

variFLUTE™

Variable Flute AlTiN Coated HPE High Performance Solid Carbide Single End Mills

Patent Pending

Center Cutting
Premium Micrograin Carbide
10% Cobalt Content

HIGH PERFORMANCE MILLING: Carbon Steels, Alloy Steels, Stainless Steels, Mold & Die Steels, High Temperature Alloys, Titanium Alloys, Cast Iron and many other materials.

Variable Flute design reduces chatter, harmonics and cutting forces for increased feed rates, greater depths of cut, improved surface finish and accuracy, minimal tool deflection, reduced machine vibration and increased tool life.

TOLERANCES

Diameter +.000/ -.002
Shank Dia. -.0001/ -.0004



List No. 5985 – 3-Flute – Corner Radius



List No. 5985 3-Flute – Corner Radius



List No. 5986 5-Flute – Corner Radius

List No. 5987 5-Flute – Square End



List No. 5988 3-Flute – Ball Nose

3-Flute end mills with their greater chip capacity are recommended for slotting and roughing applications.

5-Flute end mills feature a greater core thickness for increased rigidity allowing increased feed rates with minimum tool deflection but have less chip capacity than 3-flute end mills. Recommended for peripheral milling, finishing applications, improved surface finish and greater dimensional accuracy.

Cutting Speeds: Page 196

AlTiN- Aluminum Titanium Nitride Coated

Corner Radius strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.	LIST PRICE
STUB LENGTH						
1/4	1/4	3/8	2	.015-.020	56270	\$15.00
3/8	3/8	1/2	2	.015-.020	56271	24.80
1/2	1/2	5/8	2 1/2	.025-.030	56272	40.44
5/8	5/8	3/4	3	.030-.035	56273	81.55
3/4	3/4	7/8	3	.030-.035	56274	111.73
REGULAR LENGTH						
1/8	1/8	3/8	1 1/2	.010-.015	56275	\$10.95
5/32	3/16	7/16	2	.010-.015	56276	16.16
3/16	3/16	7/16	2	.010-.015	56277	15.31
7/32	1/4	7/16	2 1/2	.015-.020	56278	20.39
1/4	1/4	5/8	2 1/2	.015-.020	56279	18.73
9/32	5/16	5/8	2 1/2	.015-.020	56280	25.71
5/16	5/16	3/4	2 1/2	.015-.020	56281	25.71
3/8	3/8	7/8	2 1/2	.015-.020	56282	30.89
7/16	7/16	1	2 3/4	.015-.020	56283	42.13
1/2	1/2	1	3	.025-.030	56284	50.56
5/8	5/8	1 1/4	3 1/2	.030-.035	56285	94.76
3/4	3/4	1 1/2	4	.030-.035	56286	139.59
1	1	1 1/2	4	.030-.035	56287	219.27

AlTiN - Aluminum Titanium Nitride coating offers excellent hardness, lubricity, wear resistance and heat resistance for dry machining, abrasive and difficult materials and applications generating higher cutting temperatures. An excellent universal high performance coating for machining titanium alloys, stainless steels, aerospace materials and a wide range of other materials. Higher speeds and feeds, increased productivity and enhanced tool life.

(continued)

variFLUTE™ Solid Carbide Single End Mills (continued)



AlTiN- Aluminum Titanium Nitride Coated

Corner Radius strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

List No. 5986 – 5-Flute – Corner Radius

Patent Pending

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.	LIST PRICE
STUB LENGTH						
1/4	1/4	3/8	2	.015-.020	56290	\$15.00
3/8	3/8	1/2	2	.015-.020	56291	24.80
1/2	1/2	5/8	2 1/2	.025-.030	56292	40.44
5/8	5/8	3/4	3	.030-.035	56293	81.55
3/4	3/4	7/8	3	.030-.035	56294	111.73
REGULAR LENGTH						
1/4	1/4	5/8	2 1/2	.015-.020	56295	18.73
5/16	5/16	3/4	2 1/2	.015-.020	56296	25.71
3/8	3/8	7/8	2 1/2	.015-.020	56297	30.89
7/16	7/16	1	2 3/4	.015-.020	56298	42.13
1/2	1/2	1	3	.025-.030	56299	50.56
5/8	5/8	1 1/4	3 1/2	.030-.035	56300	94.76
3/4	3/4	1 1/2	4	.030-.035	56301	139.59
1	1	1 1/2	4	.030-.035	56302	219.27
LONG LENGTH						
1/4	1/4	1 1/4	3	.015-.020	56330	40.82
3/8	3/8	1 1/4	3	.015-.020	56331	55.10
1/2	1/2	2	4	.025-.030	56332	83.67
5/8	5/8	2 1/4	5	.030-.035	56333	142.65
3/4	3/4	2 1/4	5	.030-.035	56334	199.69
EXTENDED LENGTH						
1/4	1/4	5/8	4	.015-.020	56303	20.71
3/8	3/8	7/8	4	.015-.020	56304	31.43
1/2	1/2	1	6	.025-.030	56305	60.67
5/8	5/8	1 1/4	6	.030-.035	56306	110.60
3/4	3/4	1 1/2	6	.030-.035	56307	147.41



