05
	.0625	1/16		7/8	1-7/8	12	CD44004	1.40	CD44504	1.55
	.0635	#52		7/8	1-7/8	12	CD44252	1.80	CD44752	2.05
	.0670	#51		1	2	12	CD44251	1.80	CD44751	2.10
	.0700	#50		1	2	12	CD44250	1.80	CD44750	2.10
	.0730	#49		1	2	12	CD44249	1.80	CD44749	2.10
	.0760	#48		1	2	12	CD44248	1.80	CD44748	2.10
	.0781	5/64		1	2	12	CD44005	1.40	CD44505	1.55
	.0785	#47		1	2	12	CD44247	1.80	CD44747	2.10
NEW	.0787		2 mm	25 mm	51 mm	12			CD44766	2.50
	.0810	#46		1-1/8	2-1/8	12	CD44246	1.80	CD44746	2.15
	.0820	#45		1-1/8	2-1/8	12	CD44245	1.80	CD44745	2.15
	.0860	#44		1-1/8	2-1/8	12	CD44244	1.80	CD44744	2.15
	.0890	#43		1-1/4	2-1/4	12	CD44243	1.80	CD44743	2.15
	.0935	#42		1-1/4	2-1/4	12	CD44242	1.80	CD44742	2.20
	.0938	3/32		1-1/4	2-1/4	12	CD44006	1.40	CD44506	1.55
	.0960	#41		1-3/8	2-3/8	12	CD44241	1.80	CD44741	2.15
	.0980	#40		1-3/8	2-3/8	12	CD44240	1.85	CD44740	2.30
NEW	.0984		2.5 mm	35 mm	60 mm	12			CD44767	2.60
	.0995	#39		1-3/8	2-3/8	12	CD44239	1.85	CD44739	2.30
	.1015	#38		1-7/16	2-1/2	12	CD44238	1.85	CD44738	2.10
	.1040	#37		1-7/16	2-1/2	12	CD44237	1.85	CD44737	2.30
	.1065	#36		1-7/16	2-1/2	12	CD44236	1.85	CD44736	2.30
	.1094	7/64		1-1/2	2-5/8	12	CD44007	1.40	CD44507	1.60
	.1100	#35		1-1/2	2-5/8	12	CD44235	1.85	CD44735	2.30
	.1110	#34		1-1/2	2-5/8	12	CD44234	1.85	CD44734	2.30

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For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Jobber Length - 135° Split Point (Cont.)

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DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH		BLACK AND GOLD OXIDE FINISH	
dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
D ₁			L ₂	L ₁					
.1130	#33		1-1/2	2-5/8	12	CD44233	1.85	CD44733	2.30
.1160	#32		1-5/8	2-3/4	12	CD44232	1.85	CD44732	2.30
.1181		3 mm	41 mm	70 mm	12			CD44768	2.70
.1200	#31		1-5/8	2-3/4	12	CD44231	1.85	CD44731	2.30
.1250	1/8		1-5/8	2-3/4	12	CD44008	1.40	CD44508	1.75
.1285	#30		1-5/8	2-3/4	12	CD44230	1.75	CD44730	2.30
.1360	#29		1-3/4	2-7/8	12	CD44229	1.75	CD44729	2.50
.1378		3.5 mm	45 mm	73 mm	12			CD44769	3.05
.1405	#28		1-3/4	2-7/8	12	CD44228	2.10	CD44728	2.60
.1406	9/64		1-3/4	2-7/8	12	CD44009	1.50	CD44509	1.80
.1440	#27		1-7/8	3	12	CD44227	2.10	CD44727	2.60
.1470	#26		1-7/8	3	12	CD44226	2.10	CD44726	2.65
.1495	#25		1-7/8	3	12	CD44225	2.10	CD44725	2.65
.1520	#24		2	3-1/8	12	CD44224	2.10	CD44724	2.65
.1540	#23		2	3-1/8	12	CD44223	2.10	CD44723	2.65
.1563	5/32		2	3-1/8	12	CD44010	1.75	CD44510	2.15
.1570	#22		2	3-1/8	12	CD44222	2.10	CD44722	2.70
.1575		4 mm	54 mm	83 mm	12			CD44770	3.10
.1590	#21		2-1/8	3-1/4	12	CD44221	2.10	CD44721	2.70
.1610	#20		2-1/8	3-1/4	12	CD44220	2.30	CD44720	2.70
.1660	#19		2-1/8	3-1/4	12	CD44219	2.30	CD44719	2.70
.1695	#18		2-1/8	3-1/4	12	CD44218	2.40	CD44718	2.70
.1719	11/64		2-1/8	3-1/4	12	CD44011	1.85	CD44511	2.30
.1730	#17		2-3/16	3-3/8	12	CD44217	2.40	CD44717	3.00
.1770	#16		2-3/16	3-3/8	12	CD44216	2.40	CD44716	3.00
.1772		4.5 mm	56 mm	86 mm	12			CD44771	3.20
.1800	#15		2-3/16	3-3/8	12	CD44215	2.40	CD44715	3.00
.1820	#14		2-3/16	3-3/8	12	CD44214	2.40	CD44714	3.00
.1850	#13		2-5/16	3-1/2	12	CD44213	2.40	CD44713	3.00
.1875	3/16		2-5/16	3-1/2	12	CD44012	2.00	CD44512	2.50
.1890	#12		2-5/16	3-1/2	12	CD44212	2.10	CD44712	3.10
.1910	#11		2-5/16	3-1/2	12	CD44211	2.10	CD44711	3.10
.1935	#10		2-7/16	3-5/8	12	CD44210	2.10	CD44710	3.35
.1960	#9		2-7/16	3-5/8	12	CD44209	2.40	CD44709	3.40
.1969		5 mm	62 mm	92 mm	12			CD44772	3.40
.1990	#8		2-7/16	3-5/8	12	CD44208	2.40	CD44708	3.40
.2010	#7		2-7/16	3-5/8	12	CD44207	2.35	CD44707	3.40
.2031	13/64		2-7/16	3-5/8	12	CD44013	2.30	CD44513	2.65
.2040	#6		2-1/2	3-3/4	12	CD44206	2.45	CD44706	3.80
.2055	#5		2-1/2	3-3/4	12	CD44205	2.45	CD44705	3.80
.2090	#4		2-1/2	3-3/4	12	CD44204	2.45	CD44704	3.80
.2130	#3		2-1/2	3-3/4	12	CD44203	2.45	CD44703	3.80
.2165		5.5 mm	64 mm	95 mm	12			CD44773	3.75
.2188	7/32		2-1/2	3-3/4	12	CD44014	2.45	CD44514	2.95
.2210	#2		2-5/8	3-7/8	12	CD44202	2.60	CD44702	4.10

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DRILLS - HIGH SPEED STEEL

Jobber Length - 135° Split Point (Cont.)

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	DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH		BLACK AND GOLD OXIDE FINISH	
	dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
	D1			L2	L1					
NEW	.2280	#1		2-5/8	3-7/8	12	CD44201	2.60	CD44701	4.10
	.2340	A		2-5/8	3-7/8	12	CD44301	2.95	CD44801	4.35
	.2344	15/64		2-5/8	3-7/8	12	CD44015	2.60	CD44515	3.15
	.2362		6 mm	70 mm	102 mm	12			CD44774	4.20
	.2380	B		2-3/4	4	12	CD44302	2.95	CD44802	4.35
	.2420	C		2-3/4	4	12	CD44303	2.95	CD44803	4.35
	.2460	D		2-3/4	4	12	CD44304	2.95	CD44804	4.25
NEW	.2500	1/4		2-3/4	4	12	CD44016	2.80	CD44516	3.35
	.2500	E		2-3/4	4	12	CD44305	2.95	CD44805	3.75
	.2559		6.5 mm	73 mm	105 mm	6			CD44775	5.50
	.2570	F		2-7/8	4-1/8	6	CD44306	3.65	CD44806	4.90
	.2610	G		2-7/8	4-1/8	6	CD44307	3.65	CD44807	5.05
	.2656	17/64		2-7/8	4-1/8	6	CD44017	3.75	CD44517	4.35
	.2660	H		2-7/8	4-1/8	6	CD44308	3.65	CD44808	5.15
NEW	.2720	I		2-7/8	4-1/8	6	CD44309	3.65	CD44809	5.15
	.2756		7 mm	73 mm	105 mm	6			CD44776	5.85
	.2770	J		2-7/8	4-1/8	6	CD44310	4.45	CD44810	5.80
	.2810	K		2-15/16	4-1/4	6	CD44311	4.45	CD44811	6.00
	.2813	9/32		2-15/16	4-1/4	6	CD44018	4.05	CD44518	4.70
	.2900	L		2-15/16	4-1/4	6	CD44312	4.45	CD44812	5.85
	.2950	M		3-1/16	4-3/8	6	CD44313	5.45	CD44813	6.80
NEW	.2953		7.5 mm	78 mm	111 mm	6			CD44777	7.05
	.2969	19/64		3-1/16	4-3/8	6	CD44019	4.45	CD44519	5.15
	.3020	N		3-1/16	4-3/8	6	CD44314	5.45	CD44814	6.80
	.3125	5/16		3-3/16	4-1/2	6	CD44020	4.55	CD44520	5.40
	.3150		8 mm	81 mm	114 mm	6			CD44778	7.45
	.3160	O		3-3/16	4-1/2	6	CD44315	5.45	CD44815	6.85
	.3230	P		3-5/16	4-5/8	6	CD44316	6.10	CD44816	7.65
NEW	.3281	21/64		3-5/16	4-5/8	6	CD44021	5.15	CD44521	5.90
	.3320	Q		3-7/16	4-3/4	6	CD44317	6.10	CD44817	7.90
	.3346		8.5 mm	87 mm	121 mm	6			CD44779	8.25
	.3390	R		3-7/16	4-3/4	6	CD44318	6.10	CD44818	7.90
	.3438	11/32		3-7/16	4-3/4	6	CD44022	5.45	CD44522	6.35
	.3480	S		3-1/2	4-7/8	6	CD44319	7.00	CD44819	8.75
	.3543		9 mm	89 mm	124 mm	6			CD44780	9.15
NEW	.3580	T		3-1/2	4-7/8	6	CD44320	7.00	CD44820	9.20
	.3594	23/64		3-1/2	4-7/8	6	CD44023	5.75	CD44523	6.85
	.3680	U		3-5/8	5	6	CD44321	7.50	CD44821	9.20
	.3740		9.5 mm	92 mm	127 mm	6			CD44781	9.50
	.3750	3/8		3-5/8	5	6	CD44024	6.30	CD44524	7.25
	.3770	V		3-5/8	5	6	CD44322	7.50	CD44822	9.35
	.3860	W		3-3/4	5-1/8	6	CD44323	8.55	CD44823	11.50
NEW	.3906	25/64		3-3/4	5-1/8	6	CD44025	6.85	CD44525	7.85
	.3937		10 mm	95 mm	130 mm	6			CD44782	11.70
	.3970	X		3-3/4	5-1/8	6	CD44324	8.55	CD44824	13.55

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DRILLS - HIGH SPEED STEEL

Jobber Length - 135° Split Point (Cont.)

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DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH		BLACK AND GOLD OXIDE FINISH	
dec. equiv.	size	metric							
D ₁			L ₂	L ₁		TOOL #	USD\$	TOOL #	USD\$
.4040	Y		3-7/8	5-1/4	6	CD44325	9.20	CD44825	13.70
.4063	13/32		3-7/8	5-1/4	6	CD44026	7.50	CD44526	8.65
.4130	Z		3-7/8	5-1/4	6	CD44326	9.20	CD44826	14.05
.4134		10.5 mm	98 mm	133 mm	6			CD44783	11.70
.4219	27/64		3-15/16	5-3/8	6	CD44027	7.90	CD44527	9.15
.4331		11 mm	103 mm	140 mm	6			CD44784	11.85
.4375	7/16		4-1/16	5-1/2	6	CD44028	8.65	CD44528	9.95
.4528		11.5 mm	106 mm	143 mm	6			CD44785	13.45
.4531	29/64		4-3/16	5-5/8	6	CD44029	9.20	CD44529	10.55
.4688	15/32		4-5/16	5-3/4	6	CD44030	10.00	CD44530	11.45
.4724		12 mm	111 mm	149 mm	6			CD44786	14.60
.4844	31/64		4-3/8	5-7/8	6	CD44031	10.50	CD44531	12.05
.4921		12.5 mm	114 mm	152 mm	6			CD44787	14.90
.5000	1/2		4-1/2	6	6	CD44032	11.10	CD44532	12.55
.5118		13 mm	114 mm	152 mm	6			CD44788	22.50

NEW

NEW

NEW

NEW

NEW

NEW

For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Jobber Length - 118° Point - Black Oxide Finish



- Jobber length for deeper drilling applications
- 118° point
- Black Oxide finish increases wear resistance and adds lubricity to improve chip flow
- High speed steel
- Precision manufactured in the USA

DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH	
dec. equiv.	size	metric				TOOL #	USD\$
D1			L2	L1			
.0394		1 mm	17 mm	41 mm	12	CD42100	1.75
.0400	#60		11/16	1-5/8	12	CD40260	1.55
.0410	#59		11/16	1-5/8	12	CD40259	1.55
.0413		1.05 mm	17 mm	41 mm	12	CD42105	1.75
.0420	#58		11/16	1-5/8	12	CD40258	1.55
.0430	#57		3/4	1-3/4	12	CD40257	1.55
.0433		1.1 mm	19 mm	44 mm	12	CD42110	1.80
.0453		1.15 mm	19 mm	44 mm	12	CD42115	1.85
.0465	#56		3/4	1-3/4	12	CD40256	1.45
.0472		1.2 mm	22 mm	48 mm	12	CD42120	1.80
.0492		1.25 mm	22 mm	48 mm	12	CD42125	1.85
.0512		1.3 mm	22 mm	48 mm	12	CD42130	1.80
.0520	#55		7/8	1-7/8	12	CD40255	1.45
.0531		1.35 mm	22 mm	48 mm	12	CD42135	1.90
.0550	#54		7/8	1-7/8	12	CD40254	1.45
.0551		1.4 mm	22 mm	48 mm	12	CD42140	1.80
.0591		1.5 mm	22 mm	48 mm	12	CD42150	1.80
.0595	#53		7/8	1-7/8	12	CD40253	1.35
.0625	1/16		7/8	1-7/8	12	CD40004	1.40
.0630		1.6 mm	22 mm	48 mm	12	CD42160	1.80
.0635	#52		7/8	1-7/8	12	CD40252	1.35
.0669		1.7 mm	25 mm	51 mm	12	CD42170	1.85
.0670	#51		1	2	12	CD40251	1.35
.0700	#50		1	2	12	CD40250	1.35
.0709		1.8 mm	25 mm	51 mm	12	CD42180	1.85
.0730	#49		1	2	12	CD40249	1.35
.0748		1.9 mm	25 mm	51 mm	12	CD42190	1.85
.0760	#48		1	2	12	CD40248	1.35
.0781	5/64		1	2	12	CD40005	1.40
.0785	#47		1	2	12	CD40247	1.35
.0787		2 mm	25 mm	51 mm	12	CD42200	1.85
.0810	#46		1-1/8	2-1/8	12	CD40246	1.35
.0820	#45		1-1/8	2-1/8	12	CD40245	1.35
.0860	#44		1-1/8	2-1/8	12	CD40244	1.30
.0890	#43		1-1/4	2-1/4	12	CD40243	1.30
.0935	#42		1-1/4	2-1/4	12	CD40242	1.30

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For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Jobber Length - 118° Point - Black Oxide Finish (Cont.)

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DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH	
dec. equiv.	size	metric				TOOL #	USD\$
D ₁			L ₂	L ₁			
.0938	3/32		1-1/4	2-1/4	12	CD40006	1.40
.0960	#41		1-3/8	2-3/8	12	CD40241	1.30
.0980	#40		1-3/8	2-3/8	12	CD40240	1.30
.0984		2.5 mm	35 mm	60 mm	12	CD42250	1.90
.0995	#39		1-3/8	2-3/8	12	CD40239	1.30
.1015	#38		1-7/16	2-1/2	12	CD40238	1.30
.1040	#37		1-7/16	2-1/2	12	CD40237	1.30
.1065	#36		1-7/16	2-1/2	12	CD40236	1.30
.1094	7/64		1-1/2	2-5/8	12	CD40007	1.40
.1100	#35		1-1/2	2-5/8	12	CD40235	1.30
.1110	#34		1-1/2	2-5/8	12	CD40234	1.30
.1130	#33		1-1/2	2-5/8	12	CD40233	1.30
.1160	#32		1-5/8	2-3/4	12	CD40232	1.30
.1181		3 mm	41 mm	70 mm	12	CD42300	1.95
.1200	#31		1-5/8	2-3/4	12	CD40231	1.30
.1250	1/8		1-5/8	2-3/4	12	CD40008	1.40
.1285	#30		1-5/8	2-3/4	12	CD40230	1.35
.1360	#29		1-3/4	2-7/8	12	CD40229	1.35
.1378		3.5 mm	45 mm	73 mm	12	CD42350	2.10
.1405	#28		1-3/4	2-7/8	12	CD40228	1.35
.1406	9/64		1-3/4	2-7/8	12	CD40009	1.45
.1440	#27		1-7/8	3	12	CD40227	1.45
.1470	#26		1-7/8	3	12	CD40226	1.45
.1495	#25		1-7/8	3	12	CD40225	1.45
.1520	#24		2	3-1/8	12	CD40224	1.60
.1540	#23		2	3-1/8	12	CD40223	1.60
.1563	5/32		2	3-1/8	12	CD40010	1.50
.1570	#22		2	3-1/8	12	CD40222	1.60
.1575		4 mm	54 mm	83 mm	12	CD42400	2.20
.1590	#21		2-1/8	3-1/4	12	CD40221	1.70
.1610	#20		2-1/8	3-1/4	12	CD40220	1.70
.1660	#19		2-1/8	3-1/4	12	CD40219	1.85
.1695	#18		2-1/8	3-1/4	12	CD40218	1.85
.1719	11/64		2-1/8	3-1/4	12	CD40011	1.60
.1730	#17		2-3/16	3-3/8	12	CD40217	1.85
.1770	#16		2-3/16	3-3/8	12	CD40216	1.90
.1772		4.5 mm	56 mm	86 mm	12	CD42450	2.45
.1800	#15		2-3/16	3-3/8	12	CD40215	1.90
.1820	#14		2-3/16	3-3/8	12	CD40214	1.90
.1850	#13		2-5/16	3-1/2	12	CD40213	2.05
.1875	3/16		2-5/16	3-1/2	12	CD40012	1.75
.1890	#12		2-5/16	3-1/2	12	CD40212	2.05
.1910	#11		2-5/16	3-1/2	12	CD40211	2.05
.1935	#10		2-7/16	3-5/8	12	CD40210	2.05
.1960	#9		2-7/16	3-5/8	12	CD40209	2.15
.1969		5 mm	62 mm	92 mm	12	CD42500	2.65

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DRILLS - HIGH SPEED STEEL

Jobber Length - 118° Point - Black Oxide Finish (Cont.)

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DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH	
dec. equiv.	size	metric				TOOL #	USD\$
	D ₁		L ₂	L ₁			
.1990	#8		2-7/16	3-5/8	12	CD40208	2.30
.2010	#7		2-7/16	3-5/8	12	CD40207	2.30
.2031	13/64		2-7/16	3-5/8	12	CD40013	1.90
.2040	#6		2-1/2	3-3/4	12	CD40206	2.35
.2055	#5		2-1/2	3-3/4	12	CD40205	2.35
.2090	#4		2-1/2	3-3/4	12	CD40204	2.40
.2130	#3		2-1/2	3-3/4	12	CD40203	2.40
.2165		5.5 mm	64 mm	95 mm	12	CD42550	3.00
.2188	7/32		2-1/2	3-3/4	12	CD40014	2.10
.2210	#2		2-5/8	3-7/8	12	CD40202	2.55
.2280	#1		2-5/8	3-7/8	12	CD40201	2.55
.2340	A		2-5/8	3-7/8	12	CD40301	2.40
.2344	15/64		2-5/8	3-7/8	12	CD40015	2.40
.2362		6 mm	70 mm	102 mm	12	CD42600	3.25
.2380	B		2-3/4	4	12	CD40302	2.40
.2420	C		2-3/4	4	12	CD40303	2.40
.2460	D		2-3/4	4	12	CD40304	2.50
.2500	1/4		2-3/4	4	12	CD40016	2.40
.2500	E		2-3/4	4	12	CD40305	2.50
.2559		6.5 mm	73 mm	105 mm	6	CD42650	4.15
.2570	F		2-7/8	4-1/8	6	CD40306	3.35
.2610	G		2-7/8	4-1/8	6	CD40307	3.20
.2656	17/64		2-7/8	4-1/8	6	CD40017	3.35
.2660	H		2-7/8	4-1/8	6	CD40308	3.25
.2720	I		2-7/8	4-1/8	6	CD40309	3.35
.2756		7 mm	73 mm	105 mm	6	CD42700	4.30
.2770	J		2-7/8	4-1/8	6	CD40310	3.45
.2810	K		2-15/16	4-1/4	6	CD40311	3.50
.2813	9/32		2-15/16	4-1/4	6	CD40018	3.50
.2900	L		2-15/16	4-1/4	6	CD40312	3.60
.2950	M		3-1/16	4-3/8	6	CD40313	3.95
.2953		7.5 mm	78 mm	111 mm	6	CD42750	5.00
.2969	19/64		3-1/16	4-3/8	6	CD40019	3.90
.3020	N		3-1/16	4-3/8	6	CD40314	4.05
.3125	5/16		3-3/16	4-1/2	6	CD40020	4.05
.3150		8 mm	81 mm	114 mm	6	CD42800	5.50
.3160	O		3-3/16	4-1/2	6	CD40315	4.30
.3230	P		3-5/16	4-5/8	6	CD40316	4.65
.3281	21/64		3-5/16	4-5/8	6	CD40021	4.45
.3320	Q		3-7/16	4-3/4	6	CD40317	4.80
.3346		8.5 mm	87 mm	121 mm	6	CD42850	6.30
.3390	R		3-7/16	4-3/4	6	CD40318	5.00
.3438	11/32		3-7/16	4-3/4	6	CD40022	4.75
.3480	S		3-1/2	4-7/8	6	CD40319	5.20
.3543		9 mm	89 mm	124 mm	6	CD42900	7.10
.3580	T		3-1/2	4-7/8	6	CD40320	5.55

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DRILLS - HIGH SPEED STEEL

Jobber Length - 118° Point - Black Oxide Finish (Cont.)

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DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH	
dec. equiv.	size	metric				TOOL #	USD\$
D ₁			L ₂	L ₁			
.3594	23/64		3-1/2	4-7/8	6	CD40023	5.20
.3680	U		3-5/8	5	6	CD40321	5.90
.3740		9.5 mm	92 mm	127 mm	6	CD42950	7.50
.3750	3/8		3-5/8	5	6	CD40024	5.55
.3770	V		3-5/8	5	6	CD40322	6.20
.3860	W		3-3/4	5-1/8	6	CD40323	6.50
.3906	25/64		3-3/4	5-1/8	6	CD40025	5.90
.3937		10 mm	95 mm	130 mm	6	CD43100	9.15
.3970	X		3-3/4	5-1/8	6	CD40324	6.90
.4040	Y		3-7/8	5-1/4	6	CD40325	7.30
.4063	13/32		3-7/8	5-1/4	6	CD40026	6.45
.4130	Z		3-7/8	5-1/4	6	CD40326	7.45
.4134		10.5 mm	98 mm	133 mm	6	CD43105	9.15
.4219	27/64		3-15/16	5-3/8	6	CD40027	6.90
.4331		11 mm	103 mm	140 mm	6	CD43110	9.30
.4375	7/16		4-1/16	5-1/2	6	CD40028	7.50
.4528		11.5 mm	106 mm	143 mm	6	CD43115	10.50
.4531	29/64		4-3/16	5-5/8	6	CD40029	8.00
.4688	15/32		4-5/16	5-3/4	6	CD40030	8.75
.4724		12 mm	111 mm	149 mm	6	CD43120	11.60
.4844	31/64		4-3/8	5-7/8	6	CD40031	9.20
.4921		12.5 mm	114 mm	152 mm	6	CD43125	11.95
.5000	1/2		4-1/2	6	6	CD40032	9.60
.5118		13 mm	114 mm	152 mm	6	CD43130	19.70
.5156	33/64		4-13/16	6-5/8	1	CD40033	22.75
.5313	17/32		4-13/16	6-5/8	1	CD40034	23.85
.5469	35/64		4-13/16	6-5/8	1	CD40035	25.85
.5625	9/16		4-13/16	6-5/8	1	CD40036	27.05
.5781	37/64		4-13/16	6-5/8	1	CD40037	27.25
.5938	19/32		5-3/16	7-1/8	1	CD40038	27.95
.6094	39/64		5-3/16	7-1/8	1	CD40039	30.60
.6250	5/8		5-3/16	7-1/8	1	CD40040	29.95
.6406	41/64		5-3/16	7-1/8	1	CD40041	32.75
.6563	21/32		5-3/16	7-1/8	1	CD40042	31.70
.6719	43/64		5-5/8	7-5/8	1	CD40043	37.20
.6875	11/16		5-5/8	7-5/8	1	CD40044	36.60

For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Jobber Length - 118° Point - Bright Finish & TiN Coated



- Jobber length for deeper drilling applications
- 118° point
- Bright finish improves performance in plastics and other non-ferrous materials
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

	DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BRIGHT FINISH		TIN COATED	
	dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
	D1			L2	L1					
NEW	.0394		1 mm	17 mm	41 mm	12	CD40964	1.60	CD47764	3.70
	.0400	#60		11/16	1-5/8	12	CD40860	1.55	CD47760	3.50
	.0410	#59		11/16	1-5/8	12	CD40859	1.55	CD47759	3.50
	.0420	#58		11/16	1-5/8	12	CD40858	1.55	CD47758	3.50
	.0430	#57		3/4	1-3/4	12	CD40857	1.55	CD47757	3.50
	.0465	#56		3/4	1-3/4	12	CD40856	1.45	CD47756	3.50
	.0520	#55		7/8	1-7/8	12	CD40855	1.45	CD47755	3.50
	.0550	#54		7/8	1-7/8	12	CD40854	1.45	CD47754	3.40
NEW	.0591		1.5 mm	22 mm	48 mm	12	CD40965	1.65	CD47765	3.75
	.0595	#53		7/8	1-7/8	12	CD40853	1.35	CD47753	3.50
	.0625	1/16		7/8	1-7/8	12	CD40604	1.40	CD47504	3.55
	.0635	#52		7/8	1-7/8	12	CD40852	1.35	CD47752	3.50
	.0670	#51		1	2	12	CD40851	1.35	CD47751	3.50
	.0700	#50		1	2	12	CD40850	1.35	CD47750	3.50
	.0730	#49		1	2	12	CD40849	1.35	CD47749	3.50
	.0760	#48		1	2	12	CD40848	1.35	CD47748	3.50
	.0781	5/64		1	2	12	CD40605	1.40	CD47505	3.55
	.0785	#47		1	2	12	CD40847	1.35	CD47747	3.50
NEW	.0787		2 mm	25 mm	51 mm	12	CD40966	1.70	CD47766	3.90
	.0810	#46		1-1/8	2-1/8	12	CD40846	1.35	CD47746	3.60
	.0820	#45		1-1/8	2-1/8	12	CD40845	1.35	CD47745	3.60
	.0860	#44		1-1/8	2-1/8	12	CD40844	1.30	CD47744	3.50
	.0890	#43		1-1/4	2-1/4	12	CD40843	1.30	CD47743	3.50
	.0935	#42		1-1/4	2-1/4	12	CD40842	1.30	CD47742	3.50
	.0938	3/32		1-1/4	2-1/4	12	CD40606	1.40	CD47506	3.50
	.0960	#41		1-3/8	2-3/8	12	CD40841	1.30	CD47741	3.40
	.0980	#40		1-3/8	2-3/8	12	CD40840	1.30	CD47740	3.50
NEW	.0984		2.5 mm	35 mm	60 mm	12	CD40967	1.75	CD47767	3.95
	.0995	#39		1-3/8	2-3/8	12	CD40839	1.30	CD47739	3.50
	.1015	#38		1-7/16	2-1/2	12	CD40838	1.30	CD47738	3.50
	.1040	#37		1-7/16	2-1/2	12	CD40837	1.30	CD47737	3.50
	.1065	#36		1-7/16	2-1/2	12	CD40836	1.30	CD47736	3.50
	.1094	7/64		1-1/2	2-5/8	12	CD40607	1.40	CD47507	3.65
	.1100	#35		1-1/2	2-5/8	12	CD40835	1.30	CD47735	3.55
	.1110	#34		1-1/2	2-5/8	12	CD40834	1.30	CD47734	3.55

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For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Jobber Length - 118° Point - Bright Finish & TiN Coated (Cont.)

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DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BRIGHT FINISH		TIN COATED	
dec. equiv.	size	metric							
D1			L2	L1		TOOL #	USD\$	TOOL #	USD\$
.1130	#33		1-1/2	2-5/8	12	CD40833	1.30	CD47733	3.55
.1160	#32		1-5/8	2-3/4	12	CD40832	1.30	CD47732	3.55
.1181		3 mm	41 mm	70 mm	12	CD40968	1.80	CD47768	4.00
.1200	#31		1-5/8	2-3/4	12	CD40831	1.30	CD47731	3.55
.1250	1/8		1-5/8	2-3/4	12	CD40608	1.40	CD47508	3.65
.1285	#30		1-5/8	2-3/4	12	CD40830	1.35	CD47730	3.55
.1360	#29		1-3/4	2-7/8	12	CD40829	1.35	CD47729	4.25
.1378		3.5 mm	45 mm	73 mm	12	CD40969	1.90	CD47769	4.40
.1405	#28		1-3/4	2-7/8	12	CD40828	1.35	CD47728	4.25
.1406	9/64		1-3/4	2-7/8	12	CD40609	1.45	CD47509	3.75
.1440	#27		1-7/8	3	12	CD40827	1.45	CD47727	4.35
.1470	#26		1-7/8	3	12	CD40826	1.45	CD47726	4.35
.1495	#25		1-7/8	3	12	CD40825	1.45	CD47725	4.35
.1520	#24		2	3-1/8	12	CD40824	1.60	CD47724	4.45
.1540	#23		2	3-1/8	12	CD40823	1.60	CD47723	4.45
.1563	5/32		2	3-1/8	12	CD40610	1.50	CD47510	4.15
.1570	#22		2	3-1/8	12	CD40822	1.60	CD47722	4.55
.1575		4 mm	54 mm	83 mm	12	CD40970	2.00	CD47770	4.70
.1590	#21		2-1/8	3-1/4	12	CD40821	1.70	CD47721	4.55
.1610	#20		2-1/8	3-1/4	12	CD40820	1.70	CD47720	4.60
.1660	#19		2-1/8	3-1/4	12	CD40819	1.85	CD47719	4.60
.1695	#18		2-1/8	3-1/4	12	CD40818	1.85	CD47718	4.60
.1719	11/64		2-1/8	3-1/4	12	CD40611	1.60	CD47511	4.20
.1730	#17		2-3/16	3-3/8	12	CD40817	1.85	CD47717	5.10
.1770	#16		2-3/16	3-3/8	12	CD40816	1.90	CD47716	5.10
.1772		4.5 mm	56 mm	86 mm	12	CD40971	2.25	CD47771	4.95
.1800	#15		2-3/16	3-3/8	12	CD40815	1.90	CD47715	5.10
.1820	#14		2-3/16	3-3/8	12	CD40814	1.90	CD47714	5.10
.1850	#13		2-5/16	3-1/2	12	CD40813	2.00	CD47713	6.40
.1875	3/16		2-5/16	3-1/2	12	CD40612	1.75	CD47512	4.35
.1890	#12		2-5/16	3-1/2	12	CD40812	2.00	CD47712	5.15
.1910	#11		2-5/16	3-1/2	12	CD40811	2.00	CD47711	6.00
.1935	#10		2-7/16	3-5/8	12	CD40810	2.00	CD47710	6.35
.1960	#9		2-7/16	3-5/8	12	CD40809	2.20	CD47709	6.35
.1969		5 mm	62 mm	92 mm	12	CD40972	2.45	CD47772	5.65
.1990	#8		2-7/16	3-5/8	12	CD40808	2.30	CD47708	6.35
.2010	#7		2-7/16	3-5/8	12	CD40807	2.30	CD47707	6.35
.2031	13/64		2-7/16	3-5/8	12	CD40613	1.90	CD47513	6.30
.2040	#6		2-1/2	3-3/4	12	CD40806	2.35	CD47706	6.70
.2055	#5		2-1/2	3-3/4	12	CD40805	2.35	CD47705	6.70
.2090	#4		2-1/2	3-3/4	12	CD40804	2.40	CD47704	6.70
.2130	#3		2-1/2	3-3/4	12	CD40803	2.40	CD47703	6.70
.2165		5.5 mm	64 mm	95 mm	12	CD40973	2.75	CD47773	5.95
.2188	7/32		2-1/2	3-3/4	12	CD40614	2.10	CD47514	6.40
.2210	#2		2-5/8	3-7/8	12	CD40802	2.55	CD47702	7.05

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For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Jobber Length - 118° Point - Bright Finish & TiN Coated (Cont.)

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	DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BRIGHT FINISH		TIN COATED	
	dec. equiv.	size	metric				TOOL #	USD\$	TOOL #	USD\$
	D ₁			L ₂	L ₁					
NEW	.2280	#1		2-5/8	3-7/8	12	CD40801	2.55	CD47701	7.05
	.2340	A		2-5/8	3-7/8	12	CD40901	2.40	CD47601	7.05
	.2344	15/64		2-5/8	3-7/8	12	CD40615	2.40	CD47515	6.70
	.2362		6 mm	70 mm	102 mm	12	CD40974	2.95	CD47774	6.40
	.2380	B		2-3/4	4	12	CD40902	2.40	CD47602	7.20
	.2420	C		2-3/4	4	12	CD40903	2.40	CD47603	7.20
	.2460	D		2-3/4	4	12	CD40904	2.50	CD47604	7.20
NEW	.2500	1/4		2-3/4	4	12	CD40616	2.40	CD47516	6.90
	.2500	E		2-3/4	4	12	CD40905	2.50	CD47605	6.90
	.2559		6.5 mm	73 mm	105 mm	6	CD40975	3.75	CD47775	7.90
	.2570	F		2-7/8	4-1/8	6	CD40906	3.35	CD47606	10.90
	.2610	G		2-7/8	4-1/8	6	CD40907	3.25	CD47607	10.90
	.2656	17/64		2-7/8	4-1/8	6	CD40617	3.35	CD47517	9.80
	.2660	H		2-7/8	4-1/8	6	CD40908	3.30	CD47608	10.90
NEW	.2720	I		2-7/8	4-1/8	6	CD40909	3.35	CD47609	10.90
	.2756		7 mm	73 mm	105 mm	6	CD40976	3.90	CD47776	8.05
	.2770	J		2-7/8	4-1/8	6	CD40910	3.45	CD47610	10.95
	.2810	K		2-15/16	4-1/4	6	CD40911	3.50	CD47611	11.80
	.2813	9/32		2-15/16	4-1/4	6	CD40618	3.50	CD47518	10.35
	.2900	L		2-15/16	4-1/4	6	CD40912	3.60	CD47612	11.80
	.2950	M		3-1/16	4-3/8	6	CD40913	3.90	CD47613	11.95
NEW	.2953		7.5 mm	78 mm	111 mm	6	CD40977	4.55	CD47777	8.70
	.2969	19/64		3-1/16	4-3/8	6	CD40619	3.80	CD47519	10.60
	.3020	N		3-1/16	4-3/8	6	CD40914	4.05	CD47614	12.20
	.3125	5/16		3-3/16	4-1/2	6	CD40620	4.05	CD47520	10.80
	.3150		8 mm	81 mm	114 mm	6	CD40978	5.00	CD47778	9.95
	.3160	O		3-3/16	4-1/2	6	CD40915	4.35	CD47615	12.50
	.3230	P		3-5/16	4-5/8	6	CD40916	4.60	CD47616	12.80
NEW	.3281	21/64		3-5/16	4-5/8	6	CD40621	4.45	CD47521	12.60
	.3320	Q		3-7/16	4-3/4	6	CD40917	4.80	CD47617	13.00
	.3346		8.5 mm	87 mm	121 mm	6	CD40979	5.70	CD47779	10.65
	.3390	R		3-7/16	4-3/4	6	CD40918	4.90	CD47618	13.10
	.3438	11/32		3-7/16	4-3/4	6	CD40622	4.70	CD47522	12.95
	.3480	S		3-1/2	4-7/8	6	CD40919	5.20	CD47619	16.45
	.3543		9 mm	89 mm	124 mm	6	CD40980	6.50	CD47780	11.45
NEW	.3580	T		3-1/2	4-7/8	6	CD40920	5.45	CD47620	17.30
	.3594	23/64		3-1/2	4-7/8	6	CD40623	5.20	CD47523	14.60
	.3680	U		3-5/8	5	6	CD40921	5.90	CD47621	17.30
	.3740		9.5 mm	92 mm	127 mm	6	CD40981	6.80	CD47781	11.75
	.3750	3/8		3-5/8	5	6	CD40624	5.45	CD47524	14.75
	.3770	V		3-5/8	5	6	CD40922	6.10	CD47622	17.50
	.3860	W		3-3/4	5-1/8	6	CD40923	6.45	CD47623	20.20
NEW	.3906	25/64		3-3/4	5-1/8	6	CD40625	5.90	CD47525	18.25
	.3937		10 mm	95 mm	130 mm	6	CD40982	8.35	CD47782	14.55
	.3970	X		3-3/4	5-1/8	6	CD40924	6.90	CD47624	21.85

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DRILLS - HIGH SPEED STEEL

Jobber Length - 118° Point - Bright Finish & TiN Coated (Cont.)

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DRILL DIAMETER			FLUTE LENGTH	OAL	PACKAGE QTY.	BRIGHT FINISH		TIN COATED	
dec. equiv.	size	metric							
D1			L2	L1		TOOL #	USD\$	TOOL #	USD\$
.4040	Y		3-7/8	5-1/4	6	CD40925	7.15	CD47625	23.15
.4063	13/32		3-7/8	5-1/4	6	CD40626	6.45	CD47526	18.60
.4130	Z		3-7/8	5-1/4	6	CD40926	7.50	CD47626	23.50
.4134		10.5 mm	98 mm	133 mm	6	CD40983	8.35	CD47783	14.55
.4219	27/64		3-15/16	5-3/8	6	CD40627	6.85	CD47527	19.40
.4331		11 mm	103 mm	140 mm	6	CD40984	8.50	CD47784	14.70
.4375	7/16		4-1/16	5-1/2	6	CD40628	7.55	CD47528	19.75
.4528		11.5 mm	106 mm	143 mm	6	CD40985	9.60	CD47785	16.85
.4531	29/64		4-3/16	5-5/8	6	CD40629	7.95	CD47529	21.65
.4688	15/32		4-5/16	5-3/4	6	CD40630	8.70	CD47530	22.35
.4724		12 mm	111 mm	149 mm	6	CD40986	10.60	CD47786	17.85
.4844	31/64		4-3/8	5-7/8	6	CD40631	9.15	CD47531	22.50
.4921		12.5 mm	114 mm	152 mm	6	CD40987	10.85	CD47787	18.10
.5000	1/2		4-1/2	6	6	CD40632	9.60	CD47532	22.95
.5118		13 mm	114 mm	152 mm	6	CD40988	17.90	CD47788	26.30

NEW

NEW

NEW

NEW

NEW

NEW

For technical information, see page 264 - 265

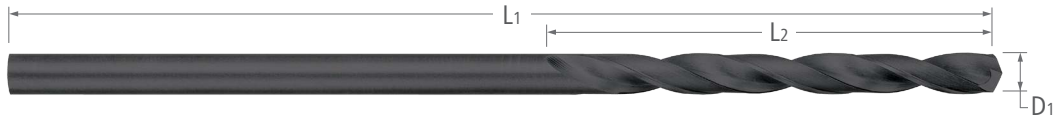
DRILLS - HIGH SPEED STEEL

Jobber Length - 118° Point - Left Hand Spiral - Bright Finish



- Jobber length for deeper drilling applications
- 118° point
- Left-hand spiral design for reverse machining or for the removal of broken screws
- Bright finish improves performance in plastics and other non-ferrous materials
- High speed steel
- Precision manufactured in the USA

DRILL DIAMETER		FLUTE LENGTH	OAL	PACKAGE QTY.	BRIGHT FINISH	
dec. equiv.	size				TOOL #	USD\$
D1		L2	L1			
.0625	1/16	7/8	1-7/8	12	CD68200	1.45
.0781	5/64	1	2	12	CD68201	1.45
.0938	3/32	1-1/4	2-1/4	12	CD68202	1.45
.1094	7/64	1-1/2	2-5/8	12	CD68203	1.45
.1250	1/8	1-5/8	2-3/4	12	CD68204	1.45
.1406	9/64	1-3/4	2-7/8	12	CD68205	1.55
.1563	5/32	2	3-1/8	12	CD68206	1.80
.1719	11/64	2-1/8	3-1/4	12	CD68207	1.90
.1875	3/16	2-5/16	3-1/2	12	CD68208	2.10
.2031	13/64	2-7/16	3-5/8	12	CD68209	2.35
.2188	7/32	2-1/2	3-3/4	12	CD68210	2.50
.2344	15/64	2-5/8	3-7/8	12	CD68211	2.65
.2500	1/4	2-3/4	4	12	CD68212	2.85
.2656	17/64	2-7/8	4-1/8	6	CD68213	3.80
.2813	9/32	2-15/16	4-1/4	6	CD68214	4.15
.2969	19/64	3-1/16	4-3/8	6	CD68215	4.55
.3125	5/16	3-3/16	4-1/2	6	CD68216	4.65
.3281	21/64	3-5/16	4-5/8	6	CD68217	5.25
.3438	11/32	3-7/16	4-3/4	6	CD68218	5.55
.3594	23/64	3-1/2	4-7/8	6	CD68219	5.85
.3750	3/8	3-5/8	5	6	CD68220	6.40
.3906	25/64	3-3/4	5-1/8	6	CD68221	6.95
.4063	13/32	3-7/8	5-1/4	6	CD68222	7.65
.4219	27/64	3-15/16	5-3/8	6	CD68223	8.05
.4375	7/16	4-1/16	5-1/2	6	CD68224	8.80
.4531	29/64	4-3/16	5-5/8	6	CD68225	9.35
.4688	15/32	4-5/16	5-3/4	6	CD68226	10.20
.4844	31/64	4-3/8	5-7/8	6	CD68227	10.80
.5000	1/2	4-1/2	6	6	CD68228	11.35

DRILLS - HIGH SPEED STEEL**Aircraft Extension Drills - 135° Split Point**

- 135° Split Point, Type "B"
- Black Oxide finish increases wear resistance and adds lubricity to improve chip flow
- Offered in 6" and 12" overall lengths
- High speed steel
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH	
D1		L2	L1		TOOL #	USD\$
.0938	3/32	1-1/4	6	6	CD67506	5.40
.0980	#40	1-5/8	6	6	CD67640	4.85
.0980	#40	1-3/8	12	6	CD68140	17.10
.1094	7/64	1-1/2	6	6	CD67507	5.40
.1250	1/8	1-5/8	6	6	CD67508	5.35
.1250	1/8	1-5/8	12	6	CD68008	15.30
.1285	#30	1-5/8	6	6	CD67630	5.90
.1285	#30	1-5/8	12	6	CD68130	17.10
.1360	#29	1-3/4	6	6	CD67629	7.70
.1360	#29	1-3/4	12	6	CD68129	18.15
.1406	9/64	1-3/4	6	6	CD67509	6.30
.1406	9/64	1-3/4	12	6	CD68009	15.40
.1563	5/32	2	6	6	CD67510	6.95
.1563	5/32	2	12	6	CD68010	15.40
.1590	#21	2-1/8	6	6	CD67621	7.20
.1590	#21	2-1/8	12	6	CD68121	12.77
.1610	#20	2-1/8	6	6	CD67620	6.90
.1610	#20	2-1/8	12	6	CD68120	17.50
.1719	11/64	2-1/8	6	6	CD67511	7.70
.1719	11/64	2-1/8	12	6	CD68011	17.50
.1875	3/16	2-5/16	6	6	CD67512	7.65
.1875	3/16	2-5/16	12	6	CD68012	17.25
.1910	#11	2-5/16	6	6	CD67611	8.30
.1910	#11	2-5/16	12	6	CD68111	19.35
.1935	#10	2-7/16	6	6	CD67610	8.30
.1935	#10	2-7/16	12	6	CD68110	19.20
.2031	13/64	2-7/16	6	6	CD67513	9.25
.2031	13/64	2-7/16	12	6	CD68013	19.75
.2188	7/32	2-1/2	6	6	CD67514	9.25
.2188	7/32	2-1/2	12	6	CD68014	19.50
.2210	#2	2-5/8	6	6	CD67602	10.75
.2280	#1	2-5/8	6	6	CD67601	10.75
.2280	#1	2-5/8	12	6	CD68101	23.85
.2344	15/64	2-5/8	6	6	CD67515	10.30
.2344	15/64	2-5/8	12	6	CD68015	22.00
.2500	1/4	2-3/4	6	6	CD67516	9.20
.2500	1/4	2-3/4	12	6	CD68016	23.85

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For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Aircraft Extension Drills - 135° Split Point (Cont.)

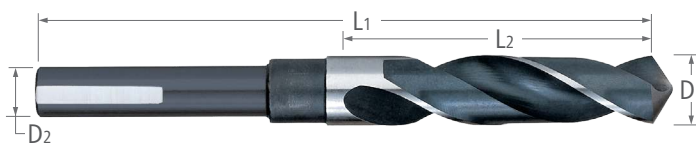
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DRILL DIAMETER		FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH	
dec. equiv.	size					
D ₁		L ₂	L ₁		TOOL #	USD\$
.2656	17/64	2-7/8	6	1	CD67517	23.35
.2656	17/64	2-7/8	12	1	CD68017	27.85
.2813	9/32	2-15/16	6	1	CD67518	24.15
.2813	9/32	2-15/16	12	1	CD68018	27.35
.2969	19/64	3-1/16	6	1	CD67519	28.45
.2969	19/64	3-1/16	12	1	CD68019	22.97
.3125	5/16	3-3/16	6	1	CD67520	30.75
.3125	5/16	3-3/16	12	1	CD68020	33.85
.3281	21/64	3-5/16	6	1	CD67521	33.20
.3281	21/64	3-5/16	12	1	CD68021	36.70
.3438	11/32	3-7/16	6	1	CD67522	33.20
.3438	11/32	3-7/16	12	1	CD68022	36.30
.3594	23/64	3-1/2	6	1	CD67523	36.95
.3594	23/64	3-1/2	12	1	CD68023	41.00
.3750	3/8	3-5/8	6	1	CD67524	37.75
.3750	3/8	3-5/8	12	1	CD68024	41.55
.3906	25/64	3-3/4	12	1	CD68025	46.10
.4063	13/32	3-7/8	12	1	CD68026	44.65
.4219	27/64	3-15/16	12	1	CD68027	49.20
.4375	7/16	4-1/16	12	1	CD68028	49.10
.4531	29/64	4-3/16	12	1	CD68029	55.35
.4688	15/32	4-5/16	12	1	CD68030	57.35
.4844	31/64	4-3/8	12	1	CD68031	59.50
.5000	1/2	4-1/2	12	1	CD68032	59.15

Drills
Carbide
Cobalt
HSS

DRILLS - HIGH SPEED STEEL

Silver & Deming - 118° Point - 3 Flats



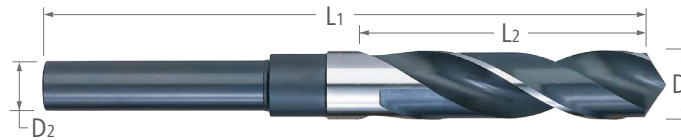
- 3" flute length
- 118° point
- 1/2" shank
- 3 flats on shank to prevent spinning in a 3 Jaw Chuck
- Bright finish on cut edge for better chip evacuation; Black Oxide finish holds cutting oil for better abrasion resistance.
- High speed steel
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	SHAK DIA.	BRIGHT & BLACK OXIDE FINISH	
D1		L2	L1	D2	TOOL #	USD\$
.5156	33/64	3	6	1/2	SD92533	25.20
.5313	17/32	3	6	1/2	SD92534	25.20
.5469	35/64	3	6	1/2	SD92535	26.80
.5625	9/16	3	6	1/2	SD92536	26.80
.5781	37/64	3	6	1/2	SD92537	28.75
.5938	19/32	3	6	1/2	SD92538	28.75
.6094	39/64	3	6	1/2	SD92539	30.15
.6250	5/8	3	6	1/2	SD92540	30.15
.6406	41/64	3	6	1/2	SD92541	32.15
.6563	21/32	3	6	1/2	SD92542	32.15
.6719	43/64	3	6	1/2	SD92543	33.45
.6875	11/16	3	6	1/2	SD92544	33.45
.7031	45/64	3	6	1/2	SD92545	33.85
.7188	23/32	3	6	1/2	SD92546	33.85
.7344	47/64	3	6	1/2	SD92547	36.95
.7500	3/4	3	6	1/2	SD92548	36.95
.7656	49/64	3	6	1/2	SD92549	39.35
.7813	25/32	3	6	1/2	SD92550	39.35
.7969	51/64	3	6	1/2	SD92551	43.15
.8125	13/16	3	6	1/2	SD92552	43.15
.8281	53/64	3	6	1/2	SD92553	45.00
.8438	27/32	3	6	1/2	SD92554	45.00
.8594	55/64	3	6	1/2	SD92555	48.00
.8750	7/8	3	6	1/2	SD92556	48.00
.8906	57/64	3	6	1/2	SD92557	49.80
.9063	29/32	3	6	1/2	SD92558	49.80
.9219	59/64	3	6	1/2	SD92559	51.00
.9375	15/16	3	6	1/2	SD92560	51.00
.9531	61/64	3	6	1/2	SD92561	53.35
.9688	31/32	3	6	1/2	SD92562	53.35
.9844	63/64	3	6	1/2	SD92563	58.45
1.0000	1	3	6	1/2	SD92564	58.45

For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

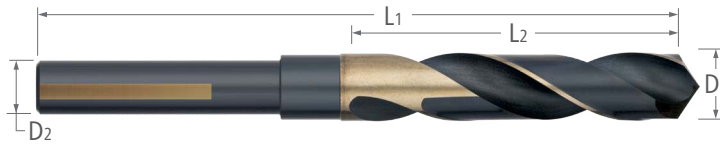
Silver & Deming - 118° Point



- 3" flute length
- 118° point
- 1/2" shank
- Bright finish on cut edge for better chip evacuation; Black Oxide finish holds cutting oil for better abrasion resistance and lubricity.
- High speed steel
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	SHANK DIA.	BRIGHT & BLACK OXIDE FINISH	
D ₁		L ₂	L ₁	D ₂	TOOL #	USD\$
.5156	33/64	3	6	1/2	SD91433	25.00
.5313	17/32	3	6	1/2	SD91434	25.00
.5469	35/64	3	6	1/2	SD91435	26.45
.5625	9/16	3	6	1/2	SD91436	26.45
.5781	37/64	3	6	1/2	SD91437	28.35
.5938	19/32	3	6	1/2	SD91438	28.35
.6094	39/64	3	6	1/2	SD91439	29.95
.6250	5/8	3	6	1/2	SD91440	29.95
.6406	41/64	3	6	1/2	SD91441	31.20
.6563	21/32	3	6	1/2	SD91442	31.20
.6719	43/64	3	6	1/2	SD91443	33.30
.6875	11/16	3	6	1/2	SD91444	33.30
.7031	45/64	3	6	1/2	SD91445	33.30
.7188	23/32	3	6	1/2	SD91446	33.30
.7344	47/64	3	6	1/2	SD91447	36.25
.7500	3/4	3	6	1/2	SD91448	36.35
.7656	49/64	3	6	1/2	SD91449	38.55
.7813	25/32	3	6	1/2	SD91450	38.55
.7969	51/64	3	6	1/2	SD91451	40.55
.8125	13/16	3	6	1/2	SD91452	40.55
.8281	53/64	3	6	1/2	SD91453	42.35
.8438	27/32	3	6	1/2	SD91454	42.35
.8594	55/64	3	6	1/2	SD91455	43.80
.8750	7/8	3	6	1/2	SD91456	43.80
.8906	57/64	3	6	1/2	SD91457	45.30
.9063	29/32	3	6	1/2	SD91458	45.30
.9219	59/64	3	6	1/2	SD91459	49.35
.9375	15/16	3	6	1/2	SD91460	49.35
.9531	61/64	3	6	1/2	SD91461	51.75
.9688	31/32	3	6	1/2	SD91462	51.75
.9844	63/64	3	6	1/2	SD91463	57.60
1.0000	1	3	6	1/2	SD91464	57.60
1.0313	1-1/32	3	6	1/2	SD91466	77.45
1.0625	1-1/16	3	6	1/2	SD91468	77.45
1.0938	1-3/32	3	6	1/2	SD91470	82.55
1.1250	1-1/8	3	6	1/2	SD91472	88.60
1.1563	1-5/32	3	6	1/2	SD91474	88.60
1.1875	1-3/16	3	6	1/2	SD91476	97.65
1.2188	1-7/32	3	6	1/2	SD91478	108.60
1.2500	1-1/4	3	6	1/2	SD91480	108.60
1.3125	1-5/16	3	6	1/2	SD91484	114.30
1.3750	1-3/8	3	6	1/2	SD91488	131.70
1.4375	1-7/16	3	6	1/2	SD91492	144.75
1.5000	1-1/2	3	6	1/2	SD91496	159.05

For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL**Silver & Deming - 118° Split Point - 3 Flats - Black & Gold Oxide Finish**

- 3" flute length
- 118° split point
- 1/2" shank
- 3 flats on shank to prevent spinning in a 3 Jaw Chuck
- Black & Gold Oxide finish minimizes friction and improves lubricity
- High speed steel
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	SHANK DIA.	BLACK & GOLD OXIDE FINISH	
D1		L2	L1	D2	TOOL #	USD\$
.5156	33/64	3	6	1/2	SD94733	28.15
.5313	17/32	3	6	1/2	SD94734	28.15
.5469	35/64	3	6	1/2	SD94735	29.80
.5625	9/16	3	6	1/2	SD94736	29.80
.5781	37/64	3	6	1/2	SD94737	31.60
.5938	19/32	3	6	1/2	SD94738	31.60
.6094	39/64	3	6	1/2	SD94739	32.90
.6250	5/8	3	6	1/2	SD94740	32.90
.6406	41/64	3	6	1/2	SD94741	34.85
.6563	21/32	3	6	1/2	SD94742	34.85
.6719	43/64	3	6	1/2	SD94743	36.40
.6875	11/16	3	6	1/2	SD94744	36.40
.7031	45/64	3	6	1/2	SD94745	37.90
.7188	23/32	3	6	1/2	SD94746	37.90
.7344	47/64	3	6	1/2	SD94747	39.60
.7500	3/4	3	6	1/2	SD94748	39.60
.7656	49/64	3	6	1/2	SD94749	41.70
.7813	25/32	3	6	1/2	SD94750	41.70
.7969	51/64	3	6	1/2	SD94751	44.40
.8125	13/16	3	6	1/2	SD94752	44.40
.8281	53/64	3	6	1/2	SD94753	46.40
.8438	27/32	3	6	1/2	SD94754	46.40
.8594	55/64	3	6	1/2	SD94755	47.60
.8750	7/8	3	6	1/2	SD94756	47.60
.8906	57/64	3	6	1/2	SD94757	49.70
.9063	29/32	3	6	1/2	SD94758	49.70
.9219	59/64	3	6	1/2	SD94759	53.40
.9375	15/16	3	6	1/2	SD94760	53.40
.9531	61/64	3	6	1/2	SD94761	57.55
.9688	31/32	3	6	1/2	SD94762	57.55
.9844	63/64	3	6	1/2	SD94763	60.40
1.0000	1	3	6	1/2	SD94764	60.40

For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Taper Length - 118° Point



- Taper length for drilling applications at extreme depths
- 118° point
- Black Oxide finish increases wear resistance and adds lubricity to improve chip flow
- High speed steel
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH	
D ₁		L ₂	L ₁		TOOL #	USD\$
.0469	3/64	1-1/8	2-1/4	12	CD52503	8.55
.0625	1/16	1-3/4	3	12	CD52504	8.55
.0781	5/64	2	3-3/4	12	CD52505	8.55
.0938	3/32	2-1/4	4-1/4	12	CD52506	7.85
.0980	#40	2-1/2	4-5/8	12	CD52740	8.75
.0995	#39	2-1/2	4-5/8	12	CD52739	8.75
.1015	#38	2-1/2	4-5/8	12	CD52738	10.00
.1040	#37	2-1/2	4-5/8	12	CD52737	10.00
.1065	#36	2-1/2	4-5/8	12	CD52736	10.00
.1094	7/64	2-1/2	4-5/8	12	CD52507	8.15
.1100	#35	2-3/4	5-1/8	12	CD52735	13.30
.1110	#34	2-3/4	5-1/8	12	CD52734	13.30
.1130	#33	2-3/4	5-1/8	12	CD52733	13.35
.1160	#32	2-3/4	5-1/8	12	CD52732	13.30
.1200	#31	2-3/4	5-1/8	12	CD52731	13.35
.1250	1/8	2-3/4	5-1/8	12	CD52508	8.55
.1285	#30	3	5-3/8	12	CD52730	13.55
.1360	#29	3	5-3/8	12	CD52729	13.55
.1405	#28	3	5-3/8	12	CD52728	13.55
.1406	9/64	3	5-3/8	12	CD52509	11.40
.1440	#27	3	5-3/8	12	CD52727	13.55
.1470	#26	3	5-3/8	12	CD52726	13.55
.1495	#25	3	5-3/8	12	CD52725	13.55
.1520	#24	3	5-3/8	12	CD52724	13.55
.1563	5/32	3	5-3/8	12	CD52510	11.50
.1570	#22	3-3/8	5-3/4	12	CD52722	13.55
.1590	#21	3-3/8	5-3/4	12	CD52721	13.55
.1610	#20	3-3/8	5-3/4	12	CD52720	13.55
.1660	#19	3-3/8	5-3/4	12	CD52719	13.55
.1695	#18	3-3/8	5-3/4	12	CD52718	13.55
.1719	11/64	3-3/8	5-3/4	12	CD52511	12.10
.1730	#17	3-3/8	5-3/4	12	CD52717	13.55
.1770	#16	3-3/8	5-3/4	12	CD52716	13.55
.1800	#15	3-3/8	5-3/4	12	CD52715	13.55
.1820	#14	3-3/8	5-3/4	12	CD52714	13.55
.1850	#13	3-3/8	5-3/4	12	CD52713	13.55
.1875	3/16	3-3/8	5-3/4	12	CD52512	11.15

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For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Taper Length - 118° Point (Cont.)

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DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH	
D ₁		L ₂	L ₁		TOOL #	USD\$
.1890	#12	3-5/8	6	12	CD52712	14.95
.1910	#11	3-5/8	6	12	CD52711	14.95
.1935	#10	3-5/8	6	12	CD52710	14.95
.1960	#9	3-5/8	6	12	CD52709	14.95
.1990	#8	3-5/8	6	12	CD52708	14.95
.2010	#7	3-5/8	6	12	CD52707	14.95
.2031	13/64	3-5/8	6	12	CD52513	13.70
.2040	#6	3-5/8	6	12	CD52706	14.95
.2055	#5	3-5/8	6	12	CD52705	14.95
.2090	#4	3-5/8	6	12	CD52704	14.95
.2130	#3	3-5/8	6	12	CD52703	14.95
.2188	7/32	3-5/8	6	12	CD52514	14.70
.2210	#2	3-3/4	6-1/8	12	CD52702	15.50
.2280	#1	3-3/4	6-1/8	12	CD52701	15.50
.2344	15/64	3-3/4	6-1/8	12	CD52515	14.70
.2500	1/4	3-3/4	6-1/8	12	CD52516	12.65
.2656	17/64	3-7/8	6-1/4	6	CD52517	15.40
.2813	9/32	3-7/8	6-1/4	6	CD52518	15.40
.2969	19/64	4	6-3/8	6	CD52519	16.80
.3125	5/16	4	6-3/8	6	CD52520	16.80
.3281	21/64	4-1/8	6-1/2	6	CD52521	16.80
.3438	11/32	4-1/8	6-1/2	6	CD52522	16.80
.3594	23/64	4-1/4	6-3/4	6	CD52523	19.85
.3750	3/8	4-1/4	6-3/4	6	CD52524	19.85
.3906	25/64	4-3/8	6-3/4	6	CD52525	22.55
.4063	13/32	4-3/8	7	6	CD52526	22.55
.4219	27/64	4-5/8	7-1/4	6	CD52527	23.95
.4375	7/16	4-5/8	7-1/4	6	CD52528	23.95
.4531	29/64	4-3/4	7-1/2	6	CD52529	27.20
.4688	15/32	4-3/4	7-1/2	6	CD52530	27.20
.4844	31/64	4-3/4	7-3/4	6	CD52531	28.85
.5000	1/2	4-3/4	7-3/4	6	CD52532	28.85
.5156	33/64	4-3/4	8	1	CD52533	38.10
.5313	17/32	4-3/4	8	1	CD52534	38.10
.5469	35/64	4-7/8	8-1/4	1	CD52535	40.25
.5625	9/16	4-7/8	8-1/4	1	CD52536	40.25
.5781	37/64	4-7/8	8-3/4	1	CD52537	47.05
.5938	19/32	4-7/8	8-3/4	1	CD52538	47.05
.6094	39/64	4-7/8	8-3/4	1	CD52539	48.50
.6250	5/8	4-7/8	8-3/4	1	CD52540	48.50
.6406	41/64	5-1/8	9	1	CD52541	55.60
.6563	21/32	5-1/8	9	1	CD52542	55.60
.6719	43/64	5-3/8	9-1/4	1	CD52543	65.35
.6875	11/16	5-3/8	9-1/4	1	CD52544	65.35
.7031	45/64	5-5/8	9-1/2	1	CD52545	68.35
.7188	23/32	5-5/8	9-1/2	1	CD52546	68.35

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For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL

Taper Length - 118° Point (Cont.)

continued from previous page

DRILL DIAMETER		FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK OXIDE FINISH	
dec. equiv.	size				TOOL #	USD\$
D ₁		L ₂	L ₁			
.7344	47/64	5-7/8	9-3/4	1	CD52547	73.55
.7500	3/4	5-7/8	9-3/4	1	CD52548	73.55
.7656	49/64	6	9-7/8	1	CD52549	80.00
.7813	25/32	6	9-7/8	1	CD52550	80.00
.7969	51/64	6-1/8	10	1	CD52551	86.40
.8125	13/16	6-1/8	10	1	CD52552	86.40
.8281	53/64	6-1/8	10	1	CD52553	91.05
.8438	27/32	6-1/8	10	1	CD52554	91.05
.8594	55/64	6-1/8	10	1	CD52555	95.05
.8750	7/8	6-1/8	10	1	CD52556	95.05
.8906	57/64	6-1/8	10	1	CD52557	99.05
.9063	29/32	6-1/8	10	1	CD52558	99.55
.9219	59/64	6-1/8	10-3/4	1	CD52559	107.75
.9375	15/16	6-1/8	10-3/4	1	CD52560	108.25
.9531	61/64	6-3/8	11	1	CD52561	89.07
.9688	31/32	6-3/8	11	1	CD52562	118.90
.9844	63/64	6-3/8	11	1	CD52563	123.95
1.0000	1	6-3/8	11	1	CD52564	123.95
1.0625	1-1/16	6-5/8	11-1/4	1	CD52568	154.35
1.1250	1-1/8	7-1/8	11-3/4	1	CD52572	170.95
1.1875	1-3/16	7-3/8	12	1	CD52576	200.35
1.2500	1-1/4	7-7/8	12-1/2	1	CD52580	214.50
1.3125	1-5/16	8-5/8	14-1/4	1	CD52584	191.97
1.3750	1-3/8	8-7/8	14-1/2	1	CD52588	205.77

Drills

Carbide

Cobalt

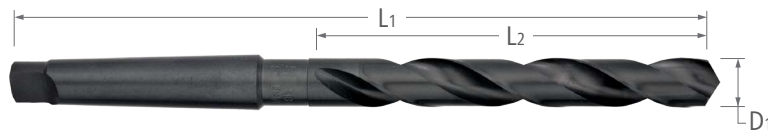
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DRILLS - HIGH SPEED STEEL

Taper Shank - 118° Point



- Morse taper shank
- 118° point
- Black Oxide finish increases wear resistance and adds lubricity to improve chip flow
- High speed steel
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		MORSE TAPER	FLUTE LENGTH	OAL	BLACK OXIDE FINISH	
D1			L2	L1	TOOL #	USD\$
.1875	3/16	1	2-1/2	5-3/4	CD55012	29.95
.2031	13/64	1	2-3/4	6	CD55013	29.95
.2188	7/32	1	2-3/4	6	CD55014	29.95
.2344	15/64	1	2-7/8	6-1/8	CD55015	22.37
.2500	1/4	1	2-7/8	6-1/8	CD55016	29.95
.2656	17/64	1	3	6-1/4	CD55017	29.95
.2813	9/32	1	3	6-1/4	CD55018	22.37
.2969	19/64	1	3-1/8	6-3/8	CD55019	23.77
.3125	5/16	1	3-1/8	6-3/8	CD55020	33.35
.3281	21/64	1	3-1/4	6-1/2	CD55021	33.35
.3438	11/32	1	3-1/4	6-1/2	CD55022	33.35
.3750	3/8	1	3-1/2	6-3/4	CD55024	34.25
.3906	25/64	1	3-5/8	7	CD55025	40.65
.4063	13/32	1	3-5/8	7	CD55026	40.65
.4219	27/64	1	3-7/8	7-1/4	CD55027	43.75
.4375	7/16	1	3-7/8	7-1/4	CD55028	43.75
.4531	29/64	1	4-1/8	7-1/2	CD55029	43.60
.4688	15/32	1	4-1/8	7-1/2	CD55030	43.75
.4844	31/64	2	4-3/8	8-1/4	CD55031	47.90
.5000	1/2	2	4-3/8	8-1/4	CD55032	44.80
.5156	33/64	2	4-5/8	8-1/2	CD55033	51.40
.5313	17/32	2	4-5/8	8-1/2	CD55034	53.05
.5469	35/64	2	4-7/8	8-3/4	CD55035	56.25
.5625	9/16	2	4-7/8	8-3/4	CD55036	54.80
.5781	37/64	2	4-7/8	8-3/4	CD55037	59.55
.5938	19/32	2	4-7/8	8-3/4	CD55038	58.90
.6094	39/64	2	4-7/8	8-3/4	CD55039	61.90
.6250	5/8	2	4-7/8	8-3/4	CD55040	59.50
.6406	41/64	2	5-1/8	9	CD55041	68.45
.6563	21/32	2	5-1/8	9	CD55042	67.10
.6719	43/64	2	5-3/8	9-1/4	CD55043	73.55
.6875	11/16	2	5-3/8	9-1/4	CD55044	69.45
.7031	45/64	2	5-5/8	9-1/2	CD55045	76.60
.7188	23/32	2	5-5/8	9-1/2	CD55046	74.00
.7344	47/64	2	5-7/8	9-3/4	CD55047	81.70
.7500	3/4	2	5-7/8	9-3/4	CD55048	81.00
.7656	49/64	2	6	9-7/8	CD55049	98.15
.7813	25/32	2	6	9-7/8	CD55050	97.10
.7969	51/64	3	6-1/8	10-3/4	CD55051	106.85

Taper shank drills sold individually.

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For technical information, see page 264 - 265

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DRILLS - HIGH SPEED STEEL

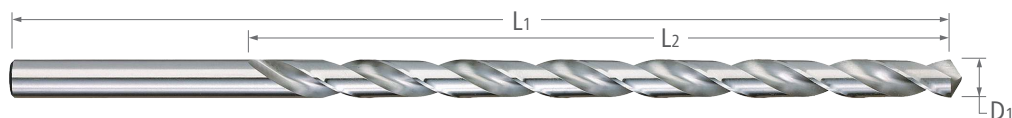
Taper Shank - 118° Point (Cont.)

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DRILL DIAMETER dec. equiv. size		MORSE TAPER	FLUTE LENGTH	OAL	BLACK OXIDE FINISH	
D ₁			L ₂	L ₁	TOOL #	USD\$
.8125	13/16	3	6-1/8	10-3/4	CD55052	100.45
.8281	53/64	3	6-1/8	10-3/4	CD55053	111.85
.8438	27/32	3	6-1/8	10-3/4	CD55054	108.30
.8594	55/64	3	6-1/8	10-3/4	CD55055	122.80
.8750	7/8	3	6-1/8	10-3/4	CD55056	112.10
.8906	57/64	3	6-1/8	10-3/4	CD55057	117.80
.9063	29/32	3	6-1/8	10-3/4	CD55058	117.80
.9219	59/64	3	6-1/8	10-3/4	CD55059	119.50
.9375	15/16	3	6-1/8	10-3/4	CD55060	112.00
.9531	61/64	3	6-3/8	11	CD55061	122.75
.9688	31/32	3	6-3/8	11	CD55062	121.90
.9844	63/64	3	6-3/8	11	CD55063	130.15
1.0000	1	3	6-3/8	11	CD55064	123.95
1.0156	1-1/64	3	6-1/2	11-1/8	CD55065	144.75
1.0313	1-1/32	3	6-1/2	11-1/8	CD55066	143.00
1.0469	1-3/64	3	6-5/8	11-1/4	CD55067	149.85
1.0625	1-1/16	3	6-5/8	11-1/4	CD55068	143.00
1.0781	1-5/64	4	6-7/8	12-1/2	CD55069	127.57
1.0938	1-3/32	4	6-7/8	12-1/2	CD55070	171.05
1.1094	1-7/64	4	7-1/8	12-3/4	CD55071	177.00
1.1250	1-1/8	4	7-1/8	12-3/4	CD55072	177.00
1.1406	1-9/64	4	7-1/4	12-7/8	CD55073	190.65
1.1563	1-5/32	4	7-1/4	12-7/8	CD55074	183.85
1.1719	1-11/64	4	7-3/8	13	CD55075	190.65
1.1875	1-3/16	4	7-3/8	13	CD55076	190.65
1.2031	1-13/64	4	7-1/2	13-1/8	CD55077	153.07
1.2188	1-7/32	4	7-1/2	13-1/8	CD55078	204.20
1.2500	1-1/4	4	7-7/8	13-1/2	CD55080	213.85
1.3125	1-5/16	4	8-5/8	14-1/4	CD55084	264.10
1.3750	1-3/8	4	8-7/8	14-1/2	CD55088	280.50
1.4375	1-7/16	4	9-1/8	14-3/4	CD55092	230.77
1.5000	1-1/2	4	9-3/8	15	CD55096	322.75
1.5625	1-9/16	5	9-5/8	16-5/8	CD55102	295.07
1.6250	1-5/8	5	10	17	CD55106	424.90
1.6875	1-11/16	5	10-1/8	17-1/8	CD55110	351.27
1.7500	1-3/4	5	10-1/8	17-1/8	CD55114	373.67
1.8125	1-13/16	5	10-1/8	17-1/8	CD55118	401.37
1.8750	1-7/8	5	10-3/8	17-3/8	CD55122	418.57
1.9375	1-15/16	5	10-3/8	17-3/8	CD55126	451.47
2.0000	2	5	10-3/8	17-3/8	CD55130	623.80

 Drills
 Carbide
 Cobalt
HSS

For technical information, see page 264 - 265

DRILLS - HIGH SPEED STEEL**Extra Long - 118° Point**

- Extra long length design for deep drilling applications
- Offered in 8" and 12" overall lengths
- Bright finish improves performance in plastics and other non-ferrous materials
- High speed steel
- Precision manufactured in the USA

DRILL DIAMETER		FLUTE LENGTH	OAL	BRIGHT FINISH	
dec. equiv.	size			TOOL #	USD\$
D ₁		L ₂	L ₁		
.1250	1/8	5-1/2	8	CD66600	31.10
.1250	1/8	9	12	CD68608	33.65
.1406	9/64	5-1/2	8	CD66601	33.30
.1406	9/64	9	12	CD68609	48.45
.1563	5/32	5-1/2	8	CD66602	33.65
.1563	5/32	9	12	CD68610	44.05
.1719	11/64	5-1/2	8	CD66603	33.65
.1719	11/64	9	12	CD68611	37.65
.1875	3/16	5-1/2	8	CD66604	33.65
.1875	3/16	9	12	CD68612	37.80
.2031	13/64	5-1/2	8	CD66605	34.50
.2031	13/64	9	12	CD68613	45.60
.2188	7/32	5-1/2	8	CD66606	34.65
.2188	7/32	9	12	CD68614	40.75
.2344	15/64	5-1/2	8	CD66607	35.05
.2344	15/64	9	12	CD68615	40.75
.2500	1/4	5-1/2	8	CD66608	35.05
.2500	1/4	9	12	CD68616	42.15
.2656	17/64	5-1/2	8	CD66609	35.95
.2656	17/64	9	12	CD68617	43.65
.2813	9/32	5-1/2	8	CD66610	37.10
.2813	9/32	9	12	CD68618	43.65
.2969	19/64	9	12	CD68619	45.50
.3125	5/16	5-1/2	8	CD66612	39.40
.3125	5/16	9	12	CD68620	45.50
.3281	21/64	9	12	CD68621	48.45
.3438	11/32	5-1/2	8	CD66614	45.05
.3438	11/32	9	12	CD68622	48.45
.3594	23/64	9	12	CD68623	48.45
.3750	3/8	5-1/2	8	CD66616	42.75
.3750	3/8	9	12	CD68624	44.90
.3906	25/64	9	12	CD68625	67.60
.4063	13/32	5-1/2	8	CD66618	49.05

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DRILLS - HIGH SPEED STEEL

Extra Long - 118° Point (Cont.)

continued from previous page

DRILL DIAMETER		FLUTE LENGTH	OAL	BRIGHT FINISH	
dec. equiv.	size			TOOL #	USD\$
D ₁		L ₂	L ₁		
.4063	13/32	9	12	CD68626	67.60
.4219	27/64	5-1/2	8	CD66619	54.50
.4219	27/64	9	12	CD68627	67.60
.4375	7/16	5-1/2	8	CD66620	54.70
.4375	7/16	9	12	CD68628	57.65
.4531	29/64	9	12	CD68629	70.60
.4688	15/32	9	12	CD68630	63.55
.4844	31/64	9	12	CD68631	65.00
.5000	1/2	5-1/2	8	CD66624	62.45
.5000	1/2	9	12	CD68632	65.30
.5313	17/32	9	12	CD68634	82.75
.5625	9/16	9	12	CD68636	82.75
.5938	19/32	9	12	CD68638	103.40
.6250	5/8	9	12	CD68640	100.50
.6875	11/16	9	12	CD68644	105.95
.7500	3/4	9	12	CD68648	119.85

Drills

Carbide

Cobalt

HSS

DRILLS - HIGH SPEED STEEL

Mechanics Length -135° Split Point



- 3 flats on shank for added tool holding security in 3 Jaw Chucks
- Black & Gold Oxide finish minimizes friction and improves lubricity
- High speed steel
- 135° split point
- Precision manufactured in the USA

DRILL DIAMETER dec. equiv. size		FLUTE LENGTH	OAL	PACKAGE QTY.	BLACK & GOLD OXIDE FINISH	
D ₁		L ₂	L ₁		TOOL #	USD\$
.0625	1/16	7/8	1-7/8	12	CD45504	1.80
.0781	5/64	1	2	12	CD45505	1.90
.0938	3/32	1-1/4	2-1/4	12	CD45506	1.90
.1094	7/64	1-5/16	2-3/8	12	CD45507	1.95
.1250	1/8	1-7/16	2-1/2	12	CD45508	2.00
.1406	9/64	1-9/16	2-5/8	12	CD45509	2.10
.1563	5/32	1-11/16	2-3/4	12	CD45510	2.50
.1719	11/64	1-13/16	2-7/8	12	CD45511	2.55
.1875	3/16	1-7/8	3	12	CD45512	2.85
.2031	13/64	1-15/16	3-1/8	12	CD45513	3.15
.2188	7/32	2	3-1/4	12	CD45514	3.40
.2344	15/64	2-1/16	3-3/8	12	CD45515	3.60
.2500	1/4	2	3-1/2	12	CD45516	3.80
.2656	17/64	2-1/8	3-5/8	6	CD45517	4.70
.2813	9/32	2-1/4	3-3/4	6	CD45518	4.70
.2969	19/64	2-3/8	3-7/8	6	CD45519	5.60
.3125	5/16	2-1/2	4	6	CD45520	5.95
.3281	21/64	2-9/16	4-1/16	6	CD45521	6.40
.3438	11/32	2-5/8	4-1/8	6	CD45522	6.95
.3594	23/64	2-11/16	4-3/16	6	CD45523	7.40
.3750	3/8	2-11/16	4-1/4	6	CD45524	7.85
.3906	25/64	2-3/4	4-5/16	6	CD45525	8.35
.4063	13/32	2-13/16	4-3/8	6	CD45526	8.95
.4219	27/64	2-7/8	4-7/16	6	CD45527	10.15
.4375	7/16	2-15/16	4-1/2	6	CD45528	10.70
.4531	29/64	3	4-5/8	6	CD45529	11.60
.4688	15/32	3-1/8	4-3/4	6	CD45530	12.50
.4844	31/64	3-1/4	4-7/8	6	CD45531	12.75
.5000	1/2	3-3/8	5	6	CD45532	13.20

Sizes 3/16" through 1/2" include 3 Flats. Sizes 27/64" and larger include 3/8" reduced flatted shanks.