AlTiN- Aluminum Titanium Nitride Coated

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

List No. 5987 – 5-Flute – Square End

Patent Pending

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
REGULAR LENGTH					
1/4	1/4	5/8	2 1/2	56310	\$17.80
5/16	5/16	3/4	2 1/2	56311	24.42
3/8	3/8	7/8	2 1/2	56312	29.34
7/16	7/16	1	2 3/4	56313	40.02
1/2	1/2	1	3	56314	48.03
5/8	5/8	1 1/4	3 1/2	56315	90.02
3/4	3/4	1 1/2	4	56316	132.61
1	1	1 1/2	4	56317	208.30

(continued)

HPE High Performance End Mills

variFLUTE™ Solid Carbide Single End Mills (continued)



AlTiN- Aluminum Titanium Nitride Coated

Ball Nose for milling die cavities, fillets, radius bottom slots and special contours.

List No. 5988 – 3-Flute – Ball Nose

Patent Pending

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
REGULAR LENGTH					
1/8	1/8	3/8	1 1/2	56320	\$13.25
5/32	3/16	7/16	2	56321	19.65
3/16	3/16	7/16	2	56322	18.04
7/32	1/4	7/16	2 1/2	56323	23.44
1/4	1/4	5/8	2 1/2	56324	21.60
9/32	5/16	5/8	2 1/2	56325	29.39
5/16	5/16	3/4	2 1/2	56326	29.39
3/8	3/8	7/8	2 1/2	56327	35.12
7/16	7/16	1	2 3/4	56328	45.75
1/2	1/2	1	3	56329	62.14

AlTiN - Aluminum Titanium Nitride coating offers excellent hardness, lubricity, wear resistance and heat resistance for dry machining, abrasive and difficult materials and applications generating higher cutting temperatures. An excellent universal high performance coating for machining titanium alloys, stainless steels, aerospace materials and a wide range of other materials. Higher speeds and feeds, increased productivity and enhanced tool life.

variFLUTE™ SPEEDS & FEEDS

MATERIAL		HARDNESS BHN	CUTTING SPEED SFM	FEED (INCH PER TOOTH) FOR PROFILE MILLING								
TYPE	EXAMPLES			1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
Plain Steels - Low & Medium Carbon	1008, 1010, 1020	175 275	500 400	.0004	.0006	.0015	.002	.0025	.003	.0035	.004	.005
Alloy Steels - Medium Carbon	4140, 4150, 4340	275 375	400 300	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Mold & Die Steels	O1, A2, D2, H13, P20	275	180	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Stainless Steels - 300 Series	304, 310, 316	275	300	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Stainless Steels - 400 Series	409, 430, 436	175 325	400 250	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Stainless Steels - Precipitation Hardened	15-5PH, 17-4PH	325	250	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
High Temperature Alloys	Inconel, Waspaloy, Hastalloy, A286	300	75	.0002	.0004	.0008	.001	.0015	.002	.0025	.003	.0035
Titanium Alloys	6A14V	300	300	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Cast Irons	Gray	200	500	.0004	.0006	.0015	.002	.0025	.003	.0035	.004	.005
Aluminum	6061-T6	—	1500	.0005	.001	.002	.0025	.003	.004	.005	.006	.007

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

RECOMMENDED MAXIMUM DEPTHS OF CUT:	PROFILING Radial Depth = .5 × D Axial Depth = 1 × D	SLOTING Axial Depth = .5 × D
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SHEARMILL™

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

Center Cutting

High Spiral Design Cuts
Cleanly & Efficiently

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

TOOL COATINGS
AVAILABLE
TiN TiCN TiAlN



List No. 4686

60° High Helix angle keeps the cutting edges constantly engaged in the workpiece reducing cutting load variations. The result is a clean efficient cutting action with decreased cutting resistance, enhanced chip control, excellent surface finish and long tool life.

Recommended for tough milling jobs including stainless steel, titanium, inconel, mold and die steels and other abrasive and difficult materials. Center Cutting end allows for plunge cutting like a drill into solid material.

STANDARD All sizes — 1 each
PACKAGE

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	5/8	27/16	42938	\$33.58
5/16	.3125	3/8	3/4	2 1/2	42939	33.58
3/8	.3750	3/8	3/4	2 1/2	42918	33.58
3/8	.3750	3/8	1 1/2	3 1/4	42919	43.67
1/2	.5000	1/2	1 1/4	3 1/4	42920	50.75
1/2	.5000	1/2	2	4	42921	65.94
1/2	.5000	1/2	3	5	42922	78.68
5/8	.6250	5/8	1 5/8	3 3/4	42928	70.70
5/8	.6250	5/8	2 1/2	4 5/8	42929	91.87
3/4	.7500	3/4	1 5/8	3 7/8	42936	91.87
3/4	.7500	3/4	3	5 1/4	42937	133.19

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
7/8	.8750	3/4	1 7/8	4 1/8	42944*	\$96.50
7/8	.8750	3/4	3 1/2	5 3/4	42945*	154.42
1	1.0000	1	2	4 1/2	42953	149.09
1	1.0000	1	4	6 1/2	42954	238.57
1 1/4	1.2500	1	2	4 1/2	42970*	249.36
1 1/4	1.2500	1 1/4	2	4 1/2	42971*	177.13
1 1/4	1.2500	1 1/4	4	6 1/2	42972*	454.21
1 1/2	1.5000	1 1/4	2	4 1/2	42980*	409.21
1 3/4	1.7500	1 1/4	2	4 1/2	42989*	263.54
2	2.0000	1 1/4	2	4 1/2	42995*	634.33
2	2.0000	2	2	5 3/4	43000*	482.66

*Available While Supplies Last

Morse® Plastic Wall Chart



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

List No. 1007 EDP No. 01650 List Price \$7.00

Decimal Equivalent Pocket Chart

List No. 1005



Front



Back

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

Pack of 50
EDP No. 20412
List Price \$51.50

Pack of 100
EDP No. 20413
List Price \$96.45

2-Flute Single End Mills

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

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

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

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



List No. 1898 High Speed Steel
List No. 1898G High Speed Steel TiN Coated
List No. 4580 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE		
TiN	TiCN	TiAlN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1898 High Speed Steel		1898G High Speed Steel TiN COATED		4580 COBALT	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	43651	\$15.80	96150	\$18.96	44376	\$20.54
9/64	.1406	3/8	7/16	2 3/8	43704	19.24	—	—	—	—
5/32	.1562	3/8	7/16	2 3/8	43691	16.24	96152	19.60	44387	21.11
1 1/64	.1719	3/8	7/16	2 3/8	43705	19.24	—	—	—	—
3/16	.1875	3/8	7/16	2 3/8	43652	15.80	96154	18.96	44377	20.54
1 9/64	.2031	3/8	1/2	2 7/16	43706	19.24	—	—	—	—
7/32	.2187	3/8	1/2	2 7/16	43692	16.24	96156	19.60	44388	21.11
1 5/64	.2344	3/8	1/2	2 7/16	43707	19.24	—	—	—	—
1/4	.2500	3/8	1/2	2 7/16	43653	15.80	96158	18.96	44378	20.54
1 7/64	.2656	3/8	9/16	2 1/2	43708	19.24	—	—	—	—
9/32	.2812	3/8	9/16	2 1/2	43693	16.24	96160	19.60	44389	21.11
1 9/64	.2969	3/8	9/16	2 1/2	43709	19.24	—	—	—	—
5/16	.3125	3/8	9/16	2 1/2	43654	15.80	96162	18.96	44379	20.54
2 1/64	.3281	3/8	9/16	2 1/2	43710	19.24	—	—	—	—
1 1/32	.3437	3/8	9/16	2 1/2	43694	16.24	96164	20.55	44390	22.50
2 3/64	.3594	3/8	9/16	2 1/2	43711	19.24	—	—	—	—
3/8	.3750	3/8	9/16	2 1/2	43655	15.80	96166	18.96	44380	20.54
2 5/64	.3906	3/8	1 3/16	2 1 1/16	43712	27.26	—	—	—	—
1 9/32	.4062	3/8	1 3/16	2 1 1/16	43695	22.54	96168	27.81	44391	30.50
2 7/64	.4219	3/8	1 3/16	2 1 1/16	43713	27.66	—	—	—	—
7/16	.4375	3/8	1 3/16	2 1 1/16	43656	23.28	96170	26.77	44392	30.26
2 9/64	.4531	1/2	1 3/16	3 1/4	43714	29.53	—	—	—	—
1 9/32	.4687	1/2	1 3/16	3 1/4	43696	22.54	96172	27.81	44393	30.50
3 1/64	.4844	1/2	1 3/16	3 1/4	43715	29.73	—	—	—	—
1/2	.5000	3/8	1 3/16	2 1 1/16	43657	23.28	96183	26.77	—	—
1/2	.5000	1/2	1	3 1/4	43658	24.58	96174	28.26	44381	31.95
3 3/64	.5156	1/2	1 1/8	3 3/8	43716	29.73	—	—	—	—
1 7/32	.5312	1/2	1 1/8	3 3/8	43697	24.65	96184	28.34	—	—
3 5/64	.5469	1/2	1 1/8	3 3/8	43717	34.13	—	—	—	—
9/16	.5625	1/2	1 1/8	3 3/8	43659	25.28	96185	29.07	44394	31.60