SCREW EXTRACTORS



- High speed steel
- Precision manufactured in the USA

SIZE	FOR SCREW & BOLT SIZES	PIPE SIZE	PACKAGE QUANTITY	UNCOATED	
				TOOL #	USD\$
1	3/16 - 1/4	-	1	CD53101	6.00
2	1/4 - 5/16	-	1	CD53102	6.40
3	5/16 - 7/16	-	1	CD53103	7.65
4	7/16 - 9/16	1/8	1	CD53104	8.10
5	9/16 - 3/4	1/4	1	CD53105	10.25
6	3/4-1	3/8	1	CD53106	22.55
7	1 - 1-3/8	1/2	1	CD53107	36.40
SET	SIZES 1-5	-	1	CD53113	38.60



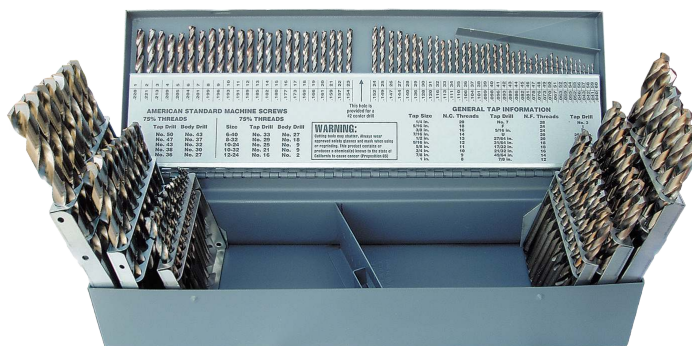
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DRILL SETS - COBALT

Jobber Drill Sets

- Comprehensive drill set featuring tools with jobber length geometry, ideal for deeper drilling applications
- M42 cobalt
- Precision manufactured in the USA



DESCRIPTION	GOLD OXIDE FINISH	
	TOOL #	USD\$
13PC • 1/16" - 1/4" by 64ths • Heavy Duty • 135° SP/PT	MS99151	49.95
15PC • 1/16" - 1/2" by 32nds • Heavy Duty • 135° SP/PT	MS99153	148.00
21PC • 1/16" - 3/8" by 64ths • Heavy Duty • 135° SP/PT	MS99155	161.10
26PC • A - Z • Heavy Duty • 135° SP/PT	MS99157	282.65
29PC • 1/16" - 1/2" by 64ths • Heavy Duty • 135° SP/PT	MS99159	282.65
60PC • #1 - #60 • Heavy Duty • 135° SP/PT	MS99161	209.65
115PC • 1/16" - 1/2" by 64ths • #1 - #60 • A - Z • H.D. • 135° SP/PT	MS99163	884.80

DRILL SETS - COBALT

Screw Machine Drill Set

- Comprehensive cobalt drill set featuring tools with screw machine length geometry for extra strength
- M42 cobalt
- Precision manufactured in the USA



DESCRIPTION	GOLD OXIDE FINISH	
	TOOL #	USD\$
29PC • 1/16" - 1/2" by 64ths • H.D. • 135° SP/PT	MS99167	242.45
115PC • 1/16" - 1/2" by 64ths • #1 - #60 • A - Z • H.D. • 135° SP/PT	MS99165	733.75

For technical information, see page 264 - 265

DRILL SETS - HIGH SPEED STEEL

Jobber Drill Sets

- Comprehensive drill set featuring tools with jobber length geometry, ideal for deeper drilling applications
- High speed steel
- Precision manufactured in the USA



DESCRIPTION	BRIGHT FINISH		BLACK OXIDE FINISH		TIN COATED	
	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
13PC • 1/16" - 1/4" by 64ths • 118° Point	MS99011	34.00	MS99010	34.00		
15PC • 1/16" - 1/2" by 32nds • 118° Point	MS99016	93.75	MS99014	93.75		
15PC • 1/16" - 1/2" by 32nds • Heavy Duty • 135° SP/PT			MS99017	103.35		
21PC • 1/16" - 3/8" by 64ths • 118° Point	MS99020	79.55	MS99018	79.55		
25PC • 1.0mm - 13.0mm by 0.5mm • 118° Point			MS99050	181.40		
26PC • A - Z • 118° Point	MS99024	133.20	MS99022	133.20		
29PC • 1/16" - 1/2" by 64ths • 118° Point	MS99028	134.55	MS99026	134.55		
29PC • 1/16" - 1/2" by 64ths • Heavy Duty • 135° SP/PT			MS99032	160.40		
29PC • 1/16" - 1/2" by 64ths • 118° Point					MS99036	373.80
60PC • #1 - #60 • 118° Point	MS99040	116.90	MS99038	116.90		
115PC • 1/16" - 1/2" by 64ths • #1 - #60 • A - Z • 118° Point	MS99044	377.75	MS99042	377.75		

For technical information, see page 264 - 265

DRILL SETS - HIGH SPEED STEEL

Jobber Drill Sets - Black & Gold Oxide Finish

- Comprehensive set of drills with Black & Gold finish for minimized friction and improved lubricity.
- High speed steel
- Precision manufactured in the USA



DESCRIPTION	BLACK & GOLD OXIDE FINISH	
	TOOL #	USD\$
13PC • 1/16" - 1/4" by 64ths • Heavy Duty • 135° SP/PT • Black & Gold Oxide	MS99012	42.05
15PC • 1/16" - 1/2" by 32nds • Heavy Duty • 135° SP/PT • Black & Gold Oxide	MS99015	121.60
21PC • 1/16" - 3/8" by 64ths • Heavy Duty • 135° SP/PT • Black & Gold Oxide	MS99021	86.07
29PC • 1/16" - 1/2" by 64ths • Heavy Duty • 135° SP/PT • Black & Gold Oxide	MS99030	194.35
29PC • 1/16" - 1/2" by 64ths • H.D. • 135° SP/PT • Black & Gold Oxide • Plastic Case	MS99431	194.35
115PC • 1/16" - 1/2" by 64ths • #1 - #60 • A - Z • Heavy Duty • 135° SP/PT • Black & Gold Oxide	MS99046	577.50

Sizes below 1/16" are not split point.

DRILL SETS - HIGH SPEED STEEL

Mechanics Length Sets

- Comprehensive drill set featuring tools with mechanics length geometry for added tool holding security in 3 Jaw Chucks
- High speed steel
- Precision manufactured in the USA



DESCRIPTION	BLACK & GOLD OXIDE FINISH	
	TOOL #	USD\$
15PC • 1/16" - 1/2" by 32ths • Black & Gold • Heavy Duty • 135° SP/PT • Metal Case	MS99425	114.10
29PC • 1/16" - 1/2" by 64ths • Black & Gold • Heavy Duty • 135° SP/PT • Metal Case	MS99405	211.35
29PC • 1/16" - 1/2" by 64ths • Black & Gold • Heavy Duty • 135° SP/PT • Plastic Case	MS99442	211.35

Mechanics Length sizes 3/16" to 1/2" include 3 flats.
 Sizes 27/64" and up include 3/8" reduced flat shanks.

For technical information, see page 264 - 265

DRILL SETS - HIGH SPEED STEEL

Silver & Deming Sets



- Comprehensive Silver & Deming drill set featuring tools with a 1/2" shank diameter
- High speed steel
- Precision manufactured in the USA

DESCRIPTION	UNCOATED		BLACK & GOLD OXIDE FINISH	
	TOOL #	USD\$	TOOL #	USD\$
8PC • HSS • 9/16" - 1" by 16ths • 118° Point • Plastic Case	MS99302	338.30		
8PC • HSS • 9/16" - 1" by 16ths • 118° Split Point • Plastic Case			MS99313	406.30
8PC • 9/16" - 1" by 16ths • M42 cobalt • 135° Split Point • Plastic Case	MS99310	672.55		
33PC • HSS • 1/2" - 1" by 64ths • 118° Point • Metal Stand	MS99304	1392.90		

DRILL SETS - HIGH SPEED STEEL

Tap & Drill Sets

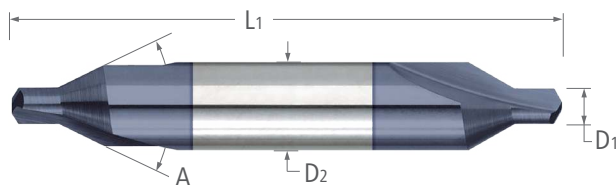


- 18 piece tap & drill set
- High speed steel
- Precision manufactured in the USA

DESCRIPTION	TOOL #	USD\$
18PC • (6-32, #36), (8-32, #29), (10-24, #25), (10-32, #21), (1/4-20, #7) (5/16-18,"F"), (3/8-16, 5/16"), (7/16-14,"U"), (1/2-13, 27/64) • Metal Case	MS99201	173.20

For technical information, see page 264 - 265

COMBINED DRILL & COUNTERSINKS - CARBIDE



- 60°, 90° included angle
- Double-ended
- AlTiN coating offers increased wear and heat resistance
- Commonly referred to as Center Drills, constructed from solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	DRILL DIA.	BODY DIA.	OAL	PACKAGE QTY.	UNCOATED		AlTiN COATED	
A		D ₁	D ₂	L ₁		TOOL #	USD\$	TOOL #	USD\$
60°	00	.025	1/8	1-1/2	1	CS30020	24.40	CS36020	29.65
	0	1/32	1/8	1-1/2	1	CS30010	23.45	CS36010	28.75
	1	3/64	1/8	1-1/2	1	CS30001	21.25	CS36001	26.60
	2	5/64	3/16	2	1	CS30002	31.70	CS36002	37.65
	3	7/64	1/4	2	1	CS30003	35.65	CS36003	42.70
	4	1/8	5/16	2-1/8	1	CS30004	46.25	CS36004	55.30
	5	3/16	7/16	2-3/4	1	CS30005	72.95	CS36005	86.80
	6	7/32	1/2	3	1	CS30006	91.25	CS36006	108.15
90°	00	.025	1/8	1 1/2	1	CS30035	24.40	CS36035	31.65
	0	1/32	1/8	1 1/2	1	CS30036	23.45	CS36036	30.70
	1	3/64	1/8	1 1/2	1	CS30037	21.25	CS36037	28.50
	2	5/64	3/16	2	1	CS30038	31.70	CS36038	39.85
	3	7/64	1/4	2	1	CS30039	35.65	CS36039	45.45
	4	1/8	5/16	2 1/2	1	CS30040	46.25	CS36040	58.75
	5	3/16	7/16	2 3/4	1	CS30041	72.95	CS36041	90.25
	6	7/32	1/2	3	1	CS30042	91.25	CS36042	111.45

NEW

NEW

NEW

NEW

NEW

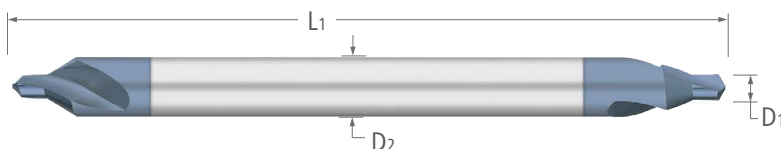
NEW

NEW

NEW

COMBINED DRILL & COUNTERSINKS - CARBIDE

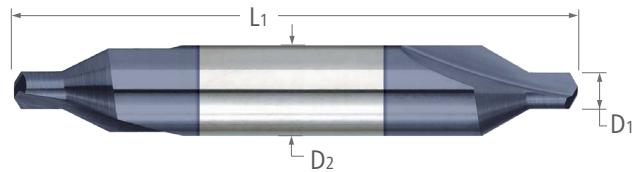
Long Length



- 60° included angle
- Long length design
- Double-ended
- AlTiN coating offers increased wear and heat resistance
- Commonly referred to as Center Drills, constructed from solid carbide
- Precision manufactured in the USA

SIZE	DRILL DIA.	BODY DIA.	OAL	PACKAGE QTY.	UNCOATED		AlTiN COATED	
	D ₁	D ₂	L ₁		TOOL #	USD\$	TOOL #	USD\$
1 x 4	3/64	1/8	4	1	CS95464	91.35	CS95474	99.95
2 x 4	5/64	3/16	4	1	CS95465	96.95	CS95475	106.60
3 x 4	7/64	1/4	4	1	CS95466	101.80	CS95476	113.40
3 x 6	7/64	1/4	6	1	CS95467	111.70	CS95477	125.25
4 x 4	1/8	5/16	4	1	CS95468	153.40	CS95478	167.35
4 x 5	1/8	5/16	5	1	CS95469	166.75	CS95479	181.75
4 x 6	1/8	5/16	6	1	CS95470	172.45	CS95480	188.70
5 x 5	3/16	7/16	5	1	CS95471	229.35	CS95481	250.10
5 x 6	3/16	7/16	6	1	CS95472	235.00	CS95482	257.45
6 x 6	7/32	1/2	6	1	CS95473	237.60	CS95483	263.90

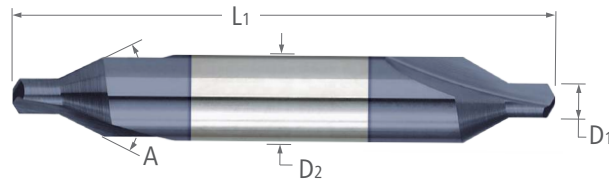
COMBINED DRILL & COUNTERSINKS - M42 COBALT



- 60° included angle
- Double-ended
- AlTiN coating offers increased wear and heat resistance
- Commonly referred to as Center Drills, constructed from M42 cobalt
- Precision manufactured in the USA

SIZE	DRILL DIA.	BODY DIA.	OAL	PACKAGE QTY.	UNCOATED		AlTiN COATED	
	D ₁	D ₂	L ₁		TOOL #	USD\$	TOOL #	USD\$
00	0.025	1/8	1-1/4	6	CS19999	33.20	CS36999	38.65
0	1/32	1/8	1-1/4	6	CS20000	33.20	CS37000	38.65
1	3/64	1/8	1-1/4	6	CS20001	22.70	CS37001	28.00
2	5/64	3/16	1-7/8	6	CS20002	24.40	CS37002	30.50
3	7/64	1/4	2	6	CS20003	25.40	CS37003	32.55
4	1/8	5/16	2-1/8	6	CS20004	26.55	CS37004	35.65
5	3/16	7/16	2-3/4	1	CS19998	31.35	CS37005	44.35
6	7/32	1/2	3	1	CS19997	48.70	CS37006	63.95

COMBINED DRILL & COUNTERSINKS - HIGH SPEED STEEL

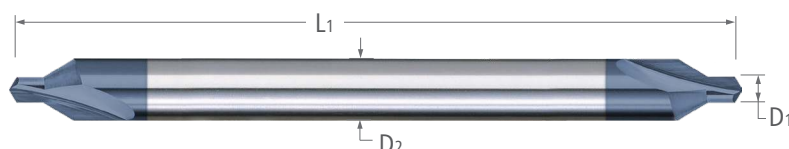


- 60°, 90° included angle
- Double-ended
- AlTiN coating offers increased wear and heat resistance
- Commonly referred to as Center Drills, constructed from high speed steel
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	DRILL DIA.	BODY DIA.	OAL	PACKAGE QTY.	UNCOATED		AlTiN COATED	
A		D ₁	D ₂	L ₁		TOOL #	USD\$	TOOL #	USD\$
60°	00000	.010	1/8	1-1/4	6	CS00050	13.40	CS35050	18.20
	0000	.015	1/8	1-1/4	6	CS00040	12.25	CS35040	17.45
	000	.020	1/8	1-1/4	6	CS00030	11.65	CS35030	16.70
	00	.025	1/8	1-1/4	6	CS00020	11.65	CS35020	15.85
	0	.031	1/8	1-1/4	6	CS10010	12.25	CS35010	15.85
	1	.047	1/8	1-1/4	6	CS10001	7.40	CS35001	12.00
	2	.078	3/16	1-7/8	6	CS10002	7.65	CS35002	12.30
	3	.109	1/4	2	6	CS10003	8.00	CS35003	15.45
	4	.125	5/16	2-1/8	6	CS10004	8.35	CS35004	17.30
	5	.188	7/16	2-3/4	1	CS10005	13.25	CS35005	22.90
	6	.219	1/2	3	1	CS10006	19.75	CS35006	35.40
	7	.250	5/8	3-1/4	1	CS10007	34.30	CS35007	52.45
	8	.313	3/4	3-1/2	1	CS10008	47.95	CS35008	81.75
90°	0	.031	1/8	1-1/4	6	CS16000	21.40	CS15090	25.75
	1	.047	1/8	1-1/4	6	CS16001	16.40	CS15091	20.75
	2	.078	3/16	1-7/8	6	CS16002	25.05	CS15092	29.95
	3	.109	1/4	2	6	CS16003	33.15	CS15093	39.00
	4	.125	5/16	2-1/8	6	CS16004	41.65	CS15094	49.15
	5	.188	7/16	2-3/4	1	CS16005	65.45	CS15095	75.85

COMBINED DRILL & COUNTERSINKS - HIGH SPEED STEEL

Long Length

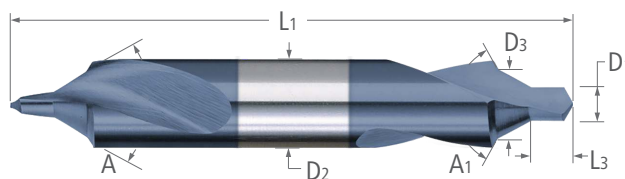


- 60° included angle
- Long length design
- Double-ended
- AlTiN coating offers increased wear and heat resistance
- Commonly referred to as Center Drills, constructed high speed steel
- Precision manufactured in the USA

SIZE	DRILL DIA.	BODY DIA.	OAL	PACKAGE QTY.	UNCOATED		AlTiN COATED		
	D ₁	D ₂	L ₁		TOOL #	USD\$	TOOL #	USD\$	
1 x 3	3/64	1/8	3	1	CS50013	18.40	CS61959	23.00	NEW
1 x 4	3/64	1/8	4	1	CS50014	19.50	CS61960	24.45	NEW
1 x 5	3/64	1/8	5	1	CS50015	26.90	CS61961	32.25	NEW
1 x 6	3/64	1/8	6	1	CS50016	35.25	CS61962	41.00	NEW
2 x 3	5/64	3/16	3	1	CS50023	18.80	CS61969	24.00	NEW
2 x 4	5/64	3/16	4	1	CS50024	21.05	CS61970	26.65	NEW
2 x 5	5/64	3/16	5	1	CS50025	27.25	CS61971	33.30	NEW
2 x 6	5/64	3/16	6	1	CS50026	35.20	CS61972	41.75	NEW
3 x 3	7/64	1/4	3	1	CS50033	19.70	CS61979	25.95	NEW
3 x 4	7/64	1/4	4	1	CS50034	22.30	CS61980	29.00	NEW
3 x 5	7/64	1/4	5	1	CS50035	29.55	CS61981	36.70	NEW
3 x 6	7/64	1/4	6	1	CS50036	35.60	CS61982	43.35	NEW
4 x 4	1/8	5/16	4	1	CS50044	24.60	CS61990	32.65	NEW
4 x 5	1/8	5/16	5	1	CS50045	31.65	CS61991	40.30	NEW
4 x 6	1/8	5/16	6	1	CS50046	36.60	CS61992	45.95	NEW
4-1/2 x 4	9/64	3/8	4	1	CS50040	27.80	CS61986	37.35	NEW
4-1/2 x 5	9/64	3/8	5	1	CS50050	40.60	CS61996	50.95	NEW
4-1/2 x 6	9/64	3/8	6	1	CS50060	45.05	CS61997	56.25	NEW
5 x 4	3/16	7/16	4	1	CS50054	32.40			
5 x 5	3/16	7/16	5	1	CS50055	37.70			
5 x 6	3/16	7/16	6	1	CS50056	42.35			
6 x 5	7/32	1/2	5	1	CS50065	40.40			
6 x 6	7/32	1/2	6	1	CS50066	48.70			
7 x 6	1/4	5/8	6	1	CS50076	91.25			
8 x 6	5/16	3/4	6	1	CS50086	110.35			

COMBINED DRILL & COUNTERSINKS - HIGH SPEED STEEL

Bell Type



- Features a 60° Countersink followed by a larger 120° Countersink
- Double-ended
- AlTiN coating offers increased wear and heat resistance
- Commonly referred to as Center Drills, constructed from high speed steel
- Precision manufactured in the USA

	INCLUDED ANGLE	SIZE	DRILL DIA.	DRILL LENGTH	BELL ANGLE	BELL DIA.	BODY DIA.	OVERALL LENGTH	UNCOATED		AlTiN COATED	
	A		D ₁	L ₂	A ₁	D ₃	D ₂ (H6)	L ₁	TOOL #	USD\$	TOOL #	USD\$
NEW	60°	11	.0468 (3/64)	.0469	120°	.100	1/8	1-1/4	CS40051	8.70	CS40111	8.70
NEW		12	.0625 (1/16)	.0625	120°	.150	3/16	1-7/8	CS40052	9.30	CS40112	9.30
NEW		13	.0937 (3/32)	.0938	120°	.200	1/4	2	CS40053	11.50	CS40113	11.50
NEW		14	.1093 (7/64)	.1094	120°	.250	5/16	2-1/8	CS40054	13.65	CS40114	13.65
NEW		15	.1562 (5/32)	.1563	120°	.350	7/16	2-3/4	CS40055	19.70	CS40115	19.70
NEW		16	.1875 (3/16)	.1875	120°	.400	1/2	3	CS40056	21.95	CS40116	21.95
NEW		17	.2187 (7/32)	.2188	120°	.500	5/8	3-1/4	CS40057	32.40	CS40117	32.40
NEW		18	.2500 (1/4)	.2500	120°	.600	3/4	3-1/2	CS40058	42.95	CS40118	42.95

For technical information, see page 266

COUNTERSINKS - CARBIDE

Single Flute



- 60°, 82°, 90°, and 100° included angle options
- Single flute design
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

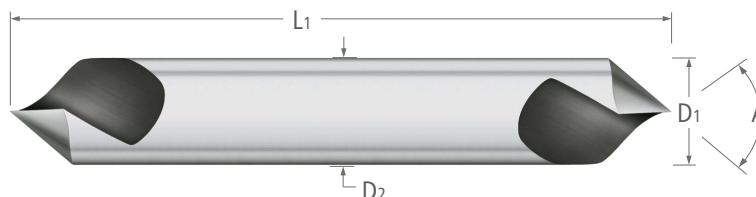
INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A	D1	D2	L1	TOOL #	USD\$
60°	1/8*	1/8	1-1/2	CS31008	19.00
	3/16*	3/16	2	CS31012	20.20
	1/4*	1/4	2	CS31016	23.05
	3/8	1/4	2-5/8	CS31024	41.70
	1/2	1/4	2-5/8	CS31032	51.45
	5/8	3/8	2-3/4	CS31040	75.40
	3/4	3/8	2-3/4	CS31048	106.85
	1	1/2	3	CS31064	157.50
82°	1/8*	1/8	1-1/2	CS31108	19.00
	3/16*	3/16	2	CS31112	20.20
	1/4*	1/4	2	CS31116	23.05
	3/8	1/4	2-5/8	CS31124	41.70
	1/2	1/4	2-5/8	CS31132	51.45
	5/8	3/8	2-3/4	CS31140	75.40
	3/4	3/8	2-3/4	CS31148	106.85
	1	1/2	3	CS31164	157.50
90°	1/8*	1/8	1-1/2	CS31208	19.00
	3/16*	3/16	2	CS31212	20.20
	1/4*	1/4	2	CS31216	23.05
	3/8	1/4	2-5/8	CS31224	41.70
	1/2	1/4	2-5/8	CS31232	51.45
	5/8	3/8	2-3/4	CS31240	75.40
	3/4	3/8	2-3/4	CS31248	106.85
	1	1/2	3	CS31264	157.50
100°	1/8*	1/8	1-1/2	CS31308	19.00
	3/16*	3/16	2	CS31312	20.20
	1/4*	1/4	2	CS31316	23.05
	3/8	1/4	2-5/8	CS31324	41.70
	1/2	1/4	2-5/8	CS31332	51.45
	5/8	3/8	2-3/4	CS31340	75.40
	3/4	3/8	2-3/4	CS31348	106.85
	1	1/2	3	CS31364	157.50

*One solid carbide piece

For technical information, see page 266

COUNTERSINKS - CARBIDE

Single Flute - Double-Ended



- Designed for countersinking, chamfering, and deburring holes

- 60°, 82°, 90°, 100° and 120° included angle options
- Double-ended

- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A	D1	D2	L1	TOOL #	USD\$
60°	1/8	1/8	1-1/2	CS36050	46.30
	3/16	3/16	2	CS36051	59.55
	1/4	1/4	2	CS36052	74.95
	5/16	5/16	2-1/2	CS36053	120.50
	3/8	3/8	2-1/2	CS36054	142.70
	1/2	1/2	3	CS36055	201.25
	5/8	5/8	3-1/2	CS36056	267.10
	3/4	3/4	4	CS36057	381.20
82°	1/8	1/8	1-1/2	CS36060	46.30
	3/16	3/16	2	CS36061	59.55
	1/4	1/4	2	CS36062	74.95
	5/16	5/16	2-1/2	CS36063	120.50
	3/8	3/8	2-1/2	CS36064	142.70
	1/2	1/2	3	CS36065	201.25
	5/8	5/8	3-1/2	CS36066	267.10
	3/4	3/4	4	CS36067	381.20
90°	1/8	1/8	1-1/2	CS36070	46.30
	3/16	3/16	2	CS36071	59.55
	1/4	1/4	2	CS36072	74.95
	5/16	5/16	2-1/2	CS36073	120.50
	3/8	3/8	2-1/2	CS36074	142.70
	1/2	1/2	3	CS36075	201.25
	5/8	5/8	3-1/2	CS36076	267.10
	3/4	3/4	4	CS36077	381.20
100°	1/8	1/8	1-1/2	CS36080	46.30
	3/16	3/16	2	CS36081	59.55
	1/4	1/4	2	CS36082	74.95
	5/16	5/16	2-1/2	CS36083	120.50
	3/8	3/8	2-1/2	CS36084	142.70
	1/2	1/2	3	CS36085	201.25
	5/8	5/8	3-1/2	CS36086	267.10
	3/4	3/4	4	CS36087	381.20
120°	1/8	1/8	1-1/2	CS36090	46.30
	3/16	3/16	2	CS36091	59.55
	1/4	1/4	2	CS36092	74.95
	5/16	5/16	2-1/2	CS36093	120.50
	3/8	3/8	2-1/2	CS36094	142.70
	1/2	1/2	3	CS36095	201.25
	5/8	5/8	3-1/2	CS36096	267.10
	3/4	3/4	4	CS36097	381.20

For technical information, see page 266

COUNTERSINKS - CARBIDE

3 Flute



- 60°, 82°, 90°, and 100° included angle options
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A	D1	D2	L1	TOOL #	USD\$
60°	1/8*	1/8	1-1/2	CS33108	19.00
	3/16*	3/16	2	CS33112	20.20
	1/4*	1/4	2	CS33116	23.05
	3/8	1/4	2-5/8	CS33124	41.70
	1/2	1/4	2-5/8	CS33132	51.45
	5/8	3/8	2-3/4	CS33140	75.40
	3/4	3/8	2-3/4	CS33148	106.85
	1	1/2	3	CS33164	157.50
82°	1/8*	1/8	1-1/2	CS33208	19.00
	3/16*	3/16	2	CS33212	20.20
	1/4*	1/4	2	CS33216	23.05
	3/8	1/4	2-5/8	CS33224	41.70
	1/2	1/4	2-5/8	CS33232	51.45
	5/8	3/8	2-3/4	CS33240	75.40
	3/4	3/8	2-3/4	CS33248	106.85
	1	1/2	3	CS33264	157.50
90°	1/8*	1/8	1-1/2	CS33308	19.00
	3/16*	3/16	2	CS33312	20.20
	1/4*	1/4	2	CS33316	23.05
	3/8	1/4	2-5/8	CS33324	41.70
	1/2	1/4	2-5/8	CS33332	51.45
	5/8	3/8	2-3/4	CS33340	75.40
	3/4	3/8	2-3/4	CS33348	106.85
	1	1/2	3	CS33364	157.50
100°	1/8*	1/8	1-1/2	CS33408	19.00
	3/16*	3/16	2	CS33412	20.20
	1/4*	1/4	2	CS33416	23.05
	3/8	1/4	2-5/8	CS33424	41.70
	1/2	1/4	2-5/8	CS33432	51.45
	5/8	3/8	2-3/4	CS33440	75.40
	3/4	3/8	2-3/4	CS33448	106.85
	1	1/2	3	CS33464	157.50

*One solid carbide piece

For technical information, see page 266

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COUNTERSINKS - CARBIDE

4 Flute

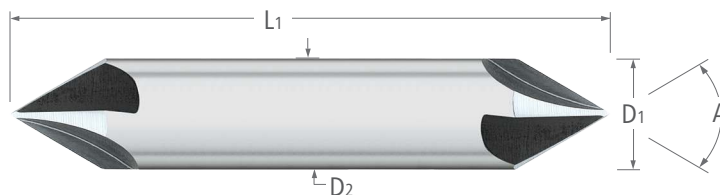


- 60°, 82°, 90°, and 100° included angle options
- 4 flute design for smooth cutting action and improved surface finish
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

	INCLUDED ANGLE	SIZE	SHANK DIAMETER		OVERALL LENGTH	UNCOATED	
	A	D1	D2		L1	TOOL #	USD\$
NEW	60°	1/4	1/4		2	CS36209	19.05
NEW		3/8	1/4		2-5/8	CS36217	27.70
NEW	82°	1/4	1/4		2	CS36309	19.05
NEW		3/8	1/4		2-5/8	CS36317	27.70
NEW		1/2	1/4		2-5/8	CS36325	36.60
NEW		5/8	3/8		2-3/4	CS36333	57.20
NEW		3/4	3/8		2-3/4	CS36341	72.55
NEW		1	1/2		3	CS36357	114.85
NEW	90°	1/8	1/8		1-1/2	CS36401	13.20
NEW		3/16	3/16		2	CS36405	17.55
NEW		1/4	1/4		2	CS36409	19.05
NEW		3/8	1/4		2-5/8	CS36417	27.70
NEW		1/2	1/4		2-5/8	CS36425	36.60
NEW		5/8	3/8		2-3/4	CS36433	57.20
NEW		3/4	3/8		2-3/4	CS36441	72.55
NEW		1	1/2		3	CS36457	114.85
NEW	100°	1/4	1/4		2	CS36509	19.05
NEW		3/8	1/4		2-5/8	CS36517	27.70

COUNTERSINKS - CARBIDE

4 Flute - Double-Ended



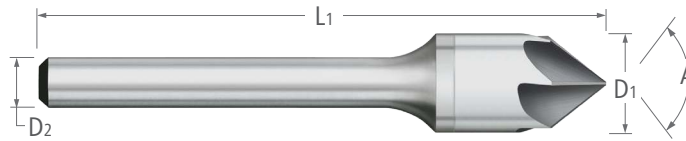
- Designed for countersinking, chamfering, and deburring holes
- 60°, 82°, 90°, 100°, 120° included angle options
- Double-ended
- 4 flute design allows for higher feed rates over single flute design
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A	D ₁	D ₂	L ₁	TOOL #	USD\$
60°	1/8	1/8	1-1/2	CS36100	46.30
	3/16	3/16	2	CS36101	59.55
	1/4	1/4	2	CS36102	74.95
	5/16	5/16	2-1/2	CS36103	120.50
	3/8	3/8	2-1/2	CS36104	142.70
	1/2	1/2	3	CS36105	201.25
	5/8	5/8	3-1/2	CS36106	267.10
	3/4	3/4	4	CS36107	381.20
82°	1/8	1/8	1-1/2	CS36110	46.30
	3/16	3/16	2	CS36111	59.55
	1/4	1/4	2	CS36112	74.95
	5/16	5/16	2-1/2	CS36113	120.50
	3/8	3/8	2-1/2	CS36114	142.70
	1/2	1/2	3	CS36115	201.25
	5/8	5/8	3-1/2	CS36116	267.10
	3/4	3/4	4	CS36117	381.20
90°	1/8	1/8	1-1/2	CS36120	46.30
	3/16	3/16	2	CS36121	59.55
	1/4	1/4	2	CS36122	74.95
	5/16	5/16	2-1/2	CS36123	120.50
	3/8	3/8	2-1/2	CS36124	142.70
	1/2	1/2	3	CS36125	201.25
	5/8	5/8	3-1/2	CS36126	267.10
	3/4	3/4	4	CS36127	381.20
100°	1/8	1/8	1-1/2	CS36130	46.30
	3/16	3/16	2	CS36131	59.55
	1/4	1/4	2	CS36132	74.95
	5/16	5/16	2-1/2	CS36133	120.50
	3/8	3/8	2-1/2	CS36134	142.70
	1/2	1/2	3	CS36135	201.25
	5/8	5/8	3-1/2	CS36136	267.10
	3/4	3/4	4	CS36137	381.20
120°	1/8	1/8	1-1/2	CS36140	46.30
	3/16	3/16	2	CS36141	59.55
	1/4	1/4	2	CS36142	74.95
	5/16	5/16	2-1/2	CS36143	120.50
	3/8	3/8	2-1/2	CS36144	142.70
	1/2	1/2	3	CS36145	201.25
	5/8	5/8	3-1/2	CS36146	267.10
	3/4	3/4	4	CS36147	381.20

For technical information, see page 266

COUNTERSINKS - CARBIDE

6 Flute



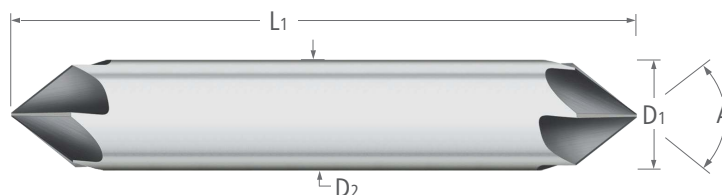
- 6 Flute chatterless design for improved finish
- 60°, 82°, 90°, and 100° included angle options
- Solid carbide head brazed onto a steel shank
- AlTiN coating offers increased wear and heat resistance
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AlTiN COATED	
				TOOL #	USD\$	TOOL #	USD\$
A	D1	D2	L1				
60°	1/8*	1/8	1-1/2	CS36608	19.00		
	3/16*	3/16	2	CS36612	20.20		
	1/4*	1/4	2	CS36616	23.05		
	3/8	1/4	2-5/8	CS36624	41.70		
	1/2	1/4	2-5/8	CS36632	51.45		
	5/8	3/8	2-3/4	CS36640	75.40		
	3/4	3/8	2-3/4	CS36648	106.85		
	1	1/2	3	CS36664	157.50		
82°	1/8*	1/8	1-1/2	CS36708	19.00	CS37708	23.85
	3/16*	3/16	2	CS36712	20.20	CS37712	25.65
	1/4*	1/4	2	CS36716	23.05	CS37716	29.55
	3/8	1/4	2-5/8	CS36724	41.70	CS37724	48.65
	1/2	1/4	2-5/8	CS36732	51.45	CS37732	58.40
	5/8	3/8	2-3/4	CS36740	75.40	CS37740	85.30
	3/4	3/8	2-3/4	CS36748	106.85	CS37748	116.75
	1	1/2	3	CS36764	157.50	CS37764	170.95
90°	1/8*	1/8	1-1/2	CS36808	19.00	CS37808	23.85
	3/16*	3/16	2	CS36812	20.20	CS37812	25.65
	1/4*	1/4	2	CS36816	23.05	CS37816	29.55
	3/8	1/4	2-5/8	CS36824	41.70	CS37824	48.65
	1/2	1/4	2-5/8	CS36832	51.45	CS37832	58.40
	5/8	3/8	2-3/4	CS36840	75.40	CS37840	85.30
	3/4	3/8	2-3/4	CS36848	106.85	CS37848	116.75
	1	1/2	3	CS36864	157.50	CS37864	170.95
100°	1/8*	1/8	1-1/2	CS36908	13.57		
	3/16*	3/16	2	CS36912	20.20		
	1/4*	1/4	2	CS36916	23.05		
	3/8	1/4	2-5/8	CS36924	41.70		
	1/2	1/4	2-5/8	CS36932	51.45		
	5/8	3/8	2-3/4	CS36940	75.40		
	3/4	3/8	2-3/4	CS36948	106.85		
	1	1/2	3	CS36964	157.50		

*One solid carbide piece

COUNTERSINKS - CARBIDE

6 Flute - Double-Ended



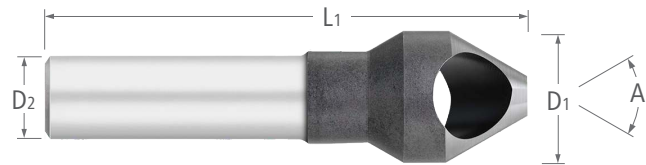
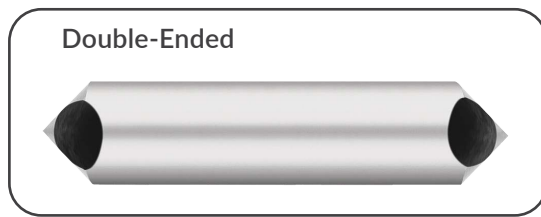
- Designed for countersinking, chamfering, and deburring holes
- 60°, 82°, 90°, 100°, and 120° included angle options
- Double-ended
- 6 flute design allows for higher feed rates over 4 flute design
- Solid carbide
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A	D1	D2	L1	TOOL #	USD\$
60°	1/8	1/8	1-1/2	CS36150	46.30
	3/16	3/16	2	CS36151	59.55
	1/4	1/4	2	CS36152	74.95
	5/16	5/16	2-1/2	CS36153	120.50
	3/8	3/8	2-1/2	CS36154	142.70
	1/2	1/2	3	CS36155	201.25
	5/8	5/8	3-1/2	CS36156	267.10
	3/4	3/4	4	CS36157	381.20
82°	1/8	1/8	1-1/2	CS36160	46.30
	3/16	3/16	2	CS36161	59.55
	1/4	1/4	2	CS36162	74.95
	5/16	5/16	2-1/2	CS36163	120.50
	3/8	3/8	2-1/2	CS36164	142.70
	1/2	1/2	3	CS36165	201.25
	5/8	5/8	3-1/2	CS36166	267.10
	3/4	3/4	4	CS36167	381.20
90°	1/8	1/8	1-1/2	CS36170	46.30
	3/16	3/16	2	CS36171	59.55
	1/4	1/4	2	CS36172	74.95
	5/16	5/16	2-1/2	CS36173	120.50
	3/8	3/8	2-1/2	CS36174	142.70
	1/2	1/2	3	CS36175	201.25
	5/8	5/8	3-1/2	CS36176	267.10
	3/4	3/4	4	CS36177	381.20
100°	1/8	1/8	1-1/2	CS36180	46.30
	3/16	3/16	2	CS36181	59.55
	1/4	1/4	2	CS36182	74.95
	5/16	5/16	2-1/2	CS36183	120.50
	3/8	3/8	2-1/2	CS36184	142.70
	1/2	1/2	3	CS36185	201.25
	5/8	5/8	3-1/2	CS36186	267.10
	3/4	3/4	4	CS36187	381.20
120°	1/8	1/8	1-1/2	CS36190	46.30
	3/16	3/16	2	CS36191	59.55
	1/4	1/4	2	CS36192	74.95
	5/16	5/16	2-1/2	CS36193	120.50
	3/8	3/8	2-1/2	CS36194	142.70
	1/2	1/2	3	CS36195	201.25
	5/8	5/8	3-1/2	CS36196	267.10
	3/4	3/4	4	CS36197	381.20

For technical information, see page 266

COUNTERSINKS - COBALT

Zero Flute



- Designed with a radially-relieved single edge for fast removal without chatter
- 60°, 82°, 90° included angle options
- M42 cobalt
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	END	UNCOATED	
A	D ₁	D ₂	L ₁		TOOL #	USD\$
60°	1/4	1/4	1-1/2	DE	CD31500	25.40
	7/16	1/4	2-1/32	SE	CD31501	33.40
	9/16	1/4	2	SE	CD31502	42.65
	13/16	1/2	2-5/8	SE	CD31503	77.05
	1-1/8	1/2	2-7/8	SE	CD31504	126.35
82°	1/4	1/4	1-1/2	DE	CD31505	25.40
	7/16	1/4	2-1/32	SE	CD31506	33.40
	9/16	1/4	2	SE	CD31507	42.65
	13/16	1/2	2-5/8	SE	CD31508	77.05
	1-1/8	1/2	2-7/8	SE	CD31509	126.35
90°	1/4	1/4	1-1/2	DE	CD31510	25.40
	7/16	1/4	2-1/32	SE	CD31511	33.40
	9/16	1/4	2	SE	CD31512	42.65
	13/16	1/2	2-5/8	SE	CD31513	77.05
	1-1/8	1/2	2-7/8	SE	CD31514	126.35

COUNTERSINKS - HIGH SPEED STEEL

Single Flute



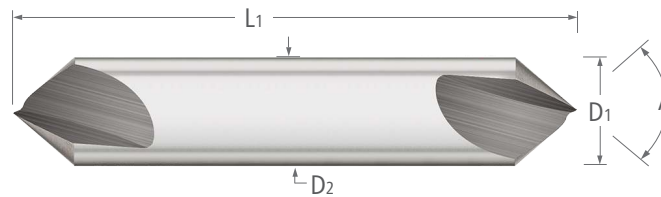
- 60°, 82°, and 90° included angle options
- Single flute design
- High speed steel
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A	D1	D2	L1	TOOL #	USD\$
60°	1/4	3/16	1-1/2	CD50501	20.75
	3/8	1/4	1-3/4	CD50502	23.65
	1/2	1/4	2	CD50503	30.25
	3/4	1/2	2-21/32	CD50504	41.65
	1	1/2	3-1/8	CD50505	64.85
82°	1/4	3/16	1-7/16	CD51014	20.75
	3/8	1/4	1-21/32	CD51015	23.65
	1/2	1/4	1-27/32	CD51016	30.25
	3/4	1/2	1-27/32	CD51017	41.65
	1	1/2	2-13/16	CD51018	64.85
90°	1/4	3/16	1-7/16	CD51523	20.75
	3/8	1/4	1-5/8	CD51524	23.65
	1/2	1/4	1-13/32	CD51525	30.25
	3/4	3/8	2-5/16	CD51526	41.65
	1	1/2	2-13/16	CD51527	64.85

For technical information, see page 266

COUNTERSINKS - HIGH SPEED STEEL

Single Flute - Double-Ended



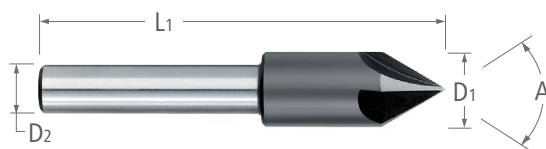
- Designed for countersinking, and deburring holes
- 60°, 82°, 90°, 100°, 120° included angle options
- High speed steel
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A	D1	D2	L1	TOOL #	USD\$
60°	1/8	1/8	1-1/2	CD51025	19.45
	3/16	3/16	2	CD51026	20.95
	1/4	1/4	2	CD51027	21.45
	5/16	5/16	2-1/2	CD51028	24.50
	3/8	3/8	2-1/2	CD51029	27.45
	1/2	1/2	3	CD51030	34.30
	5/8	5/8	3-1/2	CD51031	49.65
	3/4	3/4	4	CD51032	70.95
82°	1/8	1/8	1-1/2	CD51033	19.45
	3/16	3/16	2	CD51034	20.95
	1/4	1/4	2	CD51035	21.45
	5/16	5/16	2-1/2	CD51036	24.50
	3/8	3/8	2-1/2	CD51037	27.45
	1/2	1/2	3	CD51038	34.30
	5/8	5/8	3-1/2	CD51039	49.65
	3/4	3/4	4	CD51040	70.95
90°	1/8	1/8	1-1/2	CD51041	19.45
	3/16	3/16	2	CD51042	20.95
	1/4	1/4	2	CD51043	21.45
	5/16	5/16	2-1/2	CD51044	24.50
	3/8	3/8	2-1/2	CD51045	27.45
	1/2	1/2	3	CD51046	34.30
	5/8	5/8	3-1/2	CD51047	49.65
	3/4	3/4	4	CD51048	70.95
100°	1/8	1/8	1-1/2	CD51049	19.45
	3/16	3/16	2	CD51050	20.95
	1/4	1/4	2	CD51051	21.45
	5/16	5/16	2-1/2	CD51052	24.50
	3/8	3/8	2-1/2	CD51053	27.45
	1/2	1/2	3	CD51054	34.30
	5/8	5/8	3-1/2	CD51055	49.65
	3/4	3/4	4	CD51056	70.95
120°	1/8	1/8	1-1/2	CD51057	19.45
	3/16	3/16	2	CD51058	20.95
	1/4	1/4	2	CD51059	21.45
	5/16	5/16	2-1/2	CD51060	24.50
	3/8	3/8	2-1/2	CD51061	27.45
	1/2	1/2	3	CD51062	34.30
	5/8	5/8	3-1/2	CD51063	49.65
	3/4	3/4	4	CD51064	70.95

For technical information, see page 266

COUNTERSINKS - HIGH SPEED STEEL

4 Flute

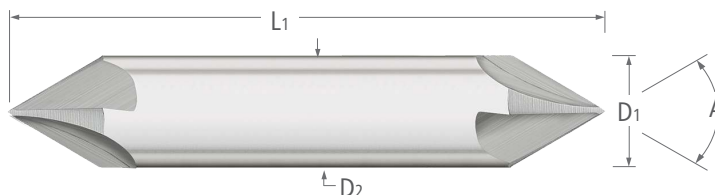


- 60°, 82°, and 90° included angle options
- High speed steel
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A	D1	D2	L1	TOOL #	USD\$
60°	1/2	1/2	3-7/8	CD52032	66.25
	5/8	1/2	4	CD52040	74.60
	3/4	1/2	4-1/8	CD52048	95.10
	7/8	1/2	4-1/4	CD52056	111.70
	1	1/2	4-3/8	CD52064	116.05
82°	1/2	1/2	3-7/8	CD52232	66.25
	5/8	1/2	4	CD52240	74.60
	3/4	1/2	4-1/8	CD52248	95.10
	7/8	1/2	4-1/4	CD52256	111.70
	1	1/2	4-3/8	CD52264	116.05
90°	1/2	1/2	3-7/8	CD55339	66.25 NEW
	5/8	1/2	4	CD55340	74.60 NEW
	3/4	1/2	4-1/8	CD55341	95.10 NEW
	7/8	1/2	4-1/4	CD55342	111.70 NEW
	1	1/2	4-3/8	CD55343	116.05 NEW

COUNTERSINKS - HIGH SPEED STEEL

4 Flute - Double-Ended



- Designed for countersinking, and deburring holes
- 60°, 82°, 90°, 100°, 120° included angle options
- 4 flute design allows for higher feed rates over single flute design
- High speed steel
- Precision manufactured in the USA

INCLUDED ANGLE	SIZE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
A	D ₁	D ₂	L ₁	TOOL #	USD\$
60°	1/8	1/8	1-1/2	CD51065	13.60
	3/16	3/16	2	CD51066	13.95
	1/4	1/4	2	CD51067	14.40
	5/16	5/16	2-1/2	CD51068	16.80
	3/8	3/8	2-1/2	CD51069	18.80
	1/2	1/2	3	CD51070	23.45
	5/8	5/8	3-1/2	CD51071	34.05
	3/4	3/4	4	CD51072	45.90
82°	1/8	1/8	1-1/2	CD51073	13.60
	3/16	3/16	2	CD51074	13.95
	1/4	1/4	2	CD51075	14.40
	5/16	5/16	2-1/2	CD51076	16.80
	3/8	3/8	2-1/2	CD51077	18.80
	1/2	1/2	3	CD51078	23.45
	5/8	5/8	3-1/2	CD51079	34.05
	3/4	3/4	4	CD51080	45.90
90°	1/8	1/8	1-1/2	CD51081	13.60
	3/16	3/16	2	CD51082	13.95
	1/4	1/4	2	CD51083	14.40
	5/16	5/16	2-1/2	CD51084	16.80
	3/8	3/8	2-1/2	CD51085	18.80
	1/2	1/2	3	CD51086	23.45
	5/8	5/8	3-1/2	CD51087	34.05
	3/4	3/4	4	CD51088	45.90
100°	1/8	1/8	1-1/2	CD51089	13.60
	3/16	3/16	2	CD51090	13.95
	1/4	1/4	2	CD51091	14.40
	5/16	5/16	2-1/2	CD51092	16.80
	3/8	3/8	2-1/2	CD51093	18.80
	1/2	1/2	3	CD51094	23.45
	5/8	5/8	3-1/2	CD51095	34.05
	3/4	3/4	4	CD51096	45.90
120°	1/8	1/8	1-1/2	CD51097	13.60
	3/16	3/16	2	CD51098	13.95
	1/4	1/4	2	CD51099	14.40
	5/16	5/16	2-1/2	CD51100	16.80
	3/8	3/8	2-1/2	CD51101	18.80
	1/2	1/2	3	CD51102	23.45
	5/8	5/8	3-1/2	CD51103	34.05
	3/4	3/4	4	CD51104	45.90

For technical information, see page 266

DRILLS - CARBIDE

Technical Information

General Purpose Carbide Drills									
Material Guide		Rc	SFM		Feed Per Tooth				
			25° Helix	15° Helix Straight Flute	1/16" - 1/8"	1/8" - 1/4"	1/4" - 3/8"	3/8" - 1/2"	1/2" - 5/8"
COBALT BASE ALLOYS	Stellite, HS - 21, Haynes 25/188, X - 40, L - 605	under 32 over 32	100 - 150 80 - 110	100 - 150 80 - 110	.0004 - .0010 .0004 - .0010	.0008 - .0020 .0005 - .0010	.0015 - .0025 .0010 - .0015	.0020 - .0040 .0010 - .0020	.0025 - .0050 .0015 - .0030
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	under 32 over 32	100 - 150 90 - 125	125 - 175 90 - 125	.0005 - .0015 .0004 - .0010	.0010 - .0015 .0008 - .0015	.0015 - .0025 .0010 - .0015	.0020 - .0040 .0015 - .0030	.0025 - .0050 .0020 - .0040
IRON BASE ALLOYS	Incoloy 800 - 802, Multimet N - 155, Timkin 16 - 25 - 6, Carpeneter 22 - b3	under 32 over 32	100 - 150 90 - 125	125 - 175 90 - 125	.0010 - .0015 .0008 - .0015	.0010 - .0020 .0010 - .0020	.0015 - .0035 .0015 - .0025	.0020 - .0020 .0020 - .0040	.0030 - .0060 .0025 - .0050
MONEL	Monel - 65% Nickel		100 - 150	100 - 150	.0004 - .0010	.0008 - .0015	.0010 - .0015	.0015 - .0030	.0020 - .0040
TITANIUM ALLOYS	Commercially Pure, 6AL - 4V, Astm 1/2/3, 6Al - 25N - 4Zr - 2Mo - Si		150 - 200	150 - 200	.0008 - .0015	.0010 - .0020	.0015 - .0030	.0020 - .0040	.0025 - .0050
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17 - 4	under 32 over 32	125 - 175 80 - 125	150 - 200 100 - 150	.0005 - .0015 .0004 - .0010	.0010 - .0020 .0008 - .0015	.0015 - .0035 .0010 - .0015	.0020 - .0040 .0015 - .0030	.0025 - .0050 .0020 - .0040
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	under 32 over 32	100 - 175 100 - 125	150 - 200 125 - 150	.0005 - .0015 .0004 - .0010	.0010 - .0020 .0008 - .0015	.0015 - .0035 .0010 - .0015	.0020 - .0040 .0015 - .0030	.0025 - .0050 .0020 - .0040
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	under 32 over 32	100 - 150 80 - 125	125 - 175 100 - 140	.0005 - .0015 .0004 - .0010	.0010 - .0020 .0008 - .0015	.0015 - .0035 .0010 - .0015	.0020 - .0040 .0015 - .0030	.0025 - .0050 .0020 - .0040
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	under 32 over 32	100 - 175 80 - 130	125 - 175 80 - 130	.0005 - .0015 .0004 - .0010	.0010 - .0020 .0010 - .0020	.0015 - .0025 .0010 - .0020	.0015 - .0030 .0015 - .0030	.0020 - .0040 .0020 - .0040
MEDIUM ALLOY STEELS	200, 250, 300	under 32 over 32	125 - 175 100 - 150	125 - 175 100 - 150	.0010 - .0015 .0005 - .0010	.0015 - .0025 .0010 - .0020	.0020 - .0030 .0010 - .0025	.0020 - .0040 .0015 - .0030	.0025 - .0050 .0020 - .0040
CARBON STEELS	1000's, 1100's, 1300's	under 32 over 32	125 - 175 100 - 125	150 - 200 100 - 175	.0010 - .0015 .0005 - .0010	.0015 - .0025 .0010 - .0020	.0020 - .0030 .0010 - .0025	.0020 - .0040 .0015 - .0035	.0025 - .0050 .0020 - .0040
DUCTILE	Ductile Cast Irons		125 - 200	150 - 250	.0010 - .0020	.0010 - .0030	.0015 - .0035	.0025 - .0040	.0030 - .0050
CAST IRONS	Gray Cast Irons		100 - 200	150 - 250	.0010 - .0020	.0010 - .0030	.0015 - .0035	.0025 - .0040	.0030 - .0050
ALUMINUM	2014, 2024, 6061 - (T1 - T6), 7075, Die Cast, Extruded		150 - 250		.0010 - .0020	.0015 - .0040	.0020 - .0050	.0030 - .0060	.0035 - .0070
MAGNESIUM			200 - 300		.0010 - .0020	.0010 - .0030	.0015 - .0035	.0025 - .0040	.0030 - .0050
COPPER, COPPER ALLOYS			150 - 250		.0010 - .0020	.0010 - .0030	.0015 - .0035	.0025 - .0040	.0030 - .0050
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		150 - 300 125 - 200		.0010 - .0020 .0008 - .0015	.0010 - .0030 .0010 - .0020	.0015 - .0035 .0015 - .0030	.0025 - .0040 .0020 - .0040	.0030 - .0050 .0025 - .0050

SPADE DRILLS - CARBIDE

Technical Information

General Purpose Carbide Spade Drills									
Material Guide		Machinability	Rc	SFM	Feed Per Tooth				
					1/32"- 1/16"	1/16"-1/8"	1/8"-1/4"	1/4"-3/8"	3/8"-1/2"
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	Difficult	≤ 42 Rc	40	.0005-.0010	.0010-.0015	.0015-.0030	.0030-.0040	.0040-.0050
IRON BASE ALLOYS	"Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3"	Difficult	≤ 42 Rc	40	.0005-.0011	.0010-.0016	.0015-.0031	.0030-.0041	.0040-.0051
MONEL	Monel - 65% Nickel	Difficult	≤ 42 Rc	40	.0005-.0012	.0010-.0017	.0015-.0032	.0030-.0042	.0040-.0052
TITANIUM ALLOYS	"Commercially Pure, 6AL-4V, STM 1/2/3, 6AL-25N-4Zr-2Mo-Si"	Difficult	≤ 42 Rc	80	.0005-.0013	.0010-.0018	.0015-.0033	.0030-.0043	.0040-.0053
STAINLESS STEEL (PH)	13/8, 15/5, 17-4	Difficult	"≤ 28 Rc > 28 Rc"	"125 60"	.0005-.0014	.0010-.0019	.0015-.0034	.0030-.0044	.0040-.0054
STAINLESS STEEL (AUSTENITIC)	303, 303Se	Free-Machining	≤ 28 Rc	125	.0005-.0014	.0010-.0019	.0015-.0034	.0030-.0044	.0040-.0054
	304, 304L, 316, 316L, 200 Series	Difficult	"≤ 28 Rc > 28 Rc"	"125 60"	.0005-.0015	.0010-.0020	.0015-.0035	.0030-.0045	.0040-.0055
STAINLESS STEEL (MARTENSITIC)	416	Free-Machining	≤ 28 Rc	125	.0005-.0014	.0010-.0019	.0015-.0034	.0030-.0044	.0040-.0054
	403, 410, 440	Difficult	"≤ 28 Rc > 28 Rc"	"125 60"	.0005-.0016	.0010-.0021	.0015-.0036	.0030-.0046	.0040-.0056
HIGH STRENGTH TOOL STEELS	4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	Difficult	28-44 Rc	150	.0005-.0017	.0010-.0022	.0015-.0037	.0030-.0047	.0040-.0057
MEDIUM ALLOY STEELS	4140, 8620, 52100	Moderate	28-38 Rc	165	.0005-.0018	.0010-.0023	.0015-.0038	.0030-.0048	.0040-.0058
CARBON STEELS	1018, 1045, 1117, 1215, 1300 Series	Free-Machining	≤ 28 Rc	175	.0005-.0019	.0010-.0024	.0015-.0039	.0030-.0049	.0040-.0059
DUCTILE	Ductile Cast Irons	Moderate	> 240 HB	175	.0005-.0020	.0010-.0025	.0015-.0040	.0030-.0050	.0040-.0060
CAST IRONS	Gray Cast Irons	Moderate	≤ 240 HB	275	.0005-.0021	.0010-.0026	.0015-.0041	.0030-.0051	.0040-.0061

DRILLS - HIGH SPEED STEEL & M42 COBALT

Element & Dimensional Drill Tolerances

Diameter at Point

Size (Inclusive)	Tolerance
OVER #81 TO 1/8	+0.0000 TO -.0005
OVER 1/8 TO 1/4	+0.0000 TO -.0007
OVER 1/4 TO 1/2	+0.0000 TO -.0010
OVER 1/2 TO 1	+0.0000 TO -.0012
OVER 1 TO 2	+0.0000 TO -.0015
OVER 2 TO 3-1/2	+0.0000 TO -.0020

Shank Diameter

Size (Inclusive)	Tolerance
OVER #81 TO 1/8	-.000 TO -.0025
OVER 1/8 TO 1/4	-.0005 TO -.0030
OVER 1/4 TO 1/2	-.0005 TO -.0045
OVER 1/2 TO 2	-.0005 TO -.0030

Back Taper

Size (Inclusive)	Tolerance Per Inch
OVER #81 TO 1/8	.0000 TO .0008
OVER 1/8 TO 1/4	.0002 TO .0008
OVER 1/4 TO 1/2	.0002 TO .0009
OVER 1/2 TO 1	.0003 TO .0011
OVER 1 TO 3-1/2	.0004 TO .0015

Flute Length

Size (Inclusive)	Tolerance
OVER #81 TO 1/8	+1/8 TO -1/16
OVER 1/8 TO 1/2	+1/8 TO -1/8
OVER 1/2 TO 1	+1/4 TO -1/8
OVER 1 TO 2	+1/4 TO -1/4
OVER 2 TO 3-1/2	+3/8 TO -3/8

Overall Length

Size (Inclusive)	Tolerance
OVER #81 TO 1/8	+1/8 TO -1/16
OVER 1/8 TO 1/2	+1/8 TO -1/8
OVER 1/2 TO 1	+1/4 TO -1/8
OVER 1 TO 2	+1/4 TO -1/4
OVER 2 TO 3-1/2	+3/8 TO -3/8

Included Point Angle

Size (Inclusive)	Included Angle	Tolerance
1/16 TO 1/2	118°	±5°
OVER 1/2 TO 1-1/2	118°	±3°
OVER 1-1/2 TO 3-1/2	118°	±2°

Lip Height

Size (Inclusive)	TIV (Total Indicator Variation)
1/16 TO 1/8	.0020
OVER 1/8 TO 1/4	.0030
OVER 1/4 TO 1/2	.0040
OVER 1/2 TO 1	.0050
OVER 1 TO 3-1/2	.0060

NOTE: 95% of drills in any one lot to fall within tolerances above.

Suggested Method of Measurement:

- Rotate the drill in a vee block against a back end stop.
- Measure the cutting lip height variation on a comparator, or with an indicator set at allocation approximately
- 75% of the distance from the center to the periphery of the drill.

Centrality of Web

Size (Inclusive)	TIV (Total Indicator Variation)
1/16 TO 1/8	.0030
OVER 1/8 TO 1/4	.0040
OVER 1/4 TO 1/2	.0050
OVER 1/2 TO 1	.0070
OVER 1 TO 2	.0100

NOTE: 95% of drills in any one lot to fall within tolerances above.

Suggested Method of Measurement :

- Rotate the drill in a close fitting bushing.
- Record the difference in indicator readings of the web at the point as the drill is indexed 180°.

Flute Spacing

Size (Inclusive)	Tolerance (TIV)	Actual Deviation
1/16 TO 1/8	.0030	.0015
OVER 1/8 TO 1/4	.0060	.0030
OVER 1/4 TO 1/2	.0100	.0050
OVER 1/2 TO 1	.0140	.0070
OVER 1 TO 2	.0260	.0130

NOTE: 95% of drills in any one lot to fall within tolerances above.

Suggested Method of Measurement:

- Place the drill in a vee block against a back end stop, and rotate it against a radial finger stop.
- Take an indicator reading at the leading edge of the margin on the opposite flute.
- Repeat for the other flute and note the difference between the two readings.
- The deviation in flute spacing is equal to one-half the difference between the two readings.