(continued)

2-Flute Single End Mills (continued)

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1898 High Speed Steel		1898G High Speed Steel TIN COATED		4580 COBALT	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
3/64	.5781	1/2	1 1/8	3 3/8	43718	\$36.41	—	—	—	—
19/32	.5937	1/2	1 1/8	3 3/8	43698	31.35	—	—	—	—
39/64	.6094	1/2	1 1/8	3 3/8	43719	38.04	—	—	—	—
5/8	.6250	1/2	1 1/8	3 3/8	43660	32.15	96186	\$36.97	—	—
5/8	.6250	5/8	1 5/16	3 3/4	43661	32.70	96176	37.61	44382	\$42.51
1 1/16	.6875	1/2	1 5/16	3 3/8	43662	34.84	—	—	—	—
1 1/16	.6875	5/8	1 5/16	3 3/4	43663	34.84	96187	40.06	—	—
3/4	.7500	1/2	1 5/16	3 3/8	43664	37.28	—	—	—	—
3/4	.7500	5/8	1 5/16	3 3/4	43665	37.28	96188	42.87	—	—
3/4	.7500	3/4	1 5/16	3 7/8	43666	37.28	96178	42.87	44383	48.46
13/16	.8125	5/8	1 1/2	4	43667	42.88	—	—	—	—
13/16	.8125	3/4	1 1/2	4 1/8	43668	42.88	96189	49.31	—	—
7/8	.8750	5/8	1 1/2	4	43669	42.88	—	—	—	—
7/8	.8750	3/4	1 1/2	4 1/8	43670	42.88	96190	49.31	44395	53.60
7/8	.8750	7/8	1 1/2	4 1/8	43671	45.88	96191	52.76	—	—
15/16	.9375	5/8	1 1/2	4	43672*	49.54	—	—	—	—
15/16	.9375	3/4	1 1/2	4 1/8	43673	52.01	—	—	—	—
15/16	.9375	7/8	1 1/2	4 1/8	43674*	49.54	—	—	—	—
1	1.0000	5/8	1 1/2	4	43675	52.01	—	—	—	—
1	1.0000	3/4	1 1/2	4 1/8	43676	52.01	96192	59.81	44396	65.01
1	1.0000	7/8	1 1/2	4 1/8	43677	52.01	—	—	—	—
1	1.0000	1	1 5/8	4 1/2	43678	55.52	96182	65.73	44384	72.18
1 1/8	1.1250	3/4	1 1/2	3 7/8	43720	79.83	—	—	—	—
1 1/8	1.1250	7/8	1 5/8	4 1/8	43679	79.83	—	—	—	—
1 1/8	1.1250	1	1 5/8	4 1/2	43680	80.86	96193	92.98	—	—
1 1/4	1.2500	3/4	1 1/2	3 7/8	43721	83.60	—	—	—	—
1 1/4	1.2500	7/8	1 5/8	4 1/8	43681	79.83	—	—	—	—
1 1/4	1.2500	1	1 5/8	4 1/2	43682	90.31	96194	103.85	—	—
1 1/4	1.2500	1 1/4	1 5/8	4 1/2	43683	90.31	—	—	44385	117.40
1 3/8	1.3750	3/4	1 1/2	3 7/8	43722	90.31	—	—	—	—
1 3/8	1.3750	1	1 5/8	4 1/2	43684	107.40	96195	123.51	—	—
1 1/2	1.5000	3/4	1 1/2	3 7/8	43723	118.73	—	—	—	—
1 1/2	1.5000	1	1 5/8	4 1/2	43685	118.73	—	—	—	—
1 1/2	1.5000	1 1/4	1 5/8	4 1/2	43686	118.73	96196	136.53	44386	148.41
1 5/8	1.6250	1 1/4	1 5/8	4 1/2	43687	123.51	—	—	—	—
1 3/4	1.7500	3/4	1 1/2	3 7/8	43724	141.78	—	—	—	—
1 3/4	1.7500	1 1/4	1 5/8	4 1/2	43688	141.78	—	—	—	—
1 7/8	1.8750	1 1/4	1 5/8	4 1/2	43689	145.84	—	—	—	—
2	2.0000	3/4	1 1/2	3 7/8	43725	168.70	—	—	—	—
2	2.0000	1 1/4	1 5/8	4 1/2	43690	167.54	—	—	44397	209.42