DRILLS - HIGH SPEED STEEL & M42 COBALT

Technical Information

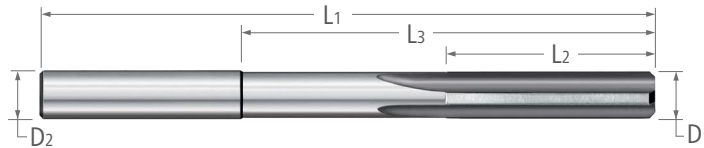
General Purpose Cobalt and HSS Drills										
Material Guide		Rc	GP	HD	Cobalt	Suggested Inch Per Revolution				
						UP TO 1/8"	1/8" - 1/4"	1/4" - 3/8"	3/8" - 1/2"	1/2" - 3/4"
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	< 32	10 - 20	20 - 23	20 - 23	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
TITANIUM ALLOYS	Commercially Pure, 6AL - 4V, Astm 1/2/3, 6Al - 25N - 4Zr - 2Mo - Si		20 - 75	35 - 90	35 - 90	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17 - 4	< 32	20	30	30	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 304L, 316, 316L	< 32	26	36	36	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	< 32	50	70	72	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	< 32	30 - 65	33 - 75	33 - 75	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
MEDIUM ALLOY STEELS	200, 250, 300	< 32	115	115	115	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
CARBON STEELS	1000's, 1100's, 1300's	< 32	95	95	95	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
DUCTILE	Ductile Cast Irons		45	55	55	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
CAST IRONS	Gray Cast Irons		80 - 100	90 - 115	90 - 115	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
HIGH SILICON ALUMINUM	A380, A390		60 - 80	80 - 95	80 - 95	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
ALUMINUM ALLOYS	2014, 2024, 6061, 7075		90 - 98	95 - 100	95 - 100	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
MAGNESIUM			90 - 115	90 - 130	90 - 130	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
COPPER, COPPER ALLOYS			108	125	125	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		90 - 115	90 - 130	90 - 130	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240
COMPOSITES	G-10 Fiberglass, Graphite, Graphite/Epoxy, Plastics		100 - 125	125 - 175	125 - 175	.0010 - .0020	.0020 - .0040	.0040 - .0080	.0080 - .0160	.0160 - .0240

COUNTERSINKS - CARBIDE & HIGH SPEED STEEL

Technical Information

Countersinks Carbide and HSS			
Material Guide	SFM		Feed Per Tooth (FPT)
	HSS	Carbide	
INCONEL ALLOY HASTELLOY WROUGHT	15 - 20	25 - 35	.0010 - .0020
HASTELLOY (CAST)	5 - 7	7 - 15	.0010 - .0020
MAGNESIUM MAGNESIUM ALLOY	125 - 250	250 - 400	.0010 - .0020
HIGH NICKEL STEEL	30 - 50	50 - 75	.0010 - .0020
STAINLESS STEEL (FREE MACHINING)	30 - 80	80 - 125	.0010 - .0020
STAINLESS STEEL (WORK HARDENING)	15 - 50	50 - 75	.0010 - .0020
STEEL - MILD	70 - 100	80 - 170	.0010 - .0020
STEEL - TOOL	50 - 60	60 - 100	.0010 - .0020
STEEL - FORGINGS	40 - 50	50 - 80	.0010 - .0020
STEEL - ALLOYS 300 - 400 BRINELL	20 - 30	30 - 50	.0010 - .0020
STEEL - HIGH TENSILE 35 - 45 RC	25 - 40	35 - 60	.0010 - .0020
STEEL - HIGH TENSILE 45 - 50 RC	15 - 25	25 - 40	.0010 - .0020
STEEL - HIGH TENSILE 50 - 55 RC	7 - 15	15 - 20	.0010 - .0020
IRON - CAST SOFT	75 - 125	125 - 225	.0010 - .0020
IRON - CAST MEDIUM HARD	50 - 100	100 - 175	.0010 - .0020
IRON MALLEABLE	80 - 90	90 - 150	.0010 - .0020
ALUMINUM ALUMINUM ALLOYS	150 - 250	300 - 500	.0010 - .0020
BRASS/BRONZE	75 - 125	150 - 250	.0010 - .0020
PLASTIC BAKELITE	100 - 250	250 - 400	.0010 - .0020

REAMERS - CARBIDE



- Straight flute general purpose reamers for through and blind hole applications
- 45° chamfer angle
- 4 and 6 flute styles
- Solid carbide
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0000" \\ -.0002" \end{smallmatrix}$		L ₂	L ₃			D ₂	L ₁	TOOL #	USD\$
.0400	#60	1/4	0*	.007	4	.0350	1-1/2	TC87046	34.25
.0410	#59	1/4	0*	.007	4	.0360	1-1/2	TC87047	34.25
.0420	#58	3/8	0*	.010	4	.0370	1-1/2	TC87048	34.25
.0430	#57	3/8	0*	.010	4	.0380	1-1/2	TC87049	34.25
.0440		3/8	0*	.010	4	.0390	1-1/2	TC87050	28.95
.0450		3/8	0*	.010	4	.0400	1-1/2	TC87051	36.15
.0460		3/8	0*	.010	4	.0410	1-1/2	TC87052	36.15
.0465	#56	3/8	0*	.010	4	.0420	1-1/2	TC87053	34.25
.0469	3/64	3/8	0*	.010	4	.0420	1-1/2	TC87054	32.65
.0470		3/8	0*	.010	4	.0420	1-1/2	TC87055	36.15
.0480		3/8	0*	.010	4	.0430	1-1/2	TC87056	36.15
.0490		3/8	0*	.010	4	.0440	1-1/2	TC87057	36.15
.0500		3/8	0*	.010	4	.0450	1-1/2	TC87058	36.15
.0510		3/8	3/4	.010	4	.0510	1-1/2	TC87059	36.15
.0520	#55	3/8	3/4	.010	4	.0520	1-1/2	TC87060	34.25
.0530		3/8	3/4	.010	4	.0530	1-1/2	TC87061	36.15
.0540		3/8	3/4	.010	4	.0540	1-1/2	TC87062	36.15
.0550	#54	3/8	3/4	.010	4	.0550	1-1/2	TC87063	34.25
.0560		3/8	3/4	.010	4	.0560	1-1/2	TC87064	36.15
.0570		3/8	3/4	.010	4	.0570	1-1/2	TC87065	36.15
.0580		3/8	3/4	.010	4	.0580	1-1/2	TC87066	36.15
.0590		3/8	3/4	.010	4	.0590	1-1/2	TC87067	36.15
.0591	1.5 mm	10 mm	3/4	.010	4	.0591	38 mm	TC87068	36.15
.0595	#53	3/8	3/4	.010	4	.0595	1-1/2	TC87069	34.25
.0600		3/8	3/4	.010	4	.0600	1-1/2	TC87070	36.15
.0605		3/8	3/4	.010	4	.0605	1-1/2	TC87071	47.90
.0610		3/8	3/4	.010	4	.0610	1-1/2	TC87072	36.15
.0615		3/8	3/4	.010	4	.0615	1-1/2	TC87073	40.15
.0620		3/8	3/4	.010	4	.0620	1-1/2	TC87074	36.15
.0625	1/16	3/8	3/4	.010	4	.0625	1-1/2	TC87075	32.65
.0630		3/8	3/4	.010	4	.0630	1-1/2	TC87076	36.15
.0635	#52	3/8	3/4	.010	4	.0635	1-1/2	TC87077	34.25
.0640		3/8	3/4	.010	4	.0640	1-1/2	TC87078	36.15
.0645		3/8	3/4	.010	4	.0645	1-1/2	TC87079	47.90
.0650		3/8	3/4	.010	4	.0650	1-1/2	TC87080	36.15
.0660		1/2	7/8	.012	4	.0660	1-3/4	TC87081	36.15
.0670	#51	1/2	7/8	.012	4	.0670	1-3/4	TC87082	34.25
.0680		1/2	7/8	.012	4	.0680	1-3/4	TC87083	36.15

*When L₃ value is 0, it is a full shank reduction

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For technical information, see page 335

REAMERS - CARBIDE

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REAMER DIAMETER dec. equiv. size	FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 ^{+0.002"} _{-0.000"}	L2	L3			D2	L1	TOOL #	USD\$
.0690	1/2	7/8	.012	4	.0690	1-3/4	TC87084	36.15
.0700 #50	1/2	7/8	.012	4	.0700	1-3/4	TC87085	34.25
.0710	1/2	7/8	.012	4	.0710	1-3/4	TC87086	36.15
.0720	1/2	7/8	.012	4	.0720	1-3/4	TC87087	36.15
.0730 #49	1/2	7/8	.012	4	.0730	1-3/4	TC87088	34.25
.0740	1/2	7/8	.012	4	.0740	1-3/4	TC87089	36.15
.0750	1/2	7/8	.012	4	.0750	1-3/4	TC87090	36.15
.0760 #48	1/2	7/8	.012	4	.0760	1-3/4	TC87091	34.25
.0770	1/2	7/8	.012	4	.0770	1-3/4	TC87092	36.15
.0780	1/2	7/8	.012	4	.0780	1-3/4	TC87093	36.15
.0781 5/64	1/2	7/8	.012	4	.0781	1-3/4	TC87094	32.65
.0785 #47	1/2	7/8	.012	4	.0785	1-3/4	TC87095	34.25
.0787 2 mm	13 mm	7/8	.012	4	.0787	44 mm	TC87096	36.15
.0790	1/2	7/8	.012	4	.0790	1-3/4	TC87097	36.15
.0800	1/2	7/8	.012	4	.0800	1-3/4	TC87098	36.15
.0810 #46	1/2	7/8	.012	4	.0810	1-3/4	TC87099	34.25
.0820 #45	1/2	7/8	.012	4	.0820	2	TC87100	34.25
.0830	1/2	7/8	.012	4	.0830	2	TC87101	36.15
.0840	1/2	7/8	.012	4	.0840	2	TC87102	36.15
.0850	1/2	7/8	.012	4	.0850	2	TC87103	36.15
.0860 #44	1/2	7/8	.012	4	.0860	2	TC87104	34.25
.0870	1/2	7/8	.012	4	.0870	2	TC87105	36.15
.0880	1/2	7/8	.012	4	.0880	2	TC87106	36.15
.0890 #43	1/2	7/8	.012	4	.0890	2	TC87107	34.25
.0900	1/2	7/8	.012	4	.0900	2	TC87108	36.15
.0910	1/2	7/8	.012	4	.0910	2	TC87109	36.15
.0915	1/2	7/8	.012	4	.0915	2	TC87110	47.55
.0920	1/2	7/8	.012	4	.0920	2	TC87111	36.15
.0925	1/2	7/8	.012	4	.0925	2	TC87112	40.15
.0930	1/2	7/8	.012	4	.0930	2	TC87113	36.15
.0935 #42	1/2	7/8	.012	4	.0935	2	TC87114	34.25
.0938 3/32	1/2	7/8	.012	4	.0938	2	TC87115	32.65
.0940	1/2	7/8	.012	4	.0940	2	TC87116	36.15
.0945	1/2	7/8	.012	4	.0945	2	TC87117	40.15
.0950	1/2	7/8	.012	4	.0950	2	TC87118	36.15
.0960 #41	1/2	7/8	.012	4	.0960	2	TC87119	34.25
.0970	5/8	1-1/8	.015	4	.0970	2-1/4	TC87120	36.15
.0980 #40	5/8	1-1/8	.015	4	.0980	2-1/4	TC87121	34.25
.0984 2.5 mm	16 mm	1-1/8	.015	4	.0984	57 mm	TC87122	36.15
.0990	5/8	1-1/8	.015	4	.0990	2-1/4	TC87123	36.15
.0995 #39	5/8	1-1/8	.015	4	.0995	2-1/4	TC87124	34.25
.1000	5/8	1-1/8	.015	4	.1000	2-1/4	TC87125	36.15
.1010	5/8	1-1/8	.015	4	.1010	2-1/4	TC87126	36.15
.1015 #38	5/8	1-1/8	.015	4	.1015	2-1/4	TC87127	34.25
.1020	5/8	1-1/8	.015	4	.1020	2-1/4	TC87128	36.15
.1030	5/8	1-1/8	.015	4	.1030	2-1/4	TC87129	36.15

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For technical information, see page 335

REAMERS - CARBIDE

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REAMER DIAMETER		FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
dec. equiv.	size								
$D_1 \begin{smallmatrix} +.0002" \\ -.0000" \end{smallmatrix}$		L ₂	L ₃			D ₂	L ₁	TOOL #	USD\$
.1040	#37	5/8	1-1/8	.015	4	.1040	2-1/4	TC87130	34.25
.1050		5/8	1-1/8	.015	4	.1050	2-1/4	TC87131	36.15
.1060		5/8	1-1/8	.015	4	.1060	2-1/4	TC87132	36.15
.1065	#36	5/8	1-1/8	.015	4	.1065	2-1/4	TC87133	34.25
.1070		5/8	1-1/8	.015	4	.1070	2-1/4	TC87134	36.15
.1080		5/8	1-1/8	.015	4	.1080	2-1/4	TC87135	36.15
.1090		5/8	1-1/8	.015	4	.1090	2-1/4	TC87136	37.60
.1094	7/64	5/8	1-1/8	.015	4	.1094	2-1/4	TC87137	32.65
.1100	#35	5/8	1-1/8	.015	4	.1100	2-1/4	TC87138	34.25
.1110	#34	5/8	1-1/8	.015	4	.1110	2-1/4	TC87139	34.25
.1120		5/8	1-1/8	.015	4	.1120	2-1/4	TC87140	36.15
.1130	#33	5/8	1-1/8	.015	4	.1130	2-1/4	TC87141	34.25
.1140		5/8	1-1/8	.015	4	.1140	2-1/4	TC87142	36.15
.1150		5/8	1-1/8	.015	4	.1150	2-1/4	TC87143	36.15
.1160	#32	5/8	1-1/8	.015	4	.1160	2-1/4	TC87144	36.20
.1170		5/8	1-1/8	.015	4	.1170	2-1/4	TC87145	38.40
.1180		5/8	1-1/8	.015	4	.1180	2-1/4	TC87146	38.40
.1181	3 mm	16 mm	1-1/8	.015	4	.1181	57 mm	TC87147	35.25
.1190		5/8	1-1/8	.015	4	.1190	2-1/4	TC87148	38.40
.1200	#31	5/8	1-1/8	.015	4	.1200	2-1/4	TC87149	36.20
.1210		5/8	1-1/8	.015	4	.1210	2-1/4	TC87150	38.40
.1220		5/8	1-1/8	.015	4	.1220	2-1/4	TC87151	38.40
.1230		5/8	1-1/8	.015	4	.1230	2-1/4	TC87152	38.40
.1235		5/8	1-1/8	.015	4	.1235	2-1/4	TC87153	50.80
.1240		5/8	1-1/8	.015	4	.1240	2-1/4	TC87154	38.40
.1245		5/8	1-1/8	.015	4	.1245	2-1/4	TC87155	42.25
.1250	1/8	5/8	1-1/8	.015	4	.1250	2-1/4	TC87156	34.60
.1255		5/8	1-1/8	.015	4	.1255	2-1/4	TC87157	42.25
.1260		5/8	1-1/8	.015	4	.1260	2-1/4	TC87158	38.40
.1265		5/8	1-1/8	.015	4	.1265	2-1/4	TC87159	50.80
.1270		5/8	1-1/8	.015	4	.1270	2-1/4	TC87160	38.40
.1275		5/8	1-1/8	.015	4	.1275	2-1/4	TC87161	50.80
.1280		5/8	1-1/8	.015	4	.1280	2-1/4	TC87162	38.40
.1285	#30	5/8	1-1/8	.015	4	.1285	2-1/4	TC87163	38.40
.1290		5/8	1-1/8	.015	4	.1290	2-1/4	TC87164	38.40
.1300		5/8	1-1/8	.015	4	.1300	2-1/4	TC87165	38.40
.1310		3/4	1-3/8	.017	4	.1310	2-1/2	TC87166	43.70
.1320		3/4	1-3/8	.017	4	.1320	2-1/2	TC87167	43.70
.1330		3/4	1-3/8	.017	4	.1330	2-1/2	TC87168	43.70
.1340		3/4	1-3/8	.017	4	.1340	2-1/2	TC87169	43.70
.1350		3/4	1-3/8	.017	4	.1350	2-1/2	TC87170	43.70
.1360	#29	3/4	1-3/8	.017	4	.1360	2-1/2	TC87171	41.00
.1370		3/4	1-3/8	.017	4	.1370	2-1/2	TC87172	43.70
.1378	3.5 mm	19 mm	1-3/8	.017	4	.1378	64 mm	TC87173	43.70
.1380		3/4	1-3/8	.017	4	.1380	2-1/2	TC87174	43.70
.1390		3/4	1-3/8	.017	4	.1390	2-1/2	TC87175	43.70

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REAMER DIAMETER dec. equiv. size	FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ - .0000" \end{smallmatrix}$	L ₂	L ₃			D ₂	L ₁	TOOL #	USD\$
.1400	3/4	1-3/8	.017	4	.1400	2-1/2	TC87176	43.70
.1405 #28	3/4	1-3/8	.017	4	.1405	2-1/2	TC87177	41.00
.1406 9/64	3/4	1-3/8	.017	4	.1406	2-1/2	TC87178	39.35
.1410	3/4	1-3/8	.017	4	.1410	2-1/2	TC87179	43.70
.1420	3/4	1-3/8	.017	4	.1420	2-1/2	TC87180	43.70
.1430	3/4	1-3/8	.017	4	.1430	2-1/2	TC87181	43.70
.1440 #27	3/4	1-3/8	.017	4	.1440	2-1/2	TC87182	41.00
.1450	3/4	1-3/8	.017	4	.1450	2-1/2	TC87183	43.70
.1460	3/4	1-3/8	.017	4	.1460	2-1/2	TC87184	45.95
.1470 #26	3/4	1-3/8	.017	4	.1470	2-1/2	TC87185	42.90
.1480	3/4	1-3/8	.017	4	.1480	2-1/2	TC87186	45.95
.1490	3/4	1-3/8	.017	4	.1490	2-1/2	TC87187	45.95
.1495 #25	3/4	1-3/8	.017	4	.1495	2-1/2	TC87188	42.90
.1500	3/4	1-3/8	.017	4	.1500	2-1/2	TC87189	45.95
.1510	3/4	1-3/8	.017	4	.1510	2-1/2	TC87190	45.95
.1520 #24	3/4	1-3/8	.017	4	.1520	2-1/2	TC87191	42.90
.1530	3/4	1-3/8	.017	4	.1530	2-1/2	TC87192	45.95
.1540 #23	3/4	1-3/8	.017	4	.1540	2-1/2	TC87193	42.90
.1545	3/4	1-3/8	.017	4	.1545	2-1/2	TC87194	53.05
.1550	3/4	1-3/8	.017	4	.1550	2-1/2	TC87195	45.95
.1555	3/4	1-3/8	.017	4	.1555	2-1/2	TC87196	53.05
.1560	3/4	1-3/8	.017	4	.1560	2-1/2	TC87197	45.95
.1562 5/32	3/4	1-3/8	.017	4	.1562	2-1/2	TC87198	41.50
.1565	3/4	1-3/8	.017	4	.1565	2-1/2	TC87199	53.05
.1570 #22	3/4	1-3/8	.017	4	.1570	2-1/2	TC87200	42.90
.1575 4 mm	3/4	1-3/8	.022	4	.1575	2-1/2	TC87201	45.95
.1580	3/4	1-3/8	.022	4	.1580	2-1/2	TC87202	45.95
.1590 #21	3/4	1-3/8	.022	4	.1590	2-1/2	TC87203	42.90
.1600	3/4	1-3/8	.022	4	.1600	2-1/2	TC87204	45.95
.1610 #20	7/8	1-1/2	.022	4	.1610	2-3/4	TC87205	47.90
.1620	7/8	1-1/2	.022	4	.1620	2-3/4	TC87206	51.60
.1630	7/8	1-1/2	.022	4	.1630	2-3/4	TC87207	51.60
.1640	7/8	1-1/2	.022	4	.1640	2-3/4	TC87208	51.60
.1650	7/8	1-1/2	.022	4	.1650	2-3/4	TC87209	47.90
.1660 #19	7/8	1-1/2	.022	4	.1660	2-3/4	TC87210	47.90
.1670	7/8	1-1/2	.022	4	.1670	2-3/4	TC87211	51.60
.1680	7/8	1-1/2	.022	4	.1680	2-3/4	TC87212	51.60
.1690	7/8	1-1/2	.022	4	.1690	2-3/4	TC87213	51.45
.1695 #18	7/8	1-1/2	.022	4	.1695	2-3/4	TC87214	47.90
.1700	7/8	1-1/2	.022	4	.1700	2-3/4	TC87215	51.60
.1710	7/8	1-1/2	.022	4	.1710	2-3/4	TC87216	51.60
.1719 11/64	7/8	1-1/2	.022	4	.1719	2-3/4	TC87217	46.40
.1720	7/8	1-1/2	.022	4	.1720	2-3/4	TC87218	51.60
.1730 #17	7/8	1-1/2	.022	4	.1730	2-3/4	TC87219	47.90
.1740	7/8	1-1/2	.022	4	.1740	2-3/4	TC87220	51.60
.1750	7/8	1-1/2	.022	4	.1750	2-3/4	TC87221	51.60
.1760	7/8	1-1/2	.022	4	.1760	2-3/4	TC87222	51.60

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REAMER DIAMETER dec. equiv. size	FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} _{-0.000"}	L ₂	L ₃			D ₂	L ₁	TOOL #	USD\$
.1770 #16	7/8	1-1/2	.022	4	.1770	2-3/4	TC87223	47.90
.1772 4.5 mm	22 mm	1-1/2	.022	4	.1772	70 mm	TC87224	53.65
.1780	7/8	1-1/2	.022	4	.1780	2-3/4	TC87225	51.60
.1790	7/8	1-1/2	.022	4	.1790	2-3/4	TC87226	51.60
.1800 #15	7/8	1-1/2	.022	4	.1800	2-3/4	TC87227	47.90
.1810	7/8	1-1/2	.022	4	.1810	2-3/4	TC87228	51.60
.1820 #14	7/8	1-1/2	.022	4	.1820	2-3/4	TC87229	47.90
.1830	7/8	1-1/2	.022	4	.1830	2-3/4	TC87230	51.60
.1840	7/8	1-1/2	.022	4	.1840	2-3/4	TC87231	51.60
.1850 #13	7/8	1-1/2	.022	4	.1850	2-3/4	TC87232	47.90
.1855	7/8	1-1/2	.022	4	.1855	2-3/4	TC87233	61.70
.1860	7/8	1-1/2	.022	4	.1860	2-3/4	TC87234	51.60
.1865	7/8	1-1/2	.022	4	.1865	2-3/4	TC87235	55.50
.1870	7/8	1-1/2	.022	4	.1870	2-3/4	TC87236	51.60
.1875 3/16	7/8	1-1/2	.022	4	.1875	2-3/4	TC87237	46.40
.1880	7/8	1-1/2	.022	4	.1880	2-3/4	TC87238	51.60
.1885	7/8	1-1/2	.022	4	.1885	2-3/4	TC87239	55.50
.1890 #12	7/8	1-1/2	.022	4	.1890	2-3/4	TC87240	47.90
.1900	7/8	1-1/2	.022	4	.1900	2-3/4	TC87241	51.60
.1910 #11	7/8	1-1/2	.022	4	.1910	2-3/4	TC87242	58.35
.1920	1	1-3/4	.025	4	.1920	3	TC87243	62.45
.1930	1	1-3/4	.025	4	.1930	3	TC87244	62.45
.1935 #10	1	1-3/4	.025	4	.1935	3	TC87245	58.35
.1940	1	1-3/4	.025	4	.1940	3	TC87246	62.45
.1950	1	1-3/4	.025	4	.1950	3	TC87247	62.45
.1960 #9	1	1-3/4	.025	4	.1960	3	TC87248	58.35
.1969 5 mm	25 mm	1-3/4	.025	4	.1969	76 mm	TC87249	62.45
.1970	1	1-3/4	.025	4	.1970	3	TC87250	62.45
.1980	1	1-3/4	.025	4	.1980	3	TC87251	62.45
.1990 #8	1	1-3/4	.025	4	.1990	3	TC87252	58.35
.2000	1	1-3/4	.025	4	.2000	3	TC87253	62.45
.2010 #7	1	1-3/4	.025	4	.2010	3	TC87254	58.35
.2020	1	1-3/4	.025	4	.2020	3	TC87255	62.45
.2030	1	1-3/4	.025	4	.2030	3	TC87256	62.45
.2031 13/64	1	1-3/4	.025	4	.2031	3	TC87257	56.35
.2040 #6	1	1-3/4	.025	4	.2040	3	TC87258	58.35
.2050	1	1-3/4	.025	4	.2050	3	TC87259	62.45
.2055 #5	1	1-3/4	.025	4	.2055	3	TC87260	58.35
.2060	1	1-3/4	.025	4	.2060	3	TC87261	62.45
.2070	1	1-3/4	.025	4	.2070	3	TC87262	62.45
.2080	1	1-3/4	.025	4	.2080	3	TC87263	62.45
.2090 #4	1	1-3/4	.025	4	.2090	3	TC87264	58.35
.2100	1	1-3/4	.025	4	.2100	3	TC87265	62.45
.2110	1	1-3/4	.025	4	.2110	3	TC87266	62.45
.2120	1	1-3/4	.025	4	.2120	3	TC87267	62.45
.2130 #3	1	1-3/4	.025	4	.2130	3	TC87268	58.35
.2140	1	1-3/4	.025	4	.2140	3	TC87269	62.45

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REAMER DIAMETER dec. equiv. size	FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.0002"} -0.0000"	L ₂	L ₃			D ₂	L ₁	TOOL #	USD\$
.2150	1	1-3/4	.025	4	.2150	3	TC87270	62.45
.2160	1	1-3/4	.025	4	.2160	3	TC87271	62.45
.2165 5.5 mm	25 mm	1-3/4	.025	4	.2165 76 mm	3	TC87272	66.15
.2170	1	1-3/4	.025	4	.2170	3	TC87273	62.45
.2180	1	1-3/4	.025	4	.2180	3	TC87274	62.45
.2188 7/32	1	1-3/4	.025	4	.2188	3	TC87275	56.35
.2190	1	1-3/4	.025	4	.2190	3	TC87276	62.45
.2200	1	1-3/4	.025	4	.2200	3	TC87277	62.45
.2210 #2	1	1-3/4	.025	4	.2210	3	TC87278	58.35
.2220	1	1-3/4	.025	4	.2220	3	TC87279	62.45
.2230	1	1-3/4	.025	4	.2230	3	TC87280	62.45
.2240	1	1-3/4	.025	4	.2240	3	TC87281	62.45
.2250	1	1-3/4	.025	4	.2250	3	TC87282	62.45
.2260	1	1-3/4	.025	4	.2260	3	TC87283	68.45
.2270	1	1-3/4	.025	4	.2270	3	TC87284	68.45
.2280 #1	1	1-3/4	.025	4	.2280	3	TC87285	64.15
.2290	1	1-3/4	.025	4	.2290	3	TC87286	63.95
.2300	1	1-3/4	.025	4	.2300	3	TC87287	68.45
.2310	1	1-3/4	.025	4	.2310	3	TC87288	68.45
.2320	1	1-3/4	.025	4	.2320	3	TC87289	68.45
.2330	1	1-3/4	.025	4	.2330	3	TC87290	68.45
.2340 A	1	1-3/4	.025	4	.2340	3	TC87291	68.45
.2344 15/64	1	1-3/4	.025	4	.2344	3	TC87292	61.55
.2350	1	1-3/4	.025	4	.2350	3	TC87293	68.45
.2360	1	1-3/4	.025	4	.2360	3	TC87294	68.45
.2362 6 mm	25 mm	1-3/4	.025	4	.2362 76 mm	3	TC87295	65.50
.2370	1	1-3/4	.025	4	.2370	3	TC87296	68.45
.2380 B	1	1-3/4	.025	4	.2380	3	TC87297	68.45
.2390	1	1-3/4	.025	4	.2390	3	TC87298	68.45
.2400	1	1-3/4	.025	4	.2400	3	TC87299	68.45
.2410	1	1-3/4	.025	4	.2410	3	TC87300	68.45
.2420 C	1	1-3/4	.025	4	.2420	3	TC87301	68.45
.2430	1	1-3/4	.025	4	.2430	3	TC87302	68.45
.2440	1	1-3/4	.025	4	.2440	3	TC87303	68.45
.2450	1	1-3/4	.025	4	.2450	3	TC87304	68.45
.2460 D	1	1-3/4	.025	4	.2460	3	TC87305	68.45
.2470	1	1-3/4	.025	4	.2470	3	TC87306	68.45
.2480	1	1-3/4	.025	4	.2480	3	TC87307	68.45
.2485	1	1-3/4	.025	4	.2485	3	TC87308	76.95
.2490	1	1-3/4	.025	4	.2490	3	TC87309	68.45
.2495	1	1-3/4	.025	4	.2495	3	TC87310	72.75
.2500 1/4	1	1-3/4	.025	4	.2500	3	TC87311	61.55
D ₁ ^{+0.0003"} -0.0000"	L ₂	L ₃			D ₂	L ₁	TOOL #	USD\$
.2505	1	1-3/4	.025	4	.2505	3	TC87312	72.75
.2510	1	1-3/4	.025	4	.2510	3	TC87313	68.45
.2515	1	1-3/4	.025	4	.2515	3	TC87314	85.50
.2520	1	1-3/4	.025	4	.2520	3	TC87315	68.45

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 ^{+0.003"} -0.000"		L2	L3			D2	L1	TOOL #	USD\$
.2530		1	1-3/4	.025	4	.2530	3	TC87316	68.45
.2540		1	1-3/4	.025	4	.2540	3	TC87317	68.45
.2550		1	1-3/4	.025	6	.2550	3	TC87318	68.45
.2559	6.5 mm	29 mm	47 mm	.030	6	6.5 mm	83 mm	TC87319	72.45
.2560		1-1/8	1-7/8	.030	6	.2560	3-1/4	TC87320	83.45
.2570	F	1-1/8	1-7/8	.030	6	.2570	3-1/4	TC87321	83.45
.2580		1-1/8	1-7/8	.030	6	.2580	3-1/4	TC87322	83.45
.2590		1-1/8	1-7/8	.030	6	.2590	3-1/4	TC87323	83.45
.2600		1-1/8	1-7/8	.030	6	.2600	3-1/4	TC87324	83.45
.2610	G	1-1/8	1-7/8	.030	6	.2610	3-1/4	TC87325	83.45
.2620		1-1/8	1-7/8	.030	6	.2620	3-1/4	TC87326	83.45
.2630		1-1/8	1-7/8	.030	6	.2630	3-1/4	TC87327	83.45
.2640		1-1/8	1-7/8	.030	6	.2640	3-1/4	TC87328	83.45
.2650		1-1/8	1-7/8	.030	6	.2650	3-1/4	TC87329	83.45
.2656	17/64	1-1/8	1-7/8	.030	6	.2656	3-1/4	TC87330	74.95
.2660	H	1-1/8	1-7/8	.030	6	.2660	3-1/4	TC87331	83.45
.2670		1-1/8	1-7/8	.030	6	.2670	3-1/4	TC87332	83.45
.2680		1-1/8	1-7/8	.030	6	.2680	3-1/4	TC87333	83.45
.2690		1-1/8	1-7/8	.030	6	.2690	3-1/4	TC87334	83.45
.2700		1-1/8	1-7/8	.030	6	.2700	3-1/4	TC87335	83.45
.2710		1-1/8	1-7/8	.030	6	.2710	3-1/4	TC87336	82.95
.2720	I	1-1/8	1-7/8	.030	6	.2720	3-1/4	TC87337	83.45
.2730		1-1/8	1-7/8	.030	6	.2730	3-1/4	TC87338	82.95
.2740		1-1/8	1-7/8	.030	6	.2740	3-1/4	TC87339	83.45
.2750		1-1/8	1-7/8	.030	6	.2750	3-1/4	TC87340	83.45
.2756	7 mm	29 mm	47 mm	.030	6	7 mm	83 mm	TC87341	90.90
.2760		1-1/8	1-7/8	.030	6	.2760	3-1/4	TC87342	83.45
.2770	J	1-1/8	1-7/8	.030	6	.2770	3-1/4	TC87343	83.45
.2780		1-1/8	1-7/8	.030	6	.2780	3-1/4	TC87344	83.45
.2790		1-1/8	1-7/8	.030	6	.2790	3-1/4	TC87345	83.45
.2800		1-1/8	1-7/8	.030	6	.2800	3-1/4	TC87346	83.45
.2810	K	1-1/8	1-7/8	.030	6	.2810	3-1/4	TC87347	83.45
.2812	9/32	1-1/8	1-7/8	.030	6	.2812	3-1/4	TC87348	74.95
.2820		1-1/8	1-7/8	.030	6	.2820	3-1/4	TC87349	83.45
.2830		1-1/8	1-7/8	.030	6	.2830	3-1/4	TC87350	83.45
.2840		1-1/8	1-7/8	.030	6	.2840	3-1/4	TC87351	83.45
.2850		1-1/8	1-7/8	.030	6	.2850	3-1/4	TC87352	83.45
.2860		1-1/8	1-7/8	.030	6	.2860	3-1/4	TC87353	83.45
.2870		1-1/8	1-7/8	.030	6	.2870	3-1/4	TC87354	83.45
.2880		1-1/8	1-7/8	.030	6	.2880	3-1/4	TC87355	82.95
.2890		1-1/8	1-7/8	.030	6	.2890	3-1/4	TC87356	82.95
.2900	L	1-1/8	1-7/8	.030	6	.2900	3-1/4	TC87357	83.45
.2910		1-1/8	1-7/8	.030	6	.2910	3-1/4	TC87358	82.95
.2920		1-1/8	1-7/8	.030	6	.2920	3-1/4	TC87359	82.95
.2930		1-1/8	1-7/8	.030	6	.2930	3-1/4	TC87360	83.45
.2940		1-1/8	1-7/8	.030	6	.2940	3-1/4	TC87361	83.45
.2950	M	1-1/8	1-7/8	.030	6	.2950	3-1/4	TC87362	82.95
.2953		1-1/8	1-7/8	.030	6	.2953	3-1/4	TC87363	90.55

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REAMER DIAMETER		FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
dec. equiv.	size								
D1 ^{+0.0003"} -0.0000"		L2	L3			D2	L1	TOOL #	USD\$
.2960		1-1/8	1-7/8	.030	6	.2960	3-1/4	TC87364	82.95
.2969	19/64	1-1/8	1-7/8	.030	6	.2969	3-1/4	TC87365	83.45
.2970		1-1/8	1-7/8	.030	6	.2970	3-1/4	TC87366	82.95
.2980		1-1/8	1-7/8	.030	6	.2980	3-1/4	TC87367	83.45
.2990		1-1/8	1-7/8	.030	6	.2990	3-1/4	TC87368	82.95
.3000		1-1/8	1-7/8	.030	6	.3000	3-1/4	TC87369	83.45
.3010		1-1/8	1-7/8	.030	6	.3010	3-1/4	TC87370	83.45
.3020	N	1-1/8	1-7/8	.030	6	.3020	3-1/4	TC87371	83.45
.3030		1-1/8	1-7/8	.030	6	.3030	3-1/4	TC87372	82.95
.3040		1-1/8	1-7/8	.030	6	.3040	3-1/4	TC87373	82.95
.3050		1-1/8	1-7/8	.030	6	.3050	3-1/4	TC87374	83.45
.3060		1-1/8	1-7/8	.030	6	.3060	3-1/4	TC87375	82.95
.3070		1-1/8	1-7/8	.030	6	.3070	3-1/4	TC87376	83.45
.3080		1-1/8	1-7/8	.030	6	.3080	3-1/4	TC87377	82.95
.3090		1-1/8	1-7/8	.030	6	.3090	3-1/4	TC87378	82.95
.3100		1-1/8	1-7/8	.030	6	.3100	3-1/4	TC87379	83.45
.3110		1-1/8	1-7/8	.030	6	.3110	3-1/4	TC87380	83.45
.3115		1-1/8	1-7/8	.030	6	.3115	3-1/4	TC87381	95.10
.3120		1-1/8	1-7/8	.030	6	.3120	3-1/4	TC87382	83.45
.3125	5/16	1-1/8	1-7/8	.030	6	.3125	3-1/4	TC87383	83.45
.3130		1-1/8	1-7/8	.030	6	.3130	3-1/4	TC87384	83.45
.3135		1-1/8	1-7/8	.030	6	.3135	3-1/4	TC87385	95.10
.3140		1-1/8	1-7/8	.030	6	.3140	3-1/4	TC87386	83.45
.3150	8 mm	29 mm	50 mm	.030	6	8 mm	83 mm	TC87387	83.45
.3160	O	1-1/8	2	.030	6	.3160	3-1/4	TC87388	92.65
.3170		1-1/4	2-1/8	.030	6	.3170	3-1/2	TC87389	92.65
.3180		1-1/4	2-1/8	.035	6	.3180	3-1/2	TC87390	92.65
.3190		1-1/4	2-1/8	.035	6	.3190	3-1/2	TC87391	92.65
.3200		1-1/4	2-1/8	.035	6	.3200	3-1/2	TC87392	92.65
.3210		1-1/4	2-1/8	.035	6	.3210	3-1/2	TC87393	92.65
.3220		1-1/4	2-1/8	.035	6	.3220	3-1/2	TC87394	92.65
.3230	P	1-1/4	2-1/8	.035	6	.3230	3-1/2	TC87395	92.65
.3240		1-1/4	2-1/8	.035	6	.3240	3-1/2	TC87396	92.65
.3250		1-1/4	2-1/8	.035	6	.3250	3-1/2	TC87397	92.65
.3260		1-1/4	2-1/8	.035	6	.3260	3-1/2	TC87398	92.65
.3270		1-1/4	2-1/8	.035	6	.3270	3-1/2	TC87399	92.65
.3280		1-1/4	2-1/8	.035	6	.3280	3-1/2	TC87400	92.65
.3281	21/64	1-1/4	2-1/8	.035	6	.3281	3-1/2	TC87401	93.65
.3290		1-1/4	2-1/8	.035	6	.3290	3-1/2	TC87402	92.65
.3300		1-1/4	2-1/8	.035	6	.3300	3-1/2	TC87403	92.65
.3310		1-1/4	2-1/8	.035	6	.3310	3-1/2	TC87404	92.65
.3320	Q	1-1/4	2-1/8	.035	6	.3320	3-1/2	TC87405	92.65
.3330		1-1/4	2-1/8	.035	6	.3330	3-1/2	TC87406	92.65
.3340		1-1/4	2-1/8	.035	6	.3340	3-1/2	TC87407	92.65
.3346	8.5 mm	32 mm	54 mm	.035	6	8.5 mm	89 mm	TC87408	92.65
.3350		1-1/4	2-1/8	.035	6	.3350	3-1/2	TC87409	92.65
.3360		1-1/4	2-1/8	.035	6	.3360	3-1/2	TC87410	92.65
.3370		1-1/4	2-1/8	.035	6	.3370	3-1/2	TC87411	92.65

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REAMER DIAMETER		FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
dec. equiv.	size								
D ₁ ^{+0.003"} _{-.0000"}		L ₂	L ₃			D ₂	L ₁	TOOL #	USD\$
.3380		1-1/4	2-1/8	.035	6	.3380	3-1/2	TC87412	92.65
.3390	R	1-1/4	2-1/8	.035	6	.3390	3-1/2	TC87413	93.75
.3400		1-1/4	2-1/8	.035	6	.3400	3-1/2	TC87414	92.65
.3410		1-1/4	2-1/8	.035	6	.3410	3-1/2	TC87415	92.65
.3420		1-1/4	2-1/8	.035	6	.3420	3-1/2	TC87416	92.65
.3430		1-1/4	2-1/8	.035	6	.3430	3-1/2	TC87417	92.65
.3438	11/32	1-1/4	2-1/8	.035	6	.3438	3-1/2	TC87418	94.15
.3440		1-1/4	2-1/8	.035	6	.3440	3-1/2	TC87419	92.65
.3450		1-1/4	2-1/8	.035	6	.3450	3-1/2	TC87420	92.65
.3460		1-1/4	2-1/8	.035	6	.3460	3-1/2	TC87421	92.65
.3470		1-1/4	2-1/8	.035	6	.3470	3-1/2	TC87422	92.65
.3480	S	1-1/4	2-1/8	.035	6	.3480	3-1/2	TC87423	92.65
.3490		1-1/4	2-1/8	.035	6	.3490	3-1/2	TC87424	92.65
.3500		1-1/4	2-1/8	.035	6	.3500	3-1/2	TC87425	92.65
.3510		1-1/4	2-1/8	.035	6	.3510	3-1/2	TC87426	101.15
.3520		1-1/4	2-1/8	.035	6	.3520	3-1/2	TC87427	101.15
.3530		1-1/4	2-1/8	.035	6	.3530	3-1/2	TC87428	101.15
.3540		1-1/4	2-1/8	.035	6	.3540	3-1/2	TC87429	101.15
.3543	9 mm	32 mm	54 mm	.035	6	9 mm	89 mm	TC87430	106.00
.3550		1-1/4	2-1/8	.035	6	.3550	3-1/2	TC87431	101.15
.3560		1-1/4	2-1/8	.035	6	.3560	3-1/2	TC87432	101.15
.3570		1-1/4	2-1/8	.035	6	.3570	3-1/2	TC87433	101.15
.3580	T	1-1/4	2-1/8	.035	6	.3580	3-1/2	TC87434	101.15
.3590		1-1/4	2-1/8	.035	6	.3590	3-1/2	TC87435	103.45
.3594	23/64	1-1/4	2-1/8	.035	6	.3594	3-1/2	TC87436	100.30
.3600		1-1/4	2-1/8	.035	6	.3600	3-1/2	TC87437	101.15
.3610		1-1/4	2-1/8	.035	6	.3610	3-1/2	TC87438	101.15
.3620		1-1/4	2-1/8	.035	6	.3620	3-1/2	TC87439	101.15
.3630		1-1/4	2-1/8	.035	6	.3630	3-1/2	TC87440	101.15
.3640		1-1/4	2-1/8	.035	6	.3640	3-1/2	TC87441	101.15
.3650		1-1/4	2-1/8	.035	6	.3650	3-1/2	TC87442	101.15
.3660		1-1/4	2-1/8	.035	6	.3660	3-1/2	TC87443	101.15
.3670		1-1/4	2-1/8	.035	6	.3670	3-1/2	TC87444	101.15
.3680	U	1-1/4	2-1/8	.035	6	.3680	3-1/2	TC87445	101.15
.3690		1-1/4	2-1/8	.035	6	.3690	3-1/2	TC87446	101.15
.3700		1-1/4	2-1/8	.035	6	.3700	3-1/2	TC87447	101.15
.3710		1-1/4	2-1/8	.035	6	.3710	3-1/2	TC87448	101.15
.3720		1-1/4	2-1/8	.035	6	.3720	3-1/2	TC87449	101.15
.3730		1-1/4	2-1/8	.035	6	.3730	3-1/2	TC87450	101.15
.3740	9.5 mm	32 mm	54 mm	.035	6	9.5 mm	89 mm	TC87451	101.15
.3745		1-1/4	2-1/8	.035	6	.3745	3-1/2	TC87452	122.70
.3750	3/8	1-1/4	2-1/8	.035	6	.3750	3-1/2	TC87453	100.30
.3755		1-1/4	2-1/8	.035	6	.3755	3-1/2	TC87454	122.70
.3760		1-1/4	2-1/8	.035	6	.3760	3-1/2	TC87455	127.65
.3765		1-1/4	2-1/8	.035	6	.3765	3-1/2	TC87456	133.25
.3770	V	1-1/4	2-1/8	.035	6	.3770	3-1/2	TC87457	127.65
.3780		1-1/4	2-1/8	.035	6	.3780	3-1/2	TC87458	127.65

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REAMER DIAMETER		FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
dec. equiv.	size								
D1 $+0.0003"$ $-0.0000"$		L2	L3			D2	L1	TOOL #	USD\$
.3790		1-1/4	2-1/8	.035	6	.3790	3-1/2	TC87459	127.05
.3800		1-1/4	2-1/8	.035	6	.3800	3-1/2	TC87460	127.65
.3810		1-1/4	2-1/8	.035	6	.3810	3-1/2	TC87461	127.05
.3820		1-1/4	2-1/8	.035	6	.3820	3-1/2	TC87462	127.65
.3830		1-1/4	2-1/8	.035	6	.3830	3-1/2	TC87463	127.05
.3840		1-1/4	2-1/8	.035	6	.3840	3-1/2	TC87464	127.65
.3850		1-1/4	2-1/8	.035	6	.3850	3-1/2	TC87465	127.05
.3860	W	1-1/4	2-1/8	.035	6	.3860	3-1/2	TC87466	127.05
.3870		1-1/4	2-1/8	.035	6	.3870	3-1/2	TC87467	157.50
.3880		1-1/4	2-1/8	.035	6	.3880	3-1/2	TC87468	157.50
.3890		1-1/4	2-1/8	.035	6	.3890	3-1/2	TC87469	157.50
.3900		1-1/4	2-1/8	.035	6	.3900	3-1/2	TC87470	157.50
.3906	25/64	1-1/4	2-1/8	.035	6	.3906	3-1/2	TC87471	157.50
.3910		1-1/4	2-1/8	.035	6	.3910	3-1/2	TC87472	157.50
.3920		1-1/4	2-1/8	.035	6	.3920	3-1/2	TC87473	157.50
.3930		1-1/4	2-1/8	.035	6	.3930	3-1/2	TC87474	157.50
.3937	10 mm	32 mm	54 mm	.035	6	10 mm	89 mm	TC87475	120.05
.3940		1-1/4	2-1/8	.035	6	.3940	3-1/2	TC87476	157.50
.3950		1-1/4	2-1/8	.035	6	.3950	3-1/2	TC87477	157.50
.3960		1-1/4	2-1/8	.035	6	.3960	3-1/2	TC87478	157.50
.3970	X	1-1/4	2-1/8	.035	6	.3970	3-1/2	TC87479	157.50
.3980		1-1/4	2-1/8	.035	6	.3980	3-1/2	TC87480	157.50
.3990		1-1/4	2-1/8	.035	6	.3990	3-1/2	TC87481	157.50
.4000		1-1/4	2-1/8	.035	6	.4000	3-1/2	TC87482	157.50
.4010		1-1/4	2-1/8	.035	6	.4010	3-1/2	TC87483	157.50
.4020		1-1/4	2-1/8	.035	6	.4020	3-1/2	TC87484	157.50
.4030		1-1/4	2-1/8	.035	6	.4030	3-1/2	TC87485	157.50
.4040	Y	1-1/4	2-1/8	.035	6	.4040	3-1/2	TC87486	157.50
.4050		1-1/4	2-1/8	.035	6	.4050	3-1/2	TC87487	157.50
.4060		1-1/4	2-1/8	.035	6	.4060	3-1/2	TC87488	157.50
.4062	13/32	1-1/4	2-1/8	.035	6	.4062	3-1/2	TC87489	114.95
.4070		1-1/4	2-1/8	.035	6	.4070	3-1/2	TC87490	157.50
.4080		1-1/4	2-1/8	.035	6	.4080	3-1/2	TC87491	157.50
.4090		1-1/4	2-1/8	.035	6	.4090	3-1/2	TC87492	157.50
.4100		1-1/4	2-1/8	.035	6	.4100	3-1/2	TC87493	157.50
.4110		1-1/4	2-1/8	.035	6	.4110	3-1/2	TC87494	157.50
.4120		1-1/4	2-1/8	.035	6	.4120	3-1/2	TC87495	157.50
.4130	Z	1-1/4	2-1/8	.035	6	.4130	3-1/2	TC87496	157.50
.4134	10.5 mm	32 mm	54 mm	.035	6	10.5 mm	89 mm	TC87497	143.55
.4140		1-1/4	2-1/8	.035	6	.4140	3-1/2	TC87498	157.50
.4150		1-1/4	2-1/8	.035	6	.4150	3-1/2	TC87499	157.50
.4160		1-1/4	2-1/8	.035	6	.4160	3-1/2	TC87500	157.50
.4170		1-3/8	2-1/8	.045	6	.4170	4	TC87501	157.50
.4180		1-3/8	2-1/8	.045	6	.4180	4	TC87502	157.50
.4190		1-3/8	2-1/8	.045	6	.4190	4	TC87503	157.50
.4200		1-3/8	2-1/8	.045	6	.4200	4	TC87504	157.50
.4210		1-3/8	2-1/8	.045	6	.4210	4	TC87505	157.50

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.003"} -0.0000"		L ₂	L ₃			D ₂	L ₁	TOOL #	USD\$
.4219	27/64	1-3/8	2-1/8	.045	6	.4219	4	TC87506	130.40
.4220		1-3/8	2-1/8	.045	6	.4220	4	TC87507	157.50
.4230		1-3/8	2-1/8	.045	6	.4230	4	TC87508	157.50
.4240		1-3/8	2-1/8	.045	6	.4240	4	TC87509	157.50
.4250		1-3/8	2-1/8	.045	6	.4250	4	TC87510	157.50
.4260		1-3/8	2-1/8	.045	6	.4260	4	TC87511	157.50
.4270		1-3/8	2-1/8	.045	6	.4270	4	TC87512	157.50
.4280		1-3/8	2-1/8	.045	6	.4280	4	TC87513	157.50
.4290		1-3/8	2-1/8	.045	6	.4290	4	TC87514	157.50
.4300		1-3/8	2-1/8	.045	6	.4300	4	TC87515	157.50
.4310		1-3/8	2-1/8	.045	6	.4310	4	TC87516	157.50
.4320		1-3/8	2-1/8	.045	6	.4320	4	TC87517	157.50
.4330		1-3/8	2-1/8	.045	6	.4330	4	TC87518	157.50
.4331	11 mm	35 mm	57 mm	.045	6	11 mm	102 mm	TC87519	143.55
.4340		1-3/8	2-1/4	.045	6	.4340	4	TC87520	157.50
.4350		1-3/8	2-1/4	.045	6	.4350	4	TC87521	157.50
.4360		1-3/8	2-1/4	.045	6	.4360	4	TC87522	157.50
.4365		1-3/8	2-1/4	.045	6	.4365	4	TC87523	157.50
.4370		1-3/8	2-1/4	.045	6	.4370	4	TC87524	157.50
.4375	7/16	1-3/8	2-1/4	.045	6	.4375	4	TC87525	130.40
.4380		1-3/8	2-1/4	.045	6	.4380	4	TC87526	157.50
.4385		1-3/8	2-1/4	.045	6	.4385	4	TC87527	188.30
.4390		1-3/8	2-1/4	.045	6	.4390	4	TC87528	157.50
.4400		1-3/8	2-1/4	.045	6	.4400	4	TC87529	157.50
.4410		1-3/8	2-1/4	.045	6	.4410	4	TC87530	179.60
.4420		1-3/8	2-1/4	.045	6	.4420	4	TC87531	179.60
.4430		1-3/8	2-1/4	.045	6	.4430	4	TC87532	179.60
.4440		1-3/8	2-1/4	.045	6	.4440	4	TC87533	178.80
.4450		1-3/8	2-1/4	.045	6	.4450	4	TC87534	179.60
.4460		1-3/8	2-1/4	.045	6	.4460	4	TC87535	178.80
.4470		1-3/8	2-1/4	.045	6	.4470	4	TC87536	178.80
.4480		1-3/8	2-1/4	.045	6	.4480	4	TC87537	178.80
.4490		1-3/8	2-1/4	.045	6	.4490	4	TC87538	178.80
.4500		1-3/8	2-1/4	.045	6	.4500	4	TC87539	178.80
.4510		1-3/8	2-1/4	.045	6	.4510	4	TC87540	178.80
.4520		1-3/8	2-1/4	.045	6	.4520	4	TC87541	178.80
.4528	11.5 mm	35 mm	57 mm	.045	6	11.5 mm	102 mm	TC87542	178.80
.4530		1-3/8	2-1/4	.045	6	.4530	4	TC87543	163.80
.4531	29/64	1-3/8	2-1/4	.045	6	.4531	4	TC87544	142.80
.4540		1-3/8	2-1/4	.045	6	.4540	4	TC87545	178.80
.4550		1-3/8	2-1/4	.045	6	.4550	4	TC87546	178.80
.4560		1-3/8	2-1/4	.045	6	.4560	4	TC87547	178.80
.4570		1-3/8	2-1/4	.045	6	.4570	4	TC87548	178.80
.4580		1-3/8	2-1/4	.045	6	.4580	4	TC87549	178.80
.4590		1-3/8	2-1/4	.045	6	.4590	4	TC87550	178.80
.4600		1-3/8	2-1/4	.045	6	.4600	4	TC87551	178.80
.4610		1-3/8	2-1/4	.045	6	.4610	4	TC87552	178.80

For technical information, see page 335

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REAMERS - CARBIDE

(Cont.)

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REAMER DIAMETER		FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
dec. equiv.	size							TOOL #	USD\$
D1 ^{+0.003"} _{-0.000"}		L2	L3			D2	L1		
.4620		1-3/8	2-1/4	.045	6	.4620	4	TC87553	178.80
.4630		1-3/8	2-1/4	.045	6	.4630	4	TC87554	178.80
.4640		1-3/8	2-1/4	.045	6	.4640	4	TC87555	178.80
.4650		1-3/8	2-1/4	.045	6	.4650	4	TC87556	178.80
.4660		1-3/8	2-1/4	.045	6	.4660	4	TC87557	178.80
.4670		1-3/8	2-1/4	.045	6	.4670	4	TC87558	178.80
.4680		1-3/8	2-1/4	.045	6	.4680	4	TC87559	179.60
.4688	15/32	1-3/8	2-1/4	.045	6	.4688	4	TC87560	142.80
.4690		1-3/8	2-1/4	.045	6	.4690	4	TC87561	188.40
.4700		1-3/8	2-1/4	.045	6	.4700	4	TC87562	188.40
.4710		1-3/8	2-1/4	.045	6	.4710	4	TC87563	188.40
.4720		1-3/8	2-1/4	.045	6	.4720	4	TC87564	189.25
.4724	12 mm	35 mm	57 mm	.045	6	12 mm	102 mm	TC87565	181.45
.4730		1-3/8	2-1/4	.045	6	.4730	4	TC87566	189.25
.4740		1-3/8	2-1/4	.045	6	.4740	4	TC87567	188.40
.4750		1-3/8	2-1/4	.045	6	.4750	4	TC87568	188.40
.4760		1-3/8	2-1/4	.045	6	.4760	4	TC87569	189.25
.4770		1-3/8	2-1/4	.045	6	.4770	4	TC87570	188.40
.4780		1-3/8	2-1/4	.045	6	.4780	4	TC87571	188.40
.4790		1-1/2	2-1/2	.045	6	.4790	4	TC87572	188.40
.4800		1-1/2	2-1/2	.045	6	.4800	4	TC87573	188.40
.4810		1-1/2	2-1/2	.045	6	.4810	4	TC87574	188.40
.4820		1-1/2	2-1/2	.045	6	.4820	4	TC87575	188.40
.4830		1-1/2	2-1/2	.045	6	.4830	4	TC87576	188.40
.4840		1-1/2	2-1/2	.045	6	.4840	4	TC87577	188.40
.4844	31/64	1-1/2	2-1/2	.045	6	.4844	4	TC87578	161.95
.4850		1-1/2	2-1/2	.045	6	.4850	4	TC87579	188.40
.4860		1-1/2	2-1/2	.045	6	.4860	4	TC87580	188.40
.4870		1-1/2	2-1/2	.045	6	.4870	4	TC87581	227.10
.4880		1-1/2	2-1/2	.045	6	.4880	4	TC87582	227.10
.4890		1-1/2	2-1/2	.045	6	.4890	4	TC87583	227.10
.4900		1-1/2	2-1/2	.045	6	.4900	4	TC87584	227.10
.4910		1-1/2	2-1/2	.045	6	.4910	4	TC87585	227.10
.4920		1-1/2	2-1/2	.045	6	.4920	4	TC87586	227.10
.4921	12.5 mm	38 mm	63 mm	.045	6	12.5 mm	102 mm	TC87587	227.10
.4930		1-1/2	2-1/2	.045	6	.4930	4	TC87588	227.10
.4940		1-1/2	2-1/2	.045	6	.4940	4	TC87589	227.10
.4950		1-1/2	2-1/2	.045	6	.4950	4	TC87590	227.10
.4960		1-1/2	2-1/2	.045	6	.4960	4	TC87591	227.10
.4970		1-1/2	2-1/2	.045	6	.4970	4	TC87592	227.10
.4980		1-1/2	2-1/2	.045	6	.4980	4	TC87593	227.10
.4990		1-1/2	2-1/2	.045	6	.4990	4	TC87594	227.10
.4995		1-1/2	2-1/2	.045	6	.4995	4	TC87595	227.10
.5000	1/2	1-1/2	2-1/2	.045	6	.5000	4	TC87596	162.65
.5005		1-1/2	2-1/2	.045	6	.5005	4	TC87597	227.10
.5010		1-1/2	2-1/2	.045	6	.5010	4	TC87598	227.10
.5020		1-1/2	2-1/2	.045	6	.5020	4	TC87599	227.10

For technical information, see page 335

REAMERS - CARBIDE

Quickturn Custom Diameter Reamer Program



- Uncommon reamer diameters are ground to order for your precise application need
- Additional dimensions will vary depending on diameter selected
- Call for current production lead times
- Pricing is based on quantity ordered, use chart for instant pricing model based on quantity
- Straight flute general purpose reamers for through and blind hole applications
- 45° chamfer angle
- 4 and 6 flute styles
- Solid carbide
- Precision manufactured in the USA

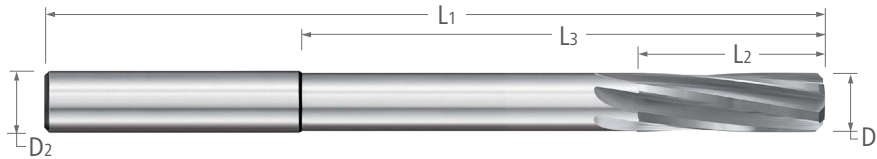
DIA. RANGE* D ₁	1 PIECE	2 PIECES	3 - 5 PIECES	6 - 11 PIECES	12 - 17 PIECES	18 - 23 PIECES	24 - 35 PIECES	36 - 49 PIECES	50 - 74 PIECES
.0401 - .0450	218.40	144.55	126.00	80.70	63.90	57.10	53.75	50.40	47.05
.0451 - .0500	218.40	144.55	126.00	80.70	63.90	57.10	53.75	50.40	47.05
.0501 - .0570	220.10	146.20	127.75	82.35	65.60	58.85	55.45	52.10	48.70
.0571 - .0650	218.40	144.55	126.00	80.70	63.90	57.10	53.75	50.40	47.05
.0651 - .0800	220.10	146.20	127.75	82.35	65.60	58.85	55.45	52.10	48.70
.0801 - .0950	221.80	147.90	129.35	84.00	67.20	60.50	57.10	53.75	50.40
.0951 - .1150	225.15	151.25	132.70	87.35	70.60	63.90	60.50	57.10	53.75
.1151 - .1300	226.80	152.95	134.50	89.05	72.25	65.60	62.20	58.85	55.45
.1301 - .1450	231.85	157.95	139.55	94.15	77.30	70.60	67.20	63.90	60.50
.1451 - .1600	236.90	163.05	144.55	99.20	82.35	75.65	72.25	68.95	65.60
.1601 - .1750	241.95	168.00	149.55	104.20	87.35	80.70	77.30	73.95	70.60
.1751 - .1950	248.75	174.80	156.25	110.95	94.15	87.35	84.00	80.70	77.30
.1951 - .2100	262.05	188.20	169.80	124.35	107.60	100.85	97.55	94.15	90.70
.2101 - .2250	267.15	193.30	174.80	129.35	112.60	105.85	102.50	99.20	95.70
.2251 - .2400	275.60	201.60	183.20	137.85	121.00	114.25	110.95	107.60	104.20
.2401 - .2550	282.25	208.30	189.90	144.55	127.75	121.00	117.60	114.25	110.95
.2551 - .2750	299.10	225.15	206.60	161.25	144.55	137.85	134.50	131.05	127.75
.2751 - .2950	300.70	226.80	208.30	163.05	146.20	139.55	136.15	132.70	129.35
.2951 - .3150	317.50	243.55	225.15	179.85	163.05	156.25	152.95	149.55	146.20
.3151 - .3350	341.10	267.15	248.75	203.20	186.60	179.85	176.45	173.10	169.80
.3351 - .3550	344.40	273.85	252.05	206.60	189.90	183.20	179.85	176.45	173.10
.3551 - .3800	351.15	280.55	258.75	213.40	196.65	189.90	186.60	183.20	179.85
.3801 - .4100	376.40	302.45	283.95	238.60	221.80	215.05	211.75	208.30	204.95
.4101 - .4400	389.85	315.85	297.35	252.05	235.25	228.55	225.15	221.80	218.40
.4401 - .4700	410.00	336.10	317.50	272.15	255.35	248.75	245.20	241.95	238.60
.4701 - .5050	443.50	369.70	351.15	305.85	288.95	282.25	278.90	275.60	272.15
.5051 - .5400	487.25	413.35	394.90	349.50	332.75	326.00	322.70	319.25	315.85
.5401 - .5800	554.45	480.55	462.10	416.70	399.90	393.15	389.85	386.40	383.10
.5801 - .6260	608.25	534.35	515.80	470.45	453.70	447.05	443.50	440.20	436.95
.6261 - .6600	688.90	614.95	596.40	551.10	534.35	527.60	524.30	520.95	517.55
.6601 - .7050	789.80	715.85	697.25	651.90	635.15	628.35	625.05	621.70	618.35
.7051 - .7550	856.90	782.95	764.50	719.20	702.35	695.60	692.25	688.90	685.50
.7551 - .7950	924.15	850.20	831.75	786.40	769.50	762.85	759.45	756.10	752.70
.7951 - .8450	991.35	917.45	899.00	853.50	836.80	830.10	826.70	823.35	820.05
.8451 - .9000	1125.85	1051.80	1033.35	988.00	971.15	964.40	961.05	957.70	954.30
.9001 - .9600	1293.80	1219.85	1201.35	1156.00	1139.30	1132.50	1129.20	1125.85	1122.40
.9601 - 1.025	1428.20	1354.25	1335.80	1290.45	1273.60	1266.95	1263.55	1260.20	1256.80

*Diameter tolerance: +.0003/- .0000

For technical information, see page 335

REAMERS - CARBIDE

Right Hand Spiral



- Spiral flute geometry best suited for blind holes
- Reduced neck for through hole clearance
- Expand an existing hole to a precise size or create a perfect hole finish
- 45° chamfer angle naturally guides the reamer into the hole
- Solid carbide
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	OVERALL REACH	AXIAL CHAMFER LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 ^{+0.0002"} _{-0.0000"}		L2	L3			D2	L1	TOOL #	USD\$
.0469	3/64	3/8	0*	.010	4	.0404	1-1/2	TC86950	35.95
.0625	1/16	3/8	3/4	.010	4	.0625	1-1/2	TC86951	35.95
.0781	5/64	1/4	7/8	.012	4	.0781	1-3/4	TC86952	35.95
.0938	3/32	1/2	7/8	.012	4	.0938	2	TC86953	35.95
.1094	7/64	5/8	1-1/8	.015	4	.1094	2-1/4	TC86954	35.95
.1250	1/8	5/8	1-1/8	.015	4	.1250	2-1/4	TC86955	38.15
.1406	9/64	3/4	1-3/8	.017	4	.1406	2-1/2	TC86956	43.25
.1562	5/32	3/4	1-3/8	.017	4	.1563	2-1/2	TC86957	45.60
.1719	11/64	7/8	1-1/2	.022	4	.1719	2-3/4	TC86958	51.10
.1875	3/16	7/8	1-1/2	.022	4	.1875	2-3/4	TC86959	51.10
.2031	13/64	1	1-3/4	.025	4	.2031	3	TC86960	61.80
.2188	7/32	1	1-3/4	.025	4	.2188	3	TC86961	61.80
.2344	15/64	1	1-3/4	.025	4	.2344	3	TC86962	67.70
.2500	1/4	1	1-3/4	.025	4	.2500	3	TC86963	67.70
D1 ^{+0.0003"} _{-0.0000"}		L2	L3			D2	L1	TOOL #	USD\$
.2656	17/64	1-1/8	1-7/8	.030	6	.2656	3-1/4	TC86964	82.45
.2812	9/32	1-1/8	1-7/8	.030	6	.2813	3-1/4	TC86965	82.45
.3125	5/16	1-1/8	1-7/8	.030	6	.3125	3-1/4	TC86966	91.55
.3750	3/8	1-1/4	2-1/8	.035	6	.3750	3-1/2	TC86967	110.30
.4062	13/32	1-1/4	2-1/8	.035	6	.4063	3-1/2	TC86968	126.35
.4375	7/16	1-3/8	2-1/4	.045	6	.4375	4	TC86969	143.20
.5000	1/2	1-1/2	2-1/2	.045	6	.5000	4	TC86970	179.00

*When L3 Value is 0, it is a full shank reduction



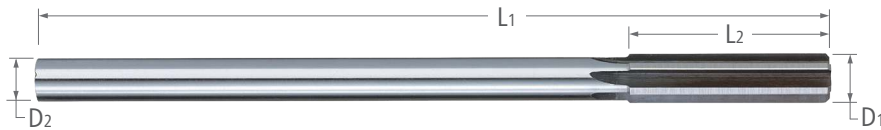
**Check Stock On 50 Tools at Once
and Simplify the Order Process**

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For technical information, see page 335

REAMERS - COBALT

Chucking - Straight Flute



- Straight flute general purpose reamers for through and blind hole applications
- 45° chamfer angle
- Flute options from 2 to 8
- M42 cobalt
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 ^{+0.0002"} -0.0000"		L2		D2	L1	TOOL #	USD\$
.0135	#80	3/8	2	.0135	3/4	TR96310	33.40
.0145	#79	3/8	2	.0145	3/4	TR96311	33.40
.0156	1/64	3/8	2	.0156	3/4	TR96312	33.40
.0160	#78	3/8	2	.0160	7/8	TR96313	33.40
.0180	#77	3/8	2	.0180	7/8	TR96314	33.40
.0200	#76	3/8	2	.0200	7/8	TR96315	33.40
.0210	#75	1/2	3	.0210	1	TR96316	33.40
.0225	#74	1/2	3	.0225	1	TR96317	33.40
.0240	#73	1/2	3	.0240	1-1/8	TR96318	33.40
.0250	#72	1/2	3	.0250	1-1/8	TR96319	33.40
.0260	#71	1/2	3	.0260	1-1/4	TR96320	33.40
.0280	#70	1/2	3	.0280	1-1/4	TR96321	33.40
.0292	#69	1/2	3	.0292	1-3/8	TR96322	33.40
.0310	#68	1/2	3	.0310	1-3/8	TR96323	33.40
.0313	1/32	1/2	3	.0312	1-3/8	TR96324	27.50
.0320	#67	1/2	3	.0320	1-3/8	TR96325	27.50
.0330	#66	1/2	3	.0330	1-3/8	TR96326	27.50
.0350	#65	1/2	3	.0350	1-1/2	TR96327	27.50
.0360	#64	1/2	3	.0360	1-1/2	TR96328	27.50
.0370	#63	1/2	3	.0370	1-1/2	TR96329	27.50
.0380	#62	1/2	3	.0380	1-1/2	TR96330	27.50
.0390	#61	1/2	3	.0390	1-1/2	TR96331	27.50
.0394	1.0 mm	1/2	4	.0394	2-1/2	TR96332	27.15
.0400	#60	1/2	4	.0390	2-1/2	TR96333	27.15
.0410	#59	1/2	4	.0390	2-1/2	TR96334	27.30
.0420	#58	1/2	4	.0390	2-1/2	TR96335	27.15
.0430	#57	1/2	4	.0390	2-1/2	TR96336	27.30
.0465	#56	1/2	4	.0455	2-1/2	TR96337	27.30
.0469	3/64	1/2	4	.0455	2-1/2	TR96338	27.15
.0520	#55	1/2	4	.0510	2-1/2	TR96339	27.30
.0550	#54	1/2	4	.0510	2-1/2	TR96340	27.30
.0591	1.5 mm	1/2	4	.0510	2-1/2	TR96341	27.30
.0595	#53	1/2	4	.0585	2-1/2	TR96342	27.30
.0625	1/16	1/2	4	.0585	2-1/2	TR96343	27.30
.0635	#52	1/2	4	.0585	2-1/2	TR96344	27.30
.0670	#51	3/4	4	.0660	3	TR96345	21.75
.0700	#50	3/4	4	.0660	3	TR96346	21.75
.0730	#49	3/4	4	.0660	3	TR96347	21.75
.0760	#48	3/4	4	.0720	3	TR96348	21.75
.0781	5/64	3/4	4	.0720	3	TR96349	21.75
.0785	#47	3/4	4	.0720	3	TR96350	21.75
.0787	2.0 mm	3/4	4	.0720	3	TR96351	21.75

For technical information, see page 335

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REAMERS - COBALT

Chucking - Straight Flute (Cont.)

continued from previous page

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 $+0.0002"$ $-0.0000"$		L2		D2	L1	TOOL #	USD\$
.0810	#46	3/4	4	.0771	3	TR96352	21.75
.0820	#45	3/4	4	.0771	3	TR96353	21.75
.0860	#44	3/4	4	.0810	3	TR96354	21.75
.0890	#43	3/4	4	.0810	3	TR96355	21.75
.0935	#42	3/4	4	.0880	3	TR96356	21.75
.0938	3/32	3/4	4	.0880	3	TR96357	21.75
.0960	#41	7/8	4	.0928	3-1/2	TR96358	22.10
.0980	#40	7/8	4	.0928	3-1/2	TR96359	22.10
.0984	2.5 mm	7/8	4	.0928	3-1/2	TR96360	22.10
.0995	#39	7/8	4	.0928	3-1/2	TR96361	22.10
.1015	#38	7/8	4	.0950	3-1/2	TR96362	22.10
.1040	#37	7/8	4	.0950	3-1/2	TR96363	22.10
.1065	#36	7/8	4	.1030	3-1/2	TR96364	22.10
.1094	7/64	7/8	4	.1030	3-1/2	TR96365	22.90
.1100	#35	7/8	4	.1030	3-1/2	TR96366	22.90
.1110	#34	7/8	4	.1055	3-1/2	TR96367	22.90
.1130	#33	7/8	4	.1055	3-1/2	TR96368	22.90
.1160	#32	7/8	4	.1120	3-1/2	TR96369	22.90
.1181	3.0 mm	7/8	4	.1120	3-1/2	TR96370	22.90
.1200	#31	7/8	4	.1120	3-1/2	TR96371	22.90
.1240	O/U	7/8	4	.1190	3-1/2	TR96372	22.90
.1250	1/8	7/8	4	.1190	3-1/2	TR96373	20.50
.1260	O/U	7/8	4	.1190	3-1/2	TR96374	22.90
.1285	#30	7/8	4	.1190	3-1/2	TR96375	22.90
.1360	#29	1	4	.1275	4	TR96376	27.30
.1378	3.5 mm	1	4	.1350	4	TR96377	27.30
.1405	#28	1	4	.1350	4	TR96378	27.15
.1406	9/64	1	4	.1350	4	TR96379	27.30
.1440	#27	1	4	.1350	4	TR96380	27.30
.1470	#26	1	4	.1430	4	TR96381	27.30
.1495	#25	1	4	.1430	4	TR96382	27.30
.1520	#24	1	4	.1460	4	TR96383	27.30
.1540	#23	1	4	.1460	4	TR96384	27.30
.1563	5/32	1	4	.1510	4	TR96385	27.30
.1570	#22	1	6	.1510	4	TR96386	27.30
.1575	4.0 mm	1	6	.1510	4	TR96387	27.30
.1590	#21	1-1/8	6	.1530	4-1/2	TR96388	28.95
.1610	#20	1-1/8	6	.1530	4-1/2	TR96389	28.95
.1660	#19	1-1/8	6	.1595	4-1/2	TR96390	28.95
.1695	#18	1-1/8	6	.1595	4-1/2	TR96391	28.95
.1719	11/64	1-1/8	6	.1645	4-1/2	TR96392	28.95
.1730	#17	1-1/8	6	.1645	4-1/2	TR96393	28.95
.1770	#16	1-1/8	6	.1704	4-1/2	TR96394	28.95
.1772	4.5 mm	1-1/8	6	.1704	4-1/2	TR96395	28.95
.1800	#15	1-1/8	6	.1755	4-1/2	TR96396	28.95
.1820	#14	1-1/8	6	.1755	4-1/2	TR96397	28.95
.1850	#13	1-1/8	6	.1805	4-1/2	TR96398	28.95
.1865	O/U	1-1/8	6	.1805	4-1/2	TR96399	28.95
.1875	3/16	1-1/8	6	.1805	4-1/2	TR96400	27.85
.1885	O/U	1-1/8	6	.1805	4-1/2	TR96401	28.95

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For technical information, see page 335

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REAMERS - COBALT

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.0002"} -0.0000"		L ₂		D ₂	L ₁	TOOL #	USD\$
.1890	#12	1-1/8	6	.1805	4-1/2	TR96402	28.95
.1910	#11	1-1/4	6	.1860	5	TR96403	34.90
.1935	#10	1-1/4	6	.1860	5	TR96404	34.90
.1960	#9	1-1/4	6	.1895	5	TR96405	34.90
.1969	5.0 mm	1-1/4	6	.1895	5	TR96406	34.90
.1990	#8	1-1/4	6	.1895	5	TR96407	34.90
.2010	#7	1-1/4	6	.1895	5	TR96408	34.90
.2031	13/64	1-1/4	6	.1945	5	TR96409	34.90
.2040	#6	1-1/4	6	.1945	5	TR96410	34.90
.2055	#5	1-1/4	6	.2016	5	TR96411	34.90
.2090	#4	1-1/4	6	.2016	5	TR96412	34.90
.2130	#3	1-1/4	6	.2075	5	TR96413	34.90
.2165	5.5 mm	1-1/4	6	.2075	5	TR96414	34.90
.2188	7/32	1-1/4	6	.2075	5	TR96415	34.90
.2210	#2	1-1/2	6	.2173	6	TR96416	36.05
.2280	#1	1-1/2	6	.2173	6	TR96417	36.05
.2340	A	1-1/2	6	.2265	6	TR96418	36.05
.2344	15/64	1-1/2	6	.2265	6	TR96419	36.05
.2362	6.0 mm	1-1/2	6	.2265	6	TR96420	36.25
.2380	B	1-1/2	6	.2329	6	TR96421	36.25
.2420	C	1-1/2	6	.2329	6	TR96422	36.25
.2460	D	1-1/2	6	.2329	6	TR96423	33.05
.2490	O/U	1-1/2	6	.2405	6	TR96424	32.50
.2500	1/4	1-1/2	6	.2405	6	TR96425	30.90
.2510	O/U	1-1/2	6	.2405	6	TR96426	32.65
.2559	6.5 mm	1-1/2	6	.2405	6	TR96427	36.25
.2570	F	1-1/2	6	.2485	6	TR96428	36.25
.2610	G	1-1/2	6	.2485	6	TR96429	36.25
.2656	17/64	1-1/2	6	.2485	6	TR96430	49.00
.2660	H	1-1/2	6	.2485	6	TR96431	49.00
.2720	I	1-1/2	6	.2485	6	TR96432	49.00
.2756	7.0 mm	1-1/2	6	.2485	6	TR96433	49.00
.2770	J	1-1/2	6	.2485	6	TR96434	49.00
.2810	K	1-1/2	6	.2485	6	TR96435	49.00
.2813	9/32	1-1/2	6	.2485	6	TR96436	46.55
.2900	L	1-1/2	6	.2792	6	TR96437	49.00
.2950	M	1-1/2	6	.2792	6	TR96438	49.00
.2953	7.5 mm	1-1/2	6	.2792	6	TR96439	49.00
.2969	19/64	1-1/2	6	.2792	6	TR96440	49.00
.3020	N	1-1/2	6	.2792	6	TR96441	49.00
.3115	O/U	1-1/2	6	.2792	6	TR96442	46.55
.3125	5/16	1-1/2	6	.2792	6	TR96443	44.10
.3135	O/U	1-1/2	6	.2792	6	TR96444	46.55
.3150	8.0 mm	1-1/2	6	.2792	6	TR96445	49.00
.3160	O	1-1/2	6	.2792	6	TR96446	49.00
.3230	P	1-1/2	6	.2792	6	TR96447	52.85
.3281	21/64	1-1/2	6	.2792	6	TR96448	52.85
.3320	Q	1-1/2	6	.2792	6	TR96449	52.85
.3346	8.5 mm	1-1/2	6	.2792	6	TR96450	52.85
.3390	R	1-1/2	6	.2792	6	TR96451	52.85
.3438	11/32	1-1/2	6	.2792	6	TR96452	52.85

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Trust in Titan USA

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REAMERS - COBALT

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} -0.000"		L ₂		D ₂	L ₁	TOOL #	USD\$
.3480	S	1-3/4	6	.3105	6	TR96453	53.75
.3543	9.0 mm	1-3/4	6	.3105	7	TR96454	53.75
.3580	T	1-3/4	6	.3105	7	TR96455	53.75
.3594	23/64	1-3/4	6	.3105	7	TR96456	53.75
.3680	U	1-3/4	6	.3105	7	TR96457	53.75
.3740	9.5 mm - O/U	1-3/4	6	.3105	7	TR96458	50.90
.3750	3/8	1-3/4	6	.3105	7	TR96459	48.50
.3760	O/U	1-3/4	6	.3105	7	TR96460	50.90
.3770	V	1-3/4	6	.3105	7	TR96461	65.75
.3860	W	1-3/4	6	.3105	7	TR96462	65.75
.3906	25/64	1-3/4	6	.3105	7	TR96463	65.75
.3937	10.0 mm	1-3/4	6	.3105	7	TR96464	65.75
.3970	X	1-3/4	6	.3105	7	TR96465	65.75
.4040	Y	1-3/4	6	.3105	7	TR96466	65.75
.4063	13/32	1-3/4	6	.3105	7	TR96467	65.45
.4130	Z	1-3/4	6	.3730	7	TR96468	65.75
.4134	10.5 mm	1-3/4	6	.3730	7	TR96469	65.45
.4219	27/64	1-3/4	6	.3730	7	TR96470	65.75
.4331	11.0 mm	1-3/4	6	.3730	7	TR96471	65.75
.4365	O/U	1-3/4	6	.3730	7	TR96472	65.45
.4375	7/16	1-3/4	6	.3730	7	TR96473	65.75
.4385	O/U	1-3/4	6	.3730	7	TR96474	65.45
.4528	11.5 mm	1-3/4	6	.3730	7	TR96475	75.30
.4531	29/64	1-3/4	6	.3730	7	TR96476	75.05
.4688	15/32	1-3/4	6	.3730	7	TR96477	75.30
.4724	12.0 mm	2	6	.4355	8	TR96478	75.30
.4844	31/64	2	6	.4355	8	TR96479	75.05
.4921	12.5 mm	2	6	.4355	8	TR96480	75.05
.4990	O/U	2	6	.4355	8	TR96481	75.30
.5000	1/2	2	6	.4355	8	TR96482	75.30
D ₁ ^{+0.003"} -0.000"		L ₂		D ₂	L ₁	TOOL #	USD\$
.5010	O/U	2	6	.4355	8	TR96483	75.30
.5313	17/32	2	6	.4355	8	TR96484	84.60
.5625	9/16	2	8	.4355	8	TR96485	84.60
.5938	19/32	2	8	.4355	8	TR96486	84.60
D ₁ ^{+0.001"} ^{+0.004"}		L ₂		D ₂	L ₁	TOOL #	USD\$
.6250	5/8	2-1/4	8	.5615	9	TR96487	98.65
.6563	21/32	2-1/4	8	.5615	9	TR96488	113.75
.6875	11/16	2-1/4	8	.5615	9	TR96489	113.45
.7188	23/32	2-1/4	8	.5615	9	TR96490	126.75
.7500	3/4	2-1/2	8	.6240	9	TR96491	126.70
.7813	25/32	2-1/2	8	.6240	9	TR96492	137.00
.8125	13/16	2-1/2	8	.6240	9	TR96493	136.15
.8438	27/32	2-1/2	8	.6240	9-1/2	TR96494	162.05
.8750	7/8	2-5/8	8	.7490	10	TR96495	165.85
.9063	29/32	2-5/8	8	.7490	10	TR96496	178.45
.9375	15/16	2-5/8	8	.7490	10	TR96497	177.75
.9688	31/32	2-5/8	8	.7490	10	TR96498	199.65
1.0000	1	2-3/4	8	.8740	10-1/2	TR96499	201.90

For technical information, see page 335

REAMERS - COBALT

Chucking - Straight Flute - Quickturn Custom Diameter Reamer Program



- Uncommon reamer diameters are ground to order for your precise application need
- Additional dimensions will vary depending on diameter selected
- Call for current production lead times
- Pricing is based on quantity ordered, use chart for instant pricing model based on quantity
- Straight flute general purpose reamers for through and blind hole applications
- 45° chamfer angle
- Flute options from 2 to 10
- M42 cobalt
- Precision manufactured in the USA

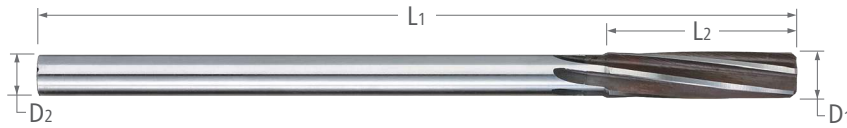
DIA. RANGE* D ₁	1 PIECE	2 PIECES	3 - 5 PIECES	6 - 7 PIECES	8 - 11 PIECES	12 - 17 PIECES	18 - 23 PIECES	24 - 35 PIECES	36 - 47 PIECES	48 - 59 PIECES	60 - 71 PIECES	72 - 95 PIECES	96+ PIECES
.0135 - .0195	262.00	138.50	102.65	67.00	58.05	49.10	43.20	40.15	37.15	35.75	34.80	33.60	33.50
.0196 - .0290	238.15	125.85	93.30	60.95	52.85	44.60	39.15	36.50	33.75	33.65	33.60	33.60	33.50
.0291 - .0390	216.55	114.45	84.90	55.35	47.95	42.90	35.65	33.20	30.75	29.65	28.80	28.25	27.60
.0391 - .0624	197.15	112.70	83.15	53.60	46.25	38.80	34.00	31.50	28.95	27.70	27.60	27.40	27.10
.0626 - .1093	198.55	110.20	80.70	51.10	43.70	36.35	31.40	28.90	26.50	25.30	25.20	25.05	24.85
.1095 - .1249	193.95	105.60	76.20	46.55	39.10	31.85	26.90	25.40	24.05	23.55	23.20	23.00	22.60
.1251 - .1405	202.70	114.40	84.50	55.35	47.95	40.65	35.65	33.20	30.75	29.65	28.80	28.25	27.60
.1407 - .1561	201.05	112.70	83.15	53.60	46.25	38.80	34.00	31.50	28.95	27.70	27.40	27.35	27.05
.1563 - .1718	202.95	114.45	84.95	55.45	48.05	40.70	35.80	33.30	30.85	29.70	29.35	29.10	28.90
.1720 - .1874	201.40	113.15	83.50	54.10	47.95	39.25	34.30	31.95	29.35	29.35	29.15	28.95	28.90
.1876 - .2030	209.75	121.35	91.75	62.20	54.95	47.45	42.55	40.10	37.60	36.45	35.65	35.20	35.00
.2032 - .2187	208.85	120.50	91.05	61.35	54.10	46.75	41.80	40.45	39.10	38.75	38.55	38.10	37.55
.2189 - .2343	208.85	120.50	91.05	61.35	54.10	46.75	41.80	40.45	39.10	38.75	38.55	38.10	37.55
.2345 - .2499	205.30	117.05	87.55	58.05	50.65	43.30	38.45	38.10	37.85	37.55	37.15	36.55	36.00
.2501 - .2968	223.50	135.25	105.55	76.20	68.70	61.30	56.25	54.00	51.40	50.20	49.90	49.15	49.05
.2970 - .3124	217.90	129.55	99.95	70.45	62.95	55.60	50.75	50.45	50.15	49.90	49.50	49.35	49.10
.3126 - .3437	226.35	137.90	108.35	78.80	71.40	64.05	59.10	56.75	54.15	54.00	53.60	53.10	52.85
.3439 - .3593	226.70	138.45	108.75	79.30	71.95	64.55	59.65	57.20	54.70	54.30	54.10	54.00	53.60
.3595 - .3749	221.45	133.20	103.60	74.05	66.70	59.20	54.30	54.20	54.10	53.90	53.85	53.75	53.55
.3751 - .3905	241.95	153.65	124.15	94.55	87.15	79.80	74.65	72.30	69.95	68.70	67.90	67.50	66.90
.3907 - .4218	245.05	156.80	127.10	97.70	90.20	82.90	77.95	75.55	73.10	71.95	71.00	70.55	69.95
.4220 - .4374	240.20	151.90	122.30	92.85	85.50	78.05	73.10	70.70	68.10	67.00	66.30	65.75	65.15
.4376 - .4843	251.90	163.60	134.10	104.55	97.15	89.80	84.95	82.40	79.95	78.70	77.95	77.50	76.75
.4845 - .4999	245.65	157.15	127.70	98.05	90.70	83.30	78.50	77.15	75.70	75.55	75.30	75.20	75.05
.5001 - .5311	259.20	169.50	140.25	108.35	105.30	102.50	99.70	96.80	94.15	91.30	88.45	85.70	82.95
.5313 - .5624	261.10	172.35	144.15	111.75	108.50	105.30	102.20	99.00	95.90	92.75	89.60	86.45	83.25
.5626 - .5937	266.00	176.85	147.80	115.25	111.55	108.10	104.65	109.95	97.65	94.15	90.65	87.10	83.50
.5939 - .6249	274.45	185.70	157.45	124.80	121.50	118.45	115.30	112.20	109.15	105.85	102.80	99.70	96.60
.6251 - .6874	283.20	194.10	167.30	134.55	131.50	128.65	125.80	122.95	120.00	117.15	115.40	111.40	108.60
.6876 - .7187	291.70	202.50	174.00	141.10	138.60	136.35	133.80	131.60	129.40	127.10	124.80	124.15	123.80
.7189 - .7499	302.05	213.75	187.20	154.05	150.35	146.85	143.35	139.80	136.35	132.70	129.25	125.70	122.10
.7501 - .8124	318.00	229.10	201.30	169.15	158.60	155.15	151.80	148.45	145.10	141.55	138.15	134.75	131.45
.8126 - .8437	334.00	246.00	216.90	186.95	178.15	175.10	172.15	169.15	166.20	163.30	160.25	157.40	154.40
.8439 - .8749	351.30	262.30	233.65	202.25	190.45	186.45	182.55	178.65	174.55	170.70	166.70	162.80	158.90
.8751 - .9374	365.45	276.00	247.75	214.70	202.70	198.70	194.75	190.80	186.80	182.85	178.85	177.10	175.30
.9376 - .9687	384.15	292.95	264.90	232.75	227.90	223.55	219.00	214.50	209.85	205.30	200.75	198.50	196.35
.9689 - .9999	397.55	308.55	281.20	249.70	243.45	237.35	231.25	225.20	219.10	213.10	207.00	200.95	194.80
1.0001 - 1.0624	427.70	338.60	309.75	277.65	270.80	263.90	257.05	250.25	243.45	236.60	229.70	222.85	216.05
1.0626 - 1.1249	458.10	369.45	341.10	309.75	300.75	292.05	283.35	274.70	265.90	257.20	248.50	239.80	231.15
1.1251 - 1.1874	487.75	397.55	371.60	337.20	329.35	321.75	314.10	306.45	298.80	291.05	283.40	275.80	268.05
1.1876 - 1.2499	518.65	431.30	403.45	369.80	359.90	350.50	341.10	331.90	322.55	313.35	303.85	294.60	285.35
1.2501 - 1.3749	549.80	459.15	429.30	398.75	392.65	328.90	380.55	374.60	368.55	362.50	356.45	356.05	355.25
1.3751 - 1.4999	580.25	491.05	463.25	430.95	426.70	422.65	418.75	416.15	413.50	412.70	411.95	411.10	410.15

*Diameter tolerances: 0-1/2" (+.0002"/-.0000"); 1/2"-5/8" (+.0003"/-.0000"); and 5/8" up to 1-1/2" (+.0001"/+.0004")

For technical information, see page 335

REAMERS - COBALT

Chucking - Right Hand Spiral



- General purpose reamers featuring a 45° chamfer angle
- 4 and 6 flute styles
- Spiral flutes for increased chip evacuation in blind hole applications
- M42 cobalt
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ -.0000" \end{smallmatrix}$		L2		D2	L1	TOOL #	USD\$
.0394	1.0 mm	1/2	4	.0394	2-1/2	TR96726	31.80
.0400	#60	1/2	4	.0390	2-1/2	TR96727	31.80
.0410	#59	1/2	4	.0390	2-1/2	TR96728	31.80
.0420	#58	1/2	4	.0390	2-1/2	TR96729	32.10
.0430	#57	1/2	4	.0390	2-1/2	TR96730	32.10
.0550	#54	1/2	4	.0510	2-1/2	TR96734	31.80
.0591	1.5 mm	1/2	4	.0510	2-1/2	TR96735	31.80
.0595	#53	1/2	4	.0585	2-1/2	TR96736	31.80
.0625	1/16	1/2	4	.0585	2-1/2	TR96737	32.10
.0635	#52	1/2	4	.0585	2-1/2	TR96738	32.10
.0670	#51	3/4	4	.0660	3	TR96739	25.75
.0700	#50	3/4	4	.0660	3	TR96740	25.75
.0730	#49	3/4	4	.0660	3	TR96741	25.75
.0760	#48	3/4	4	.0720	3	TR96742	25.75
.0781	5/64	3/4	4	.0720	3	TR96743	25.75
.0785	#47	3/4	4	.0720	3	TR96744	25.75
.0787	2.0 mm	3/4	4	.0720	3	TR96745	25.65
.0810	#46	3/4	4	.0771	3	TR96746	25.65
.0820	#45	3/4	4	.0771	3	TR96747	25.75
.0860	#44	3/4	4	.0810	3	TR96748	25.75
.0890	#43	3/4	4	.0810	3	TR96749	25.75
.0935	#42	3/4	4	.0880	3	TR96750	25.75
.0938	3/32	3/4	4	.0880	3	TR96751	25.75
.0960	#41	7/8	4	.0928	3-1/2	TR96752	26.00
.0980	#40	7/8	4	.0928	3-1/2	TR96753	25.85
.0984	2.5 mm	7/8	4	.0928	3-1/2	TR96754	25.85
.0995	#39	7/8	4	.0928	3-1/2	TR96755	26.00
.1015	#38	7/8	4	.0950	3-1/2	TR96756	25.85
.1040	#37	7/8	4	.0950	3-1/2	TR96757	25.85
.1065	#36	7/8	4	.1030	3-1/2	TR96758	25.85
.1094	7/64	7/8	4	.1030	3-1/2	TR96759	26.75
.1100	#35	7/8	4	.1030	3-1/2	TR96760	26.85
.1110	#34	7/8	4	.1055	3-1/2	TR96761	26.85
.1130	#33	7/8	4	.1055	3-1/2	TR96762	26.85
.1160	#32	7/8	4	.1120	3-1/2	TR96763	26.75
.1181	3.0 mm	7/8	4	.1120	3-1/2	TR96764	26.75
.1200	#31	7/8	4	.1120	3-1/2	TR96765	26.85
.1240	O/U	7/8	4	.1190	3-1/2	TR96766	26.85

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For technical information, see page 335

REAMERS - COBALT

Chucking - Right Hand Spiral (Cont.)

continued from previous page

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002'' \\ -.0000'' \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.1250	1/8	7/8	4	.1190	3-1/2	TR96767	24.00
.1260	O/U	7/8	4	.1190	3-1/2	TR96768	26.85
.1285	#30	7/8	4	.1190	3-1/2	TR96769	26.85
.1360	#29	1	4	.1275	4	TR96770	31.80
.1378	3.5 mm	1	4	.1350	4	TR96771	31.80
.1405	#28	1	4	.1350	4	TR96772	31.80
.1406	9/64	1	4	.1350	4	TR96773	31.80
.1440	#27	1	4	.1350	4	TR96774	31.80
.1470	#26	1	4	.1430	4	TR96775	31.80
.1495	#25	1	4	.1430	4	TR96776	31.80
.1520	#24	1	4	.1460	4	TR96777	31.80
.1540	#23	1	4	.1460	4	TR96778	31.80
.1563	5/32	1	4	.1510	4	TR96779	31.80
.1570	#22	1	6	.1510	4	TR96780	31.80
.1575	4.0 mm	1	6	.1510	4	TR96781	31.80
.1590	#21	1-1/8	6	.1530	4-1/2	TR96782	34.15
.1610	#20	1-1/8	6	.1530	4-1/2	TR96783	34.15
.1660	#19	1-1/8	6	.1595	4-1/2	TR96784	34.15
.1719	11/64	1-1/8	6	.1645	4-1/2	TR96786	34.15
.1730	#17	1-1/8	6	.1645	4-1/2	TR96787	34.15
.1770	#16	1-1/8	6	.1704	4-1/2	TR96788	34.15
.1772	4.5 mm	1-1/8	6	.1704	4-1/2	TR96789	34.15
.1800	#15	1-1/8	6	.1755	4-1/2	TR96790	34.25
.1820	#14	1-1/8	6	.1755	4-1/2	TR96791	34.15
.1850	#13	1-1/8	6	.1805	4-1/2	TR96792	34.15
.1865	O/U	1-1/8	6	.1805	4-1/2	TR96793	34.25
.1875	3/16	1-1/8	6	.1805	4-1/2	TR96794	32.50
.1885	O/U	1-1/8	6	.1805	4-1/2	TR96795	34.25
.1890	#12	1-1/8	6	.1805	4-1/2	TR96796	34.25
.1910	#11	1-1/4	6	.1860	5	TR96797	38.15
.1935	#10	1-1/4	6	.1860	5	TR96798	38.15
.1960	#9	1-1/4	6	.1895	5	TR96799	38.15
.1969	5.0 mm	1-1/4	6	.1895	5	TR96800	38.15
.1990	#8	1-1/4	6	.1895	5	TR96801	38.15
.2010	#7	1-1/4	6	.1895	5	TR96802	38.15
.2031	13/64	1-1/4	6	.1945	5	TR96803	38.15
.2040	#6	1-1/4	6	.1945	5	TR96804	38.15
.2055	#5	1-1/4	6	.2016	5	TR96805	38.15
.2090	#4	1-1/4	6	.2016	5	TR96806	38.15
.2130	#3	1-1/4	6	.2075	5	TR96807	38.15
.2165	5.5 mm	1-1/4	6	.2075	5	TR96808	38.15
.2188	7/32	1-1/4	6	.2075	5	TR96809	38.15
.2210	#2	1-1/2	6	.2173	6	TR96810	39.30
.2280	#1	1-1/2	6	.2173	6	TR96811	39.30
.2340	A	1-1/2	6	.2265	6	TR96812	39.40
.2344	15/64	1-1/2	6	.2265	6	TR96813	39.40
.2362	6.0 mm	1-1/2	6	.2265	6	TR96814	41.15

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For technical information, see page 335

REAMERS - COBALT

Chucking - Right Hand Spiral (Cont.)

continued from previous page

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.0002"} -0.0000"		L ₂		D ₂	L ₁	TOOL #	USD\$
.2380	B	1-1/2	6	.2329	6	TR96815	41.15
.2420	C	1-1/2	6	.2329	6	TR96816	41.15
.2460	D	1-1/2	6	.2329	6	TR96817	37.50
.2490	O/U	1-1/2	6	.2405	6	TR96818	44.20
.2500	1/4	1-1/2	6	.2405	6	TR96819	35.05
.2510	O/U	1-1/2	6	.2405	6	TR96820	44.20
.2559	6.5 mm	1-1/2	6	.2405	6	TR96821	41.15
.2570	F	1-1/2	6	.2485	6	TR96822	41.15
.2610	G	1-1/2	6	.2485	6	TR96823	41.15
.2656	17/64	1-1/2	6	.2485	6	TR96824	51.10
.2660	H	1-1/2	6	.2485	6	TR96825	50.95
.2720	I	1-1/2	6	.2485	6	TR96826	51.10
.2756	7.0 mm	1-1/2	6	.2485	6	TR96827	50.95
.2770	J	1-1/2	6	.2485	6	TR96828	51.10
.2810	K	1-1/2	6	.2485	6	TR96829	50.95
.2813	9/32	1-1/2	6	.2485	6	TR96830	48.45
.2900	L	1-1/2	6	.2792	6	TR96831	50.95
.2953	7.5 mm	1-1/2	6	.2792	6	TR96833	51.10
.2969	19/64	1-1/2	6	.2792	6	TR96834	50.95
.3020	N	1-1/2	6	.2792	6	TR96835	50.95
.3115	O/U	1-1/2	6	.2792	6	TR96836	48.45
.3125	5/16	1-1/2	6	.2792	6	TR96837	46.25
.3135	O/U	1-1/2	6	.2792	6	TR96838	48.45
.3150	8.0 mm	1-1/2	6	.2792	6	TR96839	51.10
.3160	O	1-1/2	6	.2792	6	TR96840	50.95
.3230	P	1-1/2	6	.2792	6	TR96841	55.25
.3281	21/64	1-1/2	6	.2792	6	TR96842	55.25
.3320	Q	1-1/2	6	.2792	6	TR96843	54.90
.3346	8.5 mm	1-1/2	6	.2792	6	TR96844	54.90
.3390	R	1-1/2	6	.2792	6	TR96845	54.90
.3438	11/32	1-1/2	6	.2792	6	TR96846	54.90
.3480	S	1-3/4	6	.3105	6	TR96847	55.70
.3543	9.0 mm	1-3/4	6	.3105	7	TR96848	55.70
.3580	T	1-3/4	6	.3105	7	TR96849	55.70
.3594	23/64	1-3/4	6	.3105	7	TR96850	56.00
.3680	U	1-3/4	6	.3105	7	TR96851	55.70
.3740	9.5 mm-O/U	1-3/4	6	.3105	7	TR96852	52.90
.3750	3/8	1-3/4	6	.3105	7	TR96853	50.40
.3760	O/U	1-3/4	6	.3105	7	TR96854	52.90
.3770	V	1-3/4	6	.3105	7	TR96855	70.45
.3860	W	1-3/4	6	.3105	7	TR96856	70.20
.3906	25/64	1-3/4	6	.3105	7	TR96857	70.45
.3937	10.0 mm	1-3/4	6	.3105	7	TR96858	70.45
.3970	X	1-3/4	6	.3105	7	TR96859	70.20
.4040	Y	1-3/4	6	.3105	7	TR96860	70.45
.4063	13/32	1-3/4	6	.3105	7	TR96861	70.20

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For technical information, see page 335

REAMERS - COBALT

Chucking - Right Hand Spiral (Cont.)

continued from previous page

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 $^{+.0002"}_{-.0000"}$		L2		D2	L1	TOOL #	USD\$
.4130	Z	1-3/4	6	.3730	7	TR96862	70.45
.4134	10.5 mm	1-3/4	6	.3730	7	TR96863	70.45
.4219	27/64	1-3/4	6	.3730	7	TR96864	70.45
.4331	11.0 mm	1-3/4	6	.3730	7	TR96865	70.45
.4365	O/U	1-3/4	6	.3730	7	TR96866	70.20
.4375	7/16	1-3/4	6	.3730	7	TR96867	67.05
.4385	O/U	1-3/4	6	.3730	7	TR96868	70.20
.4531	29/64	1-3/4	6	.3730	7	TR96870	80.45
.4688	15/32	1-3/4	6	.3730	7	TR96871	80.45
.4724	12.0 mm	2	6	.4355	8	TR96872	80.45
.4844	31/64	2	6	.4355	8	TR96873	80.45
.4921	12.5 mm	2	6	.4355	8	TR96874	80.45
.4990	O/U	2	6	.4355	8	TR96875	80.45
.5000	1/2	2	6	.4355	8	TR96876	76.80

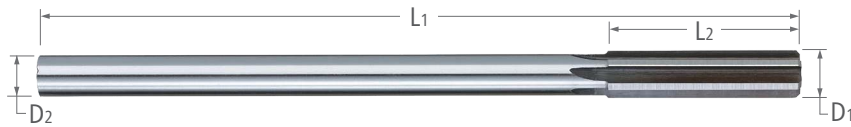


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REAMERS - COBALT

Dowel Pin - Straight Flute

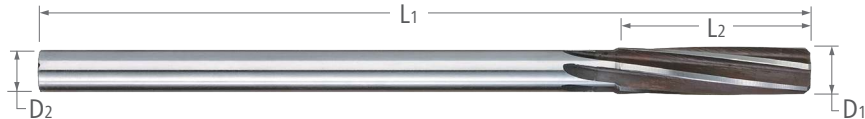


- General purpose reamers featuring a 45° chamfer angle
- Straight flutes for through and blind hole applications
- 4 and 6 flute styles
- M42 cobalt
- Precision manufactured in the USA

REAMER DIA.	FLUTE LENGTH	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED	
$D_1^{+.0000" \atop -.0002"}$	L_2		D_2	L_1	TOOL #	USD\$
.1230	7/8	4	.1190	3-1/2	TR96508	22.95
.1247	7/8	4	.1190	3-1/2	TR96509	21.90
.1855	1-1/8	6	.1805	4-1/2	TR96510	27.65
.1870	1-1/8	6	.1805	4-1/2	TR96511	27.65
.2480	1-1/2	6	.2405	6	TR96512	30.95
.2495	1-1/2	6	.2405	6	TR96513	30.95
.3105	1-1/2	6	.2792	6	TR96514	32.17
.3120	1-1/2	6	.2792	6	TR96515	44.50
.3730	1-3/4	6	.3105	7	TR96516	48.50
.3745	1-3/4	6	.3105	7	TR96517	48.50
.4355	1-3/4	6	.3730	7	TR96518	45.17
.4370	1-3/4	6	.3730	7	TR96519	45.17
.4980	2	6	.4355	8	TR96520	51.77
.4995	2	6	.4355	8	TR96521	71.50

REAMERS - COBALT

Dowel Pin - Right Hand Spiral



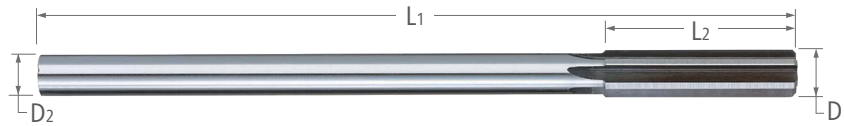
- General purpose reamers featuring a 45° chamfer angle
- Spiral flutes for increased chip evacuation in blind hole applications
- 4 and 6 flute styles
- M42 cobalt
- Precision manufactured in the USA

REAMER DIA.	FLUTE LENGTH	FLUTES	SHANK DIA.	OVERALL LENGTH	UNCOATED	
$D_1^{+.0000" \atop -.0002"}$	L_2		D_2	L_1	TOOL #	USD\$
.1230	7/8	4	.1190	3-1/2	TR96970	25.45
.1247	7/8	4	.1190	3-1/2	TR96971	25.45
.1855	1-1/8	6	.1805	4-1/2	TR96972	33.75
.1870	1-1/8	6	.1805	4-1/2	TR96973	34.05
.2480	1-1/2	6	.2405	6	TR96974	35.55
.2495	1-1/2	6	.2405	6	TR96975	35.55
.3105	1-1/2	6	.2792	6	TR96976	46.80
.3120	1-1/2	6	.2792	6	TR96977	46.10
.3730	1-3/4	6	.3105	7	TR96978	50.40
.3745	1-3/4	6	.3105	7	TR96979	50.40
.4355	1-3/4	6	.3730	7	TR96980	69.15
.4370	1-3/4	6	.3730	7	TR96981	69.15
.4980	2	6	.4355	8	TR96982	76.60
.4995	2	6	.4355	8	TR96983	79.05

For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute



- Straight flute general purpose reamers for through and blind hole applications
- 45° chamfer angle
- Flute options from 2 to 12
- High speed steel
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 $^{+.0002}_{-.0000}$ "		L2		D2	L1	TOOL #	USD\$
.0135	#80	3/8	2	.0135	3/4	TR96001	29.95
.0140		3/8	2	.0135	3/4	TR94007	37.45
.0145	#79	3/8	2	.0145	3/4	TR96002	29.95
.0150		3/8	2	.0156	3/4	TR94008	37.35
.0155		3/8	2	.0156	3/4	TR94009	37.35
.0156	1/64	3/8	2	.0156	3/4	TR96003	30.05
.0160	#78	3/8	2	.0160	7/8	TR96004	30.05
.0165		3/8	2	.0180	7/8	TR94010	37.35
.0170		3/8	2	.0180	7/8	TR94011	37.35
.0175		3/8	2	.0180	7/8	TR94012	37.35
.0180	#77	3/8	2	.0180	7/8	TR96005	29.95
.0185		3/8	2	.0200	7/8	TR94013	37.45
.0190		3/8	2	.0200	7/8	TR94014	37.45
.0195		3/8	2	.0200	7/8	TR94015	37.35
.0200	#76	3/8	2	.0200	7/8	TR96006	30.05
.0205		1/2	3	.0210	1	TR94016	33.95
.0210	#75	1/2	3	.0210	1	TR96007	29.95
.0215		1/2	3	.0225	1	TR94017	33.95
.0220		1/2	3	.0225	1	TR94018	33.95
.0225	#74	1/2	3	.0225	1	TR96008	30.05
.0230		1/2	3	.0240	1-1/8	TR94019	33.95
.0235		1/2	3	.0240	1-1/8	TR94020	33.95
.0240	#73	1/2	3	.0240	1-1/8	TR96009	30.05
.0245		1/2	3	.0250	1-1/8	TR94021	33.95
.0250	#72	1/2	3	.0250	1-1/8	TR96010	30.05
.0255		1/2	3	.0260	1-1/4	TR94022	33.95
.0260	#71	1/2	3	.0260	1-1/4	TR96011	30.05
.0265		1/2	3	.0280	1-1/4	TR94023	33.95
.0270		1/2	3	.0280	1-1/4	TR94024	33.95
.0275		1/2	3	.0280	1-1/4	TR94025	33.95
.0280	#70	1/2	3	.0280	1-1/4	TR96012	29.95
.0285		1/2	3	.0292	1-3/8	TR94026	33.95
.0290		1/2	3	.0292	1-3/8	TR94027	33.95
.0292	#69	1/2	3	.0292	1-3/8	TR96013	29.95
.0295		1/2	3	.0310	1-3/8	TR94028	30.90
.0300		1/2	3	.0310	1-3/8	TR94029	30.90
.0305		1/2	3	.0310	1-3/8	TR94030	30.90
.0310	#68	1/2	3	.0310	1-3/8	TR96014	30.05
.0312	1/32	1/2	3	.0312	1-3/8	TR96015	23.65
.0315		1/2	3	.0320	1-3/8	TR94031	30.90
.0320	#67	1/2	3	.0320	1-3/8	TR96016	25.20
.0325		1/2	3	.0330	1-3/8	TR94032	30.90

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For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 ^{+0.0002"} -0.0000"		L2		D2	L1	TOOL #	USD\$
.0330	#66	1/2	3	.0330	1-3/8	TR96017	25.20
.0335		1/2	3	.0350	1-1/2	TR94033	30.90
.0340		1/2	3	.0350	1-1/2	TR94034	30.90
.0345		1/2	3	.0350	1-1/2	TR94035	30.90
.0350	#65	1/2	3	.0350	1-1/2	TR96018	25.20
.0355		1/2	3	.0360	1-1/2	TR94036	30.90
.0360	#64	1/2	3	.0360	1-1/2	TR96019	25.20
.0365		1/2	3	.0370	1-1/2	TR94037	30.90
.0370	#63	1/2	3	.0370	1-1/2	TR96020	25.20
.0375		1/2	3	.0380	1-1/2	TR94038	30.90
.0380	#62	1/2	3	.0380	1-1/2	TR96021	25.20
.0385		1/2	3	.0390	1-1/2	TR94039	30.90
.0390	#61	1/2	3	.0390	1-1/2	TR96022	25.20
.0394	1.0 mm	1/2	4	.0394	2-1/2	TR96023	25.20
.0395		1/2	4	.0390	2-1/2	TR94040	29.45
.0400	#60	1/2	4	.0390	2-1/2	TR96024	25.20
.0405		1/2	4	.0390	2-1/2	TR94041	29.60
.0410	#59	1/2	4	.0390	2-1/2	TR96025	25.20
.0415		1/2	4	.0390	2-1/2	TR94042	29.45
.0420	#58	1/2	4	.0390	2-1/2	TR96026	25.20
.0425		1/2	4	.0390	2-1/2	TR94043	29.60
.0430	#57	1/2	4	.0390	2-1/2	TR96027	25.20
.0435		1/2	4	.0455	2-1/2	TR94044	29.45
.0440		1/2	4	.0455	2-1/2	TR94045	29.60
.0445		1/2	4	.0455	2-1/2	TR94046	29.45
.0450		1/2	4	.0455	2-1/2	TR94047	29.60
.0455		1/2	4	.0455	2-1/2	TR94048	29.60
.0460		1/2	4	.0455	2-1/2	TR94049	29.60
.0465	#56	1/2	4	.0455	2-1/2	TR96028	25.20
.0469	3/64	1/2	4	.0455	2-1/2	TR96029	25.20
.0470		1/2	4	.0510	2-1/2	TR94050	29.60
.0475		1/2	4	.0510	2-1/2	TR94051	29.60
.0480		1/2	4	.0510	2-1/2	TR94052	29.60
.0485		1/2	4	.0510	2-1/2	TR94053	29.60
.0490		1/2	4	.0510	2-1/2	TR94054	29.60
.0495		1/2	4	.0510	2-1/2	TR94055	29.60
.0500		1/2	4	.0510	2-1/2	TR94056	29.60
.0505		1/2	4	.0510	2-1/2	TR94057	29.60
.0510		1/2	4	.0510	2-1/2	TR94058	29.60
.0515		1/2	4	.0510	2-1/2	TR94059	29.60
.0520	#55	1/2	4	.0510	2-1/2	TR96030	25.20
.0525		1/2	4	.0510	2-1/2	TR94060	29.60
.0530		1/2	4	.0510	2-1/2	TR94061	29.60
.0535		1/2	4	.0510	2-1/2	TR94062	29.60
.0540		1/2	4	.0510	2-1/2	TR94063	29.60
.0545		1/2	4	.0510	2-1/2	TR94064	29.60
.0550	#54	1/2	4	.0510	2-1/2	TR96031	25.20
.0555		1/2	4	.0510	2-1/2	TR94065	29.60
.0560		1/2	4	.0510	2-1/2	TR94066	29.60
.0565		1/2	4	.0510	2-1/2	TR94067	29.60

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 $^{+.0002''}_{-.0000''}$		L2		D2	L1	TOOL #	USD\$
.0570		1/2	4	.0510	2-1/2	TR94068	29.45
.0575		1/2	4	.0510	2-1/2	TR94069	29.60
.0580		1/2	4	.0510	2-1/2	TR94070	29.60
.0585		1/2	4	.0510	2-1/2	TR94071	29.60
.0590		1/2	4	.0510	2-1/2	TR94072	29.60
.0591	1.5 mm	1/2	4	.0510	2-1/2	TR96032	25.20
.0595	#53	1/2	4	.0585	2-1/2	TR96033	25.20
.0600		1/2	4	.0585	2-1/2	TR94073	29.60
.0605		1/2	4	.0585	2-1/2	TR94074	29.60
.0610		1/2	4	.0585	2-1/2	TR94075	29.60
.0615		1/2	4	.0585	2-1/2	TR94076	29.60
.0620		1/2	4	.0585	2-1/2	TR94077	29.60
.0625	1/16	1/2	4	.0585	2-1/2	TR96034	22.55
.0630		1/2	4	.0585	2-1/2	TR94078	26.50
.0635	#52	1/2	4	.0585	2-1/2	TR96035	22.55
.0640		3/4	4	.0660	3	TR94079	26.50
.0645		3/4	4	.0660	3	TR94080	26.50
.0650		3/4	4	.0660	3	TR94081	26.50
.0655		3/4	4	.0660	3	TR94082	26.50
.0660		3/4	4	.0660	3	TR94083	26.50
.0665		3/4	4	.0660	3	TR94084	26.50
.0670	#51	3/4	4	.0660	3	TR96036	20.30
.0675		3/4	4	.0660	3	TR94085	26.50
.0680		3/4	4	.0660	3	TR94086	26.50
.0685		3/4	4	.0660	3	TR94087	26.50
.0690		3/4	4	.0660	3	TR94088	26.50
.0695		3/4	4	.0660	3	TR94089	26.50
.0700	#50	3/4	4	.0660	3	TR96037	20.30
.0705		3/4	4	.0660	3	TR94090	26.50
.0710		3/4	4	.0660	3	TR94091	26.50
.0715		3/4	4	.0660	3	TR94092	26.50
.0720		3/4	4	.0660	3	TR94093	26.50
.0725		3/4	4	.0660	3	TR94094	26.50
.0730	#49	3/4	4	.0660	3	TR96038	20.30
.0735		3/4	4	.0720	3	TR94095	26.50
.0740		3/4	4	.0720	3	TR94096	26.50
.0745		3/4	4	.0720	3	TR94097	26.45
.0750		3/4	4	.0720	3	TR94098	26.50
.0755		3/4	4	.0720	3	TR94099	26.50
.0760	#48	3/4	4	.0720	3	TR96039	20.30
.0765		3/4	4	.0720	3	TR94100	26.50
.0770		3/4	4	.0720	3	TR94101	26.50
.0775		3/4	4	.0720	3	TR94102	26.50
.0780		3/4	4	.0720	3	TR94103	26.50
.0781	5/64	3/4	4	.0720	3	TR96040	20.30
.0785	#47	3/4	4	.0720	3	TR96041	20.30
.0787	2.0 mm	3/4	4	.0720	3	TR96042	20.30
.0790		3/4	4	.0771	3	TR94104	26.50
.0795		3/4	4	.0771	3	TR94105	26.50

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} -0.000"		L ₂		D ₂	L ₁	TOOL #	USD\$
.0800		3/4	4	.0771	3	TR94106	26.50
.0805		3/4	4	.0771	3	TR94107	26.50
.0810	#46	3/4	4	.0771	3	TR96043	20.30
.0815		3/4	4	.0771	3	TR94108	26.50
.0820	#45	3/4	4	.0771	3	TR96044	20.30
.0825		3/4	4	.0810	3	TR94109	26.45
.0830		3/4	4	.0810	3	TR94110	26.50
.0835		3/4	4	.0810	3	TR94111	26.50
.0840		3/4	4	.0810	3	TR94112	26.50
.0845		3/4	4	.0810	3	TR94113	26.50
.0850		3/4	4	.0810	3	TR94114	26.50
.0855		3/4	4	.0810	3	TR94115	26.50
.0860	#44	3/4	4	.0810	3	TR96045	20.30
.0865		3/4	4	.0810	3	TR94116	26.50
.0870		3/4	4	.0810	3	TR94117	26.50
.0875		3/4	4	.0810	3	TR94118	26.45
.0880		3/4	4	.0810	3	TR94119	26.50
.0885		3/4	4	.0810	3	TR94120	26.50
.0890	#43	3/4	4	.0810	3	TR96046	20.30
.0895		3/4	4	.0880	3	TR94121	26.50
.0900		3/4	4	.0880	3	TR94122	26.50
.0905		3/4	4	.0880	3	TR94123	26.50
.0910		3/4	4	.0880	3	TR94124	26.50
.0915		3/4	4	.0880	3	TR94125	26.50
.0920		3/4	4	.0880	3	TR94126	26.50
.0925		3/4	4	.0880	3	TR94127	26.50
.0930		3/4	4	.0880	3	TR94128	26.50
.0935	#42	3/4	4	.0880	3	TR96047	20.30
.0938	3/32	3/4	4	.0880	3	TR96048	18.15
.0940		7/8	4	.0928	3-1/2	TR94129	26.50
.0945		7/8	4	.0928	3-1/2	TR94130	26.50
.0950		7/8	4	.0928	3-1/2	TR94131	26.50
.0955		7/8	4	.0928	3-1/2	TR94132	26.50
.0960	#41	7/8	4	.0928	3-1/2	TR96049	20.55
.0965		7/8	4	.0928	3-1/2	TR94133	26.50
.0970		7/8	4	.0928	3-1/2	TR94134	26.50
.0975		7/8	4	.0928	3-1/2	TR94135	26.50
.0980	#40	7/8	4	.0928	3-1/2	TR96050	20.55
.0984	2.5 mm	7/8	4	.0928	3-1/2	TR96051	20.55
.0985		7/8	4	.0928	3-1/2	TR94136	26.50
.0990		7/8	4	.0928	3-1/2	TR94137	26.50
.0995	#39	7/8	4	.0928	3-1/2	TR96052	20.55
.1000		7/8	4	.0950	3-1/2	TR94138	26.50
.1005		7/8	4	.0950	3-1/2	TR94139	26.50
.1010		7/8	4	.0950	3-1/2	TR94140	26.50
.1015	#38	7/8	4	.0950	3-1/2	TR96053	20.55
.1020		7/8	4	.0950	3-1/2	TR94141	26.50
.1025		7/8	4	.0950	3-1/2	TR94142	26.50
.1030		7/8	4	.0950	3-1/2	TR94143	26.50

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ - .0000" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.1035		7/8	4	.0950	3-1/2	TR94144	26.50
.1040	#37	7/8	4	.0950	3-1/2	TR96054	20.55
.1045		7/8	4	.1030	3-1/2	TR94145	26.50
.1050		7/8	4	.1030	3-1/2	TR94146	26.50
.1055		7/8	4	.1030	3-1/2	TR94147	26.45
.1060		7/8	4	.1030	3-1/2	TR94148	26.50
.1065	#36	7/8	4	.1030	3-1/2	TR96055	20.55
.1070		7/8	4	.1030	3-1/2	TR94149	26.50
.1075		7/8	4	.1030	3-1/2	TR94150	26.45
.1080		7/8	4	.1030	3-1/2	TR94151	26.50
.1085		7/8	4	.1030	3-1/2	TR94152	26.50
.1090		7/8	4	.1030	3-1/2	TR94153	26.50
.1094	7/64	7/8	4	.1030	3-1/2	TR96056	20.95
.1095		7/8	4	.1030	3-1/2	TR94154	22.90
.1100	#35	7/8	4	.1030	3-1/2	TR96057	20.95
.1105		7/8	4	.1055	3-1/2	TR94155	22.85
.1110	#34	7/8	4	.1055	3-1/2	TR96058	20.95
.1115		7/8	4	.1055	3-1/2	TR94156	22.85
.1120		7/8	4	.1055	3-1/2	TR94157	22.90
.1125		7/8	4	.1055	3-1/2	TR94158	22.85
.1130	#33	7/8	4	.1055	3-1/2	TR96059	20.95
.1135		7/8	4	.1120	3-1/2	TR94159	22.90
.1140		7/8	4	.1120	3-1/2	TR94160	22.90
.1145		7/8	4	.1120	3-1/2	TR94161	22.90
.1150		7/8	4	.1120	3-1/2	TR94162	22.90
.1155		7/8	4	.1120	3-1/2	TR94163	22.90
.1160	#32	7/8	4	.1120	3-1/2	TR96060	20.95
.1165		7/8	4	.1120	3-1/2	TR94164	22.90
.1170		7/8	4	.1120	3-1/2	TR94165	22.90
.1175		7/8	4	.1120	3-1/2	TR94166	22.90
.1180		7/8	4	.1120	3-1/2	TR94167	22.90
.1181	3.0 mm	7/8	4	.1120	3-1/2	TR96061	20.95
.1185		7/8	4	.1120	3-1/2	TR94168	22.90
.1190		7/8	4	.1120	3-1/2	TR94169	22.90
.1195		7/8	4	.1120	3-1/2	TR94170	22.90
.1200	#31	7/8	4	.1120	3-1/2	TR96062	20.95
.1205		7/8	4	.1190	3-1/2	TR94171	22.90
.1210		7/8	4	.1190	3-1/2	TR94172	22.90
.1215		7/8	4	.1190	3-1/2	TR94173	22.90
.1220		7/8	4	.1190	3-1/2	TR94174	22.90
.1225		7/8	4	.1190	3-1/2	TR94175	22.90
.1230		7/8	4	.1190	3-1/2	TR94176	22.90
.1235		7/8	4	.1190	3-1/2	TR94177	22.90
.1240	O/U	7/8	4	.1190	3-1/2	TR96063	20.95
.1245		7/8	4	.1190	3-1/2	TR94178	22.90
.1247		7/8	4	.1190	3-1/2	TR94179	22.90
.1250	1/8	7/8	4	.1190	3-1/2	TR96064	19.05
.1255		7/8	4	.1190	3-1/2	TR94180	30.90
.1260	O/U	7/8	4	.1190	3-1/2	TR96065	20.95

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} -0.000"	L ₂		D ₂	L ₁	TOOL #	USD\$
.1265	7/8	4	.1190	3-1/2	TR94181	30.90
.1270	7/8	4	.1190	3-1/2	TR94182	30.90
.1275	7/8	4	.1190	3-1/2	TR94183	30.90
.1280	7/8	4	.1190	3-1/2	TR94184	30.90
.1285 #30	7/8	4	.1190	3-1/2	TR96066	20.95
.1290	1	4	.1275	4	TR94185	30.90
.1295	1	4	.1275	4	TR94186	30.90
.1300	1	4	.1275	4	TR94187	30.90
.1305	1	4	.1275	4	TR94188	30.90
.1310	1	4	.1275	4	TR94189	30.90
.1315	1	4	.1275	4	TR94190	30.90
.1320	1	4	.1275	4	TR94191	30.90
.1325	1	4	.1275	4	TR94192	30.90
.1330	1	4	.1275	4	TR94193	30.90
.1335	1	4	.1275	4	TR94194	30.90
.1340	1	4	.1275	4	TR94195	30.90
.1345	1	4	.1275	4	TR94196	30.90
.1350	1	4	.1275	4	TR94197	30.90
.1355	1	4	.1275	4	TR94198	30.90
.1360 #29	1	4	.1275	4	TR96067	25.20
.1365	1	4	.1350	4	TR94199	30.90
.1370	1	4	.1350	4	TR94200	30.90
.1375	1	4	.1350	4	TR94201	30.90
.1378 3.5 mm	1	4	.1350	4	TR96068	25.20
.1380	1	4	.1350	4	TR94202	30.90
.1385	1	4	.1350	4	TR94203	30.90
.1390	1	4	.1350	4	TR94204	30.90
.1395	1	4	.1350	4	TR94205	30.90
.1400	1	4	.1350	4	TR94206	30.90
.1405 #28	1	4	.1350	4	TR96069	25.20
.1406 9/64	1	4	.1350	4	TR96070	25.20
.1410	1	4	.1350	4	TR94207	29.60
.1415	1	4	.1350	4	TR94208	29.60
.1420	1	4	.1350	4	TR94209	29.60
.1425	1	4	.1350	4	TR94210	29.60
.1430	1	4	.1350	4	TR94211	29.60
.1435	1	4	.1350	4	TR94212	29.60
.1440 #27	1	4	.1350	4	TR96071	25.20
.1445	1	4	.1430	4	TR94213	29.45
.1450	1	4	.1430	4	TR94214	29.60
.1455	1	4	.1430	4	TR94215	29.60
.1460	1	4	.1430	4	TR94216	29.60
.1465	1	4	.1430	4	TR94217	29.45
.1470 #26	1	4	.1430	4	TR96072	25.20
.1475	1	4	.1430	4	TR94218	29.45
.1480	1	4	.1430	4	TR94219	29.60
.1485	1	4	.1430	4	TR94220	29.45
.1490	1	4	.1430	4	TR94221	29.60
.1495 #25	1	4	.1430	4	TR96073	25.20

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ - .0000" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.1500		1	4	.1460	4	TR94222	29.60
.1505		1	4	.1460	4	TR94223	29.45
.1510		1	4	.1460	4	TR94224	29.60
.1515		1	4	.1460	4	TR94225	29.60
.1520	#24	1	4	.1460	4	TR96074	25.20
.1525		1	4	.1460	4	TR94226	29.45
.1530		1	4	.1460	4	TR94227	29.60
.1535		1	4	.1460	4	TR94228	29.45
.1540	#23	1	4	.1460	4	TR96075	25.20
.1545		1	4	.1510	4	TR94229	29.60
.1550		1	4	.1510	4	TR94230	29.60
.1555		1	4	.1510	4	TR94231	29.60
.1560		1	4	.1510	4	TR94232	29.60
.1562	5/32	1	4	.1510	4	TR96076	25.20
.1565		1	6	.1510	4	TR94233	30.90
.1570	#22	1	6	.1510	4	TR96077	25.20
.1575	4.0 mm	1	6	.1510	4	TR96078	25.20
.1580		1-1/8	6	.1530	4-1/2	TR94234	30.90
.1585		1-1/8	6	.1530	4-1/2	TR94235	30.90
.1590	#21	1-1/8	6	.1530	4-1/2	TR96079	26.90
.1595		1-1/8	6	.1530	4-1/2	TR94236	30.90
.1600		1-1/8	6	.1530	4-1/2	TR94237	30.90
.1605		1-1/8	6	.1530	4-1/2	TR94238	30.90
.1610	#20	1-1/8	6	.1530	4-1/2	TR96080	26.90
.1615		1-1/8	6	.1595	4-1/2	TR94239	30.90
.1620		1-1/8	6	.1595	4-1/2	TR94240	30.90
.1625		1-1/8	6	.1595	4-1/2	TR94241	30.90
.1630		1-1/8	6	.1595	4-1/2	TR94242	30.90
.1635		1-1/8	6	.1595	4-1/2	TR94243	30.90
.1640		1-1/8	6	.1595	4-1/2	TR94244	30.90
.1645		1-1/8	6	.1595	4-1/2	TR94245	30.90
.1650		1-1/8	6	.1595	4-1/2	TR94246	30.90
.1655		1-1/8	6	.1595	4-1/2	TR94247	30.90
.1660	#19	1-1/8	6	.1595	4-1/2	TR96081	26.90
.1665		1-1/8	6	.1595	4-1/2	TR94248	30.90
.1670		1-1/8	6	.1595	4-1/2	TR94249	30.90
.1675		1-1/8	6	.1595	4-1/2	TR94250	30.90
.1680		1-1/8	6	.1595	4-1/2	TR94251	30.90
.1685		1-1/8	6	.1595	4-1/2	TR94252	30.90
.1690		1-1/8	6	.1595	4-1/2	TR94253	30.90
.1695	#18	1-1/8	6	.1595	4-1/2	TR96082	26.90
.1700		1-1/8	6	.1645	4-1/2	TR94254	30.90
.1705		1-1/8	6	.1645	4-1/2	TR94255	30.90
.1710		1-1/8	6	.1645	4-1/2	TR94256	30.90
.1715		1-1/8	6	.1645	4-1/2	TR94257	30.90
.1719	11/64	1-1/8	6	.1645	4-1/2	TR96083	26.90
.1720		1-1/8	6	.1645	4-1/2	TR94258	29.10
.1725		1-1/8	6	.1645	4-1/2	TR94259	29.10
.1730	#17	1-1/8	6	.1645	4-1/2	TR96084	26.90

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002'' \\ -.0000'' \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.1735		1-1/8	6	.1704	4-1/2	TR94260	29.10
.1740		1-1/8	6	.1704	4-1/2	TR94261	29.10
.1745		1-1/8	6	.1704	4-1/2	TR94262	29.10
.1750		1-1/8	6	.1704	4-1/2	TR94263	29.10
.1755		1-1/8	6	.1704	4-1/2	TR94264	29.10
.1760		1-1/8	6	.1704	4-1/2	TR94265	29.10
.1765		1-1/8	6	.1704	4-1/2	TR94266	29.00
.1770	#16	1-1/8	6	.1704	4-1/2	TR96085	26.90
.1772	4.5 mm	1-1/8	6	.1704	4-1/2	TR96086	26.90
.1775		1-1/8	6	.1755	4-1/2	TR94267	29.10
.1780		1-1/8	6	.1755	4-1/2	TR94268	29.10
.1785		1-1/8	6	.1755	4-1/2	TR94269	29.00
.1790		1-1/8	6	.1755	4-1/2	TR94270	29.10
.1795		1-1/8	6	.1755	4-1/2	TR94271	29.10
.1800	#15	1-1/8	6	.1755	4-1/2	TR96087	26.90
.1805		1-1/8	6	.1755	4-1/2	TR94272	29.10
.1810		1-1/8	6	.1755	4-1/2	TR94273	29.10
.1815		1-1/8	6	.1755	4-1/2	TR94274	29.10
.1820	#14	1-1/8	6	.1755	4-1/2	TR96088	26.90
.1825		1-1/8	6	.1805	4-1/2	TR94275	29.00
.1830		1-1/8	6	.1805	4-1/2	TR94276	29.10
.1835		1-1/8	6	.1805	4-1/2	TR94277	29.00
.1840		1-1/8	6	.1805	4-1/2	TR94278	29.10
.1845		1-1/8	6	.1805	4-1/2	TR94279	29.10
.1850	#13	1-1/8	6	.1805	4-1/2	TR96089	26.90
.1855		1-1/8	6	.1805	4-1/2	TR94280	29.10
.1860		1-1/8	6	.1805	4-1/2	TR94281	29.10
.1865	O/U	1-1/8	6	.1805	4-1/2	TR96090	26.90
.1870		1-1/8	6	.1805	4-1/2	TR94282	29.10
.1875	3/16	1-1/8	6	.1805	4-1/2	TR96091	24.25
.1880		1-1/8	6	.1805	4-1/2	TR94283	36.60
.1885	O/U	1-1/8	6	.1805	4-1/2	TR96092	26.90
.1890	#12	1-1/8	6	.1805	4-1/2	TR96093	26.90
.1895		1-1/4	6	.1860	5	TR94284	36.60
.1900		1-1/4	6	.1860	5	TR94285	36.60
.1905		1-1/4	6	.1860	5	TR94286	36.60
.1910	#11	1-1/4	6	.1860	5	TR96094	29.95
.1915		1-1/4	6	.1860	5	TR94287	36.60
.1920		1-1/4	6	.1860	5	TR94288	36.60
.1925		1-1/4	6	.1860	5	TR94289	36.60
.1930		1-1/4	6	.1860	5	TR94290	36.60
.1935	#10	1-1/4	6	.1860	5	TR96095	29.95
.1940		1-1/4	6	.1895	5	TR94291	36.60
.1945		1-1/4	6	.1895	5	TR94292	36.60
.1950		1-1/4	6	.1895	5	TR94293	36.60
.1955		1-1/4	6	.1895	5	TR94294	36.60
.1960	#9	1-1/4	6	.1895	5	TR96096	29.95
.1965		1-1/4	6	.1895	5	TR94295	36.60
.1969	5.0 mm	1-1/4	6	.1895	5	TR96097	29.95

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ -.0000" \end{smallmatrix}$	L ₂		D ₂	L ₁	TOOL #	USD\$
.1970	1-1/4	6	.1895	5	TR94296	36.60
.1975	1-1/4	6	.1895	5	TR94297	36.60
.1980	1-1/4	6	.1895	5	TR94298	36.60
.1985	1-1/4	6	.1895	5	TR94299	36.60
.1990	#8	6	.1895	5	TR96098	29.95
.1995		6	.1945	5	TR94300	36.60
.2000		6	.1945	5	TR94301	36.60
.2005	#7	6	.1945	5	TR94302	36.60
.2010		6	.1895	5	TR96099	29.95
.2015		6	.1945	5	TR94303	36.60
.2020	13/64	6	.1945	5	TR94304	36.60
.2025		6	.1945	5	TR94305	36.60
.2030		6	.1945	5	TR94306	36.60
.2031	#6	6	.1945	5	TR96100	29.95
.2035		6	.1945	5	TR94307	35.70
.2040		6	.1945	5	TR96101	29.95
.2045	#5	6	.2016	5	TR94308	35.70
.2050		6	.2016	5	TR94309	35.70
.2055		6	.2016	5	TR96102	29.95
.2060	#4	6	.2016	5	TR94310	35.70
.2065		6	.2016	5	TR94311	35.70
.2070		6	.2016	5	TR94312	35.70
.2075	#3	6	.2016	5	TR94313	35.70
.2080		6	.2016	5	TR94314	35.70
.2085		6	.2016	5	TR94315	35.70
.2090	#2	6	.2016	5	TR96103	29.95
.2095		6	.2075	5	TR94316	35.70
.2100		6	.2075	5	TR94317	35.70
.2105	#1	6	.2075	5	TR94318	35.70
.2110		6	.2075	5	TR94319	35.70
.2115		6	.2075	5	TR94320	35.70
.2120	#1/2	6	.2075	5	TR94321	35.70
.2125		6	.2075	5	TR94322	35.70
.2130		6	.2075	5	TR96104	29.95
.2135	5.5 mm	6	.2075	5	TR94323	35.70
.2140		6	.2075	5	TR94324	35.70
.2145		6	.2075	5	TR94325	35.70
.2150	7/32	6	.2075	5	TR94326	35.70
.2155		6	.2075	5	TR94327	35.70
.2160		6	.2075	5	TR94328	35.70
.2165	7/16	6	.2075	5	TR96105	29.95
.2170		6	.2075	5	TR94329	35.70
.2175		6	.2075	5	TR94330	35.70
.2180	3/8	6	.2075	5	TR94331	35.70
.2185		6	.2075	5	TR94332	35.70
.2188		6	.2075	5	TR96106	29.95
.2190	1/2	6	.2173	6	TR94333	36.40
.2195		6	.2173	6	TR94334	36.25
.2200		6	.2173	6	TR94335	36.40

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Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} -0.000"		L ₂		D ₂	L ₁	TOOL #	USD\$
.2205	#2	1-1/2	6	.2173	6	TR94336	36.40
.2210		1-1/2	6	.2173	6	TR96107	31.00
.2215		1-1/2	6	.2173	6	TR94337	36.40
.2220		1-1/2	6	.2173	6	TR94338	36.40
.2225		1-1/2	6	.2173	6	TR94339	36.25
.2230	#1	1-1/2	6	.2173	6	TR94340	36.40
.2235		1-1/2	6	.2173	6	TR94341	36.25
.2240		1-1/2	6	.2173	6	TR94342	36.40
.2245		1-1/2	6	.2173	6	TR94343	36.25
.2250		1-1/2	6	.2173	6	TR94344	36.40
.2255		1-1/2	6	.2173	6	TR94345	36.25
.2260		1-1/2	6	.2173	6	TR94346	36.40
.2265		1-1/2	6	.2173	6	TR94347	36.25
.2270		1-1/2	6	.2173	6	TR94348	36.40
.2275		1-1/2	6	.2173	6	TR94349	36.40
.2280		1-1/2	6	.2173	6	TR96108	31.00
.2285		1-1/2	6	.2265	6	TR94350	36.25
.2290		1-1/2	6	.2265	6	TR94351	36.40
.2295		1-1/2	6	.2265	6	TR94352	36.40
.2300		1-1/2	6	.2265	6	TR94353	36.40
.2305	A	1-1/2	6	.2265	6	TR94354	36.25
.2310		1-1/2	6	.2265	6	TR94355	36.25
.2315		1-1/2	6	.2265	6	TR94356	36.25
.2320		1-1/2	6	.2265	6	TR94357	36.40
.2325		1-1/2	6	.2265	6	TR94358	36.25
.2330	15/64	1-1/2	6	.2265	6	TR94359	36.40
.2335		1-1/2	6	.2265	6	TR94360	36.25
.2340		1-1/2	6	.2265	6	TR96109	31.00
.2344		1-1/2	6	.2265	6	TR96110	31.00
.2345		1-1/2	6	.2265	6	TR94361	32.80
.2350	6.0 mm	1-1/2	6	.2265	6	TR94362	32.90
.2355		1-1/2	6	.2265	6	TR94363	32.90
.2360		1-1/2	6	.2265	6	TR94364	32.90
.2362		1-1/2	6	.2265	6	TR96111	32.65
.2365		1-1/2	6	.2329	6	TR94365	32.90
.2370	B	1-1/2	6	.2329	6	TR94366	32.90
.2375		1-1/2	6	.2329	6	TR94367	32.90
.2380		1-1/2	6	.2329	6	TR96112	32.65
.2385		1-1/2	6	.2329	6	TR94368	32.90
.2390		1-1/2	6	.2329	6	TR94369	32.90
.2395	C	1-1/2	6	.2329	6	TR94370	32.90
.2400		1-1/2	6	.2329	6	TR94371	32.90
.2405		1-1/2	6	.2329	6	TR94372	32.90
.2410		1-1/2	6	.2329	6	TR94373	32.90
.2415		1-1/2	6	.2329	6	TR94374	32.80
.2420		1-1/2	6	.2329	6	TR96113	32.65
.2425		1-1/2	6	.2329	6	TR94375	32.90
.2430		1-1/2	6	.2329	6	TR94376	32.90
.2435		1-1/2	6	.2329	6	TR94377	32.80

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Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.0002"} -0.0000"	L ₂		D ₂	L ₁	TOOL #	USD\$
.2440	1-1/2	6	.2329	6	TR94378	32.90
.2445	1-1/2	6	.2329	6	TR94379	32.90
.2450	1-1/2	6	.2329	6	TR94380	32.90
.2455	1-1/2	6	.2329	6	TR94381	32.80
.2460	1-1/2	6	.2329	6	TR96114	32.65
.2465	1-1/2	6	.2405	6	TR94382	32.90
.2470	1-1/2	6	.2405	6	TR94383	32.90
.2475	1-1/2	6	.2405	6	TR94384	32.90
.2480	1-1/2	6	.2405	6	TR94385	32.90
.2485	1-1/2	6	.2405	6	TR94386	32.90
.2490	1-1/2	6	.2405	6	TR96115	30.60
.2495	1-1/2	6	.2405	6	TR94387	32.90
.2500	1-1/2	6	.2405	6	TR96116	29.05
.2505	1-1/2	6	.2405	6	TR94388	41.70
.2510	1-1/2	6	.2405	6	TR96117	30.60
.2515	1-1/2	6	.2405	6	TR94389	41.70
.2520	1-1/2	6	.2405	6	TR94390	41.70
.2525	1-1/2	6	.2405	6	TR94391	41.70
.2530	1-1/2	6	.2405	6	TR94392	41.70
.2535	1-1/2	6	.2405	6	TR94393	41.70
.2540	1-1/2	6	.2405	6	TR94394	41.70
.2545	1-1/2	6	.2405	6	TR94395	41.70
.2550	1-1/2	6	.2405	6	TR94396	41.70
.2555	1-1/2	6	.2405	6	TR94397	41.70
.2559	1-1/2	6	.2405	6	TR96118	32.65
.2560	1-1/2	6	.2485	6	TR94398	41.70
.2565	1-1/2	6	.2485	6	TR94399	41.70
.2570	1-1/2	6	.2485	6	TR96119	32.65
.2575	1-1/2	6	.2485	6	TR94400	41.70
.2580	1-1/2	6	.2485	6	TR94401	41.70
.2585	1-1/2	6	.2485	6	TR94402	41.70
.2590	1-1/2	6	.2485	6	TR94403	41.70
.2595	1-1/2	6	.2485	6	TR94404	41.70
.2600	1-1/2	6	.2485	6	TR94405	41.70
.2605	1-1/2	6	.2485	6	TR94406	41.70
.2610	1-1/2	6	.2485	6	TR96120	32.65
.2615	1-1/2	6	.2485	6	TR94407	41.70
.2620	1-1/2	6	.2485	6	TR94408	41.70
.2625	1-1/2	6	.2485	6	TR94409	41.70
.2630	1-1/2	6	.2485	6	TR94410	41.70
.2635	1-1/2	6	.2485	6	TR94411	41.70
.2640	1-1/2	6	.2485	6	TR94412	41.70
.2645	1-1/2	6	.2485	6	TR94413	41.70
.2650	1-1/2	6	.2485	6	TR94414	41.70
.2655	1-1/2	6	.2485	6	TR94415	41.70
.2656	1-1/2	6	.2485	6	TR96121	36.20
.2660	1-1/2	6	.2485	6	TR96122	36.20
.2665	1-1/2	6	.2485	6	TR94416	41.70
.2670	1-1/2	6	.2485	6	TR94417	41.70

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Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002'' \\ -.0000'' \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.2675		1-1/2	6	.2485	6	TR94418	41.70
.2680		1-1/2	6	.2485	6	TR94419	41.70
.2685		1-1/2	6	.2485	6	TR94420	41.70
.2690		1-1/2	6	.2485	6	TR94421	41.70
.2695		1-1/2	6	.2485	6	TR94422	41.70
.2700		1-1/2	6	.2485	6	TR94423	41.70
.2705		1-1/2	6	.2485	6	TR94424	41.70
.2710		1-1/2	6	.2485	6	TR94425	41.70
.2715		1-1/2	6	.2485	6	TR94426	41.70
.2720	I	1-1/2	6	.2485	6	TR96123	36.20
.2725		1-1/2	6	.2485	6	TR94427	41.70
.2730		1-1/2	6	.2485	6	TR94428	41.70
.2735		1-1/2	6	.2485	6	TR94429	41.70
.2740		1-1/2	6	.2485	6	TR94430	41.70
.2745		1-1/2	6	.2485	6	TR94431	41.70
.2750		1-1/2	6	.2485	6	TR94432	41.70
.2755		1-1/2	6	.2485	6	TR94433	41.70
.2756	7.0 mm	1-1/2	6	.2485	6	TR96124	36.20
.2760		1-1/2	6	.2485	6	TR94434	41.70
.2765		1-1/2	6	.2485	6	TR94435	41.70
.2770	J	1-1/2	6	.2485	6	TR96125	36.20
.2775		1-1/2	6	.2485	6	TR94436	41.70
.2780		1-1/2	6	.2485	6	TR94437	41.70
.2785		1-1/2	6	.2485	6	TR94438	41.70
.2790		1-1/2	6	.2485	6	TR94439	41.70
.2795		1-1/2	6	.2485	6	TR94440	41.70
.2800		1-1/2	6	.2485	6	TR94441	41.70
.2805		1-1/2	6	.2485	6	TR94442	41.70
.2810	K	1-1/2	6	.2485	6	TR96126	36.20
.2812	9/32	1-1/2	6	.2485	6	TR96127	34.30
.2815		1-1/2	6	.2792	6	TR94443	41.70
.2820		1-1/2	6	.2792	6	TR94444	41.70
.2825		1-1/2	6	.2792	6	TR94445	41.70
.2830		1-1/2	6	.2792	6	TR94446	41.70
.2835		1-1/2	6	.2792	6	TR94447	41.70
.2840		1-1/2	6	.2792	6	TR94448	41.70
.2845		1-1/2	6	.2792	6	TR94449	41.70
.2850		1-1/2	6	.2792	6	TR94450	41.70
.2855		1-1/2	6	.2792	6	TR94451	41.70
.2860		1-1/2	6	.2792	6	TR94452	41.70
.2865		1-1/2	6	.2792	6	TR94453	41.70
.2870		1-1/2	6	.2792	6	TR94454	41.70
.2875		1-1/2	6	.2792	6	TR94455	41.70
.2880		1-1/2	6	.2792	6	TR94456	41.70
.2885		1-1/2	6	.2792	6	TR94457	41.70
.2890		1-1/2	6	.2792	6	TR94458	41.70
.2895		1-1/2	6	.2792	6	TR94459	41.70
.2900	L	1-1/2	6	.2792	6	TR96128	36.20
.2905		1-1/2	6	.2792	6	TR94460	41.70

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Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002'' \\ -.0000'' \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.2910		1-1/2	6	.2792	6	TR94461	41.70
.2915		1-1/2	6	.2792	6	TR94462	41.70
.2920		1-1/2	6	.2792	6	TR94463	41.70
.2925		1-1/2	6	.2792	6	TR94464	41.70
.2930		1-1/2	6	.2792	6	TR94465	41.70
.2935		1-1/2	6	.2792	6	TR94466	41.70
.2940		1-1/2	6	.2792	6	TR94467	41.70
.2945		1-1/2	6	.2792	6	TR94468	41.70
.2950	M	1-1/2	6	.2792	6	TR96129	36.20
.2953	7.5 mm	1-1/2	6	.2792	6	TR96130	36.20
.2955		1-1/2	6	.2792	6	TR94469	41.70
.2960		1-1/2	6	.2792	6	TR94470	41.70
.2965		1-1/2	6	.2792	6	TR94471	41.70
.2969	19/64	1-1/2	6	.2792	6	TR96131	36.20
.2970		1-1/2	6	.2792	6	TR94472	37.35
.2975		1-1/2	6	.2792	6	TR94473	37.35
.2980		1-1/2	6	.2792	6	TR94474	37.35
.2985		1-1/2	6	.2792	6	TR94475	37.35
.2990		1-1/2	6	.2792	6	TR94476	37.35
.2995		1-1/2	6	.2792	6	TR94477	37.35
.3000		1-1/2	6	.2792	6	TR94478	37.35
.3005		1-1/2	6	.2792	6	TR94479	37.35
.3010		1-1/2	6	.2792	6	TR94480	37.35
.3015		1-1/2	6	.2792	6	TR94481	37.35
.3020	N	1-1/2	6	.2792	6	TR96132	36.20
.3025		1-1/2	6	.2792	6	TR94482	37.35
.3030		1-1/2	6	.2792	6	TR94483	37.35
.3035		1-1/2	6	.2792	6	TR94484	37.35
.3040		1-1/2	6	.2792	6	TR94485	37.35
.3045		1-1/2	6	.2792	6	TR94486	37.35
.3050		1-1/2	6	.2792	6	TR94487	37.35
.3055		1-1/2	6	.2792	6	TR94488	37.35
.3060		1-1/2	6	.2792	6	TR94489	37.35
.3065		1-1/2	6	.2792	6	TR94490	37.35
.3070		1-1/2	6	.2792	6	TR94491	37.35
.3075		1-1/2	6	.2792	6	TR94492	37.35
.3080		1-1/2	6	.2792	6	TR94493	37.35
.3085		1-1/2	6	.2792	6	TR94494	37.35
.3090		1-1/2	6	.2792	6	TR94495	37.35
.3095		1-1/2	6	.2792	6	TR94496	37.35
.3100		1-1/2	6	.2792	6	TR94497	37.35
.3105		1-1/2	6	.2792	6	TR94498	37.35
.3110		1-1/2	6	.2792	6	TR94499	37.35
.3115	O/U	1-1/2	6	.2792	6	TR96133	34.30
.3120		1-1/2	6	.2792	6	TR94500	37.35
.3125	5/16	1-1/2	6	.2792	6	TR96134	32.75
.3130		1-1/2	6	.2792	6	TR94501	44.15
.3135	O/U	1-1/2	6	.2792	6	TR96135	34.30
.3140		1-1/2	6	.2792	6	TR94502	44.15

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002'' \\ -.0000'' \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.3145	8.0 mm	1-1/2	6	.2792	6	TR94503	44.15
.3150		1-1/2	6	.2792	6	TR96136	36.20
.3155		1-1/2	6	.2792	6	TR94504	44.15
.3160		1-1/2	6	.2792	6	TR96137	36.20
.3165	O	1-1/2	6	.2792	6	TR94505	44.15
.3170		1-1/2	6	.2792	6	TR94506	44.15
.3175		1-1/2	6	.2792	6	TR94507	44.15
.3180		1-1/2	6	.2792	6	TR94508	44.15
.3185		1-1/2	6	.2792	6	TR94509	44.15
.3190		1-1/2	6	.2792	6	TR94510	44.15
.3195		1-1/2	6	.2792	6	TR94511	44.00
.3200		1-1/2	6	.2792	6	TR94512	44.15
.3205		1-1/2	6	.2792	6	TR94513	44.00
.3210		1-1/2	6	.2792	6	TR94514	44.15
.3215		1-1/2	6	.2792	6	TR94515	44.00
.3220		1-1/2	6	.2792	6	TR94516	44.15
.3225	P	1-1/2	6	.2792	6	TR94517	44.15
.3230		1-1/2	6	.2792	6	TR96138	38.70
.3235		1-1/2	6	.2792	6	TR94518	44.00
.3240		1-1/2	6	.2792	6	TR94519	44.00
.3245		1-1/2	6	.2792	6	TR94520	44.00
.3250		1-1/2	6	.2792	6	TR94521	44.15
.3255		1-1/2	6	.2792	6	TR94522	44.00
.3260		1-1/2	6	.2792	6	TR94523	44.15
.3265		1-1/2	6	.2792	6	TR94524	44.15
.3270		1-1/2	6	.2792	6	TR94525	44.00
.3275		1-1/2	6	.2792	6	TR94526	44.00
.3280		1-1/2	6	.2792	6	TR94527	44.15
.3281	21/64	1-1/2	6	.2792	6	TR96139	38.70
.3285		1-1/2	6	.2792	6	TR94528	44.00
.3290		1-1/2	6	.2792	6	TR94529	44.15
.3295		1-1/2	6	.2792	6	TR94530	44.00
.3300		1-1/2	6	.2792	6	TR94531	44.00
.3305		1-1/2	6	.2792	6	TR94532	44.00
.3310		1-1/2	6	.2792	6	TR94533	44.00
.3315		1-1/2	6	.2792	6	TR94534	44.15
.3320	Q	1-1/2	6	.2792	6	TR96140	38.70
.3325		1-1/2	6	.2792	6	TR94535	44.00
.3330		1-1/2	6	.2792	6	TR94536	44.15
.3335		1-1/2	6	.2792	6	TR94537	44.00
.3340		1-1/2	6	.2792	6	TR94538	44.15
.3345		1-1/2	6	.2792	6	TR94539	44.15
.3346		1-1/2	6	.2792	6	TR96141	38.70
.3350		1-1/2	6	.2792	6	TR94540	44.15
.3355	8.5 mm	1-1/2	6	.2792	6	TR94541	44.15
.3360		1-1/2	6	.2792	6	TR94542	44.15
.3365		1-1/2	6	.2792	6	TR94543	44.00
.3370		1-1/2	6	.2792	6	TR94544	44.15
.3375		1-1/2	6	.2792	6	TR94545	44.00

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} _{-0.000"}		L ₂		D ₂	L ₁	TOOL #	USD\$
.3380		1-1/2	6	.2792	6	TR94546	44.00
.3385		1-1/2	6	.2792	6	TR94547	44.00
.3390	R	1-1/2	6	.2792	6	TR96142	38.70
.3395		1-1/2	6	.2792	6	TR94548	44.00
.3400		1-1/2	6	.2792	6	TR94549	44.15
.3405		1-1/2	6	.2792	6	TR94550	44.00
.3410		1-1/2	6	.2792	6	TR94551	44.15
.3415		1-1/2	6	.2792	6	TR94552	44.00
.3420		1-1/2	6	.2792	6	TR94553	44.15
.3425		1-1/2	6	.2792	6	TR94554	44.15
.3430		1-1/2	6	.2792	6	TR94555	44.15
.3435		1-1/2	6	.2792	6	TR94556	44.15
.3438	11/32	1-1/2	6	.2792	6	TR96143	38.70
.3440		1-3/4	6	.3105	7	TR94557	44.50
.3445		1-3/4	6	.3105	7	TR94558	44.50
.3450		1-3/4	6	.3105	7	TR94559	44.50
.3455		1-3/4	6	.3105	7	TR94560	44.50
.3460		1-3/4	6	.3105	7	TR94561	44.50
.3465		1-3/4	6	.3105	7	TR94562	44.50
.3470		1-3/4	6	.3105	7	TR94563	44.50
.3475		1-3/4	6	.3105	7	TR94564	44.50
.3480	S	1-3/4	6	.3105	6	TR96144	39.40
.3485		1-3/4	6	.3105	7	TR94565	44.50
.3490		1-3/4	6	.3105	7	TR94566	44.50
.3495		1-3/4	6	.3105	7	TR94567	44.50
.3500		1-3/4	6	.3105	7	TR94568	44.50
.3505		1-3/4	6	.3105	7	TR94569	44.50
.3510		1-3/4	6	.3105	7	TR94570	44.50
.3515		1-3/4	6	.3105	7	TR94571	44.50
.3520		1-3/4	6	.3105	7	TR94572	44.50
.3525		1-3/4	6	.3105	7	TR94573	44.50
.3530		1-3/4	6	.3105	7	TR94574	44.50
.3535		1-3/4	6	.3105	7	TR94575	44.50
.3540		1-3/4	6	.3105	7	TR94576	44.50
.3543	9.0 mm	1-3/4	6	.3105	7	TR96145	39.40
.3545		1-3/4	6	.3105	7	TR94577	44.50
.3550		1-3/4	6	.3105	7	TR94578	44.50
.3555		1-3/4	6	.3105	7	TR94579	44.50
.3560		1-3/4	6	.3105	7	TR94580	44.50
.3565		1-3/4	6	.3105	7	TR94581	44.50
.3570		1-3/4	6	.3105	7	TR94582	44.50
.3575		1-3/4	6	.3105	7	TR94583	44.50
.3580	T	1-3/4	6	.3105	7	TR96146	39.40
.3585		1-3/4	6	.3105	7	TR94584	44.50
.3590		1-3/4	6	.3105	7	TR94585	44.50
.3594	23/64	1-3/4	6	.3105	7	TR96147	39.40
.3595		1-3/4	6	.3105	7	TR94586	39.95
.3600		1-3/4	6	.3105	7	TR94587	39.95
.3605		1-3/4	6	.3105	7	TR94588	39.95

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 ^{+0.0002"} -0.0000"	L2		D2	L1	TOOL #	USD\$
.3610	1-3/4	6	.3105	7	TR94589	39.95
.3615	1-3/4	6	.3105	7	TR94590	39.95
.3620	1-3/4	6	.3105	7	TR94591	39.95
.3625	1-3/4	6	.3105	7	TR94592	39.95
.3630	1-3/4	6	.3105	7	TR94593	39.95
.3635	1-3/4	6	.3105	7	TR94594	39.95
.3640	1-3/4	6	.3105	7	TR94595	39.95
.3645	1-3/4	6	.3105	7	TR94596	39.95
.3650	1-3/4	6	.3105	7	TR94597	39.95
.3655	1-3/4	6	.3105	7	TR94598	39.95
.3660	1-3/4	6	.3105	7	TR94599	39.95
.3665	1-3/4	6	.3105	7	TR94600	39.95
.3670	1-3/4	6	.3105	7	TR94601	39.95
.3675	1-3/4	6	.3105	7	TR94602	39.95
.3680 U	1-3/4	6	.3105	7	TR96148	39.40
.3685	1-3/4	6	.3105	7	TR94603	39.95
.3690	1-3/4	6	.3105	7	TR94604	39.95
.3695	1-3/4	6	.3105	7	TR94605	39.95
.3700	1-3/4	6	.3105	7	TR94606	39.95
.3705	1-3/4	6	.3105	7	TR94607	39.95
.3710	1-3/4	6	.3105	7	TR94608	39.95
.3715	1-3/4	6	.3105	7	TR94609	39.95
.3720	1-3/4	6	.3105	7	TR94610	39.95
.3725	1-3/4	6	.3105	7	TR94611	39.95
.3730	1-3/4	6	.3105	7	TR94612	39.95
.3735	1-3/4	6	.3105	7	TR94613	39.95
.3740 9.5 mm - O/U	1-3/4	6	.3105	7	TR96149	37.20
.3745	1-3/4	6	.3105	7	TR94614	39.95
.3750 3/8	1-3/4	6	.3105	7	TR96150	35.20
.3755	1-3/4	6	.3105	7	TR94615	48.10
.3760 O/U	1-3/4	6	.3105	7	TR96151	37.20
.3765	1-3/4	6	.3105	7	TR94616	48.10
.3770 V	1-3/4	6	.3105	7	TR96152	42.75
.3775	1-3/4	6	.3105	7	TR94617	48.10
.3780	1-3/4	6	.3105	7	TR94618	48.10
.3785	1-3/4	6	.3105	7	TR94619	48.10
.3790	1-3/4	6	.3105	7	TR94620	48.10
.3795	1-3/4	6	.3105	7	TR94621	48.10
.3800	1-3/4	6	.3105	7	TR94622	48.10
.3805	1-3/4	6	.3105	7	TR94623	48.10
.3810	1-3/4	6	.3105	7	TR94624	48.10
.3815	1-3/4	6	.3105	7	TR94625	48.10
.3820	1-3/4	6	.3105	7	TR94626	48.10
.3825	1-3/4	6	.3105	7	TR94627	48.10
.3830	1-3/4	6	.3105	7	TR94628	48.10
.3835	1-3/4	6	.3105	7	TR94629	48.10
.3840	1-3/4	6	.3105	7	TR94630	48.10
.3845	1-3/4	6	.3105	7	TR94631	48.10
.3850	1-3/4	6	.3105	7	TR94632	48.10