* Available While Supplies Last

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiAlN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

2-Flute Long Length Single End Mills

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

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Long Length end mills provide a longer length of cut for deeper milling applications

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

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



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

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS
AVAILABLE
TiN TiCN TiAlN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	4599 High Speed Steel		4599G High Speed Steel TIN COATED		4584 COBALT	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
3/16	.1875	3/8	1 1/4	3 1/16	43001	\$23.80	96200	\$27.37	—	—
7/32	.2188	3/8	1 1/4	3 1/16	43002	23.80	—	—	—	—
1/4	.2500	3/8	1 1/4	3 1/16	43003	23.80	96201	27.37	—	—
9/32	.2812	3/8	1 3/8	3 1/8	43005	23.80	—	—	—	—
5/16	.3125	3/8	1 3/8	3 1/8	43006	24.99	96202	28.73	—	—
1 1/32	.3438	3/8	1 1/2	3 1/4	43007	24.99	—	—	—	—
3/8	.3750	3/8	1 1/2	3 1/4	44601	24.99	96203	28.73	45370	\$31.24
13/32	.4062	1/2	1 3/4	3 3/4	43008	28.47	—	—	—	—
7/16	.4375	1/2	1 3/4	3 3/4	43009	27.67	96204	31.83	—	—
15/32	.4688	1/2	2	4	43010	28.47	—	—	—	—
1/2	.5000	1/2	2	4	44602	33.22	96205	38.21	45371	41.53
9/16	.5625	5/8	2	4 5/8	43011	33.22	—	—	—	—
5/8	.6250	5/8	2	4 5/8	44603	33.22	96206	38.21	45372	41.53
1 1/16	.6875	3/4	2 1/4	5 1/4	43012	36.20	—	—	—	—
3/4	.7500	3/4	2 1/4	5 1/4	44604	46.69	96207	53.70	45373	58.37
13/16	.8125	7/8	2 1/2	5 1/4	43013	51.90	—	—	—	—
7/8	.8750	7/8	2 1/2	5 3/4	44605	57.12	96208	65.69	—	—
15/16	.9375	1	3	6 1/2	43014	67.03	—	—	—	—
1	1.0000	1	3	6 1/2	44606	76.93	96209	88.46	45374	96.17
1 1/8	1.1250	1	3	6 1/2	44607	110.21	—	—	—	—
1 1/4	1.2500	1	3	6 1/2	44608	120.18	—	—	—	—
1 1/4	1.2500	1 1/4	3	6 1/2	44609	130.29	—	—	—	—
1 3/8	1.3750	1	3	6 1/2	44610	135.18	—	—	—	—
1 1/2	1.5000	1 1/4	3	6 1/2	44611	144.19	—	—	—	—
1 3/4	1.7500	1 1/4	3	6 1/2	44613*	180.62	—	—	—	—
1 7/8	1.8750	1 1/4	3	6 1/2	44614*	205.15	—	—	—	—
2	2.0000	1 1/4	3	6 1/2	44615*	217.68	—	—	—	—

* Available While Supplies Last

2-Flute Extended Length Single End Mills

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

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Extended Length end mills are recommended for applications that require a longer reach but not a longer length of cut. The increased rigidity of the unfluted extended shank reduces deflection.



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

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	LENGTH BELOW SHANK	OAL	1899 High Speed Steel		1899G High Speed Steel TiN COATED		4585 COBALT	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	13/16	25/16	43749	\$26.94	96215	\$30.98	45380	\$33.68
3/16	.1875	3/8	1/2	1 1/8	2 1/16	43750	26.94	96216	30.98	45381	33.68
1/4	.2500	3/8	5/8	1 1/2	3 1/16	43751	26.94	96217	30.98	45382	33.68
5/16	.3125	3/8	3/4	1 3/4	3 5/16	43752	23.32	96218	26.82	45383	29.15
3/8	.3750	3/8	3/4	1 3/4	3 5/16	43753	24.76	96219	28.48	45384	30.95
7/16	.4375	1/2	1	1 7/8	3 3/4	43747	25.85	96220	29.73	—	—
1/2	.5000	1/2	1	2 1/4	4	43754	26.94	96221	30.98	45385	33.68
5/8	.6250	5/8	1 3/8	2 3/4	4 5/8	43755	39.59	96222	45.52	—	—
3/4	.7500	3/4	1 5/8	3 3/8	5 1/4	43756	50.27	96223	57.81	45386	62.83
7/8	.8750	7/8	2	4	5 3/4	43748	60.33	96224	69.37	—	—
1	1.0000	1	2 1/2	5	7 1/4	43757	88.73	96225	102.04	45387	110.91
1 1/4	1.2500	1 1/4	3	5	7 1/4	43758*	122.08	—	—	—	—