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ - .0000" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.3855		1-3/4	6	.3105	7	TR94633	48.10
.3860	W	1-3/4	6	.3105	7	TR96153	42.75
.3865		1-3/4	6	.3105	7	TR94634	48.10
.3870		1-3/4	6	.3105	7	TR94635	48.10
.3875		1-3/4	6	.3105	7	TR94636	48.10
.3880		1-3/4	6	.3105	7	TR94637	48.10
.3885		1-3/4	6	.3105	7	TR94638	48.10
.3890		1-3/4	6	.3105	7	TR94639	48.10
.3895		1-3/4	6	.3105	7	TR94640	48.10
.3900		1-3/4	6	.3105	7	TR94641	48.10
.3905		1-3/4	6	.3105	7	TR94642	48.10
.3906	25/64	1-3/4	6	.3105	7	TR96154	42.75
.3910		1-3/4	6	.3105	7	TR94643	49.65
.3915		1-3/4	6	.3105	7	TR94644	49.65
.3920		1-3/4	6	.3105	7	TR94645	49.65
.3925		1-3/4	6	.3105	7	TR94646	49.65
.3930		1-3/4	6	.3105	7	TR94647	49.65
.3935		1-3/4	6	.3105	7	TR94648	49.65
.3937	10.0 mm	1-3/4	6	.3105	7	TR96155	42.75
.3940		1-3/4	6	.3105	7	TR94649	49.65
.3945		1-3/4	6	.3105	7	TR94650	49.65
.3950		1-3/4	6	.3105	7	TR94651	49.65
.3955		1-3/4	6	.3105	7	TR94652	49.45
.3960		1-3/4	6	.3105	7	TR94653	49.65
.3965		1-3/4	6	.3105	7	TR94654	49.45
.3970	X	1-3/4	6	.3105	7	TR96156	42.75
.3975		1-3/4	6	.3105	7	TR94655	49.45
.3980		1-3/4	6	.3105	7	TR94656	49.65
.3985		1-3/4	6	.3105	7	TR94657	49.45
.3990		1-3/4	6	.3105	7	TR94658	49.65
.3995		1-3/4	6	.3105	7	TR94659	49.45
.4000		1-3/4	6	.3105	7	TR94660	49.65
.4005		1-3/4	6	.3105	7	TR94661	49.45
.4010		1-3/4	6	.3105	7	TR94662	49.65
.4015		1-3/4	6	.3105	7	TR94663	49.45
.4020		1-3/4	6	.3105	7	TR94664	49.65
.4025		1-3/4	6	.3105	7	TR94665	49.45
.4030		1-3/4	6	.3105	7	TR94666	49.45
.4035		1-3/4	6	.3105	7	TR94667	49.45
.4040	Y	1-3/4	6	.3105	7	TR96157	44.25
.4045		1-3/4	6	.3105	7	TR94668	49.45
.4050		1-3/4	6	.3105	7	TR94669	49.65
.4055		1-3/4	6	.3105	7	TR94670	49.45
.4060		1-3/4	6	.3105	7	TR94671	49.65
.4062	13/32	1-3/4	6	.3105	7	TR96158	44.25
.4065		1-3/4	6	.3730	7	TR94672	49.65
.4070		1-3/4	6	.3730	7	TR94673	49.65
.4075		1-3/4	6	.3730	7	TR94674	49.65
.4080		1-3/4	6	.3730	7	TR94675	49.65

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} -0.000"		L ₂		D ₂	L ₁	TOOL #	USD\$
.4085		1-3/4	6	.3730	7	TR94676	49.65
.4090		1-3/4	6	.3730	7	TR94677	49.45
.4095		1-3/4	6	.3730	7	TR94678	49.45
.4100		1-3/4	6	.3730	7	TR94679	49.45
.4105		1-3/4	6	.3730	7	TR94680	49.45
.4110		1-3/4	6	.3730	7	TR94681	49.45
.4115		1-3/4	6	.3730	7	TR94682	49.45
.4120		1-3/4	6	.3730	7	TR94683	49.45
.4125		1-3/4	6	.3730	7	TR94684	49.65
.4130	Z	1-3/4	6	.3730	7	TR96159	44.25
.4134	10.5 mm	1-3/4	6	.3730	7	TR96160	44.45
.4135		1-3/4	6	.3730	7	TR94685	49.45
.4140		1-3/4	6	.3730	7	TR94686	49.45
.4145		1-3/4	6	.3730	7	TR94687	49.45
.4150		1-3/4	6	.3730	7	TR94688	49.65
.4155		1-3/4	6	.3730	7	TR94689	49.45
.4160		1-3/4	6	.3730	7	TR94690	49.65
.4165		1-3/4	6	.3730	7	TR94691	49.45
.4170		1-3/4	6	.3730	7	TR94692	49.65
.4175		1-3/4	6	.3730	7	TR94693	49.45
.4180		1-3/4	6	.3730	7	TR94694	49.65
.4185		1-3/4	6	.3730	7	TR94695	49.45
.4190		1-3/4	6	.3730	7	TR94696	49.45
.4195		1-3/4	6	.3730	7	TR94697	49.45
.4200		1-3/4	6	.3730	7	TR94698	49.65
.4205		1-3/4	6	.3730	7	TR94699	49.45
.4210		1-3/4	6	.3730	7	TR94700	49.45
.4215		1-3/4	6	.3730	7	TR94701	49.45
.4219	27/64	1-3/4	6	.3730	7	TR96161	44.25
.4220		1-3/4	6	.3730	7	TR94702	46.50
.4225		1-3/4	6	.3730	7	TR94703	46.35
.4230		1-3/4	6	.3730	7	TR94704	46.50
.4235		1-3/4	6	.3730	7	TR94705	46.35
.4240		1-3/4	6	.3730	7	TR94706	46.50
.4245		1-3/4	6	.3730	7	TR94707	46.35
.4250		1-3/4	6	.3730	7	TR94708	46.50
.4255		1-3/4	6	.3730	7	TR94709	46.35
.4260		1-3/4	6	.3730	7	TR94710	46.35
.4265		1-3/4	6	.3730	7	TR94711	46.35
.4270		1-3/4	6	.3730	7	TR94712	46.35
.4275		1-3/4	6	.3730	7	TR94713	46.35
.4280		1-3/4	6	.3730	7	TR94714	46.50
.4285		1-3/4	6	.3730	7	TR94715	46.35
.4290		1-3/4	6	.3730	7	TR94716	46.35
.4295		1-3/4	6	.3730	7	TR94717	46.35
.4300		1-3/4	6	.3730	7	TR94718	46.50
.4305		1-3/4	6	.3730	7	TR94719	46.35
.4310		1-3/4	6	.3730	7	TR94720	46.50
.4315		1-3/4	6	.3730	7	TR94721	46.35

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} -0.000"	L ₂		D ₂	L ₁	TOOL #	USD\$
.4320	1-3/4	6	.3730	7	TR94722	46.50
.4325	1-3/4	6	.3730	7	TR94723	46.50
.4330	1-3/4	6	.3730	7	TR94724	46.50
.4331	1-3/4	6	.3730	7	TR96162	44.25
.4335	1-3/4	6	.3730	7	TR94725	46.50
.4340	1-3/4	6	.3730	7	TR94726	46.50
.4345	1-3/4	6	.3730	7	TR94727	46.35
.4350	1-3/4	6	.3730	7	TR94728	46.50
.4355	1-3/4	6	.3730	7	TR94729	46.50
.4360	1-3/4	6	.3730	7	TR94730	46.50
.4365	O/U	6	.3730	7	TR96163	41.85
.4370	1-3/4	6	.3730	7	TR94731	46.50
.4375	7/16	6	.3730	7	TR96164	41.85
.4380	1-3/4	6	.3730	7	TR94732	52.75
.4385	O/U	6	.3730	7	TR96165	41.85
.4390	1-3/4	6	.3730	7	TR94733	52.75
.4395	1-3/4	6	.3730	7	TR94734	52.60
.4400	1-3/4	6	.3730	7	TR94735	52.75
.4405	1-3/4	6	.3730	7	TR94736	52.60
.4410	1-3/4	6	.3730	7	TR94737	52.75
.4415	1-3/4	6	.3730	7	TR94738	52.75
.4420	1-3/4	6	.3730	7	TR94739	52.75
.4425	1-3/4	6	.3730	7	TR94740	52.75
.4430	1-3/4	6	.3730	7	TR94741	52.75
.4435	1-3/4	6	.3730	7	TR94742	52.60
.4440	1-3/4	6	.3730	7	TR94743	52.75
.4445	1-3/4	6	.3730	7	TR94744	52.60
.4450	1-3/4	6	.3730	7	TR94745	52.75
.4455	1-3/4	6	.3730	7	TR94746	52.60
.4460	1-3/4	6	.3730	7	TR94747	52.60
.4465	1-3/4	6	.3730	7	TR94748	52.60
.4470	1-3/4	6	.3730	7	TR94749	52.60
.4475	1-3/4	6	.3730	7	TR94750	52.60
.4480	1-3/4	6	.3730	7	TR94751	52.75
.4485	1-3/4	6	.3730	7	TR94752	52.60
.4490	1-3/4	6	.3730	7	TR94753	52.60
.4495	1-3/4	6	.3730	7	TR94754	52.60
.4500	1-3/4	6	.3730	7	TR94755	52.75
.4505	1-3/4	6	.3730	7	TR94756	52.60
.4510	1-3/4	6	.3730	7	TR94757	52.60
.4515	1-3/4	6	.3730	7	TR94758	52.60
.4520	1-3/4	6	.3730	7	TR94759	52.75
.4525	1-3/4	6	.3730	7	TR94760	52.60
.4528	11.5 mm	6	.3730	7	TR96166	47.95
.4530	1-3/4	6	.3730	7	TR94761	52.60
.4531	29/64	6	.3730	7	TR96167	47.95
.4535	1-3/4	6	.3730	7	TR94762	52.60
.4540	1-3/4	6	.3730	7	TR94763	52.75
.4545	1-3/4	6	.3730	7	TR94764	52.60

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} -0.000"	L ₂		D ₂	L ₁	TOOL #	USD\$
.4550	1-3/4	6	.3730	7	TR94765	52.75
.4555	1-3/4	6	.3730	7	TR94766	52.60
.4560	1-3/4	6	.3730	7	TR94767	52.75
.4565	1-3/4	6	.3730	7	TR94768	52.60
.4570	1-3/4	6	.3730	7	TR94769	52.60
.4575	1-3/4	6	.3730	7	TR94770	52.60
.4580	1-3/4	6	.3730	7	TR94771	52.60
.4585	1-3/4	6	.3730	7	TR94772	52.60
.4590	1-3/4	6	.3730	7	TR94773	52.60
.4595	1-3/4	6	.3730	7	TR94774	52.60
.4600	1-3/4	6	.3730	7	TR94775	52.60
.4605	1-3/4	6	.3730	7	TR94776	52.60
.4610	1-3/4	6	.3730	7	TR94777	52.60
.4615	1-3/4	6	.3730	7	TR94778	52.60
.4620	1-3/4	6	.3730	7	TR94779	52.60
.4625	1-3/4	6	.3730	7	TR94780	52.60
.4630	1-3/4	6	.3730	7	TR94781	52.60
.4635	1-3/4	6	.3730	7	TR94782	52.60
.4640	1-3/4	6	.3730	7	TR94783	52.60
.4645	1-3/4	6	.3730	7	TR94784	52.60
.4650	1-3/4	6	.3730	7	TR94785	52.60
.4655	1-3/4	6	.3730	7	TR94786	52.60
.4660	1-3/4	6	.3730	7	TR94787	52.60
.4665	1-3/4	6	.3730	7	TR94788	52.60
.4670	1-3/4	6	.3730	7	TR94789	52.60
.4675	1-3/4	6	.3730	7	TR94790	52.60
.4680	1-3/4	6	.3730	7	TR94791	52.75
.4685	1-3/4	6	.3730	7	TR94792	52.60
.4688	15/32	6	.3730	7	TR96168	47.95
.4690	2	6	.4355	8	TR94793	52.75
.4695	2	6	.4355	8	TR94794	52.60
.4700	2	6	.4355	8	TR94795	52.75
.4705	2	6	.4355	8	TR94796	52.60
.4710	2	6	.4355	8	TR94797	52.75
.4715	2	6	.4355	8	TR94798	52.75
.4720	2	6	.4355	8	TR94799	52.75
.4724	12.0 mm	6	.4355	8	TR96169	47.95
.4725	2	6	.4355	8	TR94800	52.75
.4730	2	6	.4355	8	TR94801	52.75
.4735	2	6	.4355	8	TR94802	52.75
.4740	2	6	.4355	8	TR94803	52.75
.4745	2	6	.4355	8	TR94804	52.75
.4750	2	6	.4355	8	TR94805	52.75
.4755	2	6	.4355	8	TR94806	52.75
.4760	2	6	.4355	8	TR94807	52.75
.4765	2	6	.4355	8	TR94808	52.75
.4770	2	6	.4355	8	TR94809	52.60
.4775	2	6	.4355	8	TR94810	52.60
.4780	2	6	.4355	8	TR94811	52.60

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} -0.000"	L ₂		D ₂	L ₁	TOOL #	USD\$
.4785	2	6	.4355	8	TR94812	52.60
.4790	2	6	.4355	8	TR94813	52.60
.4795	2	6	.4355	8	TR94814	52.60
.4800	2	6	.4355	8	TR94815	52.60
.4805	2	6	.4355	8	TR94816	52.60
.4810	2	6	.4355	8	TR94817	52.60
.4815	2	6	.4355	8	TR94818	52.60
.4820	2	6	.4355	8	TR94819	52.75
.4825	2	6	.4355	8	TR94820	52.60
.4830	2	6	.4355	8	TR94821	52.75
.4835	2	6	.4355	8	TR94822	52.75
.4840	2	6	.4355	8	TR94823	52.60
.4844	2	6	.4355	8	TR96170	47.95
.4845	2	6	.4355	8	TR94824	49.45
.4850	2	6	.4355	8	TR94825	49.65
.4855	2	6	.4355	8	TR94826	49.45
.4860	2	6	.4355	8	TR94827	49.45
.4865	2	6	.4355	8	TR94828	49.45
.4870	2	6	.4355	8	TR94829	49.45
.4875	2	6	.4355	8	TR94830	49.45
.4880	2	6	.4355	8	TR94831	49.45
.4885	2	6	.4355	8	TR94832	49.45
.4890	2	6	.4355	8	TR94833	49.65
.4895	2	6	.4355	8	TR94834	49.45
.4900	2	6	.4355	8	TR94835	49.45
.4905	2	6	.4355	8	TR94836	49.45
.4910	2	6	.4355	8	TR94837	49.45
.4915	2	6	.4355	8	TR94838	49.45
.4920	2	6	.4355	8	TR94839	49.45
.4921	2	6	.4355	8	TR96171	47.95
.4925	2	6	.4355	8	TR94840	49.45
.4930	2	6	.4355	8	TR94841	49.45
.4935	2	6	.4355	8	TR94842	49.45
.4940	2	6	.4355	8	TR94843	49.45
.4945	2	6	.4355	8	TR94844	49.45
.4950	2	6	.4355	8	TR94845	49.65
.4955	2	6	.4355	8	TR94846	49.45
.4960	2	6	.4355	8	TR94847	49.65
.4965	2	6	.4355	8	TR94848	49.45
.4970	2	6	.4355	8	TR94849	49.65
.4975	2	6	.4355	8	TR94850	49.45
.4980	2	6	.4355	8	TR94851	49.65
.4985	2	6	.4355	8	TR94852	49.65
.4990	2	6	.4355	8	TR96172	45.60
.4995	2	6	.4355	8	TR94853	49.65
.5000	2	6	.4355	8	TR96173	45.60

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.003"} _{-0.000"}		L ₂		D ₂	L ₁	TOOL #	USD\$
.5005		2	6	.4355	8	TR94854	66.40
.5010	O/U	2	6	.4355	8	TR96174	45.60
.5015		2	6	.4355	8	TR94855	66.40
.5020		2	6	.4355	8	TR94856	66.40
.5025		2	6	.4355	8	TR94857	66.40
.5030		2	6	.4355	8	TR94858	66.40
.5035		2	6	.4355	8	TR94859	66.40
.5040		2	6	.4355	8	TR94860	66.40
.5045		2	6	.4355	8	TR94861	66.40
.5050		2	6	.4355	8	TR94862	66.40
.5060		2	6	.4355	8	TR94863	66.40
.5070		2	6	.4355	8	TR94864	66.40
.5080		2	6	.4355	8	TR94865	66.40
.5090		2	6	.4355	8	TR94866	66.40
.5100		2	6	.4355	8	TR94867	66.40
.5118	13.0 mm	2	6	.4355	8	TR96175	59.65
.5156	33/64	2	6	.4355	8	TR96176	59.65
.5312	17/32	2	6	.4355	8	TR96177	56.65
.5315	13.5 mm	2	6	.4355	8	TR96178	59.65
.5469	35/64	2	8	.4355	8	TR96179	59.65
.5512	14.0 mm	2	8	.4355	8	TR96180	59.65
.5600		2	8	.4355	8	TR94868	64.95
.5605		2	8	.4355	8	TR94869	64.95
.5610		2	8	.4355	8	TR94870	64.95
.5615	O/U	2	8	.4355	8	TR96181	59.65
.5620		2	8	.4355	8	TR94871	64.95
.5625	9/16	2	8	.4355	8	TR96182	56.65
.5630		2	8	.4355	8	TR94872	74.70
.5635	O/U	2	8	.4355	8	TR96183	59.65
.5640		2	8	.4355	8	TR94873	74.70
.5645		2	8	.4355	8	TR94874	74.70
.5650		2	8	.4355	8	TR94875	74.70
.5655		2	8	.4355	8	TR94876	74.70
.5709	14.5 mm	2	8	.4355	8	TR96184	59.65
.5781	37/64	2	8	.4355	8	TR96185	59.65
.5906	15.0 mm	2	8	.4355	8	TR96186	59.65
.5938	19/32	2	8	.4355	8	TR96187	56.65
.6094	39/64	2-1/4	8	.5615	9	TR96188	69.75
.6102	15.5 mm	2-1/4	8	.5615	9	TR96189	69.75
.6220		2-1/4	8	.5615	9	TR94877	75.00
.6225		2-1/4	8	.5615	9	TR94878	75.00
.6230		2-1/4	8	.5615	9	TR94879	75.30
.6235		2-1/4	8	.5615	9	TR94880	75.30
.6240	O/U	2-1/4	8	.5615	9	TR96190	69.75
.6245		2-1/4	8	.5615	9	TR94881	75.30
.6250	5/8	2-1/4	8	.5615	9	TR96191	66.40

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REAMERS - HIGH SPEED STEEL

Chuckling - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.001"} _{+0.004"}		L ₂		D ₂	L ₁	TOOL #	USD\$
.6255		2-1/4	8	.5615	9	TR94882	83.80
.6260	O/U	2-1/4	8	.5615	9	TR96192	71.80
.6265		2-1/4	8	.5615	9	TR94883	83.80
.6270		2-1/4	8	.5615	9	TR94884	83.80
.6275		2-1/4	8	.5615	9	TR94885	83.80
.6280		2-1/4	8	.5615	9	TR94886	83.80
.6299	16.0 mm	2-1/4	8	.5615	9	TR96193	71.80
.6300		2-1/4	8	.5615	9	TR94949	83.80
.6406	41/64	2-1/4	8	.5615	9	TR96194	71.75
.6496	16.5 mm	2-1/4	8	.5615	9	TR96195	74.90
.6562	21/32	2-1/4	8	.5615	9	TR96196	77.00
.6693	17.0 mm	2-1/4	8	.5615	9	TR96197	80.80
.6719	43/64	2-1/4	8	.5615	9	TR96198	80.80
.6845		2-1/4	8	.5615	9	TR94887	83.80
.6850		2-1/4	8	.5615	9	TR94888	83.80
.6855		2-1/4	8	.5615	9	TR94889	83.80
.6860		2-1/4	8	.5615	9	TR94890	83.80
.6865	O/U	2-1/4	8	.5615	9	TR96199	80.75
.6870		2-1/4	8	.5615	9	TR94891	83.80
.6875	11/16	2-1/4	8	.5615	9	TR96200	77.20
.6880		2-1/4	8	.5615	9	TR94892	92.30
.6885	O/U	2-1/4	8	.5615	9	TR96201	86.90
.6890	17.5 mm	2-1/4	8	.5615	9	TR96202	86.90
.6895		2-1/4	8	.5615	9	TR94893	92.30
.6900		2-1/4	8	.5615	9	TR94894	92.30
.6905		2-1/4	8	.5615	9	TR94895	92.30
.7031	45/64	2-1/4	8	.5615	9	TR96203	86.80
.7087	18.0 mm	2-1/4	8	.5615	9	TR96204	86.80
.7188	23/32	2-1/4	8	.5615	9	TR96205	86.25
.7283	18.5 mm	2-1/2	8	.6240	9-1/2	TR96206	90.05
.7344	47/64	2-1/2	8	.6240	9-1/2	TR96207	100.40
.7470		2-1/2	8	.6240	9-1/2	TR94896	98.15
.7475		2-1/2	8	.6240	9-1/2	TR94897	98.55
.7480	19.0 mm	2-1/2	8	.6240	9-1/2	TR96208	100.30
.7485		2-1/2	8	.6240	9-1/2	TR94898	98.55
.7490	O/U	2-1/2	8	.6240	9-1/2	TR96209	100.30
.7495		2-1/2	8	.6240	9-1/2	TR94899	98.55
.7500	3/4	2-1/2	8	.6240	9-1/2	TR96210	86.00
.7505		2-1/2	8	.6240	9-1/2	TR94900	106.60
.7510	O/U	2-1/2	8	.6240	9-1/2	TR96211	95.90
.7515		2-1/2	8	.6240	9-1/2	TR94901	106.60
.7520		2-1/2	8	.6240	9-1/2	TR94902	106.60
.7525		2-1/2	8	.6240	9-1/2	TR94903	106.60
.7530		2-1/2	8	.6240	9-1/2	TR94904	106.60
.7540		2-1/2	8	.6240	9-1/2	TR94905	106.60
.7550		2-1/2	8	.6240	9-1/2	TR94906	106.60
.7656	49/64	2-1/2	8	.6240	9-1/2	TR96212	95.80
.7677	19.5 mm	2-1/2	8	.6240	9-1/2	TR96213	95.80
.7812	25/32	2-1/2	8	.6240	9-1/2	TR96214	93.40
.7874	20.0 mm	2-1/2	8	.6240	9-1/2	TR96215	102.50

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REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.001"} _{+0.004"}		L ₂		D ₂	L ₁	TOOL #	USD\$
.7969	51/64	2-1/2	8	.6240	9-1/2	TR96216	102.50
.8071	20.5 mm	2-1/2	8	.6240	9-1/2	TR96217	102.45
.8095		2-1/2	8	.6240	9-1/2	TR94907	106.60
.8100		2-1/2	8	.6240	9-1/2	TR94908	106.60
.8105		2-1/2	8	.6240	9-1/2	TR94909	106.60
.8110		2-1/2	8	.6240	9-1/2	TR94910	106.60
.8115	O/U	2-1/2	8	.6240	9-1/2	TR96218	102.45
.8120		2-1/2	8	.6240	9-1/2	TR94911	106.60
.8125	13/16	2-1/2	8	.6240	9-1/2	TR96219	93.10
.8130		2-1/2	8	.6240	9-1/2	TR94912	117.30
.8135	O/U	2-1/2	8	.6240	9-1/2	TR96220	102.45
.8140		2-1/2	8	.6240	9-1/2	TR94913	117.80
.8145		2-1/2	8	.6240	9-1/2	TR94914	117.30
.8150		2-1/2	8	.6240	9-1/2	TR94915	117.30
.8155		2-1/2	8	.6240	9-1/2	TR94916	117.30
.8268	21.0 mm	2-1/2	8	.6240	9-1/2	TR96221	102.80
.8281	53/64	2-1/2	8	.6240	9-1/2	TR96222	102.40
.8438	27/32	2-1/2	8	.6240	9-1/2	TR96223	109.90
.8465	21.5 mm	2-5/8	8	.7490	10	TR96224	119.50
.8594	55/64	2-5/8	8	.7490	10	TR96225	119.50
.8661	22.0 mm	2-5/8	8	.7490	10	TR96226	120.15
.8720		2-5/8	8	.6240	10	TR94917	120.40
.8725		2-5/8	8	.6240	10	TR94918	120.40
.8730		2-5/8	8	.6240	10	TR94919	120.40
.8735		2-5/8	8	.6240	10	TR94920	120.40
.8740	O/U	2-5/8	8	.7490	10	TR96227	119.35
.8745		2-5/8	8	.7490	10	TR94921	121.00
.8750	7/8	2-5/8	8	.7490	10	TR96228	112.20
.8755		2-5/8	8	.7490	10	TR94922	131.70
.8760	O/U	2-5/8	8	.7490	10	TR96229	122.20
.8765		2-5/8	8	.7490	10	TR94923	131.70
.8770		2-5/8	8	.7490	10	TR94924	131.70
.8775		2-5/8	8	.7490	10	TR94925	131.15
.8780		2-5/8	8	.7490	10	TR94926	131.70
.8858	22.5 mm	2-5/8	8	.7490	10	TR96230	121.85
.8906	57/64	2-5/8	8	.7490	10	TR96231	121.85
.9055	23.0 mm	2-5/8	8	.7490	10	TR96232	121.85
.9062	29/32	2-5/8	8	.7490	10	TR96233	121.45
.9219	59/64	2-5/8	8	.7490	10	TR96234	130.70
.9252	23.5 mm	2-5/8	8	.7490	10	TR96235	130.70
.9340		2-5/8	8	.7490	10	TR94927	131.15
.9345		2-5/8	8	.7490	10	TR94928	131.15
.9350		2-5/8	8	.7490	10	TR94929	131.15
.9355		2-5/8	8	.7490	10	TR94930	131.15
.9360		2-5/8	8	.7490	10	TR94931	131.15
.9365	O/U	2-5/8	8	.7490	10	TR96236	130.55
.9370		2-5/8	8	.7490	10	TR94932	131.15
.9375	15/16	2-5/8	8	.7490	10	TR96237	121.25
.9380		2-5/8	8	.7490	10	TR94933	143.95

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For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D_1 $+0.0001"$ $+0.0004"$		L ₂		D ₂	L ₁	TOOL #	USD\$
.9385	O/U	2-5/8	8	.7490	10	TR96238	130.55
.9390		2-5/8	8	.7490	10	TR94934	143.95
.9395		2-5/8	8	.7490	10	TR94935	143.95
.9400		2-5/8	8	.7490	10	TR94936	143.95
.9405		2-5/8	8	.7490	10	TR94937	143.95
.9449	24.0 mm	2-5/8	8	.7490	10	TR96239	130.55
.9531	61/64	2-5/8	8	.7490	10	TR96240	130.55
.9646	24.5 mm	2-5/8	8	.7490	10	TR96241	130.40
.9688	31/32	2-5/8	8	.7490	10	TR96242	142.10
.9843	25.0 mm	2-3/4	8	.8740	10-1/2	TR96243	138.25
.9844	63/64	2-3/4	8	.8740	10-1/2	TR96244	138.25
.9970		2-3/4	8	.8740	10-1/2	TR94938	146.65
.9975		2-3/4	8	.8740	10-1/2	TR94939	146.65
.9980		2-3/4	8	.8740	10-1/2	TR94940	147.50
.9985		2-3/4	8	.8740	10-1/2	TR94941	146.65
.9990	O/U	2-3/4	8	.8740	10-1/2	TR96245	138.25
.9995		2-3/4	8	.8740	10-1/2	TR94942	146.65
1.0000	1	2-3/4	8	.8740	10-1/2	TR96246	137.10
1.0005		2-3/4	8	.8740	10-1/2	TR94943	203.80
1.001	O/U	2-3/4	8	.8740	10-1/2	TR96247	146.90
1.0015		2-3/4	8	.8740	10-1/2	TR94944	203.80
1.0020		2-3/4	8	.8740	10-1/2	TR94945	203.80
1.0025		2-3/4	8	.8740	10-1/2	TR94946	203.80
1.0030		2-3/4	8	.8740	10-1/2	TR94947	203.80
1.0312	1-1/32	2-3/4	8	.8740	10-1/2	TR96248	191.80
1.0625	1-1/16	2-3/4	8	.8740	10-1/2	TR96249	151.15
1.0938	1-3/32	2-7/8	8	.8740	11	TR96250	199.90
1.1250	1-1/8	2-7/8	8	.8740	11	TR96251	160.20
1.1562	1-5/32	2-7/8	10	.9990	11	TR96252	227.65
1.1875	1-3/16	2-7/8	10	.9990	11	TR96253	188.60
1.2188	1-7/32	3	10	.9990	11-1/2	TR96254	238.55
1.2500	1-1/4	3	10	.9990	11-1/2	TR96255	199.55
1.2812	1-9/32	3	10	.9990	11-1/2	TR96256	271.95
1.3125	1-5/16	3	10	.9990	11-1/2	TR96257	232.05
1.3438	1-11/32	3-1/4	10	.9990	12	TR96258	281.45
1.3750	1-3/8	3-1/4	10	.9990	12	TR96259	244.35
1.4062	1-13/32	3-1/4	10	1.2490	12	TR96260	299.90
1.4375	1-7/16	3-1/4	10	1.2490	12	TR96261	260.30
1.4688	1-15/32	3-1/2	10	1.2490	12-1/2	TR96262	319.85
1.5000	1-1/2	3-1/2	10	1.2490	12-1/2	TR96263	281.15
D_1 $+0.0002"$ $+0.0006"$		L ₂		D ₂	L ₁	TOOL #	USD\$
1.5625	1-9/16	3-1/2	12	1.2490	13	TR96910	402.05
1.6250	1-5/8	3-1/2	12	1.2490	13	TR96911	402.05
1.6875	1-11/16	4	12	1.2490	13-1/2	TR96912	461.60
1.7500	1-3/4	4	12	1.2490	13-1/2	TR96913	502.75
1.8125	1-13/16	4	12	1.4990	14	TR96914	578.65
1.8750	1-7/8	4	12	1.4990	14	TR96915	531.85
1.9375	1-15/16	4	12	1.4990	14	TR96916	623.60
2.0000	2	4	12	1.4990	14	TR96917	678.65

For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Chucking - Straight Flute - Quickturn Custom Diameter Reamer Program



- Uncommon reamer diameters are ground to order for your precise application need
- Additional dimensions will vary depending on diameter selected
- Call for current production lead times
- Pricing is based on quantity ordered, use chart for instant pricing model based on quantity
- Straight flute general purpose reamers for through and blind hole applications
- 45° chamfer angle
- Flute options from 2 to 12
- High speed steel
- Precision manufactured in the USA

DIA. RANGE* D ₁	1 PIECE	2 PIECES	3 - 5 PIECES	6 - 7 PIECES	8 - 11 PIECES	12 - 17 PIECES	18 - 23 PIECES	24 - 35 PIECES	36 - 47 PIECES	48 - 59 PIECES	60 - 71 PIECES	72 - 95 PIECES	96+ PIECES
.0135 - .0195	179.65	117.45	87.45	57.65	52.20	44.25	40.10	37.35	36.35	33.30	32.35	31.90	31.10
.0196 - .0290	163.40	106.70	79.55	52.50	47.40	41.60	36.45	34.00	31.50	30.25	30.05	30.05	29.95
.0291 - .0390	148.50	96.80	72.30	47.70	43.10	37.70	33.20	30.90	28.60	27.45	26.70	26.40	25.70
.0391 - .0624	134.25	89.40	72.30	45.95	41.45	35.90	31.55	29.35	27.10	25.40	25.05	24.95	24.85
.0626 - .1093	141.30	90.45	69.70	43.50	38.15	31.55	28.60	26.40	24.10	22.80	22.15	21.85	21.05
.1095 - .1249	139.50	88.50	65.65	38.00	33.35	30.45	25.05	22.80	22.50	22.05	21.65	21.30	21.15
.1251 - .1405	148.50	96.80	65.45	47.70	44.90	37.70	33.20	30.90	28.60	27.45	26.85	26.40	25.40
.1407 - .1561	146.25	95.25	72.35	46.20	41.45	36.20	31.55	29.35	27.70	27.10	26.50	25.85	25.20
.1563 - .1718	148.50	92.70	72.00	47.70	43.20	37.70	33.20	30.90	28.60	28.15	27.70	27.45	26.95
.1720 - .1874	142.45	88.90	71.95	44.40	39.90	35.70	31.40	28.95	28.65	28.30	27.95	27.15	26.85
.1876 - .2030	152.50	101.60	79.65	53.40	48.90	43.45	38.80	36.55	34.10	32.35	31.90	31.40	31.10
.2032 - .2187	152.50	101.60	78.95	54.20	48.00	42.45	37.85	35.70	33.35	31.40	31.00	30.50	30.40
.2189 - .2343	153.10	102.35	79.50	53.20	48.60	43.20	38.60	36.25	34.05	32.60	32.15	31.95	31.55
.2345 - .2499	153.10	102.35	75.70	49.30	44.80	39.50	35.00	32.65	30.25	30.15	29.80	29.35	29.20
.2501 - .2968	158.95	108.15	85.15	58.85	54.30	48.55	44.00	41.75	39.30	37.30	36.95	36.55	36.20
.2970 - .3124	154.60	103.65	80.75	54.30	49.80	44.25	39.60	37.35	37.20	36.90	36.65	36.40	36.20
.3126 - .3437	162.35	110.75	87.65	56.75	55.10	50.80	46.35	44.00	41.55	39.70	39.30	39.05	38.70
.3439 - .3593	162.15	111.35	88.35	61.95	57.35	53.90	46.35	44.60	42.35	40.35	39.90	39.55	39.30
.3595 - .3749	157.50	106.50	83.60	57.10	52.50	46.95	42.45	39.95	39.75	39.70	39.40	39.25	39.15
.3751 - .3905	164.90	114.10	91.20	64.65	60.15	55.15	50.40	48.05	45.90	43.50	43.20	42.90	42.45
.3907 - .4218	166.90	116.00	92.95	66.60	62.15	56.15	51.55	49.30	47.00	44.95	44.55	44.25	44.15
.4220 - .4374	163.80	112.95	89.85	63.60	59.10	53.20	48.55	46.30	45.90	45.70	45.50	44.60	44.10
.4376 - .4843	171.35	120.35	97.50	71.10	66.55	60.35	53.60	52.50	51.30	49.70	49.30	48.90	48.35
.4845 - .4999	167.25	116.50	93.45	67.10	62.55	56.35	49.45	49.30	49.00	48.75	48.35	48.20	48.00
.5001 - .5311	242.85	150.80	120.20	89.45	81.90	74.10	69.10	66.35	63.90	62.70	61.80	61.35	60.75
.5313 - .5624	241.40	149.40	118.75	88.00	80.50	72.70	67.70	64.95	62.45	61.20	60.35	59.80	59.60
.5626 - .5937	251.05	158.90	128.20	97.50	91.60	82.25	79.50	74.65	71.95	70.75	69.95	69.45	68.70
.5939 - .6249	251.30	159.20	128.50	97.75	90.15	82.60	77.40	75.00	72.20	71.05	70.20	69.70	69.45
.6251 - .6874	260.20	168.25	137.60	106.75	99.20	95.10	86.30	83.80	81.25	79.95	79.25	78.75	78.40
.6876 - .7187	268.75	176.75	146.05	114.95	107.45	99.95	94.85	92.30	89.85	88.50	87.65	87.05	86.55
.7189 - .7499	272.10	180.10	149.60	118.70	111.20	103.40	98.20	98.15	98.05	97.95	97.55	97.35	97.10
.7501 - .8124	282.85	190.85	160.30	129.50	121.85	114.20	109.15	106.50	104.00	102.70	101.95	101.25	100.65
.8126 - .8437	293.70	201.55	171.05	140.25	132.60	125.00	119.85	117.35	114.80	113.40	112.65	112.10	111.50
.8439 - .8749	296.40	204.35	173.65	142.90	135.30	127.60	122.45	120.30	119.20	116.00	115.20	114.65	112.60
.8751 - .9374	307.55	215.40	184.85	154.05	146.45	138.90	133.60	131.15	128.60	128.20	128.05	127.75	127.55
.9376 - .9687	320.30	226.85	197.60	166.90	159.30	151.65	146.45	143.95	141.45	140.15	139.20	139.00	138.15
.9689 - .9999	322.90	230.90	200.30	169.45	161.95	154.20	149.15	146.75	144.00	142.85	141.95	141.45	140.80
1.0001 - 1.0624	346.60	258.85	249.70	240.60	231.35	222.15	212.95	203.75	194.55	193.40	188.95	187.45	185.85
1.0626 - 1.1249	366.05	278.80	268.75	258.55	248.45	238.35	228.35	218.25	208.20	198.15	197.20	196.20	195.10
1.1251 - 1.1874	390.85	304.90	294.35	284.45	274.40	264.40	254.65	244.40	236.20	224.30	214.25	204.30	194.25
1.1876 - 1.2499	412.55	325.45	314.45	303.65	292.90	282.00	271.20	260.20	249.45	238.65	227.85	216.95	206.10
1.2501 - 1.3749	469.40	378.05	366.20	354.60	343.15	329.90	320.15	308.65	297.05	285.50	282.50	279.65	277.20
1.3751 - 1.4999	519.25	430.80	417.95	405.10	392.25	379.40	366.50	353.65	340.90	327.90	324.45	319.65	314.20

*Diameter tolerances: 0-1/2" (+.0002"/-.0000"); 1/2"-5/8" (+.0003"/-.0000"); and 5/8" up to 1-1/2" (+.0001"/+.0004")

For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Chucking - Right Hand Spiral



- General purpose reamers featuring a 45° chamfer angle
- Flute options from 4 to 12
- Spiral flutes for increased chip evacuation in blind hole applications
- High speed steel
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.002"} _{-0.0000"}		L ₂		D ₂	L ₁	TOOL #	USD\$
.0394	1.0 mm	1/2	4	.0394	2-1/2	TR96550	28.90
.0400	#60	1/2	4	.0390	2-1/2	TR96551	28.90
.0410	#59	1/2	4	.0390	2-1/2	TR96552	28.90
.0430	#57	1/2	4	.0390	2-1/2	TR96554	28.90
.0465	#56	1/2	4	.0455	2-1/2	TR96555	28.90
.0469	3/64	1/2	4	.0455	2-1/2	TR96556	28.90
.0520	#55	1/2	4	.0510	2-1/2	TR96557	28.90
.0550	#54	1/2	4	.0510	2-1/2	TR96558	28.90
.0591	1.5 mm	1/2	4	.0510	2-1/2	TR96559	28.90
.0595	#53	1/2	4	.0585	2-1/2	TR96560	28.90
.0625	1/16	1/2	4	.0585	2-1/2	TR96561	28.90
.0635	#52	1/2	4	.0585	2-1/2	TR96562	28.90
.0670	#51	3/4	4	.0660	3	TR96563	23.30
.0700	#50	3/4	4	.0660	3	TR96564	23.20
.0730	#49	3/4	4	.0660	3	TR96565	23.30
.0760	#48	3/4	4	.0720	3	TR96566	23.20
.0781	5/64	3/4	4	.0720	3	TR96567	23.30
.0785	#47	3/4	4	.0720	3	TR96568	23.20
.0787	2.0 mm	3/4	4	.0720	3	TR96569	23.30
.0810	#46	3/4	4	.0771	3	TR96570	23.20
.0820	#45	3/4	4	.0771	3	TR96571	23.20
.0860	#44	3/4	4	.0810	3	TR96572	23.20
.0890	#43	3/4	4	.0810	3	TR96573	23.30
.0935	#42	3/4	4	.0880	3	TR96574	23.20
.0938	3/32	3/4	4	.0880	3	TR96575	23.10
.0960	#41	7/8	4	.0928	3-1/2	TR96576	23.35
.0980	#40	7/8	4	.0928	3-1/2	TR96577	23.35
.0984	2.5 mm	7/8	4	.0928	3-1/2	TR96578	23.35
.0995	#39	7/8	4	.0928	3-1/2	TR96579	23.35
.1015	#38	7/8	4	.0950	3-1/2	TR96580	23.35
.1040	#37	7/8	4	.0950	3-1/2	TR96581	23.35
.1065	#36	7/8	4	.1030	3-1/2	TR96582	23.35
.1094	7/64	7/8	4	.1030	3-1/2	TR96583	24.25
.1100	#35	7/8	4	.1030	3-1/2	TR96584	24.15
.1110	#34	7/8	4	.1055	3-1/2	TR96585	24.15
.1130	#33	7/8	4	.1055	3-1/2	TR96586	24.15
.1160	#32	7/8	4	.1120	3-1/2	TR96587	24.25
.1181	3.0 mm	7/8	4	.1120	3-1/2	TR96588	24.25
.1200	#31	7/8	4	.1120	3-1/2	TR96589	24.25
.1240	O/U	7/8	4	.1190	3-1/2	TR96590	24.25

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For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Chucking - Right Hand Spiral (Cont.)

continued from previous page

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.0002"} -0.0000"		L ₂		D ₂	L ₁	TOOL #	USD\$
.1250	1/8	7/8	4	.1190	3-1/2	TR96591	21.70
.1260	O/U	7/8	4	.1190	3-1/2	TR96592	24.25
.1285	#30	7/8	4	.1190	3-1/2	TR96593	24.25
.1360	#29	1	4	.1275	4	TR96594	28.90
.1378	3.5 mm	1	4	.1350	4	TR96595	28.90
.1405	#28	1	4	.1350	4	TR96596	28.90
.1406	9/64	1	4	.1350	4	TR96597	28.90
.1470	#26	1	4	.1430	4	TR96599	28.90
.1495	#25	1	4	.1430	4	TR96600	28.90
.1520	#24	1	4	.1460	4	TR96601	30.00
.1540	#23	1	4	.1460	4	TR96602	30.00
.1563	5/32	1	4	.1510	4	TR96603	30.10
.1570	#22	1	6	.1510	4	TR96604	30.00
.1575	4.0 mm	1	6	.1510	4	TR96605	30.10
.1590	#21	1-1/8	6	.1530	4-1/2	TR96606	30.85
.1610	#20	1-1/8	6	.1530	4-1/2	TR96607	30.85
.1660	#19	1-1/8	6	.1595	4-1/2	TR96608	30.85
.1695	#18	1-1/8	6	.1595	4-1/2	TR96609	30.85
.1719	11/64	1-1/8	6	.1645	4-1/2	TR96610	30.85
.1730	#17	1-1/8	6	.1645	4-1/2	TR96611	30.85
.1770	#16	1-1/8	6	.1704	4-1/2	TR96612	30.85
.1772	4.5 mm	1-1/8	6	.1704	4-1/2	TR96613	30.85
.1800	#15	1-1/8	6	.1755	4-1/2	TR96614	30.85
.1820	#14	1-1/8	6	.1755	4-1/2	TR96615	30.85
.1850	#13	1-1/8	6	.1805	4-1/2	TR96616	30.85
.1865	O/U	1-1/8	6	.1805	4-1/2	TR96617	30.85
.1875	3/16	1-1/8	6	.1805	4-1/2	TR96618	29.20
.1885	O/U	1-1/8	6	.1805	4-1/2	TR96619	30.85
.1890	#12	1-1/8	6	.1805	4-1/2	TR96620	30.85
.1910	#11	1-1/4	6	.1860	5	TR96621	34.50
.1935	#10	1-1/4	6	.1860	5	TR96622	34.50
.1960	#9	1-1/4	6	.1895	5	TR96623	34.50
.1969	5.0 mm	1-1/4	6	.1895	5	TR96624	34.50
.1990	#8	1-1/4	6	.1895	5	TR96625	34.50
.2010	#7	1-1/4	6	.1895	5	TR96626	34.50
.2031	13/64	1-1/4	6	.1945	5	TR96627	34.50
.2040	#6	1-1/4	6	.1945	5	TR96628	34.50
.2055	#5	1-1/4	6	.2016	5	TR96629	34.50
.2090	#4	1-1/4	6	.2016	5	TR96630	34.50
.2130	#3	1-1/4	6	.2075	5	TR96631	34.50
.2165	5.5 mm	1-1/4	6	.2075	5	TR96632	34.50
.2188	7/32	1-1/4	6	.2075	5	TR96633	34.50
.2210	#2	1-1/2	6	.2173	6	TR96634	35.55
.2340	A	1-1/2	6	.2265	6	TR96636	35.55
.2344	15/64	1-1/2	6	.2265	6	TR96637	35.55
.2362	6.0 mm	1-1/2	6	.2265	6	TR96638	35.95
.2380	B	1-1/2	6	.2329	6	TR96639	35.95
.2420	C	1-1/2	6	.2329	6	TR96640	35.75
.2460	D	1-1/2	6	.2329	6	TR96641	35.95
.2490	O/U	1-1/2	6	.2405	6	TR96642	38.25

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REAMERS - HIGH SPEED STEEL

Chucking - Right Hand Spiral (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.0002"} _{-0.0000"}		L ₂		D ₂	L ₁	TOOL #	USD\$
.2500	1/4	1-1/2	6	.2405	6	TR96643	31.90
.2510	O/U	1-1/2	6	.2405	6	TR96644	38.25
.2559	6.5 mm	1-1/2	6	.2405	6	TR96645	35.75
.2570	F	1-1/2	6	.2485	6	TR96646	35.95
.2610	G	1-1/2	6	.2485	6	TR96647	35.75
.2656	17/64	1-1/2	6	.2485	6	TR96648	39.85
.2660	H	1-1/2	6	.2485	6	TR96649	39.85
.2720	I	1-1/2	6	.2485	6	TR96650	39.85
.2756	7.0 mm	1-1/2	6	.2485	6	TR96651	39.85
.2770	J	1-1/2	6	.2485	6	TR96652	39.85
.2810	K	1-1/2	6	.2485	6	TR96653	39.85
.2813	9/32	1-1/2	6	.2485	6	TR96654	37.70
.2900	L	1-1/2	6	.2792	6	TR96655	39.85
.2950	M	1-1/2	6	.2792	6	TR96656	39.85
.2953	7.5 mm	1-1/2	6	.2792	6	TR96657	39.85
.2969	19/64	1-1/2	6	.2792	6	TR96658	39.85
.3020	N	1-1/2	6	.2792	6	TR96659	39.85
.3115	O/U	1-1/2	6	.2792	6	TR96660	37.70
.3125	5/16	1-1/2	6	.2792	6	TR96661	36.05
.3135	O/U	1-1/2	6	.2792	6	TR96662	37.70
.3150	8.0 mm	1-1/2	6	.2792	6	TR96663	39.85
.3160	O	1-1/2	6	.2792	6	TR96664	39.85
.3230	P	1-1/2	6	.2792	6	TR96665	42.60
.3281	21/64	1-1/2	6	.2792	6	TR96666	42.60
.3320	Q	1-1/2	6	.2792	6	TR96667	42.60
.3346	8.5 mm	1-1/2	6	.2792	6	TR96668	42.60
.3390	R	1-1/2	6	.2792	6	TR96669	42.60
.3438	11/32	1-1/2	6	.2792	6	TR96670	42.60
.3480	S	1-3/4	6	.3105	6	TR96671	43.10
.3543	9.0 mm	1-3/4	6	.3105	7	TR96672	43.10
.3580	T	1-3/4	6	.3105	7	TR96673	43.10
.3594	23/64	1-3/4	6	.3105	7	TR96674	43.25
.3680	U	1-3/4	6	.3105	7	TR96675	43.10
.3740	9.5 mm-O/U	1-3/4	6	.3105	7	TR96676	40.85
.3750	3/8	1-3/4	6	.3105	7	TR96677	38.70
.3760	O/U	1-3/4	6	.3105	7	TR96678	40.85
.3770	V	1-3/4	6	.3105	7	TR96679	46.70
.3860	W	1-3/4	6	.3105	7	TR96680	46.70
.3906	25/64	1-3/4	6	.3105	7	TR96681	46.70
.3937	10.0 mm	1-3/4	6	.3105	7	TR96682	46.70
.3970	X	1-3/4	6	.3105	7	TR96683	46.70
.4040	Y	1-3/4	6	.3105	7	TR96684	48.45
.4063	13/32	1-3/4	6	.3105	7	TR96685	48.45
.4130	Z	1-3/4	6	.3730	7	TR96686	48.45
.4134	10.5 mm	1-3/4	6	.3730	7	TR96687	48.45
.4219	27/64	1-3/4	6	.3730	7	TR96688	48.65
.4331	11.0 mm	1-3/4	6	.3730	7	TR96689	48.45
.4365	O/U	1-3/4	6	.3730	7	TR96690	48.65
.4375	7/16	1-3/4	6	.3730	7	TR96691	46.35
.4385	O/U	1-3/4	6	.3730	7	TR96692	48.45

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REAMERS - HIGH SPEED STEEL

Chucking - Right Hand Spiral (Cont.)

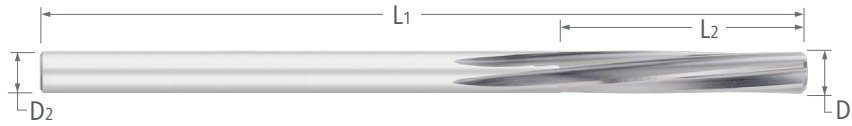
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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ -.0000" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.4528	11.5 mm	1-3/4	6	.3730	7	TR96693	52.90
.4531	29/64	1-3/4	6	.3730	7	TR96694	53.10
.4688	15/32	1-3/4	6	.3730	7	TR96695	53.10
.4724	12.0 mm	2	6	.4355	8	TR96696	52.90
.4844	31/64	2	6	.4355	8	TR96697	52.90
.4921	12.5 mm	2	6	.4355	8	TR96698	52.90
.4990	O/U	2	6	.4355	8	TR96699	53.10
.5000	1/2	2	6	.4355	8	TR96700	50.10
$D_1 \begin{smallmatrix} +.0003" \\ -.0000" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.5010	O/U	2	6	.4355	8	TR96701	53.10
.5313	17/32	2	6	.4355	8	TR96702	62.25
.5625	9/16	2	8	.4355	8	TR96703	62.25
.5938	19/32	2	8	.4355	8	TR96704	62.25
.6250	5/8	2-1/4	8	.5615	9	TR96705	73.15
$D_1 \begin{smallmatrix} +.0001" \\ -.0004" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.6562	21/32	2-1/4	8	.5615	9	TR96706	78.75
.6875	11/16	2-1/4	8	.5615	9	TR96707	84.75
.7188	23/32	2-1/4	8	.5615	9	TR96708	99.25
.7500	3/4	2-1/2	8	.6240	9-1/2	TR96709	94.30
.7812	25/32	2-1/2	8	.6240	9-1/2	TR96710	102.25
.8125	13/16	2-1/2	8	.6240	9-1/2	TR96711	102.05
.8438	27/32	2-1/2	8	.6240	9-1/2	TR96712	127.00
.8750	7/8	2-5/8	8	.7490	10	TR96713	120.55
.9062	29/32	2-5/8	8	.7490	10	TR96714	139.80
.9375	15/16	2-5/8	8	.7490	10	TR96715	133.10
.9688	31/32	2-5/8	8	.7490	10	TR96716	149.10
1.0000	1	2-3/4	8	.8740	10-1/2	TR96717	151.10
1.0625	1-1/16	2-3/4	8	.8740	10-1/2	TR96718	166.60
1.1250	1-1/8	2-7/8	8	.8740	11	TR96719	176.70
1.1875	1-3/16	2-7/8	10	.9990	11	TR96720	206.85
1.2500	1-1/4	3	10	.9990	11-1/2	TR96721	218.90
1.3125	1-5/16	3	10	.9990	11-1/2	TR96722	255.90
1.3750	1-3/8	3-1/4	10	.9990	12	TR96723	268.40
1.5000	1-1/2	3-1/2	10	1.2490	12-1/2	TR96725	308.50
$D_1 \begin{smallmatrix} +.0002" \\ -.0006" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
1.5625	1-9/16	3-1/2	12	1.2490	13	TR96900	440.05
1.6250	1-5/8	3-1/2	12	1.2490	13	TR96901	442.35
1.7500	1-3/4	4	12	1.2490	13-1/2	TR96903	507.80
1.8125	1-13/16	4	12	1.4990	14	TR96904	584.85
1.9375	1-15/16	4	12	1.4990	14	TR96906	684.75
2.0000	2	4	12	1.4990	14	TR96907	684.75

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REAMERS - HIGH SPEED STEEL

Chucking - Left Hand Spiral



- Flute options from 4 to 12
- Optimized for use in through holes as chips are pushed ahead of the tool and into the hole
- High speed steel
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 $\begin{smallmatrix} +.0002" \\ -.0000" \end{smallmatrix}$		L2		D2	L1	TOOL #	USD\$
.0394	1.0 mm	1/2	4	.0394	2-1/2	TR97010	28.90
.0400	#60	1/2	4	.0390	2-1/2	TR97011	28.90
.0410	#59	1/2	4	.0390	2-1/2	TR97012	28.90
.0420	#58	1/2	4	.0390	2-1/2	TR97013	28.90
.0430	#57	1/2	4	.0390	2-1/2	TR97014	28.90
.0465	#56	1/2	4	.0455	2-1/2	TR97015	28.90
.0469	3/64	1/2	4	.0455	2-1/2	TR97016	28.90
.0520	#55	1/2	4	.0510	2-1/2	TR97017	28.90
.0550	#54	1/2	4	.0510	2-1/2	TR97018	28.90
.0591	1.5 mm	1/2	4	.0510	2-1/2	TR97019	28.90
.0595	#53	1/2	4	.0585	2-1/2	TR97020	28.90
.0625	1/16	1/2	4	.0585	2-1/2	TR97021	28.90
.0635	#52	1/2	4	.0585	2-1/2	TR97022	28.90
.0670	#51	3/4	4	.0660	3	TR97023	23.30
.0700	#50	3/4	4	.0660	3	TR97024	23.20
.0730	#49	3/4	4	.0660	3	TR97025	23.30
.0760	#48	3/4	4	.0720	3	TR97026	23.20
.0781	5/64	3/4	4	.0720	3	TR97027	23.30
.0785	#47	3/4	4	.0720	3	TR97028	23.20
.0787	2.0 mm	3/4	4	.0720	3	TR97029	23.30
.0810	#46	3/4	4	.0771	3	TR97030	23.20
.0820	#45	3/4	4	.0771	3	TR97031	23.20
.0860	#44	3/4	4	.0810	3	TR97032	23.20
.0890	#43	3/4	4	.0810	3	TR97033	23.30
.0935	#42	3/4	4	.0880	3	TR97034	23.20
.0938	3/32	3/4	4	.0880	3	TR97035	23.10
.0960	#41	7/8	4	.0928	3-1/2	TR97036	23.35
.0980	#40	7/8	4	.0928	3-1/2	TR97037	23.35
.0984	2.5 mm	7/8	4	.0928	3-1/2	TR97038	23.35
.0995	#39	7/8	4	.0928	3-1/2	TR97039	23.35
.1015	#38	7/8	4	.0950	3-1/2	TR97040	23.35
.1040	#37	7/8	4	.0950	3-1/2	TR97041	23.35
.1065	#36	7/8	4	.1030	3-1/2	TR97042	23.35
.1094	7/64	7/8	4	.1030	3-1/2	TR97043	24.25
.1100	#35	7/8	4	.1030	3-1/2	TR97044	24.15
.1110	#34	7/8	4	.1055	3-1/2	TR97045	24.15

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REAMERS - HIGH SPEED STEEL

Chucking - Left Hand Spiral (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ -.0000" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.1130	#33	7/8	4	.1055	3-1/2	TR97046	24.15
.1160	#32	7/8	4	.1120	3-1/2	TR97047	24.25
.1181	3.0 mm	7/8	4	.1120	3-1/2	TR97048	24.25
.1200	#31	7/8	4	.1120	3-1/2	TR97049	24.25
.1240	O/U	7/8	4	.1190	3-1/2	TR97050	24.25
.1250	1/8	7/8	4	.1190	3-1/2	TR97051	21.70
.1260	O/U	7/8	4	.1190	3-1/2	TR97052	24.25
.1285	#30	7/8	4	.1190	3-1/2	TR97053	24.25
.1360	#29	1	4	.1275	4	TR97054	28.90
.1378	3.5 mm	1	4	.1350	4	TR97055	28.90
.1405	#28	1	4	.1350	4	TR97056	28.90
.1406	9/64	1	4	.1350	4	TR97057	28.90
.1440	#27	1	4	.1350	4	TR97058	28.90
.1470	#26	1	4	.1430	4	TR97059	28.90
.1495	#25	1	4	.1430	4	TR97060	28.90
.1520	#24	1	4	.1460	4	TR97061	30.00
.1540	#23	1	4	.1460	4	TR97062	30.00
.1562	5/32	1	4	.1510	4	TR97063	30.10
.1570	#22	1	6	.1510	4	TR97064	30.00
.1575	4.0 mm	1	6	.1510	4	TR97065	30.10
.1590	#21	1-1/8	6	.1530	4-1/2	TR97066	30.85
.1610	#20	1-1/8	6	.1530	4-1/2	TR97067	30.85
.1660	#19	1-1/8	6	.1595	4-1/2	TR97068	30.85
.1695	#18	1-1/8	6	.1595	4-1/2	TR97069	30.85
.1719	11/64	1-1/8	6	.1645	4-1/2	TR97070	30.85
.1730	#17	1-1/8	6	.1645	4-1/2	TR97071	30.85
.1770	#16	1-1/8	6	.1704	4-1/2	TR97072	30.85
.1772	4.5 mm	1-1/8	6	.1704	4-1/2	TR97073	30.85
.1800	#15	1-1/8	6	.1755	4-1/2	TR97074	30.85
.1820	#14	1-1/8	6	.1755	4-1/2	TR97075	30.85
.1850	#13	1-1/8	6	.1805	4-1/2	TR97076	30.85
.1865	O/U	1-1/8	6	.1805	4-1/2	TR97077	30.85
.1875	3/16	1-1/8	6	.1805	4-1/2	TR97078	29.20
.1885	O/U	1-1/8	6	.1805	4-1/2	TR97079	30.85
.1890	#12	1-1/8	6	.1805	4-1/2	TR97080	30.85
.1910	#11	1-1/4	6	.1860	5	TR97081	34.50
.1935	#10	1-1/4	6	.1860	5	TR97082	34.50
.1960	#9	1-1/4	6	.1895	5	TR97083	34.50
.1969	5.0 mm	1-1/4	6	.1895	5	TR97084	34.50
.1990	#8	1-1/4	6	.1895	5	TR97085	34.50
.2010	#7	1-1/4	6	.1895	5	TR97086	34.50
.2031	13/64	1-1/4	6	.1945	5	TR97087	34.50
.2040	#6	1-1/4	6	.1945	5	TR97088	34.50
.2055	#5	1-1/4	6	.2016	5	TR97089	34.50
.2090	#4	1-1/4	6	.2016	5	TR97090	34.50
.2130	#3	1-1/4	6	.2075	5	TR97091	34.50
.2165	5.5 mm	1-1/4	6	.2075	5	TR97092	34.50
.2188	7/32	1-1/4	6	.2075	5	TR97093	34.50

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REAMERS - HIGH SPEED STEEL

Chucking - Left Hand Spiral (Cont.)

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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D ₁ ^{+0.0002"} -0.0000"		L ₂		D ₂	L ₁	TOOL #	USD\$
.2210	#2	1-1/2	6	.2173	6	TR97094	35.55
.2280	#1	1-1/2	6	.2173	6	TR97095	35.55
.2340	A	1-1/2	6	.2265	6	TR97096	35.55
.2344	15/64	1-1/2	6	.2265	6	TR97097	35.55
.2362	6.0 mm	1-1/2	6	.2265	6	TR97098	35.95
.2380	B	1-1/2	6	.2329	6	TR97099	35.95
.2420	C	1-1/2	6	.2329	6	TR97100	35.75
.2460	D	1-1/2	6	.2329	6	TR97101	35.95
.2490	O/U	1-1/2	6	.2405	6	TR97102	38.25
.2500	1/4	1-1/2	6	.2405	6	TR97103	31.90
.2510	O/U	1-1/2	6	.2405	6	TR97104	38.25
.2559	6.5 mm	1-1/2	6	.2405	6	TR97105	35.75
.2570	F	1-1/2	6	.2485	6	TR97106	35.95
.2610	G	1-1/2	6	.2485	6	TR97107	35.75
.2656	17/64	1-1/2	6	.2485	6	TR97108	39.85
.2660	H	1-1/2	6	.2485	6	TR97109	39.85
.2720	I	1-1/2	6	.2485	6	TR97110	39.85
.2756	7.0 mm	1-1/2	6	.2485	6	TR97111	39.85
.2770	J	1-1/2	6	.2485	6	TR97112	39.85
.2810	K	1-1/2	6	.2485	6	TR97113	39.85
.2813	9/32	1-1/2	6	.2485	6	TR97114	37.70
.2900	L	1-1/2	6	.2792	6	TR97115	39.85
.2950	M	1-1/2	6	.2792	6	TR97116	39.85
.2953	7.5 mm	1-1/2	6	.2792	6	TR97117	39.85
.2969	19/64	1-1/2	6	.2792	6	TR97118	39.85
.3020	N	1-1/2	6	.2792	6	TR97119	39.85
.3115	O/U	1-1/2	6	.2792	6	TR97120	37.70
.3125	5/16	1-1/2	6	.2792	6	TR97121	36.05
.3135	O/U	1-1/2	6	.2792	6	TR97122	37.70
.3150	8.0 mm	1-1/2	6	.2792	6	TR97123	39.85
.3160	O	1-1/2	6	.2792	6	TR97124	39.85
.3230	P	1-1/2	6	.2792	6	TR97125	42.60
.3281	21/64	1-1/2	6	.2792	6	TR97126	42.60
.3320	Q	1-1/2	6	.2792	6	TR97127	42.60
.3346	8.5 mm	1-1/2	6	.2792	6	TR97128	42.60
.3390	R	1-1/2	6	.2792	6	TR97129	42.60
.3438	11/32	1-1/2	6	.2792	6	TR97130	42.60
.3480	S	1-3/4	6	.3105	6	TR97131	43.10
.3543	9.0 mm	1-3/4	6	.3105	7	TR97132	43.10
.3580	T	1-3/4	6	.3105	7	TR97133	43.10
.3594	23/64	1-3/4	6	.3105	7	TR97134	43.25
.3680	U	1-3/4	6	.3105	7	TR97135	43.10
.3740	9.5 mm-O/U	1-3/4	6	.3105	7	TR97136	40.85
.3750	3/8	1-3/4	6	.3105	7	TR97137	38.70
.3760	O/U	1-3/4	6	.3105	7	TR97138	40.85
.3770	V	1-3/4	6	.3105	7	TR97139	46.70
.3860	W	1-3/4	6	.3105	7	TR97140	46.70
.3906	25/64	1-3/4	6	.3105	7	TR97141	46.70

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For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Chucking - Left Hand Spiral (Cont.)

continued from previous page

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ -.0000" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.3937	10.0 mm	1-3/4	6	.3105	7	TR97142	46.70
.3970	X	1-3/4	6	.3105	7	TR97143	46.70
.4040	Y	1-3/4	6	.3105	7	TR97144	48.45
.4063	13/32	1-3/4	6	.3105	7	TR97145	48.45
.4130	Z	1-3/4	6	.3730	7	TR97146	48.45
.4134	10.5 mm	1-3/4	6	.3730	7	TR97147	48.45
.4219	27/64	1-3/4	6	.3730	7	TR97148	48.65
.4331	11.0 mm	1-3/4	6	.3730	7	TR97149	48.45
.4365	O/U	1-3/4	6	.3730	7	TR97150	48.65
.4375	7/16	1-3/4	6	.3730	7	TR97151	46.35
.4385	O/U	1-3/4	6	.3730	7	TR97152	48.45
.4528	11.5 mm	1-3/4	6	.3730	7	TR97153	52.90
.4531	29/64	1-3/4	6	.3730	7	TR97154	53.10
.4688	15/32	1-3/4	6	.3730	7	TR97155	53.10
.4724	12.0 mm	2	6	.4355	8	TR97156	52.90
.4844	31/64	2	6	.4355	8	TR97157	52.90
.4921	12.5 mm	2	6	.4355	8	TR97158	52.90
.4990	O/U	2	6	.4355	8	TR97159	53.10
.5000	1/2	2	6	.4355	8	TR97160	50.10

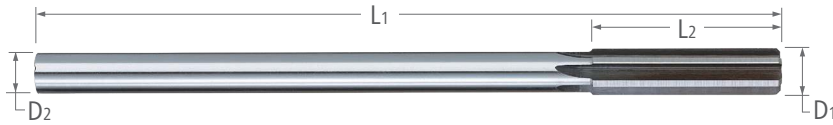
$D_1 \begin{smallmatrix} +.0003" \\ -.0000" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.5010	O/U	2	6	.4355	8	TR97161	53.10
.5313	17/32	2	6	.4355	8	TR97162	62.25
.5625	9/16	2	8	.4355	8	TR97163	62.25
.5938	19/32	2	8	.4355	8	TR97164	62.25
.6250	5/8	2-1/4	8	.5615	9	TR97165	73.15

$D_1 \begin{smallmatrix} +.0001" \\ -.0004" \end{smallmatrix}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.6562	21/32	2-1/4	8	.5615	9	TR97166	78.75
.6875	11/16	2-1/4	8	.5615	9	TR97167	84.75
.7188	23/32	2-1/4	8	.5615	9	TR97168	99.25
.7500	3/4	2-1/2	8	.6240	9-1/2	TR97169	94.30
.7812	25/32	2-1/2	8	.6240	9-1/2	TR97170	102.25
.8125	13/16	2-1/2	8	.6240	9-1/2	TR97171	102.05
.8438	27/32	2-1/2	8	.6240	9-1/2	TR97172	127.00
.8750	7/8	2-5/8	8	.7490	10	TR97173	120.55
.9062	29/32	2-5/8	8	.7490	10	TR97174	139.80
.9375	15/16	2-5/8	8	.7490	10	TR97175	133.10
.9688	31/32	2-5/8	8	.7490	10	TR97176	149.10
1.0000	1	2-3/4	8	.8740	10-1/2	TR97177	151.10
1.0625	1-1/16	2-3/4	8	.8740	10-1/2	TR97178	166.60
1.1250	1-1/8	2-7/8	8	.8740	11	TR97179	176.70
1.1875	1-3/16	2-7/8	10	.9990	11	TR97180	206.85
1.2500	1-1/4	3	10	.9990	11-1/2	TR97181	218.90
1.3125	1-5/16	3	10	.9990	11-1/2	TR97182	255.90
1.3750	1-3/8	3-1/4	10	.9990	12	TR97183	268.40
1.4375	1-7/16	3-1/4	10	1.2490	12	TR97184	287.10
1.5000	1-1/2	3-1/2	12	1.2490	12-1/2	TR97185	308.50

For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Dowel Pin - Straight Flute

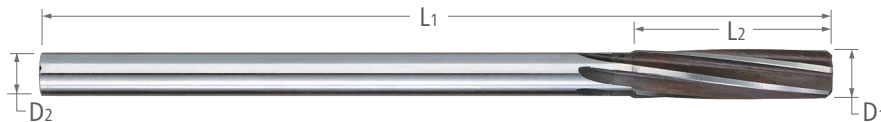


- General purpose reamers featuring a 45° chamfer angle
- Straight flutes for through and blind hole applications
- 4 and 6 flute styles
- High speed steel
- Precision manufactured in the USA

REAMER DIA.	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 ^{+0.0001"} -0.0002"	L2		D2	L1	TOOL #	USD\$
.1230	7/8	4	.1190	3-1/2	TR96264	20.95
.1247	7/8	4	.1190	3-1/2	TR96265	20.95
.1855	1-1/8	6	.1805	4-1/2	TR96266	19.27
.1870	1-1/8	6	.1805	4-1/2	TR96267	26.80
.2480	1-1/2	6	.2405	6	TR96268	29.20
.2495	1-1/2	6	.2405	6	TR96269	29.20
.3105	1-1/2	6	.2792	6	TR96270	34.30
.3120	1-1/2	6	.2792	6	TR96271	34.30
.3730	1-3/4	6	.3105	7	TR96272	37.30
.3745	1-3/4	6	.3105	7	TR96273	37.30
.4355	1-3/4	6	.3730	7	TR96274	30.27
.4370	1-3/4	6	.3730	7	TR96275	41.85
.4980	2	6	.4355	8	TR96276	45.60
.4995	2	6	.4355	8	TR96277	45.60

REAMERS - HIGH SPEED STEEL

Dowel Pin - Right Hand Spiral



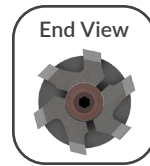
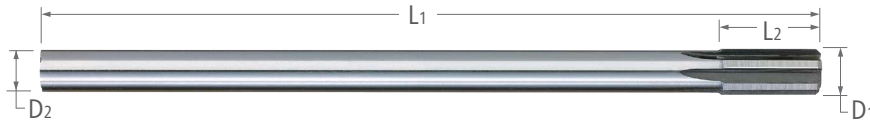
- General purpose reamers featuring a 45° chamfer angle
- Spiral flutes for increased chip evacuation in blind hole applications
- 4 and 6 flute styles
- High speed steel
- Precision manufactured in the USA

REAMER DIA.	FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
D1 ^{+0.0002"} -0.0000"	L2		D2	L1	TOOL #	USD\$
.1230	7/8	4	.1190	3-1/2	TR96950	24.15
.1247	7/8	4	.1190	3-1/2	TR96951	24.15
.1855	1-1/8	6	.1805	4-1/2	TR96952	30.85
.1870	1-1/8	6	.1805	4-1/2	TR96953	30.85
.2480	1-1/2	6	.2405	6	TR96954	32.30
.2495	1-1/2	6	.2405	6	TR96955	32.30
.3105	1-1/2	6	.2792	6	TR96956	37.80
.3120	1-1/2	6	.2792	6	TR96957	37.95
.3730	1-3/4	6	.3105	7	TR96958	40.85
.3745	1-3/4	6	.3105	7	TR96959	40.85
.4355	1-3/4	6	.3730	7	TR96960	48.45
.4370	1-3/4	6	.3730	7	TR96961	48.45
.4980	2	6	.4355	8	TR96962	52.85
.4995	2	6	.4355	8	TR96963	52.85

For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Expansion - Straight Flute



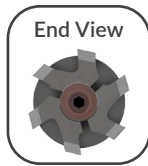
- General purpose reamers featuring a 45° chamfer angle
- Expansion style for resharpening to original size
- 6 and 8 flute styles
- Straight flutes for through and blind hole applications
- High speed steel
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1^{+.0002"}_{-.0000"}$		L2		D2	L1	TOOL #	USD\$
.3750	3/8	3/4	6	5/16	7	TR97201	127.45
.4063	13/32	3/4	6	5/16	7	TR97202	103.07
.4375	7/16	7/8	6	3/8	7	TR97203	98.37
.4688	15/32	7/8	6	27/64	8	TR97204	106.97
.5000	1/2	1	6	7/16	8	TR97205	143.65
.5313	17/32	1	6	7/16	8	TR97206	115.77
.5625	9/16	1-1/8	6	7/16	8	TR97207	155.85
.5938	19/32	1-1/8	6	7/16	8	TR97208	158.15
.6250	5/8	1-1/4	6	9/16	9	TR97209	162.70
.6563	21/32	1-1/4	6	9/16	9	TR97210	125.87
.6875	11/16	1-1/4	6	9/16	9	TR97211	132.97
.7500	3/4	1-3/8	6	5/8	9-1/2	TR97213	193.55
.8125	13/16	1-3/8	8	5/8	9-1/2	TR97215	160.77
.8750	7/8	1-1/2	8	3/4	10	TR97217	164.37
.9688	31/32	1-1/2	8	3/4	10	TR97220	198.87
1.0000	1	1-5/8	8	7/8	10-1/2	TR97221	275.85
1.0625	1-1/16	1-5/8	8	7/8	10-1/2	TR97223	231.77
1.1563	1-5/32	1-3/4	8	7/8	11	TR97226	256.97
1.1875	1-3/16	1-3/4	8	1	11	TR97227	254.17
1.2500	1-1/4	1-7/8	8	1	11-1/2	TR97229	377.95
1.3750	1-3/8	2	8	1	12	TR97231	293.17
1.4375	1-7/16	2	8	1-1/4	12	TR97232	319.47

For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Expansion - Straight Flute - Taper Shank



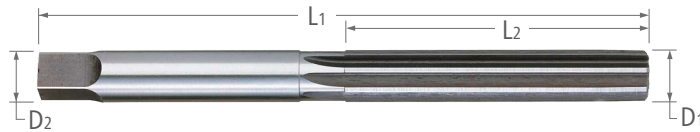
- General purpose reamers featuring a 45° chamfer angle
- Expansion tapered shank for Morse Taper Holders
- Expansion style for resharpening to original size
- 6 and 8 flute styles
- Straight flutes for through and blind hole applications
- High speed steel
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	MORSE TAPER	OAL	UNCOATED	
$D_1^{+.0002"}_{-.0000"}\)$		L ₂			L ₁	TOOL #	USD\$
.3750	3/8	3/4	6	1	7	TR97250	109.77
.5000	1/2	1	6	1	8	TR97254	115.87
.5625	9/16	1-1/8	6	1	8	TR97256	122.27
.6250	5/8	1-1/4	6	2	9	TR97258	131.77
.7500	3/4	1-3/8	6	2	9-1/2	TR97262	211.20
.8125	13/16	1-3/8	8	2	9-1/2	TR97264	162.37
.8750	7/8	1-1/2	8	2	10	TR97266	246.35
.9375	15/16	1-1/2	8	3	10	TR97268	201.97
1.0000	1.0000	1-5/8	8	3	10-1/2	TR97270	292.75
1.0313	1-1/32	1-5/8	8	3	10-1/2	TR97271	220.17
1.0938	1-3/32	1-5/8	8	3	10-1/2	TR97273	252.97
1.1250	1-1/8	1-3/4	8	3	11	TR97274	249.17
1.1563	1-5/32	1-3/4	8	3	11	TR97275	272.27
1.1875	1-3/16	1-3/4	8	3	11	TR97276	283.07
1.2500	1-1/4	1-7/8	8	4	11-1/2	TR97278	294.27
1.3750	1-3/8	2	8	4	12	TR97280	316.77
1.4375	1-7/16	2	8	4	12	TR97281	335.07

For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Hand Reamers - Straight Flute



- General purpose reamers featuring a 45° chamfer angle
- Straight flutes for through and blind hole applications
- High speed steel
- Flute options from 4 to 10
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1 \begin{smallmatrix} +.0002" \\ -.0000" \end{smallmatrix}$		L2		D2	L1	TOOL #	USD\$
.0625	1/16	1	4	.0625	2	TR97606	59.85
.0781	5/64	1	4	.0781	2	TR97607	59.65
.0938	3/32	1-1/4	4	.0938	2-1/2	TR97608	59.65
.1250	1/8	1-1/2	4	.1250	3	TR97610	56.15
.1406	9/64	1-5/8	4	.1406	3-1/4	TR97611	56.15
.1563	5/32	1-5/8	4	.1562	3-1/4	TR97612	60.60
.1719	11/64	1-3/4	6	.1719	3-1/2	TR97613	60.60
.1875	3/16	1-3/4	6	.1875	3-1/2	TR97614	59.85
.2031	13/64	1-7/8	6	.2031	3-3/4	TR97615	59.65
.2188	7/32	1-7/8	6	.2188	3-3/4	TR97616	65.50
.2344	15/64	2	6	.2344	4	TR97617	65.50
.2500	1/4	2	6	.2500	4	TR97618	65.40
.2656	17/64	2-1/8	6	.2656	4-1/4	TR97619	65.50
.2813	9/32	2-1/8	6	.2812	4-1/4	TR97620	70.60
.2969	19/64	2-1/4	6	.2969	4-1/2	TR97621	70.60
.3125	5/16	2-1/4	6	.3125	4-1/2	TR97622	68.85
.3438	11/32	2-3/8	6	.3438	4-3/4	TR97623	80.10
.3750	3/8	2-1/2	6	.3750	5	TR97624	78.10
.4063	13/32	2-5/8	6	.4062	5-1/4	TR97625	90.65
.4375	7/16	2-3/4	6	.4375	5-1/2	TR97626	88.80
.4688	15/32	2-7/8	6	.4688	5-3/4	TR97627	98.25
.5000	1/2	3	6	.5000	6	TR97628	94.85
$D_1 \begin{smallmatrix} +.0003" \\ -.0000" \end{smallmatrix}$		L2		D2	L1	TOOL #	USD\$
.5313	17/32	3-1/8	8	.5312	6-1/4	TR97629	102.05
.5625	9/16	3-1/4	8	.5625	6-1/2	TR97630	109.15
.5938	19/32	3-3/8	8	.5938	6-3/4	TR97631	121.40
.6250	5/8	3-1/2	8	.6250	7	TR97632	118.25
$D_1 \begin{smallmatrix} +.0001" \\ -.0004" \end{smallmatrix}$		L2		D2	L1	TOOL #	USD\$
.6562	21/32	3-11/16	8	.6562	7-3/8	TR97633	134.35
.6875	11/16	3-7/8	8	.6875	7-3/4	TR97634	131.15
.7188	23/32	4-1/16	8	.7188	8-1/8	TR97635	143.55
.7500	3/4	4-3/16	8	.7500	8-3/8	TR97636	137.90
.7812	25/32	4-3/8	8	.7812	8-3/4	TR97637	151.25
.8125	13/16	4-9/16	8	.8125	9-1/8	TR97638	137.90
.8438	27/32	4-11/16	8	.8438	9-3/8	TR97639	165.60

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For technical information, see page 335

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REAMERS - HIGH SPEED STEEL

Hand Reamers - Straight Flute (Cont.)

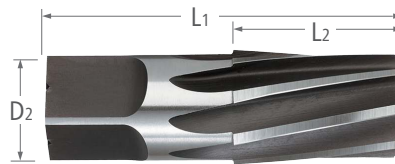
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REAMER DIAMETER dec. equiv. size		FLUTE LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
$D_1^{+.0001"}$ $^{+.0004"}$		L ₂		D ₂	L ₁	TOOL #	USD\$
.8750	7/8	4-7/8	8	.8750	9-3/4	TR97640	166.95
.9062	29/32	5	8	.9062	10	TR97641	184.60
.9375	15/16	5-1/8	8	.9375	10-1/4	TR97642	167.15
.9688	31/32	5-5/16	8	.9688	10-5/8	TR97643	203.15
1.0000	1	5-7/16	8	1.0000	10-7/8	TR97644	202.40
1.1250	1-1/8	5-13/16	8	1.1250	11-5/8	TR97645	264.50
1.2500	1-1/4	6-1/8	8	1.2500	12-1/4	TR97646	324.75
1.3750	1-3/8	6-5/16	10	1.3750	12-5/8	TR97647	383.95
1.5000	1-1/2	6-1/2	10	1.5000	13	TR97648	453.00

 Reamers
 Carbide
 Cobalt
 HSS

REAMERS - HIGH SPEED STEEL

Taper Pipe



- General purpose reamers featuring a 45° chamfer angle
- 6 to 12 flute options
- Spiral flutes for increased chip evacuation in blind hole applications
- High speed steel
- Precision manufactured in the USA

SIZE	DIAMETER SMALL END	DIAMETER LARGE END	FLUTE LENGTH	FLUTES	SIZE OF SQUARE	SHANK DIAMETER	OVERALL LENGTH	UNCOATED	
			L ₂			D ₂	L ₁	TOOL #	USD\$
1/16	.2320	.2750	3/4	6	.2350	.3125	2-1/8	TR97649	77.75
1/8	.3160	.3620	3/4	6	.3280	.4375	2-1/8	TR97650	72.50
1/4	.4060	.4720	1-1/16	6	.4210	.5625	2-7/16	TR97651	83.05
3/8	.5400	.6060	1-1/16	6	.5310	.7000	2-9/16	TR97652	94.50
1/2	.6650	.7510	1-3/8	6	.5150	.6875	3-1/8	TR97653	118.80
3/4	.8760	.9620	1-3/8	8	.6790	.9063	3-1/4	TR97654	164.70
1	1.1030	1.2120	1-3/4	8	.8430	1.1250	3-3/4	TR97655	243.55
1-1/4	1.4440	1.5530	1-3/4	10	.9840	1.3125	4	TR97656	408.25
1-1/2	1.6840	1.7930	1-3/4	12	1.1250	1.5000	4-1/4	TR97657	516.05
2	2.1590	2.2680	1-3/4	12	1.4060	1.8750	4-1/2	TR97658	692.60

For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Taper Pin



- General purpose reamers featuring a 45° chamfer angle
- Helical flutes increase shearing action for superior finish
- Straight flutes for through and blind hole applications
- Flute options from 4 to 10
- Spiral flutes for increased chip evacuation in blind hole applications
- High speed steel
- Precision manufactured in the USA

SIZE	DIAMETER SMALL END	DIAMETER LARGE END	FLUTE LENGTH	OAL	FLUTES	STRAIGHT FLUTE		LEFT HAND SPIRAL RIGHT HAND CUT		LEFT HAND HELICAL RIGHT HAND CUT	
			L2	L1		TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
7/0	.0497	.0666	13/16	1-13/16	4	TR97525	62.15	TR97567	46.97	TR97546	57.70
6/0	.0611	.0806	15/16	1-15/16	4	TR97526	62.15	TR97568	46.67	TR97547	39.27
5/0	.0719	.0966	1-3/16	2-3/16	4	TR97527	56.70				
4/0	.0869	.1142	1-5/16	2-5/16	4	TR97528	56.70			TR97549	56.45
3/0	.1029	.1302	1-5/16	2-5/16	4	TR97529	56.70	TR97571	62.15	TR97550	51.20
2/0	.1137	.1462	1-9/16	2-9/16	4	TR97530	50.70	TR97572	39.57	TR97551	51.75
0	.1287	.1638	1-11/16	2-15/16	4	TR97531	49.00	TR97573	37.57	TR97552	38.07
1	.1447	.1798	1-11/16	2-15/16	6	TR97532	34.17	TR97574	38.07	TR97553	38.77
2	.1605	.2008	1-15/16	3-3/16	6	TR97533	47.25	TR97575	52.80		
3	.1813	.2294	2-15/16	3-11/16	6	TR97534	47.25	TR97576	52.80		
4	.2071	.2604	2-9/16	4-1/16	6	TR97535	52.95	TR97577	57.75	TR97556	70.60
5	.2409	.2994	2-13/16	4-5/16	6	TR97536	57.00	TR97578	61.35	TR97557	55.77
6	.2773	.3540	3-11/16	5-7/16	6	TR97537	68.70	TR97579	75.90	TR97558	90.55
7	.3297	.4220	4-7/16	6-5/16	6	TR97538	88.15	TR97580	95.65	TR97559	111.80
8	.3971	.5050	5-3/16	7-3/16	6	TR97539	114.35	TR97581	125.00	TR97560	131.20
9	.4805	.6066	6-1/16	8-5/16	6	TR97540	137.75	TR97582	149.10	TR97561	144.20
10	.5799	.7216	6-13/16	9-5/16	6	TR97541	151.20	TR97583	165.40	TR97562	132.57
11	.7060	.8780	8-1/4	11-1/4	8	TR97542	160.25	TR97584	176.45	TR97563	146.87
12	.8420	1.0500	10	13-7/8	8	TR97543	249.30	TR97585	197.77	TR97564	217.47
13	1.0090	1.2590	12	16	10	TR97544	348.67	TR97586	531.90		
14	1.2500	1.5420	14	18-1/4	10	TR97545	558.67	TR97587	859.85	TR97566	939.50

Straight Flute



Left Hand Spiral, Right Hand Cut



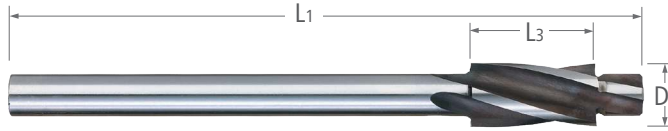
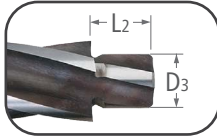
Left Hand Helical, Right Hand Cut



For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Capscrew Counterbores



- General purpose reamers featuring a 45° chamfer angle
- Capscrew counterbore style
- Unique style allowing capscrews to sit flush with the surface of a part
- Built in pilot to maintain alignment in existing hole
- High speed steel
- Precision manufactured in the USA

SIZE	PILOT LENGTH	PILOT SIZE	FLUTE SIZE	BODY LENGTH	OAL	UNCOATED	
	L ₂	D ₃	D ₁	L ₃	L ₁	TOOL #	USD\$
4	1/8	.112	.183	9/16	3-7/8	TR97470	38.30
	1/8	.127	.199	9/16	3-7/8	TR97484	36.80
	1/8	.143	.215	9/16	3-7/8	TR97501	36.90
5	5/32	.125	.205	5/8	4-1/8	TR97471	27.67
	5/32	.140	.221	5/8	4-1/8	TR97485	27.67
	5/32	.156	.237	5/8	4-1/8	TR97502	36.90
6	3/16	.138	.227	3/4	4-5/8	TR97472	38.90
	3/16	.153	.243	3/4	4-5/8	TR97486	38.90
	3/16	.169	.259	3/4	4-5/8	TR97503	38.90
8	7/32	.164	.270	3/4	5	TR97473	41.70
	7/32	.179	.286	3/4	5	TR97487	41.70
	7/32	.195	.302	3/4	5	TR97504	41.70
10	1/4	.190	.312	7/8	5-1/4	TR97474	42.60
	1/4	.205	.328	7/8	5-1/4	TR97488	42.60
	1/4	.218	.344	7/8	5-1/4	TR97505	42.60
1 1/4	9/32	.250	.380	1	5-5/8	TR97475	45.00
	9/32	.265	.396	1	5-5/8	TR97489	45.00
	9/32	.281	.412	1	5-5/8	TR97506	45.00
5/16	5/16	.313	.474	1	6-1/8	TR97476	56.20
	5/16	.328	.489	1	6-1/8	TR97490	56.20
	5/16	.343	.504	1	6-1/8	TR97507	56.20
3/8	3/8	.375	.569	1-1/4	6-1/2	TR97477	61.35
	3/8	.390	.585	1-1/4	6-1/2	TR97491	61.35
	3/8	.406	.601	1-1/4	6-1/2	TR97508	61.35
7/16	7/16	.437	.661	1-1/4	7	TR97478	73.50
	7/16	.452	.676	1-1/4	7	TR97492	73.50
	7/16	.468	.691	1-1/4	7	TR97509	73.50
1/2	1/2	.500	.755	1-1/2	7-1/2	TR97479	86.85
	1/2	.515	.771	1-1/2	7-1/2	TR97493	86.30
	1/2	.531	.787	1-1/2	7-1/2	TR97510	86.30
5/8	5/8	.625	.943	1-1/2	7-5/8	TR97480	141.05
	5/8	.640	.959	1-1/2	7-5/8	TR97494	148.05
	5/8	.656	.975	1-1/2	7-5/8	TR97511	141.00
3/4	3/4	.750	1.131	1-5/8	7-3/4	TR97481	163.10
	3/4	.765	1.147	1-5/8	7-3/4	TR97495	117.97
	3/4	.781	1.163	1-5/8	7-3/4	TR97512	162.75
7/8	7/8	.875	1.320	1-7/8	8	TR97482	142.97
	7/8	.891	1.336	1-7/8	8	TR97496	150.07
	7/8	.906	1.352	1-7/8	8	TR97513	142.67
1	1	1.000	1.508	2	8-1/2	TR97483	189.77
	1	1.031	1.540	2	8-1/2	TR97514	180.57

For technical information, see page 335

REAMERS - HIGH SPEED STEEL

Taper Shank Bridge Reamers



- Heavy duty tools designed for enlarging and aligning holes
- Taper shank style
- Left hand spiral, right hand cut to push chips forward
- Black Oxide finish increases wear resistance and adds lubricity to improve chip flow
- High speed steel
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv.	REAMER DIAMETER size	FLUTE LENGTH	SMALL DIAMETER	FLUTES	MORSE TAPER	OVERALL LENGTH	BLACK OXIDE FINISH	
D1 ^{+0.0005"} -0.0000"		L2				L1	TOOL #	USD\$
.5000	1/2	5-1/8	.3125	5	2	9	TR98976	104.75
.5625	9/16	5-1/8	.3430	5	2	9	TR97589	72.97
.6250	5/8	6-1/8	.3750	5	2	10	TR98978	110.65
.6875	11/16	7-1/8	.3906	5	3	11-3/4	TR97590	116.65
.7500	3/4	7-3/8	.5000	5	3	12	TR97591	159.90
.8125	13/16	7-3/8	.5000	5	3	12	TR97592	159.45
.8750	7/8	7-3/8	.5625	5	3	12	TR98980	174.05
.9375	15/16	7-3/8	.6250	5	3	12	TR97593	185.25
1.0000	1	7-3/8	.6875	5	3	12	TR98982	201.20
1.0625	1-1/16	7-3/8	.7500	5	3	12	TR97594	208.20
1.1250	1-1/8	7-3/8	.8125	5	3	12	TR98984	254.75
1.1875	1-3/16	7-3/8	.8750	5	3	12	TR98986	327.60
1.2500	1-1/4	7-3/8	.9375	5	4	13	TR98988	373.35
1.3125	1-5/16	7-3/8	1.0000	5	4	13	TR98990	320.07



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REAMERS - HIGH SPEED STEEL

Flatted Shank Construction Reamers



- Construction flatted shank style
- Black and gold oxide finish minimizes friction and improves lubricity
- High speed steel
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	SHANK DIAMETER	OVERALL LENGTH	BLACK & GOLD OXIDE	
$D_1 \begin{smallmatrix} +.0005" \\ -.0000" \end{smallmatrix}$		L2			L1	TOOL #	USD\$
.3750	3/8	2-1/2	5	3/8	4-5/8	TR97595	63.55
.4375	7/16	3-1/4	5	7/16	5-3/8	TR97596	68.55
.5000	1/2	3-3/4	5	1/2	5-7/8	TR97597	75.80
.5625	9/16	3-3/4	5	1/2	5-7/8	TR97598	79.05
.6250	5/8	4-1/4	5	1/2	6-3/8	TR97599	88.30
.6875	11/16	4-1/4	5	1/2	6-3/8	TR97600	105.50
.7500	3/4	4-1/2	5	1/2	6-7/8	TR97601	111.45
.8125	13/16	4-1/2	5	1/2	6-7/8	TR97602	111.45
.8750	7/8	4-1/2	5	1/2	6-7/8	TR97603	125.80
.9375	15/16	4-1/2	5	1/2	6-7/8	TR97604	125.80
1.0000	1	4-1/2	5	1/2	6-7/8	TR97605	143.75
1.0625	1-1/16	4-1/2	5	1/2	6-7/8	TR97660	169.05

REAMERS - HIGH SPEED STEEL

Magnetic Hex Shank Safety Reamers



- Heavy duty tools designed for enlarging and aligning holes
- Safety magnet hex shank style
- Back and gold oxide finish minimizes friction and improves lubricity
- High speed steel
- Precision manufactured in the USA

REAMER DIAMETER dec. equiv.	size	FLUTE LENGTH	FLUTES	HEX SHANK DIAMETER	OVERALL LENGTH	BLACK & GOLD OXIDE	
$D_1 \begin{smallmatrix} +.0005" \\ -.0000" \end{smallmatrix}$		L2			L1	TOOL #	USD\$
.5625	9/16	4	5	1-1/16	5-1/2	TR99050	133.95
.6875	11/16	4-1/2	5	1-1/16	6-3/8	TR99052	162.70
.8125	13/16	5	5	1-1/4	7	TR99054	193.65
.9375	15/16	5	5	1-7/16	7	TR99056	218.90
1.0625	1-1/16	5	5	1-5/8	7	TR99058	290.00
1.1875	1-3/16	5	5	1-13/16	7	TR99060	373.50
1.3125	1-5/16	5	5	2	7-7/8	TR99062	446.20

REAMERS - SETS

Cobalt

- General purpose reamer set
- M42 cobalt

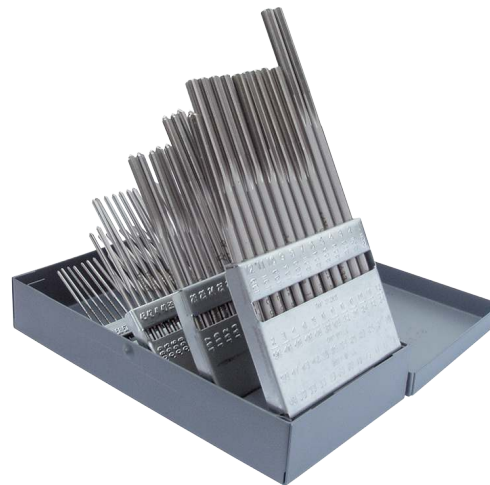


DESCRIPTION	FLUTE STYLE	UNCOATED	
		TOOL #	USD\$
14PC • Dowel Pin • .1230 - .4995 • M42 cobalt	Straight	TR96280	699.55
14PC • O/U • .1240 - .5010 • M42 cobalt	Straight	TR96294	668.35
26PC • A-Z • M42 cobalt	Straight	TR96291	1324.20
29PC • 1/16" - 1/2" by 64ths • M42 cobalt	Straight	TR96284	1346.80
60PC • #1 - #60 • M42 cobalt	Straight	TR96287	1656.15

REAMERS - SETS

High Speed Steel

- General purpose reamer set
- High speed steel



DESCRIPTION	FLUTE STYLE	UNCOATED	
		TOOL #	USD\$
10PC • #4 - 1/2" • Standard • Ctr Bore Set • HSS	RH Spiral	TR96307	529.20
10PC • #4 - 1/2" • 1/64" OS • Ctr Bore Set • HSS	RH Spiral	TR96308	529.20
10PC • #4 - 1/2" • 1/32" OS • Ctr Bore Set • HSS	RH Spiral	TR96309	529.20
14PC • Dowel Pin • .1230 - .4995 • HSS	Straight	TR96279	624.40
14PC • O/U • .1240 - .5010 • HSS	Straight	TR96293	540.85
20PC • #61 - #80 • HSS	Straight	TR96305	457.17
26PC • A-Z • HSS	Straight	TR96290	960.50
29PC • 1/16" - 1/2" by 64ths • HSS	Straight	TR96283	1037.80
60PC • #1 - #60 • HSS	Straight	TR96286	1547.05

For technical information, see page 335

REAMERS - CARBIDE

Technical Information

Carbide Reamers		
Material Guide	SFM	Feed (IPR)
INCONEL	20 - 60	.0010 - .0050
RENE	20 - 60	.0020 - .0060
TITANIUM	30 - 90	.0020 - .0080
WASPOLOY	20 - 60	.0020 - .0060
STAINLESS STEEL - 300 SERIES	20 - 80	.0040 - .0080
STAINLESS STEEL - 400 SERIES	30 - 120	.0050 - .0100
MAGNESIUM	100 - 250	.0050 - .0150
MONEL	40 - 120	.0040 - .0120
STEEL - CAST & FORGED	40 - 100	.0030 - .0100
STEEL - HEAT TREATED (35-40 RC)	40 - 70	.0040 - .0080
STEEL - HEAT TREATED (40-45 RC)	30 - 50	.0020 - .0060
STEEL - HEAT TREATED (45+ RC)	15 - 40	.0010 - .0040
STEEL - MEDIUM CARBON	50 - 100	.0050 - .0100
MOLD STEEL	40 - 120	.0040 - .0060
TOOL STEEL	30 - 90	.0040 - .0060
CAST IRON - SOFT	80 - 200	.0060 - .0150
CAST IRON - MEDIUM	60 - 150	.0060 - .0120
CAST IRON - HARD	40 - 90	.0040 - .0100
ALUMINUM / ALUMINUM ALLOYS	100 - 250	.0050 - .0150
ALUMINUM - HIGH SILICON	80 - 200	.0030 - .0120
BRASS	100 - 250	.0050 - .0150
BRONZE	90 - 175	.0030 - .0120
COPPER / COPPER ALLOYS	90 - 220	.0050 - .0150
EPOXY FIBER	100 - 250	.0050 - .0150
PLASTIC	100 - 300	.0050 - .0150
RESIN - FIBER GLASS	100 - 300	.0050 - .0150
MASONITE	60 - 150	.0050 - .0150
PHENOLIC	60 - 100	.0050 - .0150

REAMERS - COBALT & HIGH SPEED STEEL

Technical Information

Cobalt & High Speed Steel Reamers			
Material Guide	Hardness	SFM	IPR
STEEL - ALL TYPES	60 + Rc	8 - 12	-
	50 + Rc	-	.0020 - .0040
	30 - 50 Rc	-	.0040 - .0080
	50 - 60 Rc	15 - 30	-
	40 - 50 Rc	20 - 40	-
	30 - 40 Rc	35 - 65	-
	Less than 30 Rc	60 - 90	-
CAST IRON & MALLEABLE	-	50 - 85	.0050 - .0120
ALUMINUM, BRASS, BRONZE, COPPER	-	90 - 175	.0050 - .0120
FIBER, PLASTIC, HARD RUBBER, ETC.	-	90 - 175	.0050 - .0120

Recommended Stock Removal		
Material Guide	Reamer Diameter	Removal (In)
STEEL - ALL TYPES	Up to 1/16" incl.	.0030 - .0050
	Over 1/16" to 1/8" incl.	.0040 - .0080
	Over 1/8" to 1/4" incl.	.0060 - .0120
	Over 1/4" to 3/8" incl.	.0080 - .0140
	Over 3/8" to 1/2" incl.	.0100 - .0150
	Over 1/2" to 3/4" incl.	.0120 - .0180

Recommended Lubricants		
Material Guide	Hardness	Lubricants
STEEL - ALL TYPES	Steel harder than 50 Rc	Light Oil
	Steel softer than 50 Rc	Light Oil for good finished or Soluble Oil and Water
CAST IRON & MALLEABLE IRON	-	Soluble Oil and Water
NON-FERROUS MATERIALS	-	Soluble Oil and Water

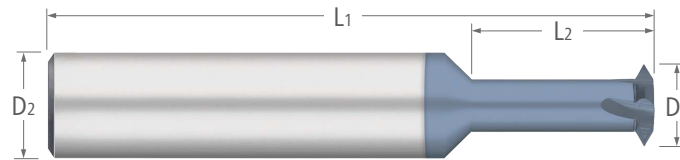
Workpiece hardness and machinability must be considered when setting machine speed. The feed rate plays an important part in the life expectancy of a tool and the hole finish which one is looking to attain. Improper feed rate can cause excessive tool wear as well as an inadequate hole finish.

To eliminate chatter, slow cutting speed and increase feed appropriately. Stock removal roughing operations should not exceed 2 to 4 percent of tool diameter in most case. Stock removal recommendations on finishing operations .002" to .004".

For best results with brass, cast iron, and some plastics, use a Left-Hand Spiral-Fluted reamer with negative shear action. This type of reamer helps prevent chips from working back into the flutes and scoring the hole. In all reaming operations, use constant-flow coolants. Soluble oil is effective for most metals; however, sulfur-based oils are recommended for stainless and certain alloy steels, lard oil and kerosene improve the finish on aluminum.

THREAD MILLS - SINGLE-FORM UN Threads

Single-Form

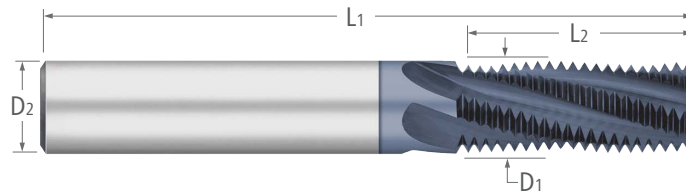


- Single thread form can mill multiple pitches
- Cuts internal and external UN threads
- Mills right and left hand threads
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

MIN. INTERNAL THREAD	THREAD RANGE	CUTTER DIA.	NECK DIA.	LENGTH OF CUT	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
		$D_1^{+.000}_{-.002}$		L2		D2	L1	TOOL #	USD\$	TOOL #	USD\$
#2	56-80	.064	.038	5/32	3	1/8	1-1/2	TC82000	82.50	TC82021	87.35
#3	48-72	.072	.040	5/32	3	1/8	1-1/2	TC82001	82.50	TC82022	87.35
#4	40-64	.080	.045	1/8	3	1/8	2	TC82002	86.60	TC82023	91.65
#4	40-64	.080	.045	1/4	3	1/8	2	TC82003	86.60	TC82024	91.65
#6	32-64	.098	.050	1/4	4	1/8	2	TC82004	83.85	TC82025	88.70
#6	32-64	.098	.050	3/8	4	1/8	2	TC82005	87.10	TC82026	91.95
#8	32-56	.120	.070	5/16	4	1/8	2	TC82006	83.85	TC82027	88.70
#8	32-56	.120	.070	1/2	4	1/8	2	TC82007	87.10	TC82028	91.95
#10	24-56	.138	.075	3/8	4	3/16	2	TC82008	80.75	TC82029	86.45
#10	24-56	.138	.075	5/8	4	3/16	2	TC82009	84.55	TC82030	90.00
#12	24-56	.160	.095	5/8	4	3/16	2	TC82010	84.55	TC82031	90.00
1/4	18-56	.180	.115	1/2	4	3/16	2	TC82011	87.95	TC82032	93.40
1/4	18-56	.180	.115	3/4	4	3/16	2	TC82012	89.70	TC82033	95.35
5/16	16-48	.240	.160	1/2	4	1/4	2-1/2	TC82013	103.35	TC82034	110.55
5/16	16-48	.240	.160	3/4	4	1/4	2-1/2	TC82014	108.20	TC82035	115.70
3/8	14-40	.300	.218	3/4	4	3/8	2-1/2	TC82015	128.30	TC82036	138.65
3/8	14-40	.300	.218	1	4	3/8	2-1/2	TC82016	134.55	TC82037	144.80
1/2	12-32	.388	.250	3/4	4	1/2	3	TC82017	157.85	TC82038	171.85
1/2	12-32	.388	.250	1-1/4	4	1/2	3	TC82018	161.45	TC82039	176.05
3/4	10-32	.495	.340	1	6	1/2	3	TC82019	216.15	TC82040	230.15
3/4	10-32	.495	.340	1-3/8	6	1/2	3	TC82020	219.75	TC82041	233.85

For technical information, see page 341

THREAD MILLS - MULTI-FORM UN Threads

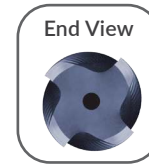
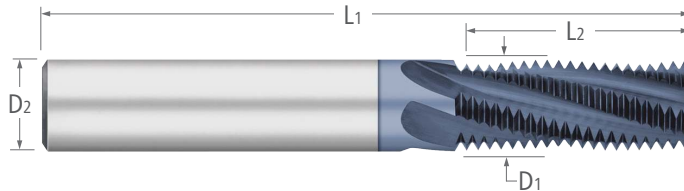


- Cuts internal and external UN threads
- Mills right hand and left hand threads
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

THREAD SIZE	CUTTER DIAMETER	THREAD LENGTH	FLUTES	SHANK DIAMETER	OAL	UNCOATED		AlTiN COATED	
	$D_1^{+.000" / -.002"}$	L_2		D_2	L_1	TOOL #	USD\$	TOOL #	USD\$
2-56	.065	.125	3	1/8	2	TC83950	120.60	TC83995	125.45
4-40	.085	.180	3	1/8	2	TC83952	120.60	TC83998	125.45
6-32	.100	.218	3	1/8	2	TC83901	129.55	TC84001	134.40
8-32	.115	.250	3	1/8	2	TC83903	129.55	TC84003	134.40
8-36	.115	.250	3	1/8	2	TC83905	129.55	TC84005	134.40
10-24	.120	.312	3	3/16	2	TC83907	129.05	TC84007	134.50
10-32	.120	.312	3	3/16	2	TC83909	129.05	TC84009	134.50
1/4-20	.180	.500	3	3/16	2-1/2	TC83911	146.35	TC84011	152.15
1/4-28	.180	.500	3	3/16	2-1/2	TC83913	146.35	TC84013	152.15
5/16-18	.240	.625	3	1/4	2-1/2	TC83915	172.90	TC84015	179.85
5/16-24	.240	.625	3	1/4	2-1/2	TC83917	172.90	TC84017	179.85
3/8-16	.290	.750	4	5/16	3	TC83919	206.00	TC84019	214.35
3/8-24	.290	.750	4	5/16	3	TC83921	206.00	TC84021	214.35
7/16-14	.340	.875	4	3/8	3	TC83923	221.20	TC84023	231.10
7/16-20	.340	.875	4	3/8	3	TC83925	221.20	TC84025	231.10
1/2-13	.350	.875	4	3/8	3-1/2	TC83927	220.35	TC84027	230.95
1/2-20	.350	.875	4	3/8	3-1/2	TC83929	220.35	TC84029	230.95
9/16-12	.370	.875	4	1/2	3-1/2	TC83931	216.20	TC84031	231.25
9/16-18	.370	.875	4	1/2	3-1/2	TC83933	216.20	TC84033	231.25
5/8-11	.470	1.250	5	1/2	3-1/2	TC83935	274.20	TC84035	289.30
5/8-18	.470	1.250	5	1/2	3-1/2	TC83937	274.20	TC84037	289.30
3/4-10	.495	1.250	5	1/2	3-1/2	TC83939	274.20	TC84039	289.30
3/4-16	.495	1.250	5	1/2	3-1/2	TC83941	274.20	TC84041	289.30
7/8-9	.620	1.250	5	5/8	3-1/2	TC83943	344.55	TC84043	361.25
7/8-14	.620	1.250	5	5/8	3-1/2	TC83945	344.55	TC84045	361.25
1-8	.620	1.375	5	3/4	4	TC83947	341.20	TC84047	362.00
1-12	.620	1.375	5	3/4	4	TC83949	341.20	TC84049	362.00

THREAD MILLS - MULTI-FORM

UN Threads - Coolant Through

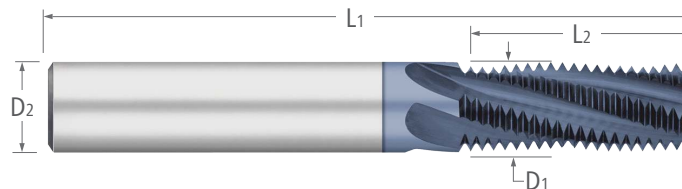


- Cuts internal and external UN threads
- Mills right hand and left hand threads
- Coolant through design for maximum chip ejection in blind holes
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

THREAD SIZE	CUTTER DIA.	THREAD LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
	D1 ^{+0.000"} -0.002"	L2		D2	L1	TOOL #	USD\$	TOOL #	USD\$
10-32	.120	.312	3	3/16	2	TC84710	150.60	TC84810	156.05
1/4-20	.180	.500	3	3/16	2-1/2	TC84712	159.80	TC84812	165.60
1/4-28	.180	.500	3	3/16	2-1/2	TC84714	159.80	TC84814	162.90
5/16-18	.235	.625	3	1/4	2-1/2	TC84716	197.00	TC84816	203.95
5/16-24	.235	.625	3	1/4	2-1/2	TC84718	198.00	TC84818	204.95
3/8-16	.290	.750	4	5/16	3	TC84720	245.55	TC84820	253.90
3/8-24	.290	.750	4	5/16	3	TC84722	245.55	TC84822	253.90
7/16-14	.340	.875	4	3/8	3	TC84724	284.20	TC84824	213.67
7/16-20	.340	.875	4	3/8	3	TC84726	285.75	TC84826	295.65
1/2-13	.350	.875	4	3/8	3-1/2	TC84728	294.55	TC84828	305.15
1/2-20	.350	.875	4	3/8	3-1/2	TC84730	294.55	TC84830	305.15
3/4-10	.495	1.250	4	1/2	3-1/2	TC84740	376.95	TC84840	284.37
3/4-16	.495	1.250	4	1/2	3-1/2	TC84742	376.95	TC84842	391.40

THREAD MILLS - MULTI-FORM

NPT Pipe Threads

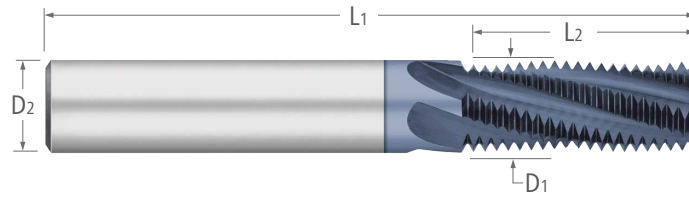


- Cuts internal and external National Pipe Taper (N.P.T.) threads
- Mills right hand and left hand threads
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

THREAD SIZE	CUTTER DIA.	THREAD LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
	D1 ^{+0.000"} -0.002"	L2		D2	L1	TOOL #	USD\$	TOOL #	USD\$
1/16-27	.245	.437	3	1/4	2-1/2	TC84100	172.90	TC84200	179.85
1/8-27	.310	.437	4	5/16	2-1/2	TC84102	171.45	TC84202	180.15
1/4-18	.370	.625	4	3/8	3	TC84104	195.00	TC84204	204.90
3/8-18	.370	.625	4	3/8	3	TC84106	195.00	TC84206	204.90
1/2-14	.495	.875	4	1/2	3-1/2	TC84108	274.20	TC84208	289.30
3/4-14	.495	.875	4	1/2	3-1/2	TC84110	274.20	TC84210	289.30
1-11-1/2	.620	1.125	5	3/4	4	TC84112	341.20	TC84212	362.00

For technical information, see page 341

THREAD MILLS - MULTI-FORM NPTF Pipe Threads

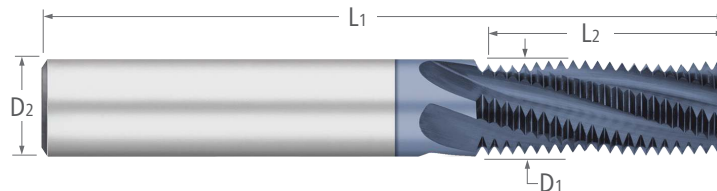


- Cuts internal and external National Pipe Taper for Fuels (N.P.T.F.) threads
- Mills right hand and left hand threads
- Solid carbide
- AlTiN coating offers increased wear and heat resistance
- Precision manufactured in the USA

THREAD SIZE	CUTTER DIA.	THREAD LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
	$D_1^{+.000}_{-.002}$	L ₂		D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
1/16-27	.245	.437	3	1/4	2-1/2	TC84301	172.90	TC84401	179.85
1/8-27	.310	.437	4	5/16	2-1/2	TC84303	171.45	TC84403	180.15
1/4-18	.370	.625	4	3/8	3	TC84305	195.00	TC84405	204.90
3/8-18	.370	.625	4	3/8	3	TC84307	195.00	TC84407	204.90
1/2-14	.495	.875	4	1/2	3-1/2	TC84309	274.20	TC84409	288.25
3/4-14	.495	.875	4	1/2	3-1/2	TC84311	274.20	TC84411	289.30
1-11-1/2	.620	1.125	5	3/4	4	TC84313	341.20	TC84413	362.00

Multi-Form

THREAD MILLS - MULTI-FORM NPS Pipe Threads



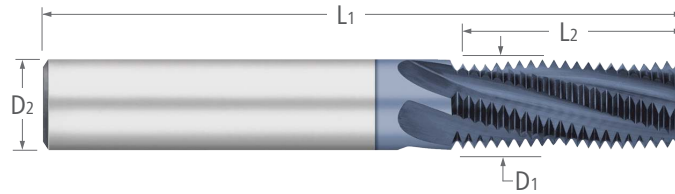
- Cuts internal and external National Pipe Straight (N.P.S.) threads
- Mills right and left hand threads
- Solid carbide
- Single thread form can mill multiple pitches
- AlTiN coating offers increased wear and heat resistance
- Precision manufactured in the USA

THREAD SIZE	CUTTER DIA.	THREAD LENGTH	FLUTES	SHANK DIA.	OAL	AlTiN COATED	
	$D_1^{+.000}_{-.002}$	L ₂		D ₂	L ₁	TOOL #	USD\$
1/16-27	.245	.437	3	1/4	2-1/2	TC83100	157.40
1/8-27	.240	.570	3	1/4	2-1/2	TC83101	172.30
1/4-18	.430	.737	4	7/16	3	TC83102	229.80
3/8-18	.430	.737	4	7/16	3	TC83103	229.80
1/2-14	.620	1.150	5	5/8	3-1/2	TC83104	340.65
3/4-14	.620	1.150	5	5/8	3-1/2	TC83105	340.65
1-11-1/2	.745	1.365	5	3/4	4	TC83106	405.10

For technical information, see page 341

THREAD MILLS - MULTI-FORM

Metric Threads



- Cuts internal and external Metric threads
- Mills right hand and left hand threads
- AlTiN coating offers increased wear and heat resistance
- Solid carbide
- Precision manufactured in the USA

Multi-Form

THREAD SIZE	CUTTER DIA.	THREAD LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
	$D_1 \begin{smallmatrix} +.000" \\ -.002" \end{smallmatrix}$	L_2		D_2	L_1	TOOL #	USD\$	TOOL #	USD\$
M4 x 0.70	.115	.250	3	1/8	2	TC84520	133.20	TC84620	138.05
M4.5 x 0.75	.120	.250	3	1/8	2	TC84522	132.40	TC84622	137.25
M5 x 0.80	.120	.312	3	3/16	2	TC84524	132.40	TC84624	137.85
M6 x 1.00	.170	.500	3	3/16	2-1/2	TC84526	145.40	TC84626	151.20
M8 x 0.75	.235	.625	3	1/4	2-1/2	TC84528	172.90	TC84628	179.85
M8 x 1.00	.235	.625	3	1/4	2-1/2	TC84530	172.90	TC84630	179.85
M8 x 1.25	.235	.625	3	1/4	2-1/2	TC84532	172.90	TC84632	179.85
M10 x 1.25	.300	.750	4	5/16	3	TC84534	205.00	TC84634	213.35
M10 x 1.50	.300	.750	4	5/16	3	TC84536	206.00	TC84636	214.35
M12 x 1.00	.360	.875	4	3/8	3-1/2	TC84538	221.30	TC84638	232.45
M12 x 1.25	.360	.875	4	3/8	3-1/2	TC84540	221.30	TC84640	232.45
M12 x 1.75	.360	.875	4	3/8	3-1/2	TC84542	221.30	TC84642	232.45
M14 x 1.50	.360	.875	4	3/8	3-1/2	TC84544	221.30	TC84644	232.45
M16 x 2.00	.470	1.250	5	1/2	3-1/2	TC84546	274.20	TC84646	289.30
M18 x 2.50	.470	1.250	5	1/2	3-1/2	TC84548	274.20	TC84648	289.30
M20 x 3.00	.470	1.250	5	5/8	3-1/2	TC84550	270.35	TC84650	208.87

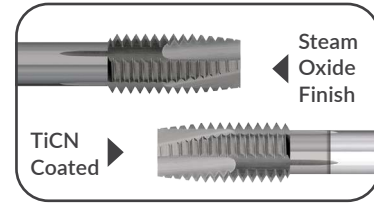
THREAD MILLS - CARBIDE

Technical Information

General Purpose Carbide Multi Form Thread Mills												
Material Guide		Rc	SFM	Feed Per Tooth								
				1/16	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4
COBALT BASE ALLOYS	Stellite, HS-21, Haynes 25/188, X-40, L-605	under 32 over 32	50 - 90	.00015 .00025	.0002 .0005	.0003 .0005	.0004 .0006	.0006 .0009	.0008 .0015	.0010 .0020	.0014 .0028	.0018 .0030
NICKEL BASE ALLOYS	Inconel-625/718, Waspalloy, Rene, Hastelloy	under 32 over 32	60 - 100	.0002 .0003	.0003 .0006	.0005 .0010	.0008 .0015	.0010 .0020	.0015 .0025	.0015 .0025	.0020 .0030	.0025 .0040
IRON BASE ALLOYS	Incoloy 800-802, Multimet N-155, Timken 16-25-6, Carpenter 22-b3	under 32 over 32	50 - 90	.00015 .00025	.0002 .0005	.0003 .0005	.0004 .0006	.0006 .0009	.0008 .0015	.0010 .0020	.0014 .0028	.0018 .0030
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		80 - 150	.0002 .0005	.0003 .0006	.0005 .0010	.0008 .0015	.0010 .0020	.0015 .0025	.0015 .0025	.0025 .0035	.0030 .0040
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17-4, AM-350/355	under 32 over 32	100 - 250	.00015 .00025	.00025 .00055	.0005 .0010	.0008 .0015	.0010 .0020	.0015 .0025	.0020 .0030	.0030 .0040	.0035 .0050
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 316	under 32 over 32	100 - 250	.00015 .00025	.00025 .00055	.0005 .0010	.0008 .0015	.0010 .0020	.0015 .0025	.0020 .0030	.0030 .0040	.0035 .0050
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	under 32 over 32	150 - 250	.0002 .0003	.0004 .0008	.0005 .0010	.0010 .0015	.0015 .0020	.0015 .0030	.0020 .0035	.0030 .0040	.0030 .0040
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, O1	under 32 over 32	250 - 400	.00015 .0003	.0003 .0006	.0005 .0010	.0008 .0015	.0010 .0020	.0015 .0025	.0020 .0030	.0030 .0040	.0035 .0050
MEDIUM ALLOY STEELS	200, 250, 300	under 32 over 32	300 - 450	.0002 .0004	.0005 .0010	.0010 .0015	.0015 .0025	.0020 .0030	.0030 .0045	.0035 .0055	.0050 .0070	.0060 .0080
CARBON STEELS	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	under 32 over 32	350 - 500	.0002 .0004	.0005 .0010	.0010 .0015	.0015 .0025	.0020 .0030	.0030 .0045	.0035 .0055	.0050 .0070	.0060 .0080
DUCTILE	Ductile Cast Irons		200 - 300	.00025 .00035	.0003 .0006	.0005 .0010	.0008 .0015	.0010 .0020	.0015 .0025	.0020 .0030	.0030 .0040	.0030 .0050
CAST IRONS	Gray Cast Irons		250 - 350	.00025 .00035	.0004 .0008	.0005 .0010	.0008 .0015	.0010 .0020	.0015 .0025	.0020 .0030	.0030 .0040	.0030 .0050
MALLEABLE	A220, A436, A439, A602		200 - 300	.00025 .00035	.0003 .0006	.0005 .0010	.0008 .0015	.0010 .0020	.0015 .0025	.0020 .0030	.0030 .0040	.0030 .0050
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded		800 - 1400	.0002 .0004	.0005 .0010	.0010 .0015	.0015 .0025	.0020 .0030	.0030 .0045	.0035 .0055	.0050 .0070	.0060 .0100
HIGH SILICON			475 - 750	.00015 .00022	.00035 .0004	.00075 .0008	.0010 .0020	.0015 .0025	.0018 .0028	.0023 .0030	.0028 .0031	.0035 .0050
MAGNESIUM			800 - 1400	.0003 .0005	.0005 .0010	.0010 .0015	.0015 .0025	.0020 .0030	.0030 .0045	.0035 .0055	.0050 .0070	.0060 .0100
COPPER, COPPER ALLOYS			450 - 1000	.00025 .00035	.0003 .0006	.0005 .0010	.0008 .0015	.0010 .0020	.0015 .0025	.0020 .0030	.0030 .0040	.0035 .0050
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		550 - 800	.0002 .0005	.0005 .0010	.0010 .0015	.0015 .0025	.0020 .0030	.0030 .0045	.0035 .0055	.0050 .0070	.0060 .0100
COMPOSITES	G-10 Fiberglass, Graphite, Graphite/Epoxy, Plastics		800 - 1400	.0003 .0005	.0005 .0010	.0010 .0015	.0015 .0025	.0020 .0030	.0030 .0045	.0035 .0055	.0050 .0070	.0060 .0100

HIGH PERFORMANCE TAPS

Spiral Point - ANSI Threads



- Best used for through hole tapping applications
- Optimized for steel, steel alloys, stainless steels, and a variety of other steels up to 32 Rc
- Taps are on blanks that meet ANSI specifications
- Steam Oxide finish provides decreased galling and increased lubricity in low carbon steels and gummy materials
- TiCN coating adds enhanced performance when AlTiN cannot be used
- AlTiN coating offers increased wear and heat resistance
- Premium powdered metal
- Precision manufactured in the USA

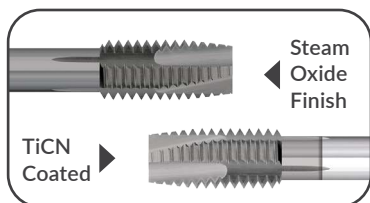
SIZE	H LIMIT	FLUTES	UNCOATED		STEAM OXIDE		TiCN COATED		AlTiN COATED	
			TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
2-56	H2	2	TT97003	25.85	TT96903	26.70	TT97903	30.25	TT97103	30.90
4-40	H2	2	TT97015	19.95	TT96915	21.55	TT97915	28.85	TT97115	28.85
6-32	H3	2	TT97024	19.95	TT96924	21.55	TT97924	28.85	TT97124	28.85
8-32	H3	3	TT97030	19.95	TT96930	21.55	TT97930	28.85	TT97130	28.85
10-24	H3	3	TT97036	19.95	TT96936	21.95	TT97936	28.85	TT97136	28.85
10-32	H3	3	TT97040	19.95	TT96940	21.95	TT97940	28.85	TT97140	28.85
1/4-20	H3	3	TT97044	22.00	TT96944	24.15	TT97944	31.55	TT97144	31.55
1/4-20	H5	3	TT97048	22.00	TT96948	24.15	TT97948	31.55	TT97148	31.55
1/4-28	H3	3	TT97051	22.00	TT96951	24.15	TT97951	31.55	TT97151	31.55
1/4-28	H4	3			TT96954	24.15			TT97154	31.55
5/16-18	H3	3	TT97057	24.05	TT96957	26.55	TT97957	34.55	TT97157	36.40
5/16-18	H5	3	TT97060	17.97	TT96960	26.55	TT97960	34.55	TT97160	36.40
5/16-24	H3	3	TT97063	24.05	TT96963	26.55	TT97963	31.80	TT97163	36.40
5/16-24	H4	3	TT97066	17.87	TT96966	26.55			TT97166	34.55
3/8-16	H3	3	TT97069	28.55	TT96969	31.45	TT97969	41.00	TT97169	41.00
3/8-16	H5	3	TT97071	28.55	TT96971	31.45	TT97971	41.00	TT97171	41.00
3/8-24	H3	3	TT97073	28.55	TT96973	31.45	TT97973	41.00	TT97173	41.00
3/8-24	H4	3	TT97075	21.27	TT96975	23.57	TT97975	40.95	TT97175	39.90
7/16-14	H3	3	TT97076	27.17	TT96976	39.30	TT97976	44.85	TT97176	46.95
7/16-14	H5	3	TT97078	36.50	TT96978	40.05	TT97978	39.27	TT97178	47.05
7/16-20	H3	3	TT97079	36.35			TT97979	52.55	TT97179	46.95
7/16-20	H5	3	TT97081	36.35					TT97181	46.95
1/2-13	H3	3	TT97083	43.40	TT96983	47.05	TT97983	62.80	TT97183	62.80
1/2-13	H5	3	TT97085	43.40	TT96985	47.05	TT97985	51.90	TT97185	62.80
1/2-20	H3	3	TT97087	43.40	TT96987	47.05	TT97987	62.80	TT97187	62.80
1/2-20	H5	3	TT97089	32.47	TT96989	35.17	TT97989	62.80	TT97189	62.80
5/8-11	H3	4	TT97091	82.75	TT96991	89.45	TT97991	119.60	TT97191	119.60
5/8-11	H6	4	TT97093	61.97	TT96993	87.05	TT97993	119.60	TT97193	119.60
5/8-18	H3	4	TT97094	62.17	TT96994	65.47			TT97194	97.40
5/8-18	H5	4	TT97095	61.97			TT97995	70.57	TT97195	97.15
3/4-10	H3	4	TT97099	107.00	TT96999	113.00	TT97999	121.35	TT97199	154.55
3/4-10	H6	4	TT97096	107.00	TT96996	113.00	TT97996	121.35	TT97196	154.55
3/4-16	H3	4	TT97097	107.00	TT96997	84.67			TT97197	124.90
3/4-16	H5	4	TT97098	80.67	TT96998	113.50	TT97998	91.17	TT97198	93.97

All taps sold individually
 Sizes 3/8" and smaller have male center

For technical information, see page 384

HIGH PERFORMANCE TAPS

Spiral Point - Metric Threads



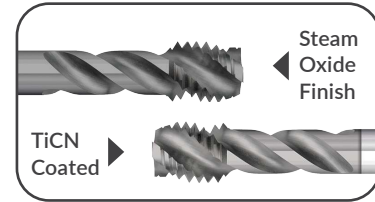
- Best used for through hole tapping applications
- Optimized for steel, steel alloys, stainless steels, and a variety of other steels up to 32 Rc
- Taps are on blanks that meet ANSI specifications
- Steam Oxide finish provides decreased galling and increased lubricity in low carbon steels and gummy materials
- TiCN coating adds enhanced performance when AlTiN cannot be used
- AlTiN coating offers increased wear and heat resistance
- Premium powdered metal
- Precision manufactured in the USA

SIZE	D LIMIT	FLUTES	UNCOATED		STEAM OXIDE		TiCN COATED		AlTiN COATED	
			TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
M2.5 x 0.45	D3	2	TT98208	22.85	TT98301	24.45	TT98955	31.95	TT98418	31.95
M3 x 0.5	D3	2	TT98210	22.85	TT98303	24.45	TT98961	31.95	TT98420	31.95
M3.5 x 0.6	D3	3	TT98221	22.75			TT98979	31.95	TT98431	31.95
M3.5 x 0.6	D4	3	TT98222	16.87					TT98432	28.15
M4 x 0.7	D3	3	TT98224	22.85	TT98321	24.55	TT98981	31.95	TT98433	31.95
M4 x 0.7	D4	3	TT98211	22.85	TT98304	24.55	TT98963	27.35	TT98421	31.95
M5 x 0.8	D3	3	TT98226	22.75	TT98323	24.60	TT98983	31.95	TT98435	31.95
M5 x 0.8	D4	3	TT98212	22.85	TT98305	24.70	TT98965	29.80	TT98422	31.95
M6 x 1.0	D3	3	TT98228	25.00	TT98325	27.25	TT98985	35.10	TT98437	35.00
M6 x 1.0	D5	3	TT98213	25.00	TT98306	27.25	TT98967	35.10	TT98423	35.00
M8 x 1.25	D3	3	TT98230	27.15	TT98327	29.85	TT98987	38.20	TT98439	38.20
M8 x 1.25	D5	3	TT98214	27.15	TT98308	29.85	TT98969	38.20	TT98424	38.20
M10 x 1.5	D3	3	TT98232	32.15	TT98329	35.20	TT98989	44.95	TT98441	44.95
M10 x 1.5	D6	3	TT98215	32.15	TT98310	35.40	TT98971	44.95	TT98425	44.95
M12 x 1.75	D3	3	TT98234	49.40	TT98331	53.30	TT98991	69.35	TT98443	69.35
M12 x 1.75	D6	3	TT98216	49.40	TT98312	53.30			TT98426	69.35
M14 x 2.0	D3	3	TT98236	75.25	TT98333	59.17	TT98993	85.10	TT98445	65.57
M14 x 2.0	D7	3	TT98218	56.37	TT98314	59.17			TT98428	95.30
M16 x 2.0	D3	3	TT98238	88.40	TT98335	92.75	TT98995	99.90	TT98447	102.75
M16 x 2.0	D7	3	TT98220	66.27	TT98316	95.45	TT98977	99.90		

All taps sold individually
 Sizes 3/8" and smaller have male center

HIGH PERFORMANCE TAPS

Spiral Flute Semi-Bottoming - ANSI Threads



- Best used for blind hole tapping applications
- Features a 2 – 2½ thread chamfer
- Semi-bottoming 45° helix
- Optimized for steel, steel alloys, stainless steels, and a variety of other steels up to 32 Rc
- Taps are on blanks that meet ANSI specifications
- Steam Oxide finish provides decreased galling and increased lubricity in low carbon steels and gummy materials
- TiCN coating adds enhanced performance when AlTiN cannot be used
- AlTiN coating offers increased wear and heat resistance
- High vanadium powdered metal
- Precision manufactured in the USA

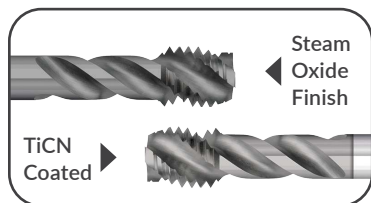
SIZE	H LIMIT	FLUTES	UNCOATED		STEAM OXIDE		TiCN COATED		AlTiN COATED	
			TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
2-56	H2	2	TT97203	31.20	TT97503	33.35	TT97603	35.55	TT97303	44.65
4-40	H2	3	TT97207	31.20	TT97507	33.35	TT97607	44.65	TT97307	44.65
6-32	H3	3	TT97215	31.20	TT97515	33.35	TT97615	44.65	TT97315	44.65
8-32	H3	3	TT97223	31.20	TT97523	33.35	TT97623	44.65	TT97323	44.65
10-24	H3	3	TT97227	31.20	TT97527	33.50	TT97627	36.75	TT97327	44.65
10-32	H3	3	TT97231	31.20	TT97531	33.50	TT97631	44.65	TT97331	44.65
1/4-20	H3	3	TT97237	32.00	TT97537	34.40	TT97637	46.05	TT97337	46.05
1/4-20	H5	3	TT97239	32.00	TT97539	34.40	TT97639	46.05	TT97339	46.05
1/4-28	H3	3	TT97241	32.00	TT97541	34.40	TT97641	46.05	TT97341	46.05
1/4-28	H4	3	TT97243	32.00	TT97543	34.40	TT97643	37.15	TT97343	46.05
5/16-18	H3	3	TT97245	35.20	TT97545	37.85	TT97645	50.40	TT97345	50.40
5/16-18	H5	3	TT97247	35.20	TT97547	37.85	TT97647	50.40	TT97347	50.40
5/16-24	H3	3	TT97249	26.17	TT97549	37.65	TT97649	50.40	TT97349	50.35
5/16-24	H4	3	TT97251	26.17	TT97551	37.65	TT97651	37.67	TT97351	44.90
3/8-16	H3	3	TT97253	41.55	TT97553	44.65	TT97653	59.75	TT97353	59.75
3/8-16	H5	3	TT97255	41.55	TT97555	44.65	TT97655	59.75	TT97355	59.75
3/8-24	H3	3	TT97257	31.07	TT97557	44.60	TT97657	50.70	TT97357	59.70
3/8-24	H4	3	TT97259	41.55	TT97559	44.55	TT97659	44.77	TT97359	44.77
7/16-14	H3	3	TT97261	39.57	TT97561	56.45	TT97661	61.25	TT97361	75.55
7/16-14	H5	3	TT97263	52.80	TT97563	56.50			TT97363	63.35
7/16-20	H3	3	TT97265	52.80	TT97565	56.25	TT97665	75.55	TT97365	63.35
7/16-20	H5	3	TT97267	39.57	TT97567	56.45	TT97667	56.67	TT97367	47.37
1/2-13	H3	3	TT97269	62.25	TT97569	67.00	TT97669	89.65	TT97369	89.65
1/2-13	H5	3	TT97271	62.25	TT97571	67.00	TT97671	89.65	TT97371	89.65
1/2-20	H3	3	TT97273	62.25	TT97573	65.80	TT97673	89.65	TT97373	72.90
1/2-20	H5	3	TT97275	62.25	TT97575	67.00	TT97675	67.17	TT97375	89.65
5/8-11	H3	3	TT97277	119.60	TT97577	123.85	TT97677	171.15	TT97377	171.20
5/8-11	H6	3	TT97279	89.17	TT97579	128.00	TT97679	171.20	TT97379	133.40
5/8-18	H3	3	TT97281	89.67	TT97581	92.87	TT97681	130.95		
5/8-18	H5	3	TT97283	89.17	TT97583	95.97	TT97683	125.70	TT97383	133.40
3/4-10	H3	4	TT97285	104.17	TT97585	149.60	TT97685	153.35	TT97385	200.15
3/4-10	H6	4	TT97287	139.85	TT97587	149.60	TT97687	200.10		
3/4-16	H3	4	TT97289	104.17	TT97589	108.77	TT97689	114.97	TT97389	157.00
3/4-16	H5	4	TT97291	104.17	TT97591	149.60	TT97691	114.97	TT97391	157.00

All taps sold individually
 Sizes 3/8" and smaller have male center

For technical information, see page 384

HIGH PERFORMANCE TAPS

Spiral Flute Semi-Bottoming - Metric Threads



- Best used for blind hole tapping applications
- Features a 2 – 2½ thread chamfer
- Semi-bottoming 45° helix
- Optimized for steel, steel alloys, stainless steels, and a variety of other steels up to 32 Rc
- Taps are on blanks that meet ANSI specifications
- Steam Oxide finish provides decreased galling and increased lubricity in low carbon steels and gummy materials
- TiCN coating adds enhanced performance when AlTiN cannot be used
- AlTiN coating offers increased wear and heat resistance
- High vanadium powdered metal
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED		STEAM OXIDE		TiCN COATED		AlTiN COATED	
			TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
M2.5 x 0.45	D3	2	TT98508	35.45	TT98601	36.30	TT98845	48.60	TT98715	48.60
M3 x 0.5	D3	2	TT98510	35.45	TT98603	37.90	TT98851	48.60	TT98720	48.60
M3.5 x 0.6	D3	3	TT98521	35.25	TT98617	26.97				
M4 x 0.7	D3	3	TT98523	35.45	TT98619	37.90	TT98871	48.60	TT98733	48.60
M4 x 0.7	D4	3	TT98511	35.45	TT98604	37.90	TT98853	48.60	TT98721	48.60
M5 x 0.8	D3	3	TT98525	35.45	TT98621	37.90	TT98873	48.60	TT98735	48.60
M5 x 0.8	D4	3	TT98512	35.45	TT98605	37.90	TT98855	40.95	TT98722	48.60
M6 x 1.0	D3	3	TT98527	36.30	TT98623	39.05	TT98875	50.40	TT98737	50.40
M6 x 1.0	D5	3	TT98513	36.30	TT98606	39.05	TT98857	50.40	TT98723	50.40
M8 x 1.25	D3	3	TT98529	40.05	TT98625	42.90	TT98877	55.80	TT98739	55.80
M8 x 1.25	D5	3	TT98514	40.05	TT98608	42.90	TT98859	47.90	TT98724	55.80
M10 x 1.5	D3	3	TT98531	47.15	TT98627	50.70	TT98879	65.75	TT98741	65.75
M10 x 1.5	D6	3	TT98515	47.15	TT98610	50.70	TT98861	65.75	TT98725	58.55
M12 x 1.75	D3	3	TT98533	70.70	TT98629	76.05	TT98881	99.00	TT98743	81.25
M12 x 1.75	D6	3	TT98516	70.70	TT98612	55.57	TT98863	79.15	TT98726	99.00
M14 x 2.0	D3	3	TT98535	100.25	TT98631	77.97			TT98745	112.50
M14 x 2.0	D7	3	TT98518	100.25					TT98728	112.50
M16 x 2.0	D3	3	TT98537	117.85	TT98633	94.37	TT98885	96.77	TT98747	132.15
M16 x 2.0	D7	3	TT98520	117.25	TT98616	121.60	TT98867	96.47	TT98730	110.97

All taps sold individually
 Sizes 3/8" and smaller have male center

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps



- For optimal results, use a Taper Tap for an initial pass, prior to using a Plug or Bottom Tap to finish the thread
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED			
			TAPER	PLUG	BOTTOM	USD\$
0-80*	H1	2	TT90000	TT90001	TT90002	14.20
0-80	H2	2		TT90005	TT90006	14.20
1-64	H1	2		TT90009	TT90010	13.25
1-72*	H1	2	TT90016	TT90017	TT90018	13.25
1-72	H2	2		TT90021	TT90022	13.25
2-56	H1	3	TT90028	TT90029	TT90030	12.20
2-56	H2	2		TT90033	TT90034	12.20
2-56*	H2	3	TT90036	TT90037	TT90038	11.30
2-64	H2	3	TT90044	TT90045	TT90046	12.20
3-48	H2	2		TT90053		9.95
3-48*	H2	3	TT90056	TT90057	TT90058	8.85
3-56	H2	3	TT90060	TT90061	TT90062	9.85
4-40	H1	2		TT90065		7.95
4-40	H1	3	TT90068	TT90069	TT90070	7.70
4-40	H2	2		TT90073	TT90074	7.70
4-40*	H2	3	TT90076	TT90077	TT90078	7.25
4-48	H2	3	TT90084	TT90085	TT90086	7.70
4-36	H2	3		TT90089		7.70
5-40	H1	3		TT90093	TT90094	7.70
5-40	H2	2		TT90097	TT90098	7.70
5-40*	H2	3	TT90100	TT90101	TT90102	7.25
5-44	H2	3	TT90108	TT90109	TT90110	7.70
6-32	H1	3	TT90116	TT90117	TT90118	6.85
6-32	H2	2		TT90121	TT90122	6.85
6-32*	H2	3	TT90124	TT90125	TT90126	5.80
6-32	H3	2		TT90129	TT90130	5.80
6-32	H3	3	TT90132	TT90133	TT90134	5.60
6-32	H7	3		TT90137	TT90138	6.85
6-40	H2	2		TT90145		6.85
6-40*	H2	3	TT90148	TT90149	TT90150	5.80
8-32	H1	3		TT90157	TT90158	6.85
8-32	H1	4	TT90160	TT90161	TT90162	6.85
8-32	H2	2		TT90165	TT90166	6.85
8-32	H2	3		TT90169	TT90170	6.85
8-32	H2	4	TT90172	TT90173	TT90174	5.80
8-32	H3	2		TT90177	TT90178	5.80
8-32	H3	3		TT90181	TT90182	5.80
8-32*	H3	4	TT90184	TT90185	TT90186	5.65
8-32	H7	3		TT90189	TT90190	6.85
8-36	H1	4		TT90197		6.85
8-36*	H2	4	TT90200	TT90201	TT90202	5.80
10-24	H1	3		TT90205		6.85
10-24	H1	4	TT90208	TT90209	TT90210	5.95
10-24	H2	2		TT90213	TT90214	6.85
10-24	H2	3		TT90217		6.85
10-24	H2	4	TT90220	TT90221	TT90222	5.95

* Most Popular Size When Multiple Options Are Available

All taps sold individually

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For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps (Cont.)

continued from previous page

SIZE	H LIMIT	FLUTES	UNCOATED			
			TAPER	PLUG	BOTTOM	USD\$
10-24	H3	2		TT90225	TT90226	5.95
10-24	H3	3		TT90229	TT90230	5.95
10-24*	H3	4	TT90232	TT90233	TT90234	5.80
10-24	H7	3		TT90237	TT90238	6.85
10-24	H7	4		TT90241	TT90242	6.85
10-32	H1	2		TT90245	TT90246	6.85
10-32	H1	3		TT90249		6.85
10-32	H1	4	TT90252	TT90253	TT90254	5.95
10-32	H2	2		TT90257	TT90258	6.85
10-32	H2	3		TT90261	TT90262	6.85
10-32	H2	4	TT90264	TT90265	TT90266	5.95
10-32	H3	2		TT90269	TT90270	5.95
10-32	H3	3		TT90273	TT90274	5.95
10-32*	H3	4	TT90276	TT90277	TT90278	5.80
12-24	H3	4	TT90288	TT90289	TT90290	6.20
12-28	H3	4	TT90296	TT90297	TT90298	6.85
1/4-20	H1	3		TT90301		7.80
1/4-20	H1	4	TT90304	TT90305	TT90306	7.80
1/4-20	H2	3		TT90309		7.80
1/4-20	H2	4	TT90311	TT90312	TT90313	7.50
1/4-20	H3	2		TT90316	TT90317	7.80
1/4-20	H3	3		TT90320	TT90321	7.50
1/4-20*	H3	4	TT90323	TT90324	TT90325	6.30
1/4-20	H5	3		TT90328	TT90329	7.80
1/4-20	H5	4		TT90332	TT90333	7.50
1/4-28	H1	4		TT90336	TT90337	7.50
1/4-28	H2	4		TT90340	TT90341	7.80
1/4-28	H3	2		TT90344	TT90345	7.80
1/4-28	H3	3		TT90348	TT90349	7.80
1/4-28*	H3	4	TT90351	TT90352	TT90353	6.30
1/4-28	H4	4		TT90356	TT90357	7.80
5/16-18	H1	4	TT90359	TT90360	TT90361	8.70
5/16-18	H2	4	TT90363	TT90364	TT90365	8.70
5/16-18	H3	2		TT90368	TT90369	9.85
5/16-18	H3	3		TT90372	TT90373	8.70
5/16-18*	H3	4	TT90375	TT90376	TT90377	7.70
5/16-18	H5	3		TT90380	TT90381	9.85
5/16-18	H5	4		TT90384	TT90385	8.70
5/16-24	H1	4		TT90388	TT90389	8.70
5/16-24	H2	4		TT90392		8.70
5/16-24	H3	3		TT90396	TT90397	8.70
5/16-24*	H3	4	TT90399	TT90400	TT90401	7.70
5/16-24	H4	4		TT90404	TT90405	8.70
3/8-16	H1	3		TT90408		11.15
3/8-16	H2	4	TT90414	TT90415	TT90416	9.85
3/8-16	H3	3		TT90419	TT90420	9.85
3/8-16*	H3	4	TT90422	TT90423	TT90424	8.85
3/8-16	H5	3		TT90427	TT90428	11.15
3/8-16	H5	4		TT90431	TT90432	9.85
3/8-24	H3	3		TT90443	TT90444	11.15
3/8-24*	H3	4	TT90446	TT90447	TT90448	8.85
3/8-24	H4	4		TT90451	TT90452	9.85
7/16-14	H2	4		TT90459	TT90460	16.60
7/16-14	H3	3		TT90463		16.60

* Most Popular Size When Multiple Options Are Available

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For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps (Cont.)

continued from previous page

SIZE	H LIMIT	FLUTES	UNCOATED			
			TAPER	PLUG	BOTTOM	USD\$
7/16-14*	H3	4	TT90465	TT90466	TT90467	15.10
7/16-14	H5	4		TT90470	TT90471	16.60
7/16-20	H2	4		TT90478	TT90479	16.60
7/16-20	H3	3		TT90482		16.60
7/16-20*	H3	4	TT90484	TT90485	TT90486	15.10
7/16-20	H5	4		TT90489	TT90490	16.60
1/2-13	H1	4		TT90493	TT90494	19.20
1/2-13	H2	4		TT90497	TT90498	19.20
1/2-13	H3	3		TT90501	TT90502	19.20
1/2-13*	H3	4	TT90504	TT90505	TT90506	15.60
1/2-13	H5	4		TT90509	TT90510	19.65
1/2-20	H1	4	TT90512	TT90513	TT90514	19.20
1/2-20	H3	3		TT90521		19.20
1/2-20*	H3	4	TT90523	TT90524	TT90525	17.70
1/2-20	H5	4		TT90528	TT90529	19.20
9/16-12	H2	4		TT90532		28.55
9/16-12*	H3	4	TT90535	TT90536	TT90537	26.45
9/16-12	H5	4		TT90540	TT90541	28.55
9/16-18	H2	4		TT90544		28.55
9/16-18*	H3	4	TT90546	TT90547	TT90548	26.45
9/16-18	H5	4		TT90551	TT90552	28.55
5/8-11*	H3	4	TT90561	TT90562	TT90563	31.55
5/8-11	H5	4		TT90566	TT90567	36.25
5/8-18	H2	4		TT90574	TT90575	36.25
5/8-18*	H3	4	TT90577	TT90578	TT90579	31.55
11/16-11	H3	4	TT90585	TT90586	TT90587	39.25
11/16-16	H3	4	TT90589	TT90590	TT90591	39.25
3/4-10	H2	4		TT90597		47.60
3/4-10*	H3	4	TT90600	TT90601	TT90602	44.05
3/4-10	H5	4		TT90605	TT90606	47.60
3/4-16	H2	4		TT90612		47.60
3/4-16*	H3	4	TT90615	TT90616	TT90617	44.05
3/4-16	H5	4		TT90620	TT90621	47.60
7/8-9*	H4	4	TT90626	TT90627	TT90628	61.40
7/8-9	H6	4		TT90631		64.70
7/8-14	H2	4		TT90634		64.70
7/8-14*	H4	4	TT90636	TT90637	TT90638	61.40
7/8-14	H6	4		TT90641		64.70
1-8	H2	4		TT90644		84.40
1-8*	H4	4	TT90646	TT90647	TT90648	81.50
1-8	H6	4		TT90651		84.40
1-12	H4	4	TT90653	TT90654	TT90655	81.50
1-14	H2	4		TT90658		84.40
1-14*	H4	4	TT90660	TT90661	TT90662	81.50
1-14	H6	4	TT90664	TT90665	TT90666	84.40
1-1/8-7	H4	4	TT90668	TT90669	TT90670	132.00
1-1/8-12	H4	4	TT90672	TT90673	TT90674	139.75
1-1/4-7	H4	4	TT90676	TT90677	TT90678	173.25
1-1/4-12	H4	6	TT90680	TT90681	TT90682	176.25
1-3/8-6	H4	4	TT90684	TT90685	TT90686	218.75
1-3/8-12	H4	6	TT90688	TT90689	TT90690	220.20
1-1/2-6	H4	4	TT90692	TT90693	TT90694	252.55
1-1/2-12	H4	6	TT90696	TT90697	TT90698	255.95

* Most Popular Size When Multiple Options Are Available

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps - Steam Oxide Finish



- For optimal results, use a Taper Tap for an initial pass, prior to using a Plug or Bottom Tap to finish the thread
- Taps are on blanks that meet ANSI specifications
- Steam Oxide finish provides decreased galling and increased lubricity in low carbon steels and gummy materials
- High speed steel
- Precision manufactured in the USA

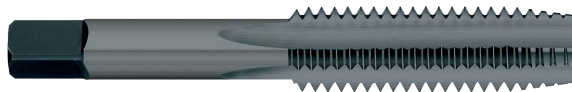
SIZE	H LIMIT	FLUTES	STEAM OXIDE			
			TAPER	PLUG	BOTTOM	USD\$
0-80	H1	2	TT90000S	TT90001S	TT90002S	15.10
2-56	H2	3	TT90036S	TT90037S	TT90038S	12.15
3-48	H2	3	TT90056S	TT90057S	TT90058S	9.70
4-40	H2	3	TT90076S	TT90077S	TT90078S	8.10
4-48	H2	3	TT90084S	TT90085S	TT90086S	8.65
5-40	H2	3	TT90100S	TT90101S	TT90102S	8.10
6-32	H2	3	TT90124S	TT90125S	TT90126S	6.65
6-40	H2	3	TT90148S	TT90149S	TT90150S	6.65
8-32	H3	4	TT90184S	TT90185S	TT90186S	6.60
8-36	H2	4	TT90200S	TT90201S	TT90202S	6.85
10-24	H3	4	TT90232S	TT90233S	TT90234S	6.85
10-32	H3	4	TT90276S	TT90277S	TT90278S	6.85
12-24	H3	4	TT90288S	TT90289S	TT90290S	7.20
12-28	H3	4	TT90296S	TT90297S	TT90298S	7.95
1/4-20	H3	4	TT90323S	TT90324S	TT90325S	7.35
1/4-28	H3	4	TT90351S	TT90352S	TT90353S	7.35
5/16-18	H3	4	TT90375S	TT90376S	TT90377S	9.00
5/16-24	H3	4	TT90399S	TT90400S	TT90401S	9.00
3/8-16	H3	4	TT90422S	TT90423S	TT90424S	10.25
3/8-24	H3	4	TT90446S	TT90447S	TT90448S	10.25
7/16-14	H3	4	TT90465S	TT90466S	TT90467S	17.60
7/16-20	H3	4	TT90484S	TT90485S	TT90486S	17.60
1/2-13	H3	4	TT90504S	TT90505S	TT90506S	18.30
1/2-20	H3	4	TT90523S	TT90524S	TT90525S	20.65
9/16-12	H3	4	TT90535S	TT90536S	TT90537S	30.50
9/16-18	H3	4	TT90546S	TT90547S	TT90548S	30.50
5/8-11	H3	4	TT90561S	TT90562S	TT90563S	36.00
5/8-18	H3	4	TT90577S	TT90578S	TT90579S	36.00
3/4-10	H3	4	TT90600S	TT90601S	TT90602S	50.35
3/4-16	H3	4	TT90615S	TT90616S	TT90617S	50.35
7/8-9	H4	4	TT90626S	TT90627S	TT90628S	68.65
7/8-14	H4	4	TT90636S	TT90637S	TT90638S	68.65
1-8	H4	4	TT90646S	TT90647S	TT90648S	91.45
1-12	H4	4	TT90653S	TT90654S	TT90655S	91.45
1-14	H4	4	TT90660S	TT90661S	TT90662S	91.45
1-1/8-7	H4	4	TT90668S	TT90669S	TT90670S	143.15
1-1/8-12	H4	4	TT90672S	TT90673S	TT90674S	151.00
1-1/4-7	H4	4	TT90676S	TT90677S	TT90678S	187.30
1-1/4-12	H4	6	TT90680S	TT90681S	TT90682S	190.30
1-3/8-6	H4	4	TT90684S	TT90685S	TT90686S	234.40
1-3/8-12	H4	6	TT90688S	TT90689S	TT90690S	235.85
1-1/2-6	H4	4	TT90692S	TT90693S	TT90694S	268.20
1-1/2-12	H4	6	TT90696S	TT90697S	TT90698S	275.15

* Most Popular Size When Multiple Options Are Available

All taps sold individually
For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps - Nitride & Steam Oxide Finish