* Available While Supplies Last

Metric 2-Flute Single End Mills

High Speed Steel
Center Cutting

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOOL COATINGS AVAILABLE
TiN TiCN TiALN



List No. 1898M

STANDARD PACKAGE All sizes — 1 each

DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE	DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
4.5	.1772	3/8	1/2	2 5/16	43332	\$18.97	12.5	.4921	1/2	1 1/8	3	43316	\$28.25
5.0	.1968	3/8	1/2	2 5/16	43333	18.97	13.0	.5118	1/2	1 1/8	3	43317	38.24
5.5	.2165	3/8	1/2	2 5/16	43334	18.97	13.5	.5315	1/2	1 1/8	3 3/8	43318	38.24
6.0	.2362	3/8	1/2	2 5/16	43335	18.97	14.0	.5512	1/2	1 1/8	3 3/8	43319	38.24
6.5	.2559	3/8	1/2	2 5/16	43336	18.97	14.5	.5709	1/2	1 1/8	3 3/8	43320	41.80
7.0	.2756	3/8	9/16	2 5/16	43337	18.97	15.0	.5906	1/2	1 1/8	3 3/8	43321	41.80
7.5	.2953	3/8	9/16	2 5/16	43338	18.97	16.0	.6299	5/8	1 5/16	3 7/16	43322	41.80
8.0	.3150	3/8	9/16	2 5/16	43307	18.97	17.0	.6693	5/8	1 5/16	3 7/16	43323	48.71
8.5	.3346	3/8	9/16	2 5/16	43308	18.97	18.0	.7087	3/4	1 5/16	3 7/16	43324	48.71
9.0	.3543	3/8	9/16	2 5/16	43309	18.97	19.0	.7480	3/4	1 1/2	3 3/4	43325	54.26
9.5	.3740	3/8	13/16	2 1/2	43310	18.97	20.0	.7874	3/4	1 1/2	3 3/4	43326	54.26
10.0	.3937	3/8	13/16	2 1/2	43311	28.25	21.0	.8268	7/8	1 1/2	3 3/4	43327	62.57
10.5	.4134	3/8	13/16	2 1/2	43312	28.25	22.0	.8661	7/8	1 1/2	3 3/4	43328	62.57
11.0	.4331	3/8	13/16	2 1/2	43313	28.25	23.0	.9055	7/8	1 1/2	3 3/4	43329	74.98
11.5	.4528	3/8	13/16	2 1/2	43314	28.25	24.0	.9449	1	2	4 1/2	43330	74.98
12.0	.4724	3/8	13/16	2 1/2	43315	28.25	25.0	.9843	1	2	4 1/2	43331	74.98

DRILL-MILL™

M42 8% Cobalt

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

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



List No. 1980

90° Point Angle

2-Flute

30° Right Hand Helix

TOOL COATINGS AVAILABLE
TiN TiCN TiAlN

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH* OF CUT	OAL*	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	2 ⁵ / ₁₆	44619	\$27.36
3/16	.1875	3/8	7/16	2 ⁵ / ₁₆	44620	27.36
1/4	.2500	3/8	5/8	2 ⁷ / ₁₆	44621	27.36
5/16	.3125	3/8	2 ³ / ₃₂	2 ¹⁵ / ₃₂	44622	30.76
3/8	.3750	3/8	3/4	2 ¹ / ₂	44623	30.76
7/16	.4375	3/8	1 ¹ / ₃₂	2 ²³ / ₃₂	44624	40.46
1/2	.5000	1/2	1 ¹ / ₄	3 ¹ / ₄	44625	40.46

* Lengths include the 90° conical cutting point.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH* OF CUT	OAL*	EDP NO.	LIST PRICE
9/16	.5625	1/2	1 ¹³ / ₃₂	3 ¹³ / ₃₂	44626	\$52.63
5/8	.6250	5/8	1 ⁵ / ₈	3 ³ / ₄	44627	60.41
1 ¹ / ₁₆	.6875	5/8	1 ²¹ / ₃₂	3 ²⁵ / ₃₂	44628	71.31
3/4	.7500	3/4	1 ¹¹ / ₁₆	3 ¹⁵ / ₁₆	44629	71.31
1 ³ / ₁₆	.8125	3/4	1 ²⁹ / ₃₂	4 ⁵ / ₃₂	44630	91.01
7/8	.8750	3/4	1 ¹⁵ / ₁₆	4 ³ / ₁₆	44631	91.01
1 ⁵ / ₁₆	.9375	3/4	1 ³¹ / ₃₂	4 ⁷ / ₃₂	44632	114.65
1	1.0000	3/4	2	4 ¹ / ₄	44633	114.65

High Helix 2-Flute Single End Mills

High Speed Steel — Center Cutting

37° Helix Angle

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

High Helix end mills are recommended for aluminum, magnesium, zinc alloys and other soft non-ferrous materials. The higher helix angle provides a positive smoother cutting shearing action and enhanced chip evacuation.