- Optimized for all types of gray, ductile, and malleable cast iron ferrous materials.
- Taps are on blanks that meet ANSI specifications
- Nitride & Steam Oxide finish provides increased surface hardness and retains liquid lubricant at cutting edge, preventing chip welding and reducing friction
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	NITRIDE & STEAM		
			PLUG	BOTTOM	USD\$
4-40	H2	3	TT90077NS	TT90078NS	8.35
6-32	H2	3	TT90125NS	TT90126NS	6.85
6-40	H2	3	TT90149NS	TT90150NS	6.85
8-32	H3	4	TT90185NS	TT90186NS	6.60
10-24	H3	4	TT90233NS	TT90234NS	6.85
10-32	H3	4	TT90277NS	TT90278NS	6.85
1/4-20	H3	4	TT90324NS	TT90325NS	7.35
1/4-28	H3	4	TT90352NS	TT90353NS	7.35
5/16-18	H3	4	TT90376NS	TT90377NS	9.00
3/8-16	H3	4	TT90423NS	TT90424NS	10.25
3/8-24	H3	4	TT90447NS	TT90448NS	10.25
7/16-14	H3	4	TT90466NS	TT90467NS	17.60
7/16-20	H3	4	TT90485NS	TT90486NS	17.15
1/2-13	H3	4	TT90505NS	TT90506NS	18.30
1/2-20	H3	4	TT90524NS	TT90525NS	20.65
9/16-12	H3	4	TT90536NS	TT90537NS	30.70
9/16-18	H3	4	TT90547NS	TT90548NS	30.70
5/8-11	H3	4	TT90562NS	TT90563NS	36.90
5/8-18	H3	4	TT90578NS	TT90579NS	36.90
3/4-10	H3	4	TT90601NS	TT90602NS	51.55
3/4-16	H3	4	TT90616NS	TT90617NS	51.55
7/8-9	H4	4	TT90627NS	TT90628NS	69.90
7/8-14	H4	4	TT90637NS	TT90638NS	69.90
1-8	H4	4	TT90647NS	TT90648NS	92.80
1-1/8-7	H4	4	TT90669NS	TT90670NS	144.40
1-1/4-7	H4	4	TT90677NS	TT90678NS	189.80
1-1/4-12	H4	6	TT90681NS	TT90682NS	192.80
1-1/2-6	H4	4	TT90693NS		270.10
1-1/2-12	H4	6	TT90697NS	TT90698NS	275.15

All taps sold individually

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps - TiN Coated



- For optimal results, use a Taper Tap for an initial pass, prior to using a Plug or Bottom Tap to finish the thread
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	TiN COATED			
			TAPER	PLUG	BOTTOM	USD\$
0 - 80	H1	2	TT75200	TT75201	TT75202	23.85
2 - 56	H2	3	TT75223	TT75224	TT75225	19.10
4 - 40	H2	3	TT75249	TT75250	TT75251	12.05
5 - 40	H2	3	TT75266	TT75267	TT75268	12.05
6 - 32	H3	3	TT75288	TT75289	TT75290	9.85
8 - 32	H3	4	TT75319	TT75320	TT75321	10.10
10 - 24	H3	4	TT75348	TT75349	TT75350	10.65
10 - 32	H3	4	TT75375	TT75376	TT75377	10.65
12 - 24	H3	4	TT75383	TT75384	TT75385	11.40
12 - 28	H3	4	TT75388	TT75389	TT75390	12.25
1/4 - 20	H3	4	TT75406	TT75407	TT75408	11.55
1/4 - 28	H3	4	TT75422	TT75423	TT75424	11.55
5/16 - 18	H3	4	TT75439	TT75440	TT75441	14.20
5/16 - 24	H3	4	TT75454	TT75455	TT75456	14.20
3/8 - 16	H3	4	TT75469	TT75470	TT75471	16.10
3/8 - 24	H3	4	TT75484	TT75485	TT75486	16.10
7/16 - 14	H3	4	TT75495	TT75496	TT75497	25.25
7/16 - 20	H3	4	TT75506	TT75507	TT75508	25.25
1/2 - 13	H3	4	TT75518	TT75519	TT75520	26.35
1/2 - 20	H3	4	TT75530	TT75531	TT75532	29.70
9/16 - 18	H3	4	TT75544	TT75545	TT75546	40.40
5/8 - 11	H3	4	TT75552	TT75553	TT75554	53.00
5/8 - 18	H3	4	TT75561	TT75562	TT75563	53.00
3/4 - 10	H3	4	TT75577	TT75578	TT75579	74.10
3/4 - 16	H3	4	TT75585	TT75586	TT75587	74.10
1 - 8	H4	4	TT75604	TT75605	TT75606	125.85

All taps sold individually

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps - Metric - Uncoated



- For optimal results, use a Taper Tap for an initial pass, prior to using a Plug or Bottom Tap to finish the thread
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	D LIMIT	FLUTES	UNCOATED			
			TAPER	PLUG	BOTTOM	USD\$
M1.6 x 0.35	D3	2		TT93002		19.00
M2 x 0.4	D3	3	TT93007	TT93008	TT93009	19.00
M2.5 x 0.45	D3	3		TT93014		11.75
M3 x 0.5	D3	3	TT93016	TT93017	TT93018	9.75
M3 X 0.6	D2	3	TT92996	TT92997	TT92998	12.40
M3.5 x 0.6	D4	3		TT93020		7.95
M4 x 0.7	D4	4	TT93022	TT93023	TT93024	7.95
M4.5 x 0.75	D4	4		TT93026		7.95
M5 x 0.5	D3	4	TT92992	TT92993	TT92994	12.40
M5 x 0.8	D4	4	TT93028	TT93029	TT93030	7.95
M5 X 0.9	D3	4	TT92988	TT92989	TT92990	12.40
M6 x 1.0	D5	4	TT93031	TT93032	TT93033	8.55
M7 x 1.0	D5	4	TT93037	TT93038	TT93039	8.55
M8 X 1.0	D5	4	TT93040	TT93041	TT93042	14.50
M8 x 1.25	D5	4	TT93043	TT93044	TT93045	8.55
M10 x 1.0	D5	4	TT92984	TT92985	TT92986	17.05
M10 x 1.25	D5	4	TT93046	TT93047	TT93048	17.45
M10 x 1.50	D6	4	TT93049	TT93050	TT93051	17.45
M12 x 1.25	D5	4	TT93052	TT93053	TT93054	20.60
M12 X 1.5	D6	4	TT92980	TT92981	TT92982	20.60
M12 x 1.75	D6	4	TT93055	TT93056	TT93057	20.60
M14 x 1.5	D6	4	TT93058	TT93059	TT93060	30.55
M14 x 2.0	D7	4	TT93061	TT93062	TT93063	30.55
M16 x 1.5	D6	4	TT93064	TT93065	TT93066	37.20
M16 x 2.0	D7	4	TT93067	TT93068	TT93069	37.20
M18 x 1.5	D6	4	TT93070	TT93071	TT93072	50.40
M18 x 2.5	D7	4	TT93073	TT93074	TT93075	50.40
M20 x 2.5	D7	4	TT93076	TT93077	TT93078	64.75
M24 x 3.0	D8	4	TT93082	TT93083	TT93084	95.25
M27 x 3.0	D8	4	TT93085	TT93086	TT93087	164.70
M30 x 3.5	D9	4	TT93088	TT93089	TT93090	209.35
M33 x 3.5	D9	4	TT93091	TT93092	TT93093	209.80
M36 x 4.0	D9	4	TT93094	TT93095	TT93096	266.00

All taps sold individually

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps - Metric - TiN Coated



- For optimal results, use a Taper Tap for an initial pass, prior to using a Plug or Bottom Tap to finish the thread
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

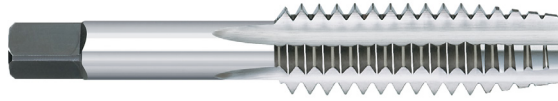
SIZE	D LIMIT	FLUTES	TiN COATED			
			TAPER	PLUG	BOTTOM	USD\$
M1.6 x 0.35	D3	2		TT75700		31.95
M2 x 0.4	D3	3	TT75702	TT75704	TT75706	31.95
M2.5 x 0.45	D3	3		TT75708		19.65
M3 x 0.5	D3	3	TT75710	TT75712	TT75714	16.40
M3.5 x 0.6	D4	3		TT75716		13.55
M4 x 0.7	D4	4	TT75718	TT75720	TT75722	13.55
M4.5 x 0.75	D4	4		TT75724		13.55
M5 x 0.8	D4	4	TT75726	TT75728	TT75730	13.55
M6 x 1.0	D5	4	TT75732	TT75734	TT75736	15.05
M7 x 1.0	D5	4	TT75738	TT75740	TT75742	15.55
M8 x 1.25	D5	4	TT75744	TT75746	TT75748	15.55
M10 x 1.25	D5	4	TT75750	TT75752	TT75754	29.20
M10 x 1.50	D6	4	TT75756	TT75758	TT75760	29.20
M12 x 1.25	D5	4	TT75762	TT75764	TT75766	34.40
M12 x 1.75	D6	4	TT75768	TT75770	TT75772	34.40
M14 x 1.5	D6	4	TT75774	TT75776	TT75778	51.40
M14 x 2.0	D7	4	TT75780	TT75782	TT75784	51.40
M16 x 1.5	D6	4	TT75786	TT75788	TT75790	62.75
M16 x 2.0	D7	4	TT75792	TT75794	TT75796	62.75
M18 x 1.5	D6	4	TT75798	TT75800	TT75802	84.35
M18 x 2.5	D7	4	TT75804	TT75806	TT75808	84.35
M20 x 2.5	D7	4	TT75810	TT75812	TT75814	109.25
M24 x 3.0	D8	4	TT75816	TT75818	TT75820	115.80
M27 x 3.0	D8	4	TT75822	TT75824	TT75826	191.05
M30 x 3.5	D9	4	TT75828	TT75830	TT75832	240.60
M33 x 3.5	D9	4	TT75834	TT75836	TT75838	227.60
M36 x 4.0	D9	4	TT75840	TT75842	TT75844	299.90

All taps sold individually

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps - 8 Pitch



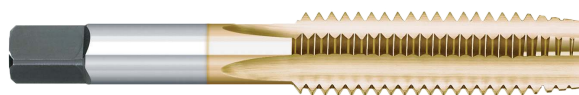
- Eight pitch large diameter taps are typically used in oil field, gas exploration and power plant maintenance
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED			
			TAPER	PLUG	BOTTOM	USD\$
1-1/8-8	H5	4	TT90700	TT90701	TT90702	178.95
1-1/4-8	H5	4	TT90704	TT90705	TT90706	217.90
1-3/8-8	H5	4		TT90709	TT90710	278.85
1-1/2-8	H5	4	TT90712	TT90713	TT90714	301.85
1-5/8-8	H6	6	TT90716	TT90717	TT90718	411.45
1-3/4-8	H6	6	TT90720	TT90721	TT90722	466.55
1-7/8-8	H6	6		TT90725	TT90726	548.40
2"-8	H6	6	TT90728	TT90729	TT90730	578.55
2-1/4-8	H6	6	TT90732	TT90733		776.80
2-1/2-8	H6	6	TT90736	TT90737	TT90738	1054.25
2-5/8-8	H8	6	TT90740		TT90742	1137.25
2-3/4-8	H8	6		TT90745	TT90746	1220.25
3"-8	H8	6	TT90752	TT90753	TT90754	1469.45

All taps sold individually

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Hand Taps - Left Hand

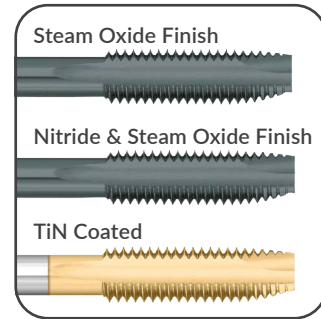
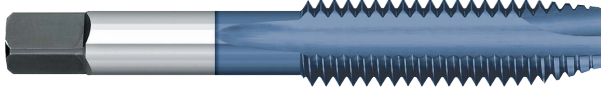


- Engineered to tap left hand threads
- For optimal results, use a Taper Tap for an initial pass prior to using a Plug or Bottom Tap to finish the thread
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED				TiN COATED			
			TAPER	PLUG	BOTTOM	USD\$	TAPER	PLUG	BOTTOM	USD\$
6-32	H2	3		TT82921	TT82922	23.30			TT82922TIN	25.75
8-32	H3	4	TT82923	TT82924	TT82925	26.75	TT82923TIN	TT82924TIN	TT82925TIN	29.40
10-24	H3	4					TT82926TIN	TT82927TIN	TT82928TIN	36.35
10-32	H3	4		TT82930	TT82931	33.20	TT82929TIN	TT82930TIN	TT82931TIN	36.35
1/4-20	H3	4		TT82933	TT82934	35.75	TT82932TIN	TT82933TIN	TT82934TIN	39.75
1/4-28	H3	4	TT82935	TT82936	TT82937	35.75	TT82935TIN	TT82936TIN	TT82937TIN	39.75
5/16-18	H3	4	TT82938	TT82939	TT82940	44.05		TT82939TIN		51.90
5/16-24	H3	4	TT82941	TT82942	TT82943	44.05	TT82941TIN	TT82942TIN	TT82943TIN	51.90
3/8-16	H3	4	TT82944	TT82945	TT82946	45.65		TT82945TIN	TT82946TIN	54.70
3/8-24	H3	4	TT82947	TT82948	TT82949	45.65	TT82947TIN	TT82948TIN	TT82949TIN	54.70
7/16-14	H3	4		TT82951	TT82952	57.00	TT82950TIN	TT82951TIN	TT82952TIN	61.75
7/16-20	H3	4	TT82953	TT82954	TT82955	57.00	TT82953TIN	TT82954TIN	TT82955TIN	61.75
1/2-13	H3	4	TT82956	TT82957	TT82958	59.40	TT82956TIN	TT82957TIN	TT82958TIN	64.15
1/2-20	H3	4	TT82959	TT82960	TT82961	67.20	TT82959TIN	TT82960TIN	TT82961TIN	71.95
5/8-11	H3	4	TT82962	TT82963	TT82964	89.70	TT82962TIN	TT82963TIN	TT82964TIN	96.20
5/8-18	H3	4	TT82965	TT82966	TT82967	89.70	TT82965TIN	TT82966TIN	TT82967TIN	96.20
3/4-10	H3	4	TT82968	TT82969	TT82970	125.55	TT82968TIN	TT82969TIN	TT82970TIN	133.60
3/4-16	H3	4	TT82971	TT82972	TT82973	125.55	TT82971TIN	TT82972TIN		133.60
7/8-9	H4	4	TT82974	TT82975	TT82976	174.80	TT82974TIN	TT82975TIN	TT82976TIN	184.50
7/8-14	H4	4	TT82977	TT82978	TT82979	174.80	TT82977TIN	TT82978TIN		184.50
1-8	H4	4	TT82980	TT82981	TT82982	193.55		TT82981TIN	TT82982TIN	206.20
1-14	H4	4	TT82983	TT82984	TT82985	193.55		TT82984TIN	TT82985TIN	206.20

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Spiral Point Plug Taps



- General purpose spiral point plug taps are best used for through hole applications
- Taps are on blanks that meet ANSI specifications
- AlTiN coating offers increased wear and heat resistance
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- Steam Oxide finish provides decreased galling and increased lubricity in low carbon steels and gummy materials
- Nitride & Steam Oxide finish provides increased surface hardness and acts as a lubricant and also retains liquid lubricant at cutting edge. Prevents chip welding and reduces friction
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED		STEAM OXIDE		NITRIDE & STEAM OXIDE		TiN COATED		AlTiN COATED	
			TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
0-80	H1	2	TT91000	17.50								
* 0-80	H2	2	TT91001	17.50	TT91001S	18.80			TT99401	24.20	TT98001	24.20
1-64	H1	2	TT91002	15.80								
* 1-64	H2	2	TT91003	15.85	TT91003S	12.07						
1-72	H1	2	TT91004	15.85								
* 1-72	H2	2	TT91005	15.85	TT91005S	16.70						
2-56	H1	2	TT91006	15.05								
* 2-56	H2	2	TT91007	13.45	TT91007S	14.40			TT99407	19.45	TT98002	19.45
2-64	H1	2	TT91008	10.87								
* 2-64	H2	2	TT91009	15.05	TT91009S	15.95						
3-48	H1	2	TT91010	10.80								
* 3-48	H2	2	TT91011	10.80	TT91011S	11.65						
3-56	H1	2	TT91012	13.25								
* 3-56	H2	2	TT91013	12.10	TT91013S	13.05						
4-40	H1	2	TT91014	9.85								
* 4-40	H2	2	TT91015	8.65	TT91015S	9.50	TT91015NS	9.75	TT99415	13.70	TT98003	14.55
4-48	H1	2	TT91016	10.05								
* 4-48	H2	2	TT91017	9.85	TT91017S	10.70	TT91017NS	10.95				
4-36	H2	2	TT91018	9.85	TT91018S	7.67	TT91018NS	10.95				
5-40	H1	2	TT91019	9.85								
* 5-40	H2	2	TT91020	8.65	TT91020S	9.50	TT91020NS	9.75	TT99420	13.70	TT98004	14.55
5-44	H2	2	TT91021	9.85	TT91021S	10.70	TT91021NS	7.87				
6-32	H1	2	TT91022	8.65								
6-32	H2	2	TT91023	7.40								
* 6-32	H3	2	TT91024	7.40	TT91024S	8.30	TT91024NS	8.50	TT99424	12.80	TT98005	13.30
6-32	H7	2	TT91025	8.05								
6-40	H1	2	TT91026	5.87								
6-40	H2	2	TT91027	8.05	TT91027S	9.00	TT91027NS	9.25				

* Most Popular Size When Multiple Options Are Available

continued on next page

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Spiral Point Plug Taps (Cont.)

continued from previous page

SIZE	H LIMIT	FLUTES	UNCOATED		STEAM OXIDE		NITRIDE & STEAM OXIDE		TiN COATED		AlTiN COATED	
			TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
8-32	H1	2	TT91028	8.05								
8-32	H2	2	TT91029	7.40								
* 8-32	H3	2	TT91030	7.40	TT91030S	8.10	TT91030NS	8.50	TT99430	12.80	TT98006	13.65
8-32	H7	2	TT91031	8.05								
8-36	H1	2	TT91032	8.05								
* 8-36	H2	2	TT91033	8.05	TT91033S	9.50	TT91033NS	9.70				
10-24	H1	2	TT91034	9.05								
10-24	H2	2	TT91035	8.05								
* 10-24	H3	2	TT91036	7.40	TT91036S	8.50	TT91036NS	8.50	TT99436	12.85	TT98007	13.95
10-24	H7	2	TT91037	9.05								
10-32	H1	2	TT91038	8.05								
10-32	H2	2	TT91039	7.40								
* 10-32	H3	2	TT91040	7.40	TT91040S	8.50	TT91040NS	8.50	TT99440	12.85	TT98008	13.95
10-32	H7	2	TT91041	9.05								
12-24	H1	2	TT91042	8.05								
* 12-24	H3	2	TT91043	8.05	TT91043S	9.70	TT91043NS	7.57	TT99443	13.90	TT98009	15.30
12-28	H3	2	TT91044	8.05					TT99444	13.90	TT98010	15.65
1/4-20	H1	2	TT91045	8.05								
1/4-20	H2	2	TT91046	8.05								
* 1/4-20	H3	2	TT91047	7.40	TT91047S	8.50	TT91047NS	8.50	TT99447	13.85	TT98011	13.95
1/4-20	H3	3	TT91048	9.05								
1/4-20	H5	2	TT91049	8.05								
1/4-20	H5	3	TT91050	9.05								
1/4-28	H1	2	TT91051	9.05								
1/4-28	H2	2	TT91052	8.05								
1/4-28	H2	3	TT91053	9.05								
* 1/4-28	H3	2	TT91054	7.40	TT91054S	8.50	TT91054NS	8.50	TT99454	13.85	TT98012	13.95
1/4-28	H4	2	TT91055	9.05								
1/4-28	H4	3	TT91056	9.05								
5/16-18	H1	2	TT91057	10.25								
5/16-18	H2	2	TT91058	9.05								
* 5/16-18	H3	2	TT91059	7.80	TT91059S	9.15	TT91059NS	9.15	TT99459	15.55	TT98013	16.20
5/16-18	H3	3	TT91060	10.25								
5/16-18	H5	2	TT91061	9.05								
5/16-18	H5	3	TT91062	10.25								
5/16-24	H1	2	TT91063	10.25								
5/16-24	H2	2	TT91064	10.25								
5/16-24	H2	3	TT91065	10.25								
* 5/16-24	H3	2	TT91066	9.15	TT91066S	9.85	TT91066NS	9.15	TT99466	16.20	TT98014	16.20
5/16-24	H4	2	TT91067	10.25								
5/16-24	H4	3	TT91068	10.25								
3/8-16	H1	3	TT91069	11.50								
3/8-16	H2	3	TT91070	10.90								
* 3/8-16	H3	3	TT91071	9.25	TT91071S	10.85	TT91071NS	10.85	TT99471	18.05	TT98015	18.05
3/8-16	H5	3	TT91072	11.70								
3/8-24	H1	3	TT91073	11.90								

* Most Popular Size When Multiple Options Are Available

continued on next page

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Spiral Point Plug Taps (Cont.)

continued from previous page

SIZE	H LIMIT	FLUTES	UNCOATED		STEAM OXIDE		NITRIDE & STEAM OXIDE		TiN COATED		AlTiN COATED	
			TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
3/8-24	H2	3	TT91074	11.90								
* 3/8-24	H3	3	TT91075	10.05	TT91075S	11.70	TT91075NS	11.70	TT99475	18.90	TT98016	18.90
3/8-24	H4	3	TT91076	11.90								
7/16-14	H2	3	TT91077	17.40								
* 7/16-14	H3	3	TT91078	15.85	TT91078S	18.55	TT91078NS	18.55	TT99478	27.20	TT98017	27.45
7/16-14	H5	3	TT91079	17.40								
7/16-20	H2	3	TT91080	17.35								
* 7/16-20	H3	3	TT91081	15.85	TT91081S	18.55	TT91081NS	19.85	TT99481	27.20	TT98018	27.45
7/16-20	H5	3	TT91082	17.40								
1/2-13	H1	3	TT91083	15.27								
1/2-13	H2	3	TT91084	21.05								
* 1/2-13	H3	3	TT91085	16.10	TT91085S	18.90	TT91085NS	18.90	TT99485	27.55	TT98019	27.65
1/2-13	H5	3	TT91086	19.10								
1/2-20	H1	3	TT91087	21.05								
1/2-20	H2	3	TT91088	21.05								
* 1/2-20	H3	3	TT91089	19.05	TT91089S	22.20	TT91089NS	23.05	TT99489	30.85	TT98020	30.90
1/2-20	H5	3	TT91090	21.05								
9/16-12	H3	3	TT91091	26.40	TT91091S	30.45	TT91091NS	30.90				
9/16-18	H3	3	TT91092	26.40	TT91092S	30.45	TT91092NS	30.90				
* 5/8-11	H3	3	TT91093	36.00	TT91093S	40.45	TT91093NS	41.00	TT99493	63.90	TT98021	63.90
5/8-11	H5	3	TT91094	36.00								
5/8-18	H3	3	TT91095	36.00	TT91095S	40.45	TT91095NS	41.00	TT99495	63.90	TT98022	63.90
* 3/4-10	H3	3	TT91096	50.85	TT91096S	57.10	TT91096NS	58.20	TT99496	83.30	TT98023	83.30
3/4-10	H5	3	TT91097	50.85								
3/4-16	H3	3	TT91098	50.85	TT91098S	57.10	TT91098NS	58.20	TT99498	83.30	TT98024	83.30

* Most Popular Size When Multiple Options Are Available

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Spiral Point Plug Taps - Metric



- General purpose spiral point plug taps
- Spiral point for through-hole applications
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	D LIMIT	FLUTES	UNCOATED		TiN COATED	
			TOOL #	USD\$	TOOL #	USD\$
M2 x 0.4	D3	2	TT93208	19.40	TT93208TiN	25.00
M2.5 x 0.45	D3	2	TT93214	13.75	TT93214TiN	18.20
M3 x 0.5	D3	2	TT93217	11.10	TT93217TiN	15.40
M3.5 x 0.6	D4	2	TT93220	9.65	TT93220TiN	13.55
M4 x 0.5	D4	2	TT93222	12.40	TT93222TiN	15.05
M4 x 0.7	D4	2	TT93223	9.65	TT93223TiN	13.55
M4.5 x 0.75	D4	2	TT93226	9.65	TT93226TiN	13.55
M5 x 0.5	D3	2	TT93228	12.40	TT93228TiN	15.55
M5 x 0.8	D4	2	TT93229	9.65	TT93229TiN	13.55
M6 x 0.75	D3	2	TT93231	12.40	TT93231TiN	16.20
M6 x 1.0	D5	2	TT93232	9.65	TT93232TiN	13.40
M7 x 1.0	D5	2	TT93238	11.15	TT93238TiN	15.55
M8 x 1.0	D5	2	TT93243	15.95	TT93243TiN	20.45
M8 x 1.25	D5	2	TT93244	11.15	TT93244TiN	15.55
M10 x 1.25	D5	3	TT93249	18.50	TT93249TiN	23.70
M10 x 1.50	D6	3	TT93250	18.50	TT93250TiN	25.95
M12 x 1.25	D5	3	TT93254	23.30	TT93254TiN	28.10
M12 x 1.50	D6	3	TT93255	23.30	TT93255TiN	28.10
M12 x 1.75	D6	3	TT93256	23.30	TT93256TiN	31.65
M14 x 2.0	D7	3	TT93262	36.00	TT93262TiN	46.25
M16 x 2.0	D7	3	TT93268	40.70	TT93268TiN	52.40
M18 x 2.5	D7	3	TT93274	59.85	TT93274TiN	69.50
M20 x 2.5	D7	3	TT93277	79.00	TT93277TiN	101.70



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GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Spiral Point Bottoming Taps



- General purpose spiral point bottoming taps
- Spiral point for through-hole applications
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED		TiN COATED	
			TOOL #	USD\$	TOOL #	USD\$
0-80	H2	2	TT91201	32.40	TT92202	40.65
2-56	H2	2	TT91207	24.60	TT92209	31.10
3-48	H2	2	TT91211	19.85	TT92212	23.50
4-40	H2	2	TT91215	15.85	TT92216	20.10
5-40	H2	2	TT91220	15.85	TT92221	20.10
6-32	H2	2	TT91223	13.35	TT92224	17.60
6-32	H3	2	TT91224	13.35	TT92225	17.60
6-40	H2	2	TT91227	15.30	TT92228	19.50
8-32	H2	2	TT91229	13.35	TT92230	17.85
8-32	H3	2	TT91230	13.35	TT92231	17.85
10-24	H2	2	TT91235	15.30	TT92236	20.65
10-24	H3	2	TT91236	13.35	TT92237	18.35
10-32	H2	2	TT91239	13.35	TT92240	18.35
10-32	H3	2	TT91240	13.35	TT92241	18.35
12-24	H3	2	TT91243	10.97	TT92244	19.50
1/4-20	H3	2	TT91247	13.35	TT92248	18.35
1/4-28	H3	2	TT91254	13.35	TT92255	18.35
5/16-18	H3	2	TT91259	14.35	TT92260	19.80
5/16-24	H3	2	TT91266	14.35	TT92267	19.80

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

STI Taps - Hand Plug & Bottoming Taps



- Oversized to produce threads that accept coil wire screw thread inserts of the same size and pitch
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED		
			PLUG	BOTTOM	USD\$
4-40	H1	3	TT78302	TT78303	18.95
5-40	H1	3	TT78304	TT78305	18.95
6-32	H2	3	TT78306	TT78307	19.20
6-40	H1	3	TT78308	TT78309	19.20
8-32	H2	3	TT78310	TT78311	19.60
10-24	H2	3	TT78312	TT78313	19.60
10-32	H2	3	TT78314	TT78315	20.20
12-24	H2	3	TT78316	TT78317	20.20
1/4-20	H2	3	TT78318	TT78319	20.50
1/4-28	H2	3	TT78320	TT78321	20.50
5/16-18	H3	4	TT78322	TT78323	22.15
5/16-24	H2	4	TT78324	TT78325	22.15
3/8-16	H3	4	TT78326	TT78327	23.95
3/8-24	H2	4	TT78328	TT78329	23.95
7/16-14	H3	4	TT78330	TT78331	33.00
7/16-20	H3	4	TT78332	TT78333	33.00
1/2-13	H3	4	TT78334	TT78335	37.15
1/2-20	H3	4	TT78336	TT78337	37.15

All taps sold individually

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

STI Taps - Spiral Point Plug



- Oversized to produce threads that accept coil wire screw thread inserts of the same size and pitch
- Spiral point for through-hole applications
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED	
			TOOL #	USD\$
4-40	H1	2	TT92315	21.10
5-40	H1	2	TT92320	21.10
6-32	H2	2	TT92324	21.15
6-40	H2	2	TT92327	21.15
8-32	H2	2	TT92330	21.30
10-24	H2	2	TT92336	21.75
10-32	H2	2	TT92340	22.20
12-24	H2	2	TT92343	22.20
1/4-20	H2	2	TT92347	22.20

SIZE	H LIMIT	FLUTES	UNCOATED	
			TOOL #	USD\$
1/4-28	H2	2	TT92354	22.75
5/16-18	H3	3	TT92360	28.75
5/16-24	H2	3	TT92368	28.90
3/8-16	H3	3	TT92371	35.20
3/8-24	H2	3	TT92375	35.70
7/16-14	H3	3	TT92378	27.97
7/16-20	H3	3	TT92381	27.87
1/2-13	H3	3	TT92385	42.95
1/2-20	H3	3	TT92389	42.95

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Oversize Taps - Hand Plug



- Most commonly used when parts are to be plated after tapping
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED	
			TOOL #	USD\$
6-32	H11	3	TT90931	9.10
8-32	H11	4	TT90933	9.10
10-24	H11	4	TT90935	7.07
10-32	H11	4	TT90937	10.00
1/4-20	H11	4	TT90940	12.00
5/16-18	H11	4	TT90946	15.10
3/8-16	H11	4	TT90950	17.35
7/16-14	H11	4	TT90954	26.00
1/2-13	H11	4	TT90958	29.55
5/8-11	H11	4	TT90966	55.25

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Oversize Taps - Spiral Point Plug



- Most commonly used when parts are to be plated after tapping
- Spiral point for through-hole applications
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED	
			TOOL #	USD\$
6-32	H11	2	TT91732	10.90
8-32	H11	2	TT91734	10.90
10-24	H11	2	TT91736	12.00
10-32	H11	2	TT91738	12.00
1/4-20	H11	2	TT91749	13.55
5/16-18	H11	2	TT91761	15.60
3/8-16	H11	3	TT91772	17.60
7/16-14	H11	3	TT91779	26.55
1/2-13	H11	3	TT91786	32.30
5/8-11	H11	3	TT91794	55.25

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Extension Taps - Spiral Point Plug



- Undersized, extended shank for increased clearance in deeper tapping applications
- Taps are on blanks that meet ANSI specifications
- AlTiN coating offers increased wear and heat resistance
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	NC/NF	THREAD LENGTH	FLUTES	SQUARE LENGTH	SQUARE	SHANK DIA.	OAL	UNCOATED		AlTiN COATED	
									TOOL #	USD\$	TOOL #	USD\$
6-32	H3	NC	11/16	2	3/16	.073	.097	6	TT94101	65.15	TT88901	72.20
8-32	H3	NC	3/4	2	1/4	.092	.123	6	TT94102	63.80	TT88902	70.80
10-24	H3	NC	7/8	2	1/4	.102	.136	6	TT94103	59.85	TT88903	67.75
10-32	H3	NF	7/8	2	1/4	.102	.136	6	TT94104	59.85	TT88904	67.75
1/4-20	H3	NC	1	2	5/16	.139	.185	6	TT94105	81.25	TT88905	89.10
1/4-28	H3	NF	1	2	5/16	.139	.185	6	TT94106	81.25	TT88906	89.10
5/16-18	H3	NC	1-1/8	2	3/8	.180	.240	6	TT94107	85.65	TT88907	95.05
5/16-24	H3	NF	1-1/8	2	3/8	.180	.240	6	TT94108	85.65	TT88908	95.05
3/8-16	H3	NC	1-1/4	3	7/16	.206	.275	6	TT94109	92.30	TT88909	111.60
3/8-24	H3	NF	1-1/4	3	7/16	.206	.275	6	TT94110	92.30	TT88910	103.65
7/16-14	H3	NC	1-7/16	3	13/32	.242	.323	6	TT94111	105.20	TT88911	113.00
7/16-20	H3	NF	1-7/16	3	13/32	.242	.323	6	TT94112	105.20	TT88912	113.00
1/2-13	H3	NC	1-21/32	3	7/16	.275	.367	6	TT94113	111.10	TT88913	124.70
1/2-20	H3	NF	1-21/32	3	7/16	.275	.367	6	TT94114	111.10	TT88914	118.55
5/8-11	H3	NC	1-13/16	3	9/16	.360	.480	6	TT94115	143.55	TT88915	173.55
5/8-18	H3	NF	1-13/16	3	9/16	.360	.480	6	TT94116	143.55	TT88916	161.85
3/4-10	H3	NC	2	3	11/16	.442	.590	6	TT94117	186.35	TT88917	207.65
3/4-16	H3	NF	2	3	11/16	.442	.590	6	TT94118	186.35	TT88918	207.65



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GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Pulley Taps



- Extended shank length
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	OVERALL LENGTH	UNCOATED	
				TOOL #	USD\$
1/4-20	H3	4	6	TT92722	63.90
1/4-20	H3	4	8	TT92723	79.05
5/16-18	H3	4	6	TT92730	67.70
5/16-18	H3	4	8	TT92731	81.35
3/8-16	H3	4	6	TT92738	75.80
3/8-16	H3	4	8	TT92739	90.65
3/8-16	H3	4	10	TT92740	113.90
7/16-14	H3	4	6	TT92746	57.87
7/16-14	H3	4	8	TT92747	75.67
1/2-13	H3	4	6	TT92754	81.35
1/2-13	H3	4	8	TT92755	106.90
1/2-13	H3	4	10	TT92756	95.07
1/2-13	H3	4	12	TT92757	116.97
5/8-11	H3	4	6	TT92762	108.50
5/8-11	H3	4	8	TT92763	140.70
5/8-11	H3	4	10	TT92764	127.87
5/8-11	H3	4	12	TT92765	149.77
3/4-10	H3	4	10	TT92772	206.80
3/4-10	H3	4	12	TT92773	178.37

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Spiral Flute - Semi-Bottoming



- Optimized for relatively deep hole tapping in copper, brass, aluminum, and other soft ductile materials
- Slightly longer chamfer distributes cutting over greater number of teeth for increased production
- Can be used for plug or bottoming applications
- 52° helix
- Taps are on blanks that meet ANSI specifications
- ZrN coating offers increased speed rates and prolonged tool life
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	FLUTES	UNCOATED		ZrN COATED	
			TOOL #	USD\$	TOOL #	USD\$
3-48	H2	2	TT76101	29.60	TT89101	36.05
3-56	H2	2	TT76103	29.60	TT89103	36.05
4-40	H2	2	TT76105	24.40	TT89105	30.95
4-48	H2	2	TT76107	24.40	TT89107	30.95
5-40	H3	2	TT76109	24.40	TT89109	30.95
5-44	H3	2	TT76111	24.35	TT89111	28.95
6-32	H3	2	TT76113	19.75	TT89113	25.80
6-40	H3	2	TT76115	19.75	TT89115	26.35
8-32	H3	3	TT76117	19.75	TT89117	25.80
8-36	H3	3	TT76119	19.75	TT89119	25.80
10-24	H3	3	TT76121	19.75	TT89121	25.80
10-32	H3	3	TT76123	19.75	TT89123	25.80
12-24	H3	3	TT76125	21.30	TT89125	29.85
12-28	H3	3	TT76127	21.30	TT89127	29.85
1/4-20	H3	3	TT76129	21.30	TT89129	28.00
1/4-28	H3	3	TT76131	21.30	TT89131	31.50
5/16-18	H3	3	TT76133	26.60	TT89133	34.40
5/16-24	H3	3	TT76135	26.60	TT89135	36.05
3/8-16	H3	3	TT76137	30.65	TT89137	39.70
3/8-24	H3	3	TT76139	30.65	TT89139	44.50
7/16-14	H3	3	TT76141	46.00	TT89141	55.15
7/16-20	H3	3	TT76143	46.00	TT89143	55.15
1/2-13	H3	3	TT76145	54.90	TT89145	67.75
1/2-20	H3	3	TT76147	54.90	TT89147	67.75
9/16-12	H3	4	TT76149	91.55	TT89149	100.00
9/16-18	H3	4	TT76151	91.55	TT89151	100.00
5/8-11	H3	4	TT76153	120.20	TT89153	130.15
5/8-18	H3	4	TT76155	120.20	TT89155	130.15
3/4-10	H3	4	TT76157	153.75	TT89157	175.50
3/4-16	H3	4	TT76159	153.75		

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Spiral Flute - Semi-Bottoming - Metric

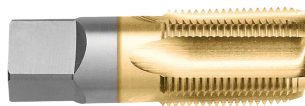


- Optimized for relatively deep hole tapping in copper, brass, aluminum, and other soft ductile materials
- Slightly longer chamfer distributes cutting over greater number of teeth for increased production
- Can be used for plug or bottoming applications
- 52° helix
- Taps are on blanks that meet ANSI specifications
- ZrN coating offers increased speed rates and prolonged tool life
- High speed steel
- Precision manufactured in the USA

SIZE	D LIMIT	FLUTES	UNCOATED		ZrN COATED	
			TOOL #	USD\$	TOOL #	USD\$
M3 x 0.5	D3	2	TT76349	25.05	TT89201	31.55
M3.5 x 0.6	D4	3	TT76351	20.20	TT89203	25.25
M4 x 0.7	D4	3	TT76353	20.20	TT89205	26.45
M4.5 x 0.75	D4	3	TT76355	20.20		
M5 x 0.8	D4	3	TT76357	20.20	TT89209	27.00
M6 x 1.0	D5	3	TT76359	22.20	TT89211	28.85
M8 x 1.25	D5	3	TT76361	27.40	TT89213	33.35
M10 x 1.5	D6	3	TT76363	47.35	TT89215	53.90
M12 x 1.75	D6	3	TT76365	56.65	TT89217	67.45

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Straight Pipe - NPS



- General purpose straight pipe taps
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	FLUTES	UNCOATED		TiN COATED	
		TOOL #	USD\$	TOOL #	USD\$
1/8-27	4	TT94201	44.55	TT94201TiN	62.15
1/4-18	4	TT94202	49.05	TT94202TiN	68.80
3/8-18	4	TT94203	64.50	TT94203TiN	74.45
1/2-14	4	TT94204	103.35	TT94204TiN	143.90
3/4-14	5	TT94205	143.75	TT94205TiN	201.30
1-11-1/2	5	TT94206	218.60	TT94206TiN	169.67

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Taper Pipe - Extension Taper Pipe



- General purpose extension taper pipe NPT taps
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	FLUTES	OVERALL LENGTH	UNCOATED		TiN COATED	
			TOOL #	USD\$	TOOL #	USD\$
1/8-27	4	6	TT94221	83.65	TT94221TIN	116.50
1/4-18	4	6	TT94223	95.90	TT94223TIN	134.30
3/8-18	4	6	TT94225	130.35	TT94225TIN	181.75
1/2-14	4	6	TT94227	208.30	TT94227TIN	211.05



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GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Taper Pipe - NPT



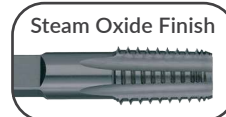
- General purpose NPT pipe taps
- Taps are on blanks that meet ANSI specifications
- Steam Oxide finish provides decreased galling and increased lubricity in low carbon steels and gummy materials
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	FLUTES	UNCOATED		STEAM OXIDE		TiN COATED	
		TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
1/16-27	4	TT93400	27.65	TT93400S	30.00	TT93400TIN	34.25
* 1/8-27	4	TT93401	27.65	TT93401S	30.00	TT93401TIN	34.25
1/8-27	4	TT93402	27.65	TT93402S	30.65	TT93402TIN	36.90
1/4-18	4	TT93406	30.75	TT93406S	34.80	TT93406TIN	40.75
3/8-18	4	TT93408	40.70	TT93408S	45.70	TT93408TIN	53.60
1/2-14	4	TT93410	64.30	TT93410S	70.30	TT93410TIN	80.05
3/4-14	5	TT93412	90.15	TT93412S	98.90	TT93412TIN	112.65
1-11-1/2	5	TT93414	137.55	TT93414S	148.85	TT93414TIN	164.15
1-1/4-11-1/2	5	TT93416	195.05	TT93416S	209.65	TT93416TIN	236.95
1-1/2-11-1/2	7	TT93418	262.80	TT93418S	281.30	TT93418TIN	297.75
2-11-1/2	7	TT93420	357.55	TT93420S	373.60	TT93420TIN	432.40

* Small Shank

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Taper Pipe - NPT Interrupted



- General purpose NPT interrupted pipe tap
- Interrupted threads reduce friction and allow for better lubrication
- Taps are on blanks that meet ANSI specifications
- Steam Oxide finish provides decreased galling and increased lubricity in low carbon steels and gummy materials
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	FLUTES	UNCOATED		STEAM OXIDE		TiN COATED	
		TOOL #	USD\$	TOOL #	USD\$	TOOL #	USD\$
* 1/8-27	5	TT93601	43.10	TT93601S	45.35	TT93601TIN	52.35
1/8-27	5	TT93602	43.10	TT93602S	46.25	TT93602TIN	52.35
1/4-18	5	TT93606	47.85	TT93606S	51.95	TT93606TIN	60.15
3/8-18	5	TT93608	60.30	TT93608S	65.10	TT93608TIN	74.90
1/2-14	5	TT93610	95.90	TT93610S	101.90	TT93610TIN	116.50
3/4-14	5	TT93612	140.20	TT93612S	149.00	TT93612TIN	169.55
1-11-1/2	5	TT93614	212.10	TT93614S	228.00	TT93614TIN	257.70
1-1/4-11-1/2	5	TT93616	301.65	TT93616S	316.30	TT93616TIN	320.20
1-1/2-11-1/2	7	TT93618	402.75	TT93618S	433.00		
2-11-1/2	7	TT93620	394.37	TT93620S	585.20		

* Small Shank

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL**Taper Pipe - NPT Spiral Flute**

- General purpose NPT pipe taps
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and is generally used in applications with lower cutting speeds
- Used in ductile or stringy materials to aid chip ejection
- High speed steel
- Precision manufactured in the USA

SIZE	FLUTES	UNCOATED		TiN COATED	
		TOOL #	USD\$	TOOL #	USD\$
1/8-27	4	TT93850	52.65	TT93950	57.90
1/4-18	4	TT93851	58.25	TT93951	65.60
3/8-18	4	TT93852	72.00	TT93952	80.70
1/2-14	4	TT93853	91.45	TT93953	100.45
3/4-14	5	TT93854	127.15	TT93954	140.60
1-11-1/2	5	TT93855	244.85	TT93955	260.10

GENERAL PURPOSE TAPS - HIGH SPEED STEEL**Taper Pipe - NPT For Cast Iron**

- General purpose NPT pipe taps
- Taps are on blanks that meet ANSI specifications
- Low rake angle to support cutting face
- 2.5 thread chamfer to produce manageable chips
- Nitride/steam oxide surface treatment to resist abrasion
- High speed steel
- Precision manufactured in the USA

SIZE	FLUTES	NITRIDE/STEAM OXIDE	
		TOOL #	USD\$
1/8-27	4	TT93880	32.40
1/4-18	4	TT93881	36.40
3/8-18	4	TT93882	47.60
1/2-14	4	TT93883	73.55
3/4-14	5	TT93884	103.30
1-11-1/2	5	TT93885	154.80
1-1/4-11-1/2	5	TT93886	218.75
1-1/2-11-1/2	7	TT93887	292.55
2-11-1/2	7	TT93888	433.45

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Taper Pipe - NPTF Dryseal



- General purpose NPTF dryseal pipe taps
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	FLUTES	UNCOATED		TiN COATED	
		TOOL #	USD\$	TOOL #	USD\$
1/16-27	4	TT93800	30.55	TT93800TiN	42.70
* 1/8-27	4	TT93801	30.55	TT93801TiN	42.70
1/8-27	4	TT93802	30.55	TT93802TiN	42.70
1/4-18	4	TT93806	33.75	TT93806TiN	47.40
3/8-18	4	TT93808	44.45	TT93808TiN	62.25
1/2-14	4	TT93810	71.10	TT93810TiN	86.85
3/4-14	5	TT93812	99.40	TT93812TiN	122.15
1-11-1/2	5	TT93814	108.97		
1-1/4-11-1/2	5	TT93816	214.55	TT93816TiN	169.27
1-1/2-11-1/2	7	TT93818	208.47	TT93818TiN	223.47
2-11-1/2	7	TT93820	283.57	TT93820TiN	298.47

* Small Shank

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Taper Pipe - NPTF Dryseal - Interrupted



- General purpose NPTF dryseal pipe taps
- Interrupted threads reduce friction and allow for better lubrication
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	FLUTES	UNCOATED		TiN COATED	
		TOOL #	USD\$	TOOL #	USD\$
* 1/8-27	5	TT94001	47.65	TT94001TiN	66.30
1/8-27	5	TT94002	47.65	TT94002TiN	56.80
1/4-18	5	TT94006	52.50	TT94006TiN	64.70
3/8-18	5	TT94008	48.17	TT94008TiN	81.25
1/2-14	5	TT94010	76.67	TT94010TiN	114.85
3/4-14	5	TT94012	111.67	TT94012TiN	167.25
1-1/2-11-1/2	7			TT94018TiN	336.07
2-11-1/2	7	TT94020	433.77		

* Small Shank

For technical information, see page 385 - 389

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Thread Forming



- Thread forming taps have no flutes or cutting edges and provide chipless tapping
- Lube grooves for lubrication and venting in blind holes
- Taps are on blanks that meet ANSI specifications

- SINGLE THREAD - 1.5 Thread Chamfer for maximum thread length in blind holes due to its short chamfer
- BOTTOM - 2.5 Thread Chamfer for blind hole tapping
- PLUG - 4.0 Thread Chamfer for through hole tapping
- Uncoated is great for lead, stainless steels, carbon steels, aluminum and most other ductile materials

producing stringy chips

- TiN coating provides improved performance in a wide variety of materials, and is generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	H LIMIT	LUBE GROOVES	UNCOATED				TiN COATED			
			1.5 ITEM	2.5 ITEM	4.0 ITEM	USD\$	1.5 ITEM	2.5 ITEM	4.0 ITEM	USD\$
0-80	H2	0	TT88301	TT82800		23.80	TT88401	TT92800		28.15
0-80	H3	0	TT88303	TT82802		23.80	TT88403	TT92802		28.15
1-64	H3	0		TT82804		23.80		TT92804		28.15
1-72	H3	0	TT88307	TT82806		23.80	TT88407	TT92806		28.15
2-56	H3	0	TT88309	TT82808		23.50	TT88409	TT92808		26.05
2-56	H4	0	TT88311	TT82810		23.50	TT88411	TT92810		26.05
2-64	H3	0		TT82814		23.50		TT92814		26.05
3-48	H3	0		TT82818		23.50		TT92818		26.05
3-56	H3	0		TT82820		23.50		TT92820		26.05
3-56	H5	0		TT82822		23.50		TT92822		26.05
4-40	H3	0	TT88321	TT82824	TT82823	21.15	TT88421	TT92824	TT92823	25.45
4-40	H5	0	TT88323	TT82826	TT82825	21.15	TT88423	TT92826	TT92825	25.45
4-48	H4	0		TT82828		21.15		TT92828		25.45
5-40	H4	0		TT82832	TT82831	21.15		TT92832	TT92831	25.45
5-44	H4	0						TT92836		25.45
6-32	H3	1	TT88331	TT82840	TT82839	17.60	TT88431	TT92840	TT92839	21.95
6-32	H5	1	TT88333	TT82842	TT82841	17.60	TT88433	TT92842	TT92841	21.95
6-40	H4	1		TT82846		17.60		TT92846	TT92845	21.95
8-32	H3	1	TT88337	TT82850	TT82849	17.60	TT88437	TT92850	TT92849	22.15
8-32	H5	1	TT88339	TT82852	TT82851	17.60	TT88439	TT92852	TT92851	22.15
8-32	H7	1		TT82854	TT82853	17.60		TT92854	TT92853	22.15
8-36	H4	1		TT82856	TT82855	17.60		TT92856	TT92855	22.15
10-24	H5	1		TT82858	TT82857	16.80		TT92858	TT92857	20.10
10-24	H7	1		TT82860	TT82859	16.80		TT92860	TT92859	20.10
10-32	H3	1	TT88347	TT82862	TT82861	16.80	TT88447	TT92862	TT92861	20.10
10-32	H5	1	TT88349	TT82864	TT82863	16.80	TT88449	TT92864	TT92863	20.10
12-24	H5	2		TT82866	TT82865	16.80		TT92866	TT92865	20.10
12-28	H4	2		TT82870	TT82869	16.80		TT92870	TT92869	20.10
1/4-20	H5	2	TT88355	TT82872	TT82871	17.85	TT88455	TT92872	TT92871	22.80
1/4-20	H8	2	TT88357	TT82874	TT82873	17.85	TT88457	TT92874	TT92873	22.80
1/4-28	H4	2	TT88359	TT82878	TT82877	17.85	TT88459	TT92878	TT92877	22.80
1/4-28	H6	2	TT88361	TT82880	TT82879	17.85	TT88461	TT92880	TT92879	22.80
5/16-18	H8	2	TT88365	TT82884	TT82883	19.90	TT88465	TT92884	TT92883	25.30
5/16-18	H5	2		TT82882	TT82881	19.90		TT92882	TT92881	25.30
5/16-24	H5	2	TT88367	TT82886	TT82885	19.90	TT88467	TT92886	TT92885	25.30

Plug tap sizes 3/8" and smaller have male centers

Continued on next page

For technical information, see page 390 - 391

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Thread Forming (Cont.)

continued from previous page

SIZE	H LIMIT	LUBE GROOVES	UNCOATED				TiN COATED			
			1.5 ITEM	2.5 ITEM	4.0 ITEM	USD\$	1.5 ITEM	2.5 ITEM	4.0 ITEM	USD\$
5/16-24	H7	2	TT88369	TT82888	TT82887	19.90	TT88469	TT92888	TT92887	25.30
3/8-16	H6	2	TT88371	TT82890	TT82889	22.80	TT88471	TT92890	TT92889	28.85
3/8-16	H8	2	TT88373	TT82892	TT82891	22.80	TT88473	TT92892	TT92891	28.85
3/8-24	H5	2	TT88375	TT82894	TT82893	22.80	TT88475	TT92894	TT92893	28.85
3/8-24	H7	1	TT88377	TT82896	TT82895	22.80	TT88477	TT92896	TT92895	28.85
7/16-14	H7	4		TT82898	TT82897	34.55		TT92898	TT92897	43.00
7/16-14	H9	4		TT82902	TT82901	34.55		TT92902	TT92901	43.00
7/16-20	H5	4		TT82904	TT82903	34.55		TT92904	TT92903	43.00
7/16-20	H8	4		TT82906	TT82905	34.55		TT92906	TT92905	43.00
1/2-13	H7	6		TT82908	TT82907	38.70		TT92908	TT92907	47.10
1/2-13	H10	6		TT82910	TT82909	38.70		TT92910	TT92909	47.10
1/2-20	H5	6		TT82912	TT82911	38.70		TT92912	TT92911	47.10
1/2-20	H8	6		TT82914	TT82913	38.70		TT92914	TT92913	47.10

Plug tap sizes 3/8" and smaller have male centers

GENERAL PURPOSE TAPS - HIGH SPEED STEEL

Thread Forming - Metric



- Thread forming taps have no flutes or cutting edges and provide chipless tapping
- Taps are on blanks that meet ANSI specifications
- SINGLE THREAD - 1.5 Thread Chamfer for maximum thread length in blind holes due to its short chamfer
- BOTTOM - 2.5 Thread Chamfer for blind hole tapping
- PLUG - 4.0 Thread Chamfer for through hole tapping
- Lube grooves for lubrication and venting in blind holes
- Uncoated is great for lead, stainless steels, carbon steels, aluminum and most other ductile materials producing stringy chips
- TiN coating provides improved performance in a wide variety of materials, and is generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA

SIZE	D LIMIT	LUBE GROOVES	UNCOATED				TiN COATED			
			1.5 ITEM	2.5 ITEM	4.0 ITEM	USD\$	1.5 ITEM	2.5 ITEM	4.0 ITEM	USD\$
M1.6 x 0.35	D5	0		TT89690		19.65		TT89790		24.20
M1.7 x 0.35	D5	0		TT89692		19.65		TT89792		24.20
M2 x 0.4	D5	0	TT88380	TT89694		19.65	TT88580	TT89794		23.90
M2.5 x 0.45	D6	0	TT88382	TT89696		19.65	TT88582	TT89796		23.90
M3 x 0.5	D6	0	TT88384	TT89802		19.65	TT88584	TT79802		23.90
M3.5 x 0.6	D7	1	TT88386	TT89698		17.65	TT88586	TT89798	TT89797	22.00
M4 x 0.7	D7	1	TT88388	TT89804	TT89803	17.65	TT88588	TT79804	TT79803	22.20
M5 x 0.8	D8	1	TT88390	TT89806	TT89805	17.65	TT88590	TT79806	TT79805	22.45
M6 x 1.0	D9	2	TT88392	TT89808	TT89807	18.80	TT88592	TT79808	TT79807	23.80
M8 x 1.25	D10	2	TT88394	TT89810	TT89809	21.25	TT88594	TT79810	TT79809	27.20
M10 x 1.5	D11	2	TT88396	TT89812	TT89811	24.10	TT88596	TT79812	TT79811	30.60
M12 x 1.75	D12	4	TT88398	TT89814	TT89813	41.35	TT88598	TT79814	TT79813	49.90

Plug taps M10 and smaller have male centers

For technical information, see page 390 - 391

GENERAL PURPOSE TAP SETS - HIGH SPEED STEEL

Hand Tap Sets

- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and is generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA



SIZE	H LIMIT	FLUTES	UNCOATED		TiN COATED	
			TOOL #	USD\$	TOOL #	USD\$
0-80	H1	2	TT90003	44.05	TT75203	72.25
1-72	H1	2	TT90019	40.05		
2-56	H1	3	TT90031	40.05		
* 2-56	H2	3	TT90039	34.10	TT75226	57.60
2-64	H2	3	TT90047	28.87		
3-48	H2	3	TT90059	27.35		
3-56	H2	3	TT90063	23.57		
4-40	H1	3	TT90071	23.35		
* 4-40	H2	3	TT90079	23.35	TT75252	35.60
4-48	H2	3	TT90087	23.35		
5-40	H2	3	TT90103	23.35	TT75269	35.60
5-44	H2	3	TT90111	16.77		
6-32	H1	3	TT90119	20.75		
* 6-32	H2	3	TT90127	19.40		
6-32	H3	3	TT90135	19.40	TT75291	27.55
6-40	H2	3	TT90151	19.40		
8-32	H1	4	TT90163	22.05		
8-32	H2	4	TT90175	19.40		
* 8-32	H3	4	TT90187	19.40	TT75322	28.60
8-36	H2	4	TT90203	19.40		
10-24	H1	4	TT90211	19.40		
10-24	H2	4	TT90223	19.40		
* 10-24	H3	4	TT90235	19.40	TT75351	29.65
10-32	H1	4	TT90255	19.40		
10-32	H2	4	TT90267	19.40		
* 10-32	H3	4	TT90279	19.40	TT75378	29.65
12-24	H3	4	TT90291	19.40	TT75386	31.30
12-28	H3	4	TT90299	20.75	TT75391	34.70
1/4-20	H1	4	TT90307	24.60		
1/4-20	H2	4	TT90314	24.60		
* 1/4-20	H3	4	TT90326	19.40	TT75409	32.10

* Most Popular Size When Multiple Options Are Available

Continued on next page

GENERAL PURPOSE TAP SETS - HIGH SPEED STEEL

Hand Tap Sets (Cont.)

continued from previous page

SIZE	H LIMIT	FLUTES	UNCOATED		TiN COATED	
			TOOL #	USD\$	TOOL #	USD\$
1/4-28	H3	4	TT90354	19.40	TT75425	32.10
5/16-18	H2	4	TT90366	26.00		
* 5/16-18	H3	4	TT90378	23.35	TT75442	40.05
5/16-24	H3	4	TT90402	23.35	TT75457	40.05
3/8-16	H2	4	TT90417	30.05		
* 3/8-16	H3	4	TT90425	26.70	TT75472	45.30
3/8-24	H3	4	TT90449	26.70	TT75487	45.30
7/16-14	H3	4	TT90468	45.25	TT75498	76.65
7/16-20	H3	4	TT90487	45.25	TT75509	76.65
1/2-13	H3	4	TT90507	47.35	TT75521	79.95
1/2-20	H3	4	TT90526	53.40	TT75533	90.65
9/16-12	H3	4	TT90538	78.65		
9/16-18	H3	4	TT90549	78.65	TT75547	124.05
5/8-11	H3	4	TT90564	94.70	TT75555	163.20
5/8-18	H3	4	TT90580	94.70	TT75564	163.20
11/16-11	H3	4	TT90588	87.37		
11/16-16	H3	4	TT90592	120.65		
3/4-10	H3	4	TT90603	132.65	TT75580	228.95
3/4-16	H3	4	TT90618	132.65	TT75588	228.95
7/8-9	H4	4	TT90629	184.65		
7/8-14	H4	4	TT90639	184.65		
1-8	H4	4	TT90649	246.05	TT75607	390.40
1-12	H4	4	TT90656	246.05		
1-14	H4	4	TT90663	246.05		

* Most Popular Size When Multiple Options Are Available

DID YOU KNOW?



Thread Forming Taps have a tool life up to 20 times longer than cutting taps, as they do not have cutting edges to dull, and can run up to twice as fast as cutting taps.

Read More : **8 Machining Facts About Thread Forming Taps** on our technical blog, "In The Loupe"

harveyperformance.com/in-the-loupe/8-unique-facts-about-thread-forming-taps



GENERAL PURPOSE TAP SETS - HIGH SPEED STEEL

Hand Tap Sets - Metric

- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and is generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA



SIZE	D LIMIT	FLUTES	UNCOATED		TiN COATED	
			TOOL #	USD\$	TOOL #	USD\$
M2 x 0.4	D3	3	TT93100	57.40		
M3 x 0.5	D3	3	TT93102	29.40	TT75848	49.00
M4 x 0.7	D4	4	TT93104	26.70	TT75850	40.20
M5 x 0.8	D4	4	TT93106	26.70		
M6 x 1.0	D5	4	TT93108	26.70		
M7 x 1.0	D5	4	TT93110	26.70	TT75856	44.20
M8 x 1.25	D5	4	TT93112	26.70		
M10 x 1.25	D5	4	TT93114	52.70	TT75860	89.30
M10 x 1.50	D6	4	TT93116	52.70		
M12 x 1.25	D5	4	TT93118	61.95	TT75864	105.15
M12 x 1.75	D6	4	TT93120	61.95		
M14 x 1.5	D6	4	TT93122	92.00	TT75868	158.55
M14 x 2.0	D7	4	TT93124	92.00	TT75870	158.55
M16 x 1.5	D6	4	TT93126	112.00		
M16 x 2.0	D7	4	TT93128	112.00	TT75874	193.40
M18 x 1.5	D6	4	TT93130	151.35	TT75876	261.00
M18 x 2.5	D7	4	TT93132	151.35	TT75878	261.00
M20 x 2.5	D7	4	TT93134	195.40	TT75880	338.50
M24 x 3.0	D8	4	TT93136	286.05	TT75882	496.00
M27 X 3.0	D8	4			TT75884	859.05
M30 X 3.5	D9	4			TT75886	1097.60
M33 X 3.5	D9	4			TT75888	1094.70
M36 X 4.0	D9	4			TT75890	1389.00

GENERAL PURPOSE TAP SETS - HIGH SPEED STEEL

Hand Tap Sets - Left Hand

- Engineered to tap left hand threads
- Taps are on blanks that meet ANSI specifications
- TiN coating provides improved performance in a wide variety of materials, and is generally used in applications with lower cutting speeds
- High speed steel
- Precision manufactured in the USA



SIZE	H LIMIT	FLUTES	UNCOATED		TiN COATED	
			TOOL #	USD\$	TOOL #	USD\$
6-32	H2	3	TT89950	32.75	TT89972	46.65
8-32	H3	4	TT89951	32.75	TT89973	46.65
10-24	H3	4	TT89952	32.75	TT89974	46.65
10-32	H3	4	TT89953	32.75	TT89975	46.65
1/4-20	H3	4	TT89954	32.75	TT89976	56.05
1/4-28	H3	4			TT89977	56.05
5/16-18	H3	4	TT89956	40.05	TT89978	66.05
5/16-24	H3	4	TT89957	40.05	TT89979	66.05
3/8-16	H3	4	TT89958	46.65	TT89980	74.00
3/8-24	H3	4	TT89959	46.65	TT89981	74.00
7/16-14	H3	4	TT89960	78.65		
7/16-20	H3	4	TT89961	78.65		
1/2-13	H3	4	TT89962	78.65	TT89984	106.75
1/2-20	H3	4	TT89963	92.00	TT89985	118.60
5/8-11	H3	4	TT89964	166.65	TT89986	198.75
5/8-18	H3	4	TT89965	166.65		
3/4-10	H3	4	TT89966	233.35	TT89988	273.40
3/4-16	H3	4	TT89967	233.35	TT89989	273.40
7/8-9	H4	4	TT89968	318.75	TT89990	372.05
7/8-14	H4	4	TT89969	318.75	TT89991	372.05
1-8	H4	4	TT89970	393.40		
1-14	H4	4	TT89971	393.40	TT89993	460.10

For technical information, see page 385 - 389

COMBINATION DRILL & TAPS



- Engineered to drill and tap in one operation for added versatility
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	DRILL LENGTH	DRILL SIZE	THREAD LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
							TOOL #	USD\$
4-40	1/4	.0890	3/8	2	.141	1-7/8	TT70701	31.95
5-40	9/32	.1015	13/32	2	.141	1-15/16	TT70703	31.95
6-32	5/16	.1110	7/16	2	.141	2	TT70705	31.95
8-32	13/32	.1360	1/2	2	.168	2-5/32	TT70707	31.95
10-24	7/16	.1540	5/8	2	.194	2-13/32	TT70709	31.95
10-32	7/16	.1610	5/8	2	.194	2-13/32	TT70711	31.95
12-24	1/2	.1800	21/32	2	.220	2-13/32	TT70713	34.60
1/4-20	9/16	.2055	25/32	2	.255	2-9/16	TT70715	31.95
1/4-28	9/16	.2188	25/32	2	.255	2-9/16	TT70717	31.95
5/16-18	3/4	.2660	15/16	2	.318	2-29/32	TT70719	47.40
5/16-24	3/4	.2770	15/16	2	.318	2-29/32	TT70721	47.40
3/8-16	29/32	.3230	1-1/16	2	.381	3-15/32	TT70723	57.25
3/8-24	29/32	.3390	1-1/16	2	.381	3-15/32	TT70725	57.25
7/16-14	1-3/32	.3770	1-1/4	2	.323	3-27/32	TT70727	68.55
7/16-20	1-3/32	.3937	1-1/4	2	.323	3-27/32	TT70729	49.77
1/2-13	1-1/4	.4331	1-3/8	2	.367	4-3/16	TT70731	77.65
1/2-20	1-1/4	.4531	1-3/8	2	.367	4-3/16	TT70733	77.40

COMBINATION DRILL & TAPS
Metric

- Engineered to drill and tap in one operation for added versatility
- Taps are on blanks that meet ANSI specifications
- High speed steel
- Precision manufactured in the USA

SIZE	DRILL LENGTH	DRILL SIZE	THREAD LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
							TOOL #	USD\$
M4 x 0.7	13/32	.131	1/2	2	.168	2-5/32	TT70830	35.10
M5 x 0.8	7/16	.166	5/8	2	.194	2-13/32	TT70832	35.10
M6 x 1.0	9/16	.198	25/32	2	.255	2-17/32	TT70834	35.10
M8 x 1.25	3/4	.267	15/16	2	.318	2-29/32	TT70836	64.00
M10 x 1.50	29/32	.336	1-1/16	2	.381	3-15/32	TT70838	72.75
M12 x 1.75	1-1/4	.405	1-3/8	2	.367	4-3/16	TT70840	72.75

COMBINATION DRILL & TAPS
NPT



- Engineered to drill and tap in one operation for added versatility
- Designed to produce tapered pipe threads that meet standard NPT requirements
- High speed steel
- Precision manufactured in the USA

SIZE	DRILL LENGTH	DRILL SIZE	THREAD LENGTH	FLUTES	SHANK DIA.	OAL	UNCOATED	
		D ₁			D ₂	L ₁	TOOL #	USD\$
1/8-27	3/4	.332	3/4	4	.437	2-7/8	TT70900	127.10
1/4-18	7/8	.437	1-1/16	4	.562	3-5/16	TT70901	157.80
3/8-18	15/16	.562	1-1/16	4	.700	3-1/2	TT70902	202.65
1/2-14	1-1/4	.703	1-3/8	4	.687	4-3/8	TT70903	272.20
3/4-14	1-5/16	.906	1-3/8	6	.906	4-9/16	TT70904	361.25
1-11-1/2	1-5/8	1.141	1-3/4	6	1.125	5-3/8	TT70905	525.45

NEW
NEW
NEW
NEW
NEW
NEW

GENERAL PURPOSE DIES - CARBON STEEL

Hexagon Rethreading Die

- Hexagon style dies engineered to rethread worn or ineffective threads
- Carbon steel
- Precision manufactured in the USA



SIZE	ACROSS FLATS	THICKNESS	UNCOATED	
			TOOL #	USD\$
1/4-20	19/32	1/4	TE80529	20.05
1/4-28	19/32	1/4	TE80532	20.05
5/16-18	11/16	5/16	TE80537	23.50
5/16-24	11/16	5/16	TE80540	23.50
3/8-16	25/32	3/8	TE80544	26.05
3/8-24	25/32	3/8	TE80547	26.05
7/16-14	7/8	7/16	TE80550	31.85
7/16-20	7/8	7/16	TE80553	31.85
1/2-13	1-1/16	1/2	TE80555	35.05
1/2-20	1-1/16	1/2	TE80557	35.05
9/16-12	1-1/16	1/2	TE80559	37.65
9/16-18	1-1/16	1/2	TE80561	37.65
5/8-11	1-1/4	5/8	TE80563	39.45
5/8-18	1-1/4	5/8	TE80566	39.45
11/16-11	1-7/16	3/4	TE80568	43.45
11/16-16	1-7/16	3/4	TE80569	43.45
3/4-10	1-7/16	3/4	TE80571	48.60
3/4-16	1-7/16	3/4	TE80573	48.60
7/8-9	1-5/8	7/8	TE80575	52.85
7/8-14	1-5/8	7/8	TE80577	52.85
1-8	1-13/16	1	TE80579	59.30
1-12	1-13/16	1	TE80581	59.30
1-14	1-13/16	1	TE80583	59.30
1-1/8-7	2	1	TE80584	68.30
1-1/8-12	2	1	TE80585	68.30
1-1/4-7	2-3/16	1	TE80586	75.45
1-1/4-12	2-3/16	1	TE80587	75.45
1-3/8-6	2-3/8	1	TE80588	142.55
1-3/8-12	2-3/8	1	TE80589	142.55
1-1/2-6	2-9/16	1	TE80590	158.65
1-1/2-12	2-9/16	1	TE80591	158.65

GENERAL PURPOSE DIES - CARBON STEEL

Hexagon Rethreading Die - Metric

- Hexagon style dies engineered to rethread worn or ineffective threads
- Carbon steel
- Precision manufactured in the USA



SIZE	ACROSS FLATS	UNCOATED	
		TOOL #	USD\$
M3 x 0.5	1	TE80601	15.40
M4 x 0.7	1	TE80602	14.85
M5 x 0.8	1	TE80603	14.85
M6 x 1.0	1	TE80604	14.85
M7 x 1.0	1	TE80605	15.40
M8 x 1.25	1	TE80606	14.85
M10 x 1.25	1	TE80607	14.85
M10 x 1.50	1	TE80608	14.85
M12 x 1.25	1	TE80609	14.85
M12 x 1.75	1	TE80610	14.85
M14 x 1.50	1-7/16	TE80611	23.10
M14 x 2.0	1-7/16	TE80612	23.10
M16 x 1.50	1-7/16	TE80613	23.10
M16 x 2.0	1-7/16	TE80614	23.10
M18 x 1.50	1-7/16	TE80615	23.10
M18 x 2.50	1-7/16	TE80616	23.10
M20 x 2.5	1-13/16	TE80617	48.10
M24 x 3.0	1-13/16	TE80618	48.10



**Check Stock On 50 Tools at Once
and Simplify the Order Process**

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GENERAL PURPOSE DIES - HIGH SPEED STEEL

Adjustable Round Split Die

- Adjustable, round dies engineered to create male threads onto a part
- High speed steel
- Precision manufactured in the USA



SIZE	OUTSIDE DIA.	UNCOATED	
		TOOL #	USD\$
4-40	1	TE80810	64.25
5-40	13/16	TE80811	43.45
5-44	13/16	TE80812	43.45
6-32	13/16	TE80813	43.45
6-32	1	TE80814	52.85
6-40	13/16	TE80815	43.45
8-32	13/16	TE80816	43.45
8-32	1	TE80817	52.85
10-24	13/16	TE80818	43.45
10-24	1	TE80819	52.85
10-32	13/16	TE80820	43.45
10-32	1	TE80821	52.85
12-24	13/16	TE80822	43.45
12-24	1	TE80823	37.97
12-28	13/16	TE80824	43.45
1/4-20	13/16	TE80825	43.45
1/4-20	1	TE80826	52.85
1/4-20	1-1/2	TE80827	85.95
1/4-28	13/16	TE80828	43.45
1/4-28	1	TE80829	52.85
1/4-28	1-1/2	TE80830	85.95
5/16-18	13/16	TE80831	43.45
5/16-18	1	TE80832	52.85
5/16-18	1-1/2	TE80833	85.95
5/16-24	13/16	TE80834	43.45
5/16-24	1	TE80835	52.85

SIZE	OUTSIDE DIA.	UNCOATED	
		TOOL #	USD\$
5/16-24	1-1/2	TE80836	85.95
3/8-16	1	TE80837	52.85
3/8-16	1-1/2	TE80838	85.95
3/8-24	1	TE80839	52.85
3/8-24	1-1/2	TE80840	85.95
7/16-14	1	TE80841	52.65
7/16-14	1-1/2	TE80842	85.95
7/16-20	1	TE80843	52.85
7/16-20	1-1/2	TE80844	85.95
1/2-13	1	TE80845	52.85
1/2-13	1-1/2	TE80846	85.95
1/2-20	1	TE80847	52.85
1/2-20	1-1/2	TE80848	85.95
9/16-12	1-1/2	TE80849	85.95
9/16-18	1-1/2	TE80850	85.95
5/8-11	1-1/2	TE80851	85.95
5/8-11	2	TE80852	116.90
5/8-18	1-1/2	TE80853	85.95
5/8-18	2	TE80854	116.90
3/4-10	1-1/2	TE80855	85.95
3/4-10	2	TE80856	116.90
3/4-16	1-1/2	TE80857	85.95
3/4-16	2	TE80858	116.90
7/8-9	2	TE80859	116.90
7/8-14	2	TE80860	116.90

GENERAL PURPOSE DIES - CARBON STEEL

Hexagon Rethreading Die - NPT

- Hexagon style dies engineered to rethread worn or ineffective NPT threads
- Carbon steel
- Precision manufactured in the USA



SIZE	ACROSS FLATS	THICKNESS	UNCOATED	
			TOOL #	USD\$
1/8 - 27 NPT	1-1/16	3/8	TE80701	27.80
1/4 - 18 NPT	1-1/4	5/8	TE80702	30.70
3/8 - 18 NPT	1-7/16	5/8	TE80703	42.45
1/2 - 14 NPT	1-5/8	3/4	TE80704	61.35
3/4 - 14 NPT	2	13/16	TE80705	76.30
1 - 11-1/2 NPT	2-3/8	1	TE80706	147.60

GENERAL PURPOSE DIES - CARBON STEEL

Adjustable Round Split Die

- Adjustable, round dies engineered to create male threads onto a part
- Carbon steel
- Precision manufactured in the USA



SIZE	OUTSIDE DIA.	UNCOATED	
		TOOL #	USD\$
6 - 32	1	TE80113	34.15
8 - 32	1	TE80116	34.15
10 - 24	1	TE80119	34.15
10 - 32	1	TE80121	34.15
1/4 - 20	1	TE80127	34.15
1/4 - 20	1-1/2	TE80128	56.00
1/4 - 28	1	TE80130	34.15
5/16 - 18	1	TE80135	34.15
5/16 - 18	1-1/2	TE80136	56.00
5/16 - 24	1	TE80138	34.15
5/16 - 24	1-1/2	TE80139	56.00

SIZE	OUTSIDE DIA.	UNCOATED	
		TOOL #	USD\$
3/8 - 16	1	TE80142	34.15
3/8 - 16	1-1/2	TE80143	56.00
3/8 - 24	1	TE80145	34.15
3/8 - 24	1-1/2	TE80146	56.00
7/16 - 14	1	TE80148	34.15
7/16 - 14	1-1/2	TE80149	56.00
7/16 - 20	1	TE80151	34.15
1/2 - 13	1-1/2	TE80154	56.00
1/2 - 20	1-1/2	TE80156	56.00
9/16 - 12	1-1/2	TE80158	56.00
9/16 - 18	1-1/2	TE80160	56.00
5/8 - 11	1-1/2	TE80162	56.00
5/8 - 18	1-1/2	TE80165	56.00

THESE ITEMS
ARE SOURCED
INTERNATIONALLY

GENERAL PURPOSE DIES - DIE STOCKS



This Table Contains Internationally-Sourced Product

To better serve the diverse needs and requests of Titan USA customers, this product table contains products sourced internationally.

- Die stocks engineered for use with Titan USA Adjustable Round Split Dies
- Precision Manufactured in China

SIZE	UNCOATED	
	TOOL #	USD\$
1 OD	TE78909	39.10
1-1/2 OD	TE78910	64.35
2 OD	TE78911	112.80

THESE ITEMS
ARE SOURCED
INTERNATIONALLY

GENERAL PURPOSE DIES - TAP HANDLES
T-Handle Tap Wrench



This Table Contains Internationally-Sourced Product

To better serve the diverse needs and requests of Titan USA customers, this product table contains products sourced internationally.