List No. 1921 Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	1 ¹ / ₄	3 ¹ / ₁₆	44051	\$25.82
5/16	.3125	3/8	1 ³ / ₈	3 ¹ / ₈	44052	25.82
3/8	.3750	3/8	1 ¹ / ₂	3 ¹ / ₄	44053	25.82
7/16	.4375	1/2	1 ³ / ₄	3 ³ / ₄	44054	35.53
1/2	.5000	1/2	2	4	44055	36.91
5/8	.6250	5/8	2 ¹ / ₂	4 ⁵ / ₈	44056	50.03
3/4	.7500	3/4	3	5 ¹ / ₄	44057	64.60
7/8	.8750	7/8	3 ¹ / ₂	5 ³ / ₄	44058	81.37
1	1.0000	1	4	6 ¹ / ₂	44059	111.66
1 ¹ / ₄	1.2500	1 ¹ / ₄	4	6 ¹ / ₂	44060	158.17
1 ¹ / ₂	1.5000	1 ¹ / ₄	4	6 ¹ / ₂	44061	202.42
2	2.0000	1 ¹ / ₄	4	6 ¹ / ₂	44062	313.49



List No. 1920 Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	5/8	2 ⁷ / ₁₆	44021	\$22.32
5/16	.3125	3/8	3/4	2 ¹ / ₂	44022	22.32
3/8	.3750	3/8	3/4	2 ¹ / ₂	44023	22.32
7/16	.4375	3/8	1	2 ¹¹ / ₁₆	44024	28.53
1/2	.5000	1/2	1 ¹ / ₄	3 ¹ / ₄	44025	31.70
5/8	.6250	5/8	1 ⁵ / ₈	3 ³ / ₄	44026	40.87
3/4	.7500	3/4	1 ⁵ / ₈	3 ⁷ / ₈	44027	46.53
7/8	.8750	7/8	1 ⁷ / ₈	4 ¹ / ₈	44028	61.52
1	1.0000	1	2	4 ¹ / ₂	44029	76.20
1 ¹ / ₄	1.2500	1 ¹ / ₄	2	4 ¹ / ₂	44030	106.74
1 ¹ / ₂	1.5000	1 ¹ / ₄	2	4 ¹ / ₂	44031*	148.25
2	2.0000	1 ¹ / ₄	2	4 ¹ / ₂	44032*	229.91

* Available While Supplies Last



List No. 1922 Extra Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	1 ³ / ₄	3 ³ / ₁₆	44076	\$29.90
5/16	.3125	3/8	2	3 ³ / ₄	44077	30.82
3/8	.3750	3/8	2 ¹ / ₂	4 ¹ / ₄	44078	32.27
1/2	.5000	1/2	3	5	44079	44.77
5/8	.6250	5/8	4	6 ¹ / ₈	44080	63.24
3/4	.7500	3/4	4	6 ¹ / ₄	44081	78.33
1	1.0000	1	6	8 ¹ / ₂	44082	140.88

2-Flute Double End Mills



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

List No. 1896 High Speed Steel
List No. 1896G High Speed Steel TiN Coated
List No. 4581 M42 8% Cobalt

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. Center Cutting end allows for plunge cutting like a drill into solid material.