- T-handle tap wrenches for use with hand taps
- Precision Manufactured in China

SIZE	UNCOATED	
	TOOL #	USD\$
0 - 1/4	TE78701	12.55
1/4-1/2	TE78702	19.10

HIGH PERFORMANCE TAPS

Technical Information

General Purpose High Performance Taps					
Material Guide		Rc	Cutting Speed (fpm)		Cutting Fluid*
			Spiral Point	Spiral Flute	
NICKEL BASE ALLOYS	Inconel-625/718, Waspalloy, Rene, Hastelloy	25 - 42	10	10	CO
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si	under 32 over 32	10 8	10 8	CO CO
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17-4, AM-350/355	35 - 42	10	10	CO
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 316	< 25	20	15	CO
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	25 - 32	15	12	CO
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	35 - 42	10	10	CO
MEDIUM ALLOY STEELS	200, 250, 300	< 15	35	25	WS, CO
CARBON STEELS	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	< 10	55	40	WS, CO
CAST IRONS	Gray Cast Irons	< 25	20	15	WS
MALLEABLE	A220, A436, A439, A602	< 25	15	12	CO
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded		80	60	WS, CO
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		60	45	WS

Your individual manufacturing conditions will greatly influence speeds.

*WS - Water Soluble

*CO - Cutting Oil

In most instances cutting fluid manufacturers recommend specific fluid for different materials.

GENERAL PURPOSE TAPS

Technical Information - Tolerances

Machine Screw Taps (NC & NF)

Size	OAL	Thread Length	Square Length	Shank Dia.	Square
#0 (.060)	1-5/8	5/16	3/16	.141	.110
#1 (.073)	1-11/16	3/8	3/16	.141	.110
#2 (.066)	1-3/4	7/16	3/16	.141	.110
#3 (.099)	1-13/16	1/2	3/16	.141	.110
#4 (.112)	1-7/8	9/16	3/16	.141	.110
#5 (.125)	1-15/16	5/8	3/16	.141	.110
#6 (.138)	2	11/16	3/16	.141	.110
#8 (.164)	2-1/8	3/4	1/4	.168	.131
#10 (.190)	2-3/8	7/8	1/4	.194	.152
#12 (.216)	2-3/8	15/16	9/32	.220	.165

Fractional Size Taps (NC & NF)

Size	OAL	Thread Length	Square Length	Shank Dia.	Square
1/4	2-1/2	1	5/16	.255	.191
5/16	2-23/32	1-1/8	3/8	.318	.238
3/8	2-15/16	1-1/4	7/16	.381	.286
7/16	3-5/32	1-7/16	13/32	.323	.242
1/2	3-3/8	1-21/32	7/16	.367	.275
9/16	3-19/32	1-21/32	1/2	.429	.322
5/8	3-13/16	1-13/16	9/16	.480	.360
11/16	4-1/32	1-13/16	5/8	.542	.406
3/4	4-1/4	2	11/16	.590	.442
7/8	4-11/16	2-7/32	3/4	.697	.523
1	5-1/8	2-1/2	13/16	.800	.600
1-1/8	5-7/16	2-9/16	7/8	.896	.672
1-1/4	5-3/4	2-9/16	1	1.021	.766
1-3/8	6-1/16	3	1-1/16	1.108	.831
1-1/2	6-3/8	3	1-1/8	1.233	.925

Pipe Taps - Straight & Taper

Size	OAL	Thread Length	Square Length	Shank Dia.	Square
1/16 - 27	2-1/8	11/16	3/8	.3125	.234
1/8 - 27	2-1/8	3/4	3/8	.3125(SS)	.234
1/8 - 27	2-1/8	3/4	3/8	.4375(LS)	.328
1/4 - 18	2-7/16	1-1/16	7/16	.5625	.421
3/8 - 18	2-9/16	1-1/16	1/2	.7000	.531
1/2 - 14	3-1/8	1-3/8	5/8	.6875	.515
3/4 - 14	3-1/4	1-3/8	11/16	.9063	.679
1 - 11-1/2	3-3/4	1-3/4	13/16	1.1250	.843
1-1/4 - 11-1/2	4	1-3/4	15/16	1.3125	.984
1-1/2 - 11-1/2	4-1/4	1-3/4	1	1.5000	1.125
2 - 11-1/2	4-1/2	1-3/4	1-1/8	1.8750	1.406

(SS) = Small Shank (LS) = Large Shank

Pulley Taps

Size	Thread Length	Square Length	Shank Dia.	Square	Neck Length	Ground Length
1/4	1	5/16	.255	.191	3/8	1-1/2
5/16	1-1/8	3/8	.318	.238	3/8	1-9/16
3/8	1-1/4	7/16	.381	.286	3/8	1-5/8
7/16	1-7/16	1/2	.444	.333	7/16	1-11/16
1/2	1-21/32	9/16	.507	.380	1/2	1-11/16
5/8	1-13/16	11/16	.633	.475	5/8	2
3/4	2	3/4	.759	.569	3/4	2-1/4

See page 324 for overall lengths available

Small Shank Extension Taps

Size	NC/NF	Thread Length	Square Length	Shank Dia.	Square
8 - 32	NC	3/4	1/4	.123	.092
10 - 24	NC	7/8	1/4	.136	.102
10 - 32	NF	7/8	1/4	.136	.102
1/4 - 20	NC	1	5/16	.185	.139
1/4 - 28	NF	1	5/16	.185	.139
5/16 - 18	NC	1-1/8	3/8	.240	.180
5/16 - 24	NF	1-1/8	3/8	.240	.180
3/8 - 16	NC	1-1/4	7/16	.275	.206
3/8 - 24	NF	1-1/4	7/16	.275	.206
7/16 - 14	NC	1-7/16	13/32	.323	.242
7/16 - 20	NF	1-7/16	13/32	.323	.242
1/2 - 13	NC	1-21/32	7/16	.367	.275
1/2 - 20	NF	1-21/32	7/16	.367	.275
5/8 - 11	NC	1-13/16	9/16	.480	.360
5/8 - 18	NF	1-13/16	9/16	.480	.360
3/4 - 10	NC	2	11/16	.590	.442
3/4 - 16	NF	2	11/16	.590	.442

Metric Taps

Size	Overall Length	Thread Length	Square Length	Shank Dia	Square	Inch Blank
M1.6 x 0.35	1-5/8	5/16	3/16	.141	.110	#0
M2 x 0.40	1-3/4	7/16	3/16	.141	.110	#2
M2.5 x 0.45	1-13/16	1/2	3/16	.141	.110	#3
M3 x 0.50	1-15/16	5/8	3/16	.141	.110	#5
M3.5 x 0.60	2	11/16	3/16	.141	.110	#6
M4 x 0.70	2-1/8	3/4	1/4	.168	.131	#8
M4.5 x 0.75	2-3/8	7/8	1/4	.194	.152	#10
M5 x 0.80	2-3/8	7/8	1/4	.194	.152	#10
M6 x 1	2-1/2	1	5/16	.255	.191	1/4
M6.3 x 1	2-1/2	1	5/16	.255	.191	1/4
M7 x 1	2-23/32	1-1/8	3/8	.318	.238	5/16
M8 x 1.25	2-23/32	1-1/8	3/8	.318	.238	5/16
M10 x 1.50	2-15/16	1-1/4	7/16	.381	.286	3/8
M12 x 1.75	3-3/8	1-21/32	7/16	.367	.275	1/2
M14 x 2	3-19/32	1-21/32	1/2	.429	.322	9/16
M16 x 2	3-13/16	1-13/16	9/16	.480	.360	5/8
M18 x 2.50	4-1/32	1-13/16	5/8	.542	.406	11/16
M20 x 2.50	4-15/32	2	11/16	.652	.489	13/16
M24 x 3	4-29/32	2-7/32	3/4	.760	.570	15/16
M30 x 3.50	5-7/16	2-9/16	1	1.021	.766	1-3/16
M36 x 4	6-1/16	3	1-1/8	1.233	.925	1-7/16

GENERAL PURPOSE TAPS

Technical Information

Tap Recommendations for Classes 2B & 3B Unified Inch Screw Threads							
Size	Threads Per Inch		Recommended Tap Limits		Internal Thread Pitch Diameter Limits		
	NC UC	NF UNF	Class 2B	Class 3B	Min. All Classes (Basic)	Max. Class 2B	Max Class 3B
0	–	80	H2	H1	.0519	.0542	.0536
1	64	–	H2	H1	.0629	.0655	.0648
	–	72	H2	H1	.0640	.0665	.0659
2	56	–	H2	H1	.0744	.0772	.0765
	–	64	H2	H1	.0759	.0786	.0779
3	48	–	H2	H1	.0855	.0885	.0877
	–	56	H2	H1	.0874	.0902	.0895
4	40	–	H2	H2	.0958	.0991	.0982
	–	48	H2	H1	.0985	.1016	.1008
5	40	–	H2	H2	.1088	.1121	.1113
	–	44	H2	H1	.1102	.1134	.1126
6	32	–	H3	H2	.1177	.1214	.1204
	–	40	H2	H1	.1218	.1252	.1243
8	32	–	H3	H2	.1437	.1475	.1465
	–	36	H2	H1	.1460	.1496	.1487
10	24	–	H3	H3	.1629	.1672	.1661
	–	32	H3	H2	.1697	.1736	.1726
12	24	–	H3	H3	.1889	.1933	.1922
	–	28	H3	H3	.1928	.1970	.1959
1/4	20	–	H5	H3	.2175	.2223	.2211
	–	28	H4	H3	.2268	.2311	.2300
5/16	18	–	H5	H3	.2764	.2817	.2803
	–	24	H4	H3	.2854	.2902	.2890
3/8	16	–	H5	H3	.3344	.3401	.3387
	–	24	H4	H3	.3479	.3528	.3516
7/16	14	–	H5	H3	.3911	.3972	.3957
	–	20	H5	H3	.4050	.4104	.4091
1/2	13	–	H5	H3	.4500	.4565	.4548
	–	20	H5	H3	.4675	.4731	.4717
9/16	12	–	H5	H3	.5084	.5152	.5135
	–	18	H5	H3	.5264	.5323	.5308
5/8	11	–	H5	H3	.5660	.5732	.5714
	–	18	H5	H3	.5889	.5949	.5934
3/4	10	–	H5	H5	.6850	.6927	.6907
	–	16	H5	H3	.7094	.7159	.7143
7/8	9	–	H6	H4	.8028	.8110	.8089
	–	14	H6	H4	.8286	.8356	.8339

The above recommended taps normally produce the Class of Thread indicated in average materials when used with reasonable care. However, if the tap specified does not give a satisfactory gage fit in the work, a choice of some other limit tap will be necessary.

GENERAL PURPOSE TAPS

Technical Information

Tap Recommendations for Classes 2B & 3B Unified Inch Screw Threads

Size	Threads Per Inch		Recommended Tap Limits		Internal Thread Pitch Diameter Limits		
	NC UC	NF UNF	Class 2B	Class 3B	Min. All Classes (Basic)	Max. Class 2B	Max Class 3B
1	8	-	H6	H4	.9188	.9276	.9254
	–	12	H6	H4	.9459	.9535	.9516
	NS	NS	H6	H4	.9536	.9609	.9590
1 1/8	7	-	H6	H4	1.0332	1.0416	.10393
	–	12	H6	H4	1.0709	1.0787	.10768
1 1/4	7	-	H6	H4	1.1572	1.1668	1.1644
	–	12	H6	H4	1.1959	1.2309	1.2019
1 3/8	6	-	H6	H4	1.2667	1.2771	1.2745
	–	12	H6	H4	1.3209	1.3291	1.3270
1 1/2	6	-	H6	H4	1.3917	1.4022	1.3996
	–	12	H6	H4	1.4459	1.4542	1.4522

Tap Recommendations for Class 6H Metric Screw Threads

Thread Size		Recommended Tap Limit	Internal Thread - Product Limits - Class 6H			
Nominal Dia. (mm)	Pitch (mm)	Limit Number	Pitch Diameter (mm)		Pitch Diameter (mm)	
			Min.	Max.	Min.	Max.
1.6	.35	D3	1.373	1.458	.05406	.05740
2	.4	D3	1.740	1.830	.06850	.07205
2.5	.45	D3	2.208	2.303	.08693	.09067
3	.5	D3	2.675	2.775	.10531	.10925
3.5	.6	D4	3.110	3.222	.12244	.12685
4	.7	D4	3.545	3.663	.13957	.14421
4.5	.75	D4	4.013	4.131	.15789	.16264
5	.8	D4	4.480	4.605	.17638	.18130
6	1	D5	5.350	5.500	.21063	.21654
7	1	D5	6.350	6.500	.25000	.25591
8	1.25	D5	7.188	7.348	.28299	.28929
10	1.5	D6	9.026	9.206	.35935	.36244
12	1.75	D6	10.863	11.063	.42758	.43555
14	2	D7	12.701	12.913	.50004	.50839
16	2	D7	14.701	14.913	.57878	.58713
20	2.5	D7	18.376	18.600	.72346	.73228
24	3	D8	22.051	22.316	.86815	.87858
30	3.5	D9	27.727	28.007	1.09161	1.10264
36	4	D9	33.402	33.702	1.31504	1.32685

GENERAL PURPOSE TAPS

Technical Information

Tap Hole Size							
Tap Size	Threads Per Inch NC UN	Threads Per Inch NF UN	75% Thread	65% Thread	Tap Drill Size (65% Thread)	Class of Fit	
						2B	3B
0	80	–	0.054	0.055	#54 or 1.4 mm	H3, H2	H2
1	64	–	0.066	0.067	#51 or 1.7 mm	H4, H3	H3, H2
	–	72	0.067	0.068	#51 or 1.75 mm	H4, H3	H3, H2
2	56	–	0.078	0.079	#47 or 2.0 mm	H4, H3	H3, H2
	–	64	0.079	0.080	2.0 mm	H4, H3	H3, H2
3	48	–	0.090	0.091	2.3 mm	H5, H4	H3, H2
	–	56	0.091	0.092	2.3 mm	H5, H4	H3, H2
4	40	–	0.100	0.101	#39	H5, H4	H4, H3
	–	48	0.103	0.104	#37	H5, H4	H4, H3
5	40	–	0.113	0.114	#33 or 2.9 mm	H5, H4	H4, H3
	–	44	0.114	0.115	#33 or 2.9 mm	H5, H4	H4, H3
6	32	–	0.124	0.125	3.1 mm	H6, H5	H4, H3
	–	40	0.126	0.127	1/8" or 3.2 mm	H5, H4	H4, H3
8	32	–	0.149	0.150	#25 or 3.8 mm	H6, H5	H4, H3
	–	36	0.151	0.152	#24	H5, H4	H4, H3
10	24	–	0.170	0.172	11/64"	H7, H6, H5	H5, H4
	–	32	0.175	0.176	#16 or .176"	H6, H5	H4, H3
12	24	–	0.196	0.198	#9 or 5.0 mm	H7, H6, H5	H5, H4
	–	28	0.199	0.201	#7 or 5.1 mm	H7, H6, H5	H4, H3
1/4	20	–	0.225	0.227	5.75 mm	H8, H7, H6	H5, H4
	–	28	0.233	0.235	A	H7, H6, H5	H5, H4
5/16	18	–	0.285	0.287	7.25 mm	H9, H8, H7	H6, H5
	–	24	0.292	0.294	.293"	H8, H7, H6	H5, H4
3/8	16	–	0.344	0.347	S or 11/32"	H9, H8, H7	H7, H6
	–	24	0.355	0.357	9.0 mm	H8, H7, H6	H6, H5
7/16	14	–	0.402	0.405	Y	H10, H9, H8	H7, H6
	–	20	0.414	0.416	Z or 10.5 mm	H9, H8, H7	H6, H5
1/2	13	–	0.462	0.466	.463"	H11, H10, H9	H8, H7, H6
	–	20	0.475	0.477	.476"	H9, H8, H7	H6, H5

Pre Tap Hole Size - Metric				
Tap Size	Pitch	75% Thread	65% Thread	Nearest Drill Size
M1.6	.350	.057	.058	1.45 mm
M1.7	.350	.061	.062	1.55 mm
M2	.400	.072	.073	1.85 mm
M2.5	.450	.091	.092	2.30 mm
M3	.500	.110	.111	#35
M3.5	.600	.128	.129	#30
M4	.700	.145	.146	3.70 mm
M5	.800	.183	.184	#14
M6	1.000	.218	.220	5.50 mm
M8	1.250	.291	.294	7.40 mm
M10	1.500	.365	.368	9.30 mm
M12	1.750	.439	.442	7/16"

HAND TAPS

Technical Information

Hand Taps		
Material Guide		SFM
NICKEL BASE ALLOYS	Inconel - 625/718, Waspalloy, Rene, Hastelloy	10
TITANIUM ALLOYS	Commercially Pure, 6AL - 4V, Astm 1/2/3, 6Al - 25N - 4Zr - 2Mo - Si	10
STAINLESS STEEL (PRECIPITATION)	13/8, 15/5, 17 - 4	15 - 25
STAINLESS STEEL (AUSTENTIC)	200 Series, 302, 303, 304, 304L, 316, 316L	10 - 20
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	15
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, O1	15 - 25
MEDIUM ALLOY STEELS	200, 250, 300	20 - 40
CARBON STEELS	1000's, 1100's, 1300's	30 - 50
DUCTILE	Ductile Cast Irons	50
CAST IRONS	Gray Cast Irons	30 - 60
ALUMINUM ALLOYS	2014, 2024, 6061, 7075	60 - 80
MAGNESIUM		50 - 70
COPPER, COPPER ALLOYS		60 - 80
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze	30 - 100
COMPOSITES	G-10 Fiberglass, Graphite, Graphite/ Epoxy, Plastics	50 - 70

THREAD FORMING TAPS

Technical Information

Pre Tap Hole Size				
Tap size	TPI	75% Thread	65% Thread	Nearest Drill Size
0	80	0.054	0.055	#54 or 1.4 mm
1	64	0.066	0.067	#51 or 1.7 mm
	72	0.067	0.068	#51 or 1.75 mm
2	56	0.078	0.079	#47 or 2.0 mm
	64	0.079	0.080	2.0 mm
3	48	0.090	0.091	2.3 mm
	56	0.091	0.092	2.3 mm
4	40	0.100	0.101	#39
	48	0.103	0.104	#37
5	40	0.113	0.114	#33 or 2.9 mm
	44	0.114	0.115	#33 or 2.9 mm
6	32	0.124	0.125	3.1 mm
	40	0.126	0.127	1/8" or 3.2 mm
8	32	0.149	0.150	#25 or 3.8 mm
	36	0.151	0.152	#24
10	24	0.170	0.172	11/64"
	32	0.175	0.176	#16 or .176"
12	24	0.196	0.198	#9 or 5.0 mm
	28	0.199	0.201	#7 or 5.1 mm
1/4	20	0.225	0.227	5.75 mm
	28	0.233	0.235	"A"
5/16	18	0.285	0.287	7.25 mm
	24	0.292	0.294	.293"
3/8	16	0.344	0.347	"S" or 11/32"
	24	0.355	0.357	9.0 mm
7/16	14	0.402	0.405	"Y"
	20	0.414	0.416	"Z" or 10.5 mm
1/2	13	0.462	0.466	.463"

Pre Tap Hole Size - Metric				
Tap size	Pitch	75% Thread	65% Thread	Nearest Drill Size
M1.6	0.35	0.057	0.058	1.45 mm
M1.7	0.35	0.061	0.062	1.55 mm
M2	0.4	0.072	0.073	1.85 mm
M2.5	0.45	0.091	0.092	2.30 mm
M3	0.5	0.110	0.111	#35
M3.5	0.6	0.128	0.129	#30
M4	0.7	0.145	0.146	3.70 mm
M5	0.8	0.183	0.184	#14
M6	1	0.218	0.220	5.50 mm
M8	1.25	0.291	0.294	7.40 mm
M10	1.5	0.365	0.368	9.30 mm
M12	1.75	0.439	0.442	7/16"

Where to Use Thread Forming Taps

Materials particularly well suited for thread forming include aluminum, brass, copper, lead, stainless steel, carbon steel, cast steel, leaded steel, and zinc. In general, any material which produces a stringy chip is a good candidate for cold forming threads. If the chips are powdery, the material may be too brittle. Forming taps generate threads without producing chips. The threads produced are much stronger than those created by cut taps because of the displacements of the grain of the metal in the workpiece. Cutting taps produce chips which may interfere with the tapping process.

Major Advantages to Thread Forming

Chipless Tapping – No chip removal problems in blind holes

Stronger Threads – The grain flow of formed threads follows the contour of the thread in steel and stainless steel, resulting in greater thread strength.

Better Thread Gaging – Forming taps create their own lead therefore the possibility of producing oversized threads is greatly reduced.

Stronger Taps – The absence for the need for flutes results in a stronger more solid tap.

Longer Tap Life – Forming taps last 3 to 20 times longer because they have no cutting edge to dull.

More Efficient Production – Longer tap life, less tap breakage and faster tapping speeds (up to 2X faster than cutting taps).

Ideal for Non-Lead Screw Tappers – The ability to form their own lead makes forming taps well suited or NC machines or other machines without lead screws.

THREAD FORMING TAPS

Technical Information

General Purpose Thread Forming Taps			
Material Guide		Rc	SFM
NICKEL BASE ALLOYS	Inconel-625/718, Waspalloy, Rene, Hastelloy	< 25	15
TITANIUM ALLOYS	Commercially Pure, 6AL-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si	25 - 32	10
STAINLESS STEEL (AUSTENITIC)	200 Series, 302, 303, 304, 316	< 25	20
STAINLESS STEEL (MARTENSITIC)	403, 410, 416, 440	25 - 32	15
HIGH STRENGTH TOOL STEELS	4140, 4340, 6150, 5210, A2, D2 P20, H11, H13, S2, 01	35 - 42	10
MEDIUM ALLOY STEELS	200, 250, 300	< 15	35
CARBON STEELS	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	< 10	55
ALUMINUM	2014, 2024, 6061-(T1-T6), 7075, Die Cast, Extruded		80
BRASS, BRONZE	Brass, Alum/Bronze, Low Silicon Bronze		60

Calculating Tap Drill Sizes - Thread Forming Taps
Drill Size = Major Diameter - [(0.0068 X Desired % of Thread) ÷ Threads Per Inch]
Drill Size (mm) = Major Diameter - [(0.0068 X Desired % of Thread x Pitch (mm))]

Guidelines for Using Thread Forming Taps

Pre-tap Hole Size - Thread Forming Taps require a larger pre-tap hole size than a cutting tap.

Tapping with too small of a pre-tap hole size results in excessive tap wear, torque and possible tap breakage.

Lubrication - Thread Forming Taps require good lubrication. Cutting oils are generally preferred because of their lubricity compared to water soluble coolants.

BURS

Cylindrical - SA



- General purpose cylindrical style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
*SA-61	1/16	1/4	3/32	1-1/2	TB19264	8.05	TB19280	8.05
*SA-41	1/16	1/4	1/8	1-1/2	TB19301	7.65	TB19316	7.65
*SA-41L2	1/16	1/4	1/8	2	TB19265	11.30	TB19281	11.30
*SA-41L3	1/16	1/4	1/8	3	TB19266	12.60	TB19282	12.60
*SA-63	3/32	3/8	3/32	1-1/2	TB19267	8.05	TB19283	8.05
*SA-42	3/32	7/16	1/8	1-1/2	TB19302	7.65	TB19317	7.65
*SA-42L2	3/32	7/16	1/8	2			TB19284	8.17
*SA-42L3	3/32	7/16	1/8	3			TB19285	12.65
*SA-43	1/8	9/16	1/8	1-1/2	TB19303	7.65	TB19318	7.65
*SA-43L2	1/8	9/16	1/8	2	TB19270	8.17	TB19286	11.30
*SA-43L3	1/8	9/16	1/8	3	TB19271	12.60	TB19287	12.60
*SA-11	1/8	1/2	1/4	2	TB19307	14.90	TB19322	14.90
*SA-12	1/8	5/8	1/4	2	TB19272	14.95	TB19288	14.95
SA-52	5/32	1/2	1/8	2	TB19304	16.60	TB19319	16.60
*SA-13	5/32	5/8	1/4	2	TB19630	14.97	TB19652	20.75
SA-53	3/16	1/2	1/8	2	TB19305	16.60	TB19320	16.60
*SA-81	3/16	1/2	3/16	2	TB19273	18.15	TB19289	18.15
*SA-14	3/16	5/8	1/4	2	TB19308	17.90	TB19323	17.90
SA-51	1/4	1/2	1/8	2	TB19306	11.15	TB19321	11.15
*SA-1	1/4	5/8	1/4	2	TB19309	12.75	TB19324	12.75
SA-1L6	1/4	1/2	1/4	6-1/2	TB19562	25.85	TB19565	25.85
*SA-1L	1/4	1	1/4	2	TB19274	19.75	TB19290	19.75
SA-2	5/16	3/4	1/4	2-1/2	TB19310	23.50	TB19325	23.50
SA-3	3/8	3/4	1/4	2-1/2	TB19311	15.70	TB19326	15.70
SA-3L6	3/8	3/4	1/4	6-3/4	TB19563	36.25	TB19566	36.25
SA-3L	3/8	1	1/4	2-3/4	TB19275	24.25	TB19291	24.25
SA-3X	3/8	1-1/2	1/4	3-1/4	TB19276	34.35	TB19292	34.35
SA-4	7/16	1	1/4	2-3/4	TB19312	26.17	TB19327	36.40
SA-5	1/2	1	1/4	2-3/4	TB19313	25.05	TB19328	25.05
SA-5L6	1/2	1	1/4	7	TB19564	56.95	TB19567	56.95
SA-6	5/8	1	1/4	2-3/4	TB19314	36.15	TB19329	36.15
SA-15	3/4	1/2	1/4	2-1/4	TB19277	39.77	TB19293	54.95
SA-16	3/4	3/4	1/4	2-1/2	TB19278	54.95	TB19294	54.95
SA-7	3/4	1	1/4	2-3/4	TB19315	56.35	TB19330	56.35
SA-9	1	1	1/4	2-3/4	TB19632	88.85	TB19654	88.85

* One Solid Carbide Piece

For technical information, see page 408

BURS

Cylindrical - SA - For Aluminum



- Cylindrical style burs optimized for use in non-ferrous metals, aluminum alloys, and plastics
- Single cut style provides optimal surface finish
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LENGTH OF CUT	SHANK DIA.	OAL	ALUMA CUT	
	D ₁		D ₂	L ₁	TOOL #	USD\$
*SA-1NF	1/4	5/8	1/4	2	TB19592	18.25
SA-3NF	3/8	3/4	1/4	2-1/2	TB19593	25.80
SA-5NF	1/2	1	1/4	2-3/4	TB19594	42.90
SA-6NF	5/8	1	1/4	2-3/4	TB19595	63.70
SA-7NF	3/4	1	1/4	2-3/4	TB19596	83.75

* One Solid Carbide Piece

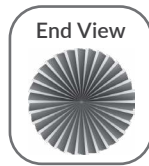


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BURS

Cylindrical End Cut - SB



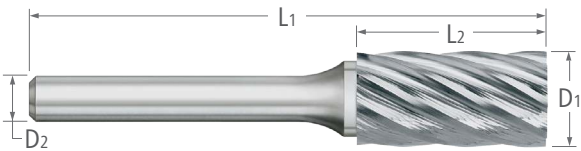
- General purpose cylindrical end cut style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D ₁				TOOL #	USD\$	TOOL #	USD\$
*SB-41	1/16	1/4	1/8	1-1/2	TB19331	10.25	TB19660	10.25
*SB-41L2	1/16	1/4	1/8	2	TB19815	12.35	TB19834	8.87
*SB-41L3	1/16	1/4	1/8	3			TB19835	13.80
*SB-42	3/32	7/16	1/8	1-1/2	TB19332	8.10	TB19658	8.10
*SB-42L2	3/32	7/16	1/8	2	TB19817	8.87	TB19836	12.35
*SB-42L3	3/32	7/16	1/8	3	TB19818	9.97	TB19837	9.97
† SB-ECO	1/8	-	1/8	1-1/2	TB19819	6.10		
*SB-43	1/8	9/16	1/8	1-1/2	TB19333	7.50	TB19656	7.50
*SB-43L2	1/8	9/16	1/8	2	TB19820	12.35	TB19839	12.35
*SB-43L3	1/8	9/16	1/8	3	TB19821	13.75	TB19840	13.75
*SB-11	1/8	1/2	1/4	2	TB19336	19.45	TB19344	19.45
*SB-12	1/8	5/8	1/4	2	TB19822	16.60	TB19841	16.60
*SB-13	5/32	5/8	1/4	2	TB19634	16.87	TB19662	23.40
*SB-14	3/16	5/8	1/4	2	TB19337	13.97	TB19345	19.55
*SB-51	1/4	3/16	1/8	1-11/16	TB19334	11.30	TB19342	11.30
SB-51	1/4	1/2	1/8	2	TB19335	12.20	TB19343	12.20
*SB-1	1/4	5/8	1/4	2	TB19338	14.95	TB19346	14.95
*SB-1L	1/4	1	1/4	2	TB19823	21.60	TB19842	21.60
SB-2	5/16	3/4	1/4	2-1/2	TB19339	25.80	TB19347	25.80
SB-3	3/8	3/4	1/4	2-1/2	TB19340	17.95	TB19348	17.95
SB-3L	3/8	1	1/4	2-3/4			TB19843	26.65
SB-3X	3/8	1-1/2	1/4	3-1/4	TB19825	25.37	TB19844	35.10
SB-4	7/16	1	1/4	2-3/4	TB19636	29.87	TB19349	41.35
SB-5	1/2	1	1/4	2-3/4	TB19341	27.55	TB19350	27.55
SB-6	5/8	1	1/4	2-3/4	TB19692	40.45	TB19351	40.45
SB-15	3/4	1/2	1/4	2-1/4			TB19845	43.67
SB-16	3/4	3/4	1/4	2-1/2	TB19827	60.35	TB19846	60.35
SB-7	3/4	1	1/4	2-3/4	TB19638	61.95	TB19352	61.95
SB-9	1	1	1/4	2-3/4	TB19640	97.15	TB19664	97.15

* One Solid Carbide Piece † End Cut Only

BURS

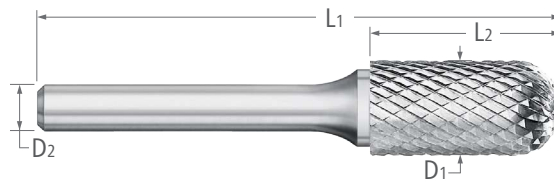
Cylindrical End Cut - SB - For Aluminum



Burs

- General purpose cylindrical end cut style burs optimized for use in non-ferrous metals, aluminum alloys, and plastics
- Single cut style provides optimal surface finish
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LENGTH OF CUT	SHANK DIA.	OAL	ALUMA CUT	
	D1	L2	D2	L1	TOOL #	USD\$
SB-3NF	3/8	3/4	1/4	2-1/2	TB19852	29.05
SB-5NF	1/2	1	1/4	2-3/4	TB19853	44.55
SB-6NF	5/8	1	1/4	2-3/4	TB19854	61.45
SB-7NF	3/4	1	1/4	2-3/4	TB19855	90.05

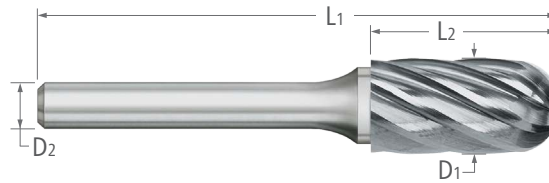
BURS**Cylindrical Ball Nose - SC**

- General purpose cylindrical ball nose style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA. D ₂	OAL L ₁	SINGLE CUT		DOUBLE CUT	
	D ₁				TOOL #	USD\$	TOOL #	USD\$
*SC-61	3/32	3/8	3/32	1-1/2	TB19761	8.05	TB19772	8.05
*SC-41	3/32	7/16	1/8	1-1/2	TB19353	7.65	TB19367	7.65
*SC-42	1/8	9/16	1/8	1-1/2	TB19354	7.65	TB19368	7.65
*SC-42L2	1/8	9/16	1/8	2	TB19762	11.30	TB19773	11.30
*SC-42L3	1/8	9/16	1/8	3	TB19763	12.60	TB19774	12.60
*SC-11	1/8	1/2	1/4	2	TB19358	20.95	TB19372	20.95
*SC-12	1/8	5/8	1/4	2	TB19764	15.95	TB19775	15.95
SC-52	5/32	1/2	1/8	2	TB19355	16.60	TB19369	16.60
*SC-13	5/32	5/8	1/4	2	TB19642	23.85	TB19666	23.85
SC-53	3/16	1/2	1/8	2	TB19356	16.60	TB19370	16.60
*SC-81	3/16	1/2	3/16	2	TB19766	13.07	TB19777	18.25
*SC-14	3/16	5/8	1/4	2	TB19359	14.97	TB19373	20.80
SC-51	1/4	1/2	1/8	2	TB19357	11.30	TB19371	11.30
*SC-1	1/4	5/8	1/4	2	TB19360	15.30	TB19374	15.30
*SC-1L	1/4	1	1/4	2	TB19767	19.75	TB19778	19.75
SC-1L6	1/4	1/2	1/4	6-1/2	TB19568	29.95	TB19571	29.95
SC-2	5/16	3/4	1/4	2-1/2	TB19361	25.40	TB19375	25.40
SC-3	3/8	3/4	1/4	2-1/2	TB19362	18.15	TB19376	18.15
SC-3L	3/8	1	1/4	2-3/4	TB19768	26.55	TB19779	26.55
SC-3L6	3/8	3/4	1/4	6-3/4	TB19569	40.40	TB19572	40.40
SC-3X	3/8	1-1/2	1/4	3-1/4	TB19769	31.15	TB19788	31.15
SC-4	7/16	1	1/4	2-3/4	TB19363	28.97	TB19377	40.10
SC-5	1/2	1	1/4	2-3/4	TB19364	28.40	TB19378	28.40
SC-5L6	1/2	1	1/4	7	TB19570	63.85	TB19573	63.85
SC-6	5/8	1	1/4	2-3/4	TB19365	42.40	TB19379	42.40
SC-15	3/4	1/2	1/4	2-1/4	TB19770	42.67	TB19789	59.05
SC-16	3/4	3/4	1/4	2-1/2	TB19771	59.10	TB19792	59.10
SC-7	3/4	1	1/4	2-3/4	TB19366	60.65	TB19380	60.65
SC-9	1	1	1/4	2-3/4	TB19780	66.47	TB19782	91.80

* One Solid Carbide Piece

For technical information, see page 408

BURS**Cylindrical Ball Nose - SC - For Aluminum**

- General purpose ball nose shape style burs optimized for use in non-ferrous metals, aluminum alloys, and plastics
- Single cut style provides optimal surface finish
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

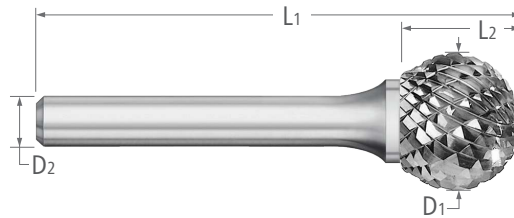
TOOL	SIZE	LENGTH OF CUT	SHANK DIA.	OAL	ALUMA CUT	
	D ₁		D ₂	L ₁	TOOL #	USD\$
*SC-1NF	1/4	5/8	1/4	2	TB19597	18.10
SC-3NF	3/8	3/4	1/4	2-1/2	TB19598	24.30
SC-5NF	1/2	1	1/4	2-3/4	TB19599	34.30
SC-7NF	3/4	1	1/4	2-3/4	TB19600	82.85

* One Solid Carbide Piece



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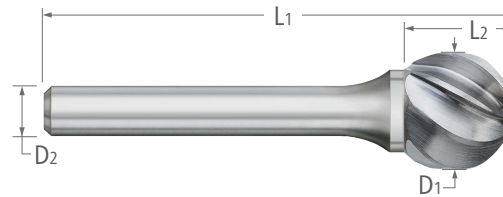
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BURS**Ball Shape - SD**

- General purpose cylindrical ball shape style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
*SD-40	1/16	1/16	1/8	1-1/2	TB19492	8.05	TB19136	8.05
*SD-61	3/32	3/32	3/32	1-1/2	TB19130	8.05	TB19137	8.05
*SD-41	3/32	3/32	1/8	1-1/2	TB19493	7.65	TB19506	7.65
*SD-42	1/8	1/8	1/8	1-1/2	TB19644	7.65	TB19507	7.65
*SD-42L2	1/8	1/8	1/8	2	TB19131	11.30	TB19138	11.30
*SD-42L3	1/8	1/8	1/8	3	TB19132	12.60	TB19139	12.60
*SD-11	1/8	1/8	1/4	2	TB19497	19.20	TB19510	19.20
*SD-52	5/32	5/32	1/8	1-21/32	TB19133	15.45	TB19140	15.45
*SD-53	3/16	3/16	1/8	1-11/16	TB19134	16.60	TB19508	16.60
*SD-81	3/16	5/32	3/16	2	TB19135	18.20	TB19141	18.20
*SD-14	3/16	3/16	1/4	2	TB19498	19.20	TB19511	19.20
SD-51	1/4	1/4	1/8	1-3/4	TB19496	11.15	TB19509	11.15
SD-1	1/4	1/4	1/4	2	TB19499	14.55	TB19512	14.55
SD-1L6	1/4	1/4	1/4	6-1/4	TB19574	27.70	TB19577	27.70
SD-2	5/16	5/16	1/4	2-1/16	TB19500	20.55	TB19513	20.55
SD-3	3/8	3/8	1/4	2-1/8	TB19501	15.70	TB19514	15.70
SD-3L6	3/8	3/8	1/4	6-3/8	TB19575	33.25	TB19578	33.25
SD-4	7/16	7/16	1/4	2-3/16	TB19502	26.75	TB19515	26.75
SD-5	1/2	1/2	1/4	2-1/2	TB19503	21.20	TB19516	21.20
SD-5L6	1/2	1/2	1/4	6-1/2	TB19576	44.90	TB19579	44.90
SD-6	5/8	5/8	1/4	2-3/8	TB19504	33.35	TB19517	33.35
SD-7	3/4	3/4	1/4	2-1/2	TB19505	46.00	TB19518	46.00
SD-9	1	1	1/4	2-3/4	TB19646	97.15	TB19668	97.15

* One Solid Carbide Piece

BURS**Ball Shape - SD - For Aluminum**

- General purpose cylindrical ball shape style burs optimized for use in non-ferrous metals, aluminum alloys, and plastics
- Single cut style provides optimal surface finish
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

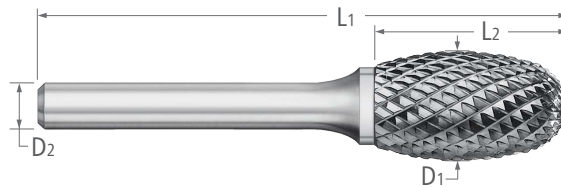
TOOL	SIZE	LENGTH OF CUT	SHANK DIA.	OAL	ALUMA CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$
* SD-1NF	1/4	1/4	1/4	2	TB19613	17.90
SD-3NF	3/8	3/8	1/4	2-1/8	TB19614	22.60
SD-5NF	1/2	1/2	1/4	2-13/64	TB19615	36.90
SD-6NF	5/8	5/8	1/4	2-5/16	TB19616	55.75

* One Solid Carbide Piece



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BURS**Egg Shape - SE**

- General purpose egg shape style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
*SE-61	3/32	1/8	3/32	1-1/2	TB19145	8.05	TB19153	8.05
*SE-41	1/8	7/32	1/8	1-1/2	TB19456	7.65	TB19464	7.65
*SE-41L2	1/8	7/32	1/8	2	TB19146	11.30	TB19154	11.30
*SE-41L3	1/8	7/32	1/8	3	TB19147	12.60	TB19155	12.60
SE-53	3/16	9/32	1/8	1-25/32	TB19457	16.60	TB19465	16.60
*SE-81	3/16	9/32	3/16	2	TB19148	18.20	TB19156	18.20
*SE-11	3/16	5/16	1/4	2	TB19149	11.77	TB19157	16.40
SE-51	1/4	3/8	1/8	1-7/8	TB19458	11.15	TB19466	11.15
*SE-1	1/4	3/8	1/4	2	TB19459	17.90	TB19467	17.90
SE-1L6	1/4	3/8	1/4	6-3/8	TB19150	24.25	TB19158	24.25
SE-3	3/8	5/8	1/4	2-3/8	TB19460	19.00	TB19468	19.00
SE-3L6	3/8	5/8	1/4	6-5/8	TB19151	27.20	TB19159	27.20
SE-5	1/2	7/8	1/4	2-5/8	TB19461	26.60	TB19469	26.60
SE-5L6	1/2	7/8	1/4	6-7/8	TB19152	40.60	TB19160	40.60
SE-6	5/8	1	1/4	2-3/4	TB19462	41.85	TB19470	41.85
SE-7	3/4	1	1/4	2-3/4	TB19463	58.30	TB19471	58.30

* One Solid Carbide Piece

BURS**Egg Shape - SE - For Aluminum**

- General purpose egg shape style burs optimized for use in non-ferrous metals, aluminum alloys, and plastics
- Single cut style provides optimal surface finish
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LENGTH OF CUT	SHANK DIA.	OAL	ALUMA CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$
SE-3NF	3/8	5/8	1/4	2-3/8	TB19606	25.05
SE-5NF	1/2	7/8	1/4	2-5/8	TB19607	43.50
SE-6NF	5/8	1	1/4	2-3/4	TB19608	44.57
SE-7NF	3/4	1	1/4	2-3/4	TB19609	63.87

For technical information, see page 408

BURS**Round Nose Tree - SF**

- General purpose round nose tree style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
*SF-61	3/32	1/4	3/32	1-1/2	TB19161	8.05	TB19165	8.05
*SF-41	1/8	1/4	1/8	1-1/2	TB19381	7.65	TB19395	7.65
*SF-42	1/8	1/2	1/8	1-1/2	TB19382	7.65	TB19396	7.65
*SF-42L2	1/8	1/2	1/8	2	TB19162	11.30	TB19166	11.30
*SF-42L3	1/8	1/2	1/8	3	TB19163	12.60	TB19167	12.60
*SF-53	3/16	1/2	1/8	2	TB19383	16.60	TB19397	16.60
*SF-81	3/16	1/2	3/16	2	TB19164	18.15	TB19168	18.15
SF-51	1/4	1/2	1/8	2	TB19384	11.15	TB19398	11.15
*SF-1	1/4	3/4	1/4	2	TB19385	16.40	TB19399	16.40
SF-1L6	1/4	1/2	1/4	6-1/2	TB19580	31.25	TB19583	31.25
SF-3	3/8	3/4	1/4	2-1/2	TB19386	18.15	TB19400	18.15
SF-3L6	3/8	3/4	1/4	6-3/4	TB19581	39.90	TB19584	39.90
SF-4	7/16	1	1/4	2-3/4	TB19387	27.57	TB19401	38.20
SF-13	1/2	3/4	1/4	2-1/2	TB19389	40.55	TB19402	40.55
SF-5	1/2	1	1/4	2-3/4	TB19390	27.50	TB19403	27.50
SF-5L6	1/2	1	1/4	7	TB19582	58.35	TB19585	58.35
SF-6	5/8	1	1/4	2-3/4	TB19391	41.85	TB19404	41.85
SF-7	3/4	1	1/4	2-3/4	TB19392	58.50	TB19405	58.50
SF-14	3/4	1-1/4	1/4	3	TB19393	107.15	TB19406	107.15
SF-15	3/4	1-1/2	1/4	3-1/4	TB19394	125.15	TB19407	125.15

* One Solid Carbide Piece

BURS**Round Nose Tree - SF - For Aluminum**

- General purpose round nose tree style burs optimized for use in non-ferrous metals, aluminum alloys, and plastics
- Single cut style provides optimal surface finish
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LENGTH OF CUT	SHANK DIA.	OAL	ALUMA CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$
*SF-1NF	1/4	3/4	1/4	2	TB19601	18.30
SF-3NF	3/8	3/4	1/4	2-1/2	TB19602	24.50
SF-5NF	1/2	1	1/4	2-3/4	TB19603	43.05
SF-6NF	5/8	1	1/4	2-3/4	TB19604	65.70
SF-14NF	3/4	1-1/4	1/4	3	TB19605	79.90

* One Solid Carbide Piece

For technical information, see page 408

BURS**Pointed Tree - SG**

- General purpose pointed tree style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D1	L2	D2	L1	TOOL #	USD\$	TOOL #	USD\$
*SG-61	3/32	1/4	3/32	1-1/2	TB19930	8.05	TB19938	8.05
*SG-41	1/8	1/4	1/8	1-1/2	TB19408	7.60	TB19421	7.60
*SG-42	1/8	5/16	1/8	1-1/2	TB19409	7.60	TB19422	7.60
*SG-43	1/8	3/8	1/8	1-1/2	TB19410	7.60	TB19423	7.60
*SG-44	1/8	1/2	1/8	1-1/2	TB19411	10.45	TB19424	10.45
*SG-44L2	1/8	1/2	1/8	2	TB19931	11.30	TB19939	11.30
*SG-44L3	1/8	1/2	1/8	3	TB19932	12.60	TB19940	12.60
SG-53	3/16	1/2	1/8	2	TB19412	16.60	TB19425	16.60
*SG-81	3/16	1/2	3/16	2			TB19941	13.07
SG-51	1/4	1/2	1/8	2	TB19413	11.15	TB19426	11.15
*SG-1	1/4	5/8	1/4	2	TB19414	16.70	TB19427	16.70
SG-1L6	1/4	1/2	1/4	6-1/2	TB19934	22.90	TB19942	22.90
SG-2	5/16	3/4	1/4	2-1/2	TB19415	26.50	TB19428	26.50
SG-3	3/8	3/4	1/4	2-1/2	TB19416	18.80	TB19429	18.80
SG-3L6	3/8	3/4	1/4	6-3/4	TB19935	20.77	TB19943	28.80
SG-13	1/2	3/4	1/4	2-1/2	TB19417	40.15	TB19430	40.15
SG-5	1/2	1	1/4	2-3/4	TB19418	27.55	TB19431	27.55
SG-5L6	1/2	1	1/4	7	TB19936	37.60	TB19944	37.60
SG-6	5/8	1	1/4	2-3/4			TB19432	42.85
SG-7	3/4	1	1/4	2-3/4	TB19420	57.20	TB19433	57.20
SG-15	3/4	1-1/2	1/4	3-1/4	TB19937	49.67	TB19945	68.75

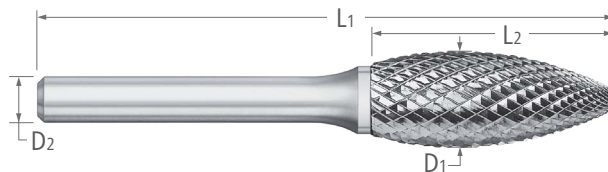
* One Solid Carbide Piece

**Explore Solutions to Common Milling Issues with
Milling Trouble Shooting Guide**

titancuttingtools.com/resources

BURS

Flame Shape - SH



- General purpose flame style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
*SH-41	1/8	1/4	1/8	1-1/2	TB19519	7.65	TB19525	7.65
*SH41L2	1/8	1/4	1/8	2	TB19950	11.30	TB19954	8.17
*SH41L3	1/8	1/4	1/8	3	TB19951	12.60	TB19955	12.60
*SH-53	3/16	3/8	1/8	1-7/8	TB19520	16.60	TB19526	16.60
*SH-1	1/4	5/8	1/4	2	TB19810	17.75	TB19812	17.75
SH-2	5/16	3/4	1/4	2-1/2	TB19521	20.40	TB19527	20.40
SH-2L6	5/16	3/4	1/4	6-3/4	TB19952	27.20	TB19956	27.20
SH-5	1/2	1-1/4	1/4	3	TB19522	39.90	TB19528	39.90
SH-5L6	1/2	1-1/4	1/4	7-1/4	TB19953	43.70	TB19957	43.70
SH-6	5/8	1-7/16	1/4	3-3/16	TB19523	67.47	TB19529	93.30
SH-7	3/4	1-5/8	1/4	3-3/8	TB19524	85.67	TB19530	118.45

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BURS

60° Included Angle - SJ

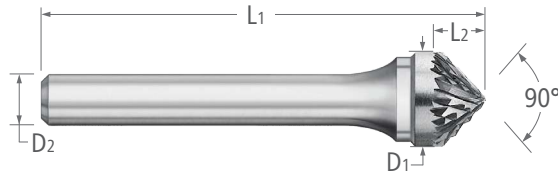


- General purpose burs featuring a 60° included angle
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
*SJ-42	1/8	3/32	1/8	1-1/2	TB19554	7.65	TB19558	7.65
*SJ-1	1/4	3/16	1/4	2	TB19555	14.55	TB19559	14.55
SJ-3	3/8	5/16	1/4	2-3/16	TB19556	17.95	TB19560	17.95
SJ-5	1/2	7/16	1/4	2-19/64	TB19557	24.60	TB19561	24.60
SJ-6	5/8	9/16	1/4	2-5/16	TB19960	29.80	TB19963	29.80
SJ-7	3/4	11/16	1/4	2-7/16	TB19961	39.05	TB19964	39.05
SJ-9	1	15/16	1/4	2-11/16	TB19962	56.77	TB19965	56.77

* One Solid Carbide Piece

For technical information, see page 408

BURS**90° Included Angle - SK**

- General purpose burs featuring a 90° included angle
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
*SK-42	1/8	1/16	1/8	1-1/2	TB19546	7.65	TB19550	7.65
*SK-1	1/4	1/8	1/4	2	TB19547	14.55	TB19551	14.55
SK-3	3/8	3/16	1/4	2-1/16	TB19548	15.30	TB19552	15.30
SK-5	1/2	1/4	1/4	2-1/8	TB19549	23.85	TB19553	23.85
SK-6	5/8	5/16	1/4	2-3/16	TB19970	29.80	TB19972	29.80
SK-7	3/4	3/8	1/4	2-1/4	TB19694	48.25	TB19695	48.25
SK-9	1	1/2	1/4	2-1/4	TB19971	73.75	TB19973	73.75

* One Solid Carbide Piece

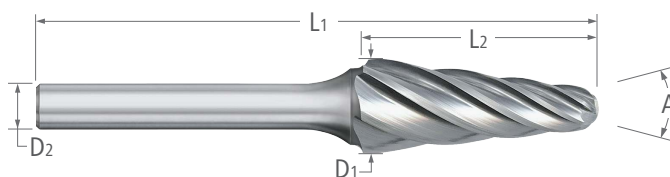
BURS**Included Angle with Radius End - SL**

- General purpose burs featuring an include angle with a radius end
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

INCLUDED ANGLE	TOOL	SIZE	LENGTH OF CUT	SHANK DIAMETER	OAL	SINGLE CUT		DOUBLE CUT	
A		D ₁	L ₂	D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
8°	*SL-41	1/8	3/8	1/8	1-1/2	TB19472	7.60	TB19482	7.60
	*SL-42	1/8	1/2	1/8	1-1/2	TB19473	7.60	TB19483	7.60
	*SL-42L2	1/8	1/2	1/8	2	TB19980	11.30	TB19992	11.30
	*SL-42L3	1/8	1/2	1/8	3	TB19981	12.60	TB19993	12.60
14°	SL-53	3/16	1/2	1/8	1-1/2	TB19474	16.60	TB19484	16.60
	*SL-81	3/16	7/16	3/16	2	TB19982	13.07	TB19994	13.07
	*SL-1	1/4	5/8	1/4	2	TB19475	15.45	TB19485	15.45
	SL-1L6	1/4	5/8	1/4	6-5/8	TB19586	32.10	TB19589	32.10
	SL-2	5/16	7/8	1/4	2-3/4	TB19476	29.35	TB19486	29.35
	SL-3	3/8	1-1/16	1/4	2-15/16	TB19477	21.05	TB19487	21.05
	SL-3L6	3/8	1-1/16	1/4	7-1/16	TB19587	50.60	TB19590	50.60
	SL-4	1/2	1-1/4	1/4	3	TB19478	43.00	TB19488	43.00
	SL-4L6	1/2	1-1/4	1/4	7-1/4	TB19588	61.65	TB19591	61.65
	SL-6	5/8	1-5/16	1/4	3-3/16			TB19490	68.60
	SL-7	3/4	1-1/2	1/4	3-3/8	TB19481	94.40	TB19491	94.40

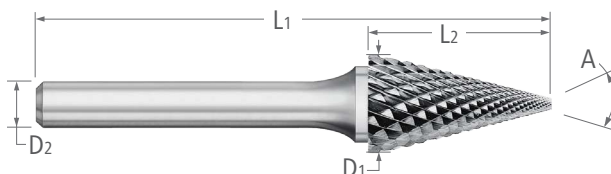
* One Solid Carbide Piece

For technical information, see page 408

BURS**Included Angle with Radius End - SL - For Aluminum**

- General purpose burs for aluminum, featuring an included angle with a radius end
- Single cut style provides optimal surface finish
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

INCLUDED ANGLE	TOOL	SIZE	LENGTH OF CUT	SHANK DIAMETER	OAL	ALUMA CUT	
A		D1	L2	D2	L1	TOOL #	USD\$
14°	SL-3NF	3/8	1-1/16	1/4	2-15/16	TB19617	37.75
	SL-4NF	1/2	1-1/4	1/4	3	TB19610	43.25
	SL-5NF	5/8	1-3/16	1/4	3-5/16	TB19618	78.55
	SL-6NF	5/8	1-5/16	1/4	3-3/16	TB19611	62.97
	SL-7NF	3/4	1-1/2	1/4	3-3/8	TB19612	78.27

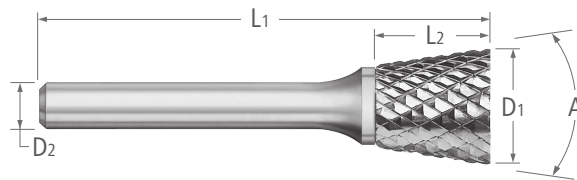
BURS**Pointed Cone - SM**

- General purpose pointed cone style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	INCL. ANGLE	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D1	L2	A	D2	L1	TOOL #	USD\$	TOOL #	USD\$
*SM-61	3/32	1/4	10°	3/32	1-1/2	TB19061	8.05	TB19064	8.05
*SM-41	1/8	11/32	12°	1/8	1-1/2	TB19434	7.65	TB19445	7.65
*SM-42	1/8	7/16	14°	1/8	1-1/2	TB19435	7.65	TB19446	7.65
*SM-42L2	1/8	7/16	14°	1/8	2	TB19062	11.30	TB19065	11.30
*SM-42L3	1/8	7/16	14°	1/8	3	TB19063	12.60	TB19066	12.60
*SM-43	1/8	5/8	7°	1/8	1-1/2	TB19436	7.65	TB19447	7.65
SM-53	3/16	1/2	16°	1/8	2	TB19437	16.60	TB19448	16.60
SM-51	1/4	1/2	22°	1/8	2-1/8	TB19438	11.15	TB19449	11.15
*SM-1	1/4	1/2	22°	1/4	2	TB19439	14.40	TB19450	14.40
*SM-2	1/4	3/4	14°	1/4	2	TB19440	22.30	TB19451	22.30
*SM-3	1/4	1	10°	1/4	2	TB19441	16.00	TB19452	16.00
SM-4	3/8	5/8	28°	1/4	2-1/2	TB19442	21.35	TB19453	21.35
SM-5	1/2	7/8	28°	1/4	2-3/4	TB19443	30.05	TB19454	30.05
SM-6	5/8	1	31°	1/4	2-7/8	TB19444	67.55	TB19455	67.55

* One Solid Carbide Piece

For technical information, see page 408

BURS**Inverted Taper - SN**

- General purpose inverted taper style burs
- Single cut option provides optimal surface finish for most steels, stainless steels, high temp resistant light metals, and cast iron
- Double cut option provides increased operator control and a strong part finish for ferrous and non-ferrous metals
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA

TOOL	SIZE	LOC	INCL. ANGLE	SHANK DIA.	OAL	SINGLE CUT		DOUBLE CUT	
	D ₁	L ₂	A	D ₂	L ₁	TOOL #	USD\$	TOOL #	USD\$
*SN-61	3/32	1/8	10°	3/32	1-1/2	TB19069	5.87	TB19075	5.87
*SN-41	3/32	1/8	10°	1/8	1-1/2	TB19531	7.65	TB19076	7.65
*SN-42	1/8	3/16	10°	1/8	1-1/2	TB19532	7.65	TB19537	7.65
SN-53	3/16	1/4	10°	1/8	1-3/4	TB19533	16.60	TB19538	16.60
*SN-81	3/16	1/4	10°	3/16	2			TB19077	18.25
SN-51	1/4	1/4	10°	1/8	1-3/4	TB19534	11.15	TB19539	11.15
*SN-1	1/4	5/16	10°	1/4	2	TB19535	14.50	TB19540	14.50
SN-2	3/8	3/8	13°	1/4	2-1/8	TB19071	14.77	TB19078	20.55
SN-4	1/2	1/2	28°	1/4	2-1/4	TB19536	42.60	TB19541	42.60
SN-6	5/8	3/4	18°	1/4	2-1/2	TB19072	27.27	TB19079	37.65
SN-7	3/4	5/8	30°	1/4	2-3/8	TB19073	32.87	TB19080	32.87

* One Solid Carbide Piece

BURS SETS

Burs

- Multi-piece general purpose bur sets for ferrous and non-ferrous metals
- Double cut
- Provides increased operator control and a strong part finish
- Solid carbide head brazed onto a steel shank
- Precision manufactured in the USA



SET SIZES	# OF PCS. IN SET	DIAMETER	SHANK DIAMETER	CASE TYPE	TYPE	DOUBLE CUT	
						TOOL #	USD\$
SA-42, SA-43, SC-41, SC-42, SD-42, SE-41,SF-42, SG-42, SM-43	9 PCS	1/8	1/8	WOOD	DOUBLE CUT	TB19542	111.80
SA-1, SC-1, SD-3, SH-1, SF-3, SA-3, SC-3, SC-5, SF-5, SA-5	10 PCS	-	1/4	METAL	DOUBLE CUT	TB19850	210.65

DEBURRING

Technical Information

Burs

Carbide Burs - Speeds		
Cutting Dia	Suggested RPM	Maximum RPM
1/16	55,000 - 85,000	90,000
1/8	35,000 - 65,000	80,000
3/16	30,000 - 55,000	70,000
1/4	25,000 - 50,000	70,000
5/16	20,000 - 40,000	67,000
3/8	18,000 - 40,000	63,000
7/16	16,000 - 38,000	58,000
1/2	14,000 - 36,000	50,000
5/8	12,000 - 25,000	40,000
3/4	10,000 - 20,000	33,000
1	7,500 - 20,000	25,000

When using double cut: Reduce speeds by 25% approximately

For stainless steel material: Increase speeds by 50% approximately

Selection By Cut



Single Cut

Provides the best surface finish and largest contact patch on the work piece.

Demands greater operator skill since the single flute direction pulls the bur into the work piece.

Use In - Non-hardened steel <45 Rc, hardened steel >45Rc, stainless steel, non-ferrous light metals, hardened cast. iron >45Rc, High temp resistant metals



Double Cut

Most popular geometry as the dual flute direction reduces the contact patch on the work piece and therefore provides easier operator control while still maintaining a good surface finish.

Use In - Ferrous metals, Non-ferrous metals



Aluminum Cut

These burs employ a coarser flute which results in improved cutting performance for aluminum and aluminum alloys.

Use In - Non-ferrous metals, aluminum alloys, plastics

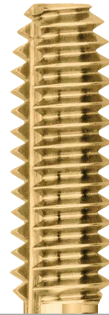
DECIMAL EQUIVALENTS & TAP DRILL SIZES

Drill Size	Decimal Inches	Drill Size	Decimal Inches	Tap Size	Drill Size	Decimal Inches	Tap Size	Drill Size	Decimal Inches	Tap Size	Drill Size	Decimal Inches	Tap Size
.97	.0059	.58	.0420		.27	.1440		H	.2660		17/32	.5312	5/8-11
.15mm	.0059	.57	.0430		.37mm	.1457		.68mm	.2677		13.5mm	.5315	
.96	.0063	1.1mm	.0433		.26	.1470	3/16-24NS	.69mm	.2717		35/64	.5469	
.16mm	.0063	1.15mm	.0453		.375mm	.1476	m4.5x0.75	I	.2720	5/16-24NF	14mm	.5512	m16x2
.95	.0067	.56	.0465		.25	.1495	#10-24	.7mm	.2756	m8x1	9/16	.5625	3/8-18NPT
.17mm	.0067	3/64	.0469	#0-80	.38mm	.1496		J	.2770		14.5mm	.5709	m16x1.5
.94	.0071	1.2mm	.0472		.24	.1520		.71mm	.2795		37/64	.5781	5/8-18NF
.18mm	.0071	1.25mm	.0492	m1.6x0.35	.39mm	.1535		K	.2810		15mm	.5906	
.93	.0075	1.3mm	.0512		.23	.1540		9/32	.2812	5/16-32NS	19/32	.5938	3/8-18 NPS PIPE
.19mm	.0075	.55	.0520		5/32	.1562		.72mm	.2835		39/64	.6094	
.92	.0079	1.35mm	.0531		.22	.1570	3/16-32NS	.725mm	.2854		15.5mm	.6102	m18x2.5
.2mm	.0079	.54	.0550		.4mm	.1575		.73mm	.2874		5/8	.6250	11/16-16NS
.91	.0083	1.4mm	.0551		.21	.1590	#10-32	L	.2900		16mm	.6299	m18x2.0
.21mm	.0083	1.45mm	.0571	m1.8x0.35	.20	.1610		.74mm	.2913		41/64	.6406	
.90	.0087	1.5mm	.0591		.41mm	.1614		M	.2950		16.5mm	.6496	
.22mm	.0087	.53	.0595	#1-64,72	.42mm	.1654	m5x0.8	.75mm	.2953		21/32	.6562	3/4-10NC
.89	.0091	1.55mm	.0610		.19	.1660		19/64	.2969		17mm	.6693	
.23mm	.0091	1/16	.0625		.425mm	.1673		.76mm	.2992		43/64	.6719	
.24mm	.0094	1.6mm	.0630	m2x0.4	.43mm	.1693		N	.3020		11/16	.6875	3/4-16NF
.88	.0095	.52	.0635		.18	.1695		.77mm	.3031		17.5mm	.6890	m20x2.5
.25mm	.0098	1.65mm	.0650		11/64	.1719		.775mm	.3051	m9x1.25	45/64	.7031	1/2-14NPT PIPE
.87	.0100	1.7mm	.0669		.17	.1730		.78mm	.3071		18mm	.7087	m20x2.0
.26mm	.0102	.51	.0670	#2-56	.44mm	.1732		.79mm	.3110		23/32	.7188	
.86	.0105	1.75mm	.0689	m2.2x0.45	.16	.1770	#12-24	5/16	.3125	3/8-16NC	18.5mm	.7283	m20x1.5
.27mm	.0106	.50	.0700	#2-64	.45mm	.1772		.8mm	.3150		47/64	.7344	1/2-14NPS PIPE
.85	.0110	1.8mm	.0709		.15	.1800		O	.3160		19mm	.7480	
.28mm	.0110	1.85mm	.0728		.46mm	.1811		.81mm	.3189		3/4	.7500	
.29mm	.0114	.49	.0730		.14	.1820	#12-28	.82mm	.3228		49/64	.7656	7/8-9NC
.84	.0115	1.9mm	.0748	m2.3x0.4	.13	.1850		P	.3230		19.5mm	.7677	m22x2.5
.3mm	.0118	.48	.0760		.47mm	.1850		.825mm	.3248		25/32	.7812	
.83	.0120	1.95mm	.0768		.475mm	.1870		.83mm	.3268		20mm	.7874	m22x2.0
.82	.0125	5/64	.0781		3/16	.1875		21/64	.3281		51/64	.7969	
.32mm	.0126	.47	.0785	#3-48	.48mm	.1890		.84mm	.3307		20.5mm	.8071	m22x1.5
.81	.0130	.2mm	.0787		.12	.1890	7/32-32NS	Q	.3320	1/8-27NPT PIPE 3/8-24NF	13/16	.8125	7/8-14NF
.34mm	.0134	2.05mm	.0807	m2.5x0.45	.11	.1910		.85mm	.3346	m10x1.5	21mm	.8268	m24x3
.80	.0135	.46	.0810		.49mm	.1929		.86mm	.3386		53/64	.8281	
.35mm	.0138	.45	.0820	#3-56	.10	.1935		R	.3390		27/32	.8438	
.36mm	.0142	2.1mm	.0827		.9	.1960		.87mm	.3425		21.5mm	.8465	
.79	.0145	2.15mm	.0846	m2.6x0.45	.5mm	.1969	m6x1	11/32	.3438		55/64	.8594	
.38mm	.0150	.44	.0860	#4-36	.8	.1990		.875mm	.3445	m10x1.25	22mm	.8661	m24x2
1/64	.0156	2.2mm	.0866		.51mm	.2008		.88mm	.3465		7/8	.8750	1-8NC
.4mm	.0157	2.25mm	.0886		.7	.2010	1/4-20	S	.3480	1/8-27NPS PIPE	22.25mm	.8760	
.78	.0160	.43	.0890	#4-40	13/64	.2031		.89mm	.3504		22.5mm	.8858	m24x1.50
.42mm	.0165	2.3mm	.0906		.6	.2040		.9mm	.3543	m10x1.00	57/64	.8906	
.44mm	.0173	2.35mm	.0925		.52mm	.2047		T	.3580		23mm	.9055	
.45mm	.0177	.42	.0935	#4-48	.5	.2055		.91mm	.3583		29/32	.9062	3/4-14NPT PIPE
.77	.0180	3/32	.0938		.525mm	.2067	m6x0.75	23/64	.3594		59/64	.9219	
.46mm	.0181	2.4mm	.0945		.53mm	.2087		.92mm	.3622		23.5mm	.9252	
.48mm	.0189	.41	.0960		.4	.2090	1/4-24	.925mm	.3642		15/16	.9375	3/4-14 NPS 1-14 NF
.5mm	.0197	2.45mm	.0965		.54mm	.2126		.93mm	.3661		24mm	.9449	m27x3
.76	.0200	.40	.0980		.3	.2130	1/4-28	U	.3680	7/16-14NC	61/64	.9531	
.75	.0210	2.5mm	.0984	m3x0.5	.55mm	.2165		.94mm	.3701		24.5mm	.9646	
.55mm	.0217	.39	.0995		7/32	.2188		.95mm	.3740	m11x1.50	31/32	.9688	
.74	.0225	.38	.1015	#5-40	.56mm	.2205		3/8	.3750		25mm	.9843	m27x2
.6mm	.0236	2.6mm	.1024		.2	.2210		V	.3770		63/64	.9844	1-1/8-7NC
.73	.0240	.37	.1040	#5-44	.57mm	.2244		.96mm	.3780		1	1.0000	
.72	.0250	2.7mm	.1063		.575mm	.2264		.97mm	.3819		25.5mm	1.0039	
.65mm	.0256	.36	.1065	#6-32	.1	.2280		.975mm	.3839		1-1/64	1.0156	
.71	.0260	2.75mm	.1083		.58mm	.2283		.98mm	.3858		26mm	1.0236	
.7mm	.0276	7/64	.1094		.59mm	.2323		W	.3860		1-1/32	1.0312	
.70	.0280	.35	.1100		A	.2340		.99mm	.3898		26.5mm	1.0433	m30x3.5
.69	.0292	2.8mm	.1102		15/64	.2344		25/64	.3906	7/16-20	1-3/64	1.0469	1-1/8-12NF
.75mm	.0295	.34	.1110		.6mm	.2362	m7x1	10mm	.3937	m12x1.75	1-1/16	1.0625	
.68	.0310	.33	.1130	#6-40	B	.2380		X	.3970		27mm	1.0630	
1/32	.0312	2.9mm	.1142	m3.5x0.6	.61mm	.2402		Y	.4040		1-5/64	1.0781	
.8mm	.0315	.32	.1160		C	.2420	1/16-27 NPT PIPE	13/32	.4062		27.5mm	1.0827	
.67	.0320	.3mm	.1181		.62mm	.2441		Z	.4130		1-3/32	1.0938	
.66	.0330	.31	.1200		D	.2460		10.5mm	.4134	m12x1.25	28mm	1.1024	m30x2.0
.85mm	.0335	3.1mm	.1220		.625mm	.2461		27/64	.4219	1/2-13	1-7/64	1.1094	1-1/4-7NC
.65	.0350	1/8	.1250	5/32-32NS	.63mm	.2480		11mm	.4331		28.5mm	1.1220	
.9mm	.0354	3.2mm	.1260		E	.2500	1/16-27 NPS PIPE	7/16	.4375	1/4-18 NPT PIPE	1-1/8	1.1250	
.64	.0360	3.25mm	.1280		1/4	.2500		11.5mm	.4528		1-9/64	1.1406	
.63	.0370	.30	.1285	5/32-36NS	.64mm	.2520		29/64	.4531	1/4-18 1/2-20	29mm	1.1417	
.95mm	.0374	3.3mm	.1299	m4x0.70	.65mm	.2559		15/32	.4688		1-5/32	1.1562	1-11-1/2NPT PIPE
.62	.0380	3.4mm	.1339		F	.2570	5/16-18NC	12mm	.4724	m14x2	29.5mm	1.1614	
.61	.0390	.29	.1360	#8-32	.66mm	.2598		31/64	.4844	9/16-12	1-11/64	1.1719	1-1/4-12NF
1mm	.0394	3.5mm	.1378		G	.2610		12.5mm	.4921	m14x1.5			
.60	.0400	.28	.1405		.67mm	.2638		1/2	.5000				
.59	.0410	9/64	.1406		17/64	.2656		13mm	.5118	m14x1.25			
1.05mm	.0413	3.6mm	.1417		.675mm	.2657	m8x1.25	33/64	.5156	9/16-18			

COATINGS

Titan USA tools are coated in our state-of-the-art coating center, providing customers with uninterrupted production of the industry's highest quality PVD coatings. This allows us to maintain a robust level of inventory available to our valued customers.

PVD COATINGS



	AlCrO-MAX	AlTiN	TiCN	ZrN	TiN
Color	Gray/Charcoal	Gray/Blue	Gray/Silver	Light Gold	Gold/Yellow
Materials	Ferrous materials: high-temp alloys, stainless steels, alloy steels, cast iron, high temp. nickel base alloys, titanium alloys, and inconel	Ferrous materials: high-temp alloys, stainless steels, alloy steels, cast iron, high temp. nickel base alloys, titanium alloys, and inconel	Ferrous materials: stainless steels and a wide variety of other materials where AlTiN cannot be used	Non-Ferrous: aluminum, brass, bronze	Non-Ferrous
Application/ Benefits	- High-performance coating with a titanium top nano-layer for higher abrasion resistance - Max temperature: 950°C - Post-polish treatment to maximize chip evacuation at high speeds and feeds	- Excellent for milling, drilling, and tapping - Excellent high temperature resistance and hardness - Excellent in dry machining	Used in milling, drilling, and tapping	- Higher hardness adds lubricity and abrasion resistance - Prevents edge build up in softer gummy alloys - Allows for higher speed and feed rates - Prolongs tool life	General purpose coating used for milling, drilling, and tapping with lower cutting speeds

FINISHES



Black Oxide Finish

Acts as a solid lubricant and also retains liquid lubricant at cutting edges prevents chip welding, reduces friction and acts a thermal insulator.



Nitride/Steam Oxide Finish

Combines the advantages of the lubricity of oxide with the abrasion resistance of nitride.



Black & Gold Oxide Finish

Resists corrosion and breakage while increasing lubricity. This finish is not prone to chipping and flaking.



Gold Oxide Finish

Extends tool life, and improves lubricity, and reduces grinding stresses.

NEW OFFERINGS FOR 2026



End Mills - Carbide - Long Reach - 3 Flute Square
pg 22



End Mills - Carbide - Long Reach - 4 Flute Square & Ball
pg 59 & 66



End Mills - Carbide - Metric - 4 Flute - 45° Helix - Square
pg 23



End Mills - Cobalt - 2 Flute - 40° Helix - Square
pg 82



Combined Drill & Countersink - High Speed Steel
Bell Type pg 249



Countersinks - Carbide - 4 Flute
pg 253



Combination Drill & Taps - NPT pg 378



Chamfer Mills - Reduced Shank - High speed Steel
Flat Tip pg 164



T-Slot Keyseat Cutters - High Speed Steel
pg 172



Double Angle Shank Cutters - High Speed Steel
pg 173



Dovetail Cutters - High Speed Steel
pg 174

High Speed Steel
Side Milling Cutters
and Straight Shank Arbor
pg 175 & 176



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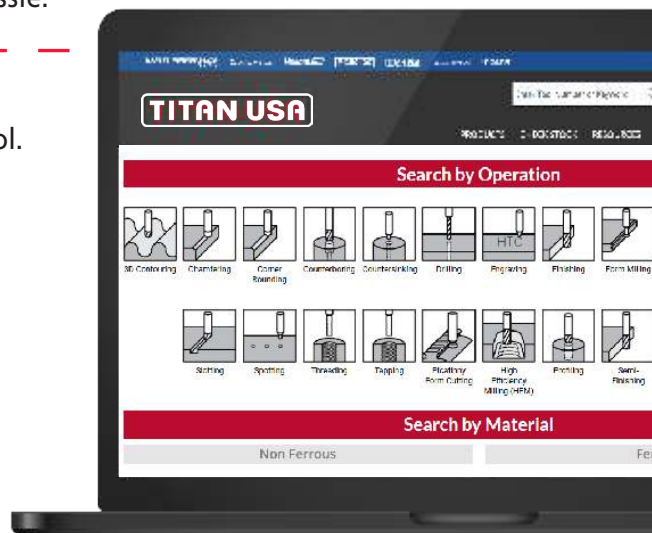
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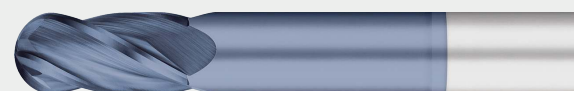


Carbide - Long Reach - General Purpose End Mills

3 Flute Square For Aluminum
pg 22



4 Flute Square and Ball
pg 59 & pg 66



High Speed Steel - Double Angle Shank Cutters

60° and 90°
pg 173



High Speed Steel - Dovetail

60° and 90°
pg 174



High Speed Steel - Side Milling Cutters - Square - Straight Tooth

Milling - Arbors - Straight Shank

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