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

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

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1896 High Speed Steel		1896G High Speed Steel TiN COATED		4581 COBALT	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	43412	\$22.40	96050	\$24.64	44560	\$25.76
9/64	.1406	3/8	7/16	3 1/8	43431	24.91	—	—	—	—
5/32	.1562	3/8	7/16	3 1/8	43413	23.73	96052	26.10	44561	27.29
11/64	.1719	3/8	7/16	3 1/4	43432	25.71	—	—	—	—
3/16	.1875	3/8	7/16	3 1/4	43414	22.40	96054	24.64	44562	25.76
13/64	.2031	3/8	1/2	3 1/4	43433	25.71	—	—	—	—
7/32	.2188	3/8	1/2	3 1/4	43415	23.54	96056	25.90	44563	27.08
15/64	.2344	3/8	1/2	3 3/8	43434	25.71	—	—	—	—
1/4	.2500	3/8	1/2	3 3/8	43416	22.83	96058	25.12	44564	26.26
17/64	.2656	3/8	9/16	3 3/8	43435	25.71	—	—	—	—
9/32	.2812	3/8	9/16	3 3/8	43417	24.23	96060	26.66	44565	27.87
19/64	.2969	3/8	9/16	3 1/2	43436	26.07	—	—	—	—
5/16	.3125	3/8	9/16	3 1/2	43418	22.40	96062	24.64	44566	25.76
21/64	.3281	3/8	9/16	3 1/2	43437	26.07	—	—	—	—
11/32	.3438	3/8	9/16	3 1/2	43419	23.73	96064	26.11	44567	27.29
23/64	.3594	3/8	9/16	3 1/2	43438	26.07	—	—	—	—
3/8	.3750	3/8	9/16	3 1/2	43420	22.83	96066	25.11	44568	26.26
25/64	.3906	1/2	13/16	4 1/8	43439	26.07	—	—	—	—
13/32	.4062	1/2	13/16	4 1/8	43421	38.64	96068	42.51	44569	44.44
27/64	.4219	1/2	13/16	4 1/8	43440	37.07	—	—	—	—
7/16	.4375	1/2	13/16	4 1/8	43422	33.65	96070	37.01	44570	38.70
29/64	.4531	1/2	13/16	4 1/8	43441	37.07	—	—	—	—
15/32	.4688	1/2	13/16	4 1/8	43423	38.64	96072	42.51	—	—
31/64	.4844	1/2	13/16	4 1/8	43442	38.55	—	—	—	—
1/2	.5000	1/2	13/16	4 1/8	43424	34.68	96074	38.14	44571	39.88
17/32	.5312	5/8	1 1/8	5	43443*	43.09	—	—	—	—
9/16	.5625	5/8	1 1/8	5	43425	50.44	96075	55.48	44572	58.01
19/32	.5938	5/8	1 1/8	5	43444*	49.65	—	—	—	—
5/8	.6250	5/8	1 1/8	5	43426	52.43	96076	57.67	44573	60.30
21/32	.6562	3/4	1 5/16	5 5/8	43445*	54.22	—	—	—	—
11/16	.6875	3/4	1 5/16	5 5/8	43427	59.47	96077	65.42	44577	68.40
23/32	.7188	3/4	1 5/16	5 5/8	43446*	63.01	—	—	—	—
3/4	.7500	3/4	1 5/16	5 5/8	43428	62.67	96078	68.94	44574	72.07
25/32	.7812	7/8	1 5/16	6 1/8	43447*	78.27	—	—	—	—
13/16	.8125	7/8	1 5/16	6 1/8	43448	75.30	—	—	—	—
27/32	.8438	7/8	1 5/16	6 1/8	43449*	80.48	—	—	—	—
7/8	.8750	7/8	1 5/16	6 1/8	43429	74.83	—	—	44575*	86.06
29/32	.9062	1	1 5/8	6 3/8	43450*	82.52	—	—	—	—
15/16	.9375	1	1 5/8	6 3/8	43451	90.76	—	—	—	—
31/32	.9688	1	1 5/8	6 3/8	43452*	88.25	—	—	—	—
1	1.0000	1	1 5/8	6 3/8	43430	97.05	96082	106.76	44576*	111.61

* Available While Supplies Last

2-Flute Miniature Stub Length Double End Mills



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

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

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

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

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	4571 High Speed Steel		4571C COBALT	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/32	.0312	3/64	2	44326	\$17.66	44360	\$20.17
3/64	.0469	1/16	2	44327	17.66	44361	20.17
1/16	.0625	3/32	2	44328	15.59	44362	17.80
5/64	.0781	1/8	2	44329	15.59	44363	17.80
3/32	.0938	9/64	2	44330	15.59	44364	17.80
7/64	.1094	5/32	2	44331	15.59	44365	17.80
1/8	.1250	3/16	2	44332	15.59	44366	17.80
9/64	.1406	7/32	2	44333	15.59	44367	17.80
5/32	.1562	15/64	2	44334	15.59	44368	17.80
11/64	.1719	1/4	2	44335	15.59	44369	17.80
3/16	.1875	9/32	2	44336	15.59	44370	17.80

2-Flute Miniature Regular Length Double End Mills



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

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

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

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

STANDARD PACKAGE All sizes — 1 each

**TOOL COATINGS
AVAILABLE**
TiN TiCN TiAlN

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1896 High Speed Steel		1896C COBALT	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/32	.0312	3/32	2 1/4	43401	\$20.88	44348	\$23.80
3/64	.0469	9/64	2 1/4	43402	20.88	44349	23.80
1/16	.0625	3/16	2 1/4	43403	18.21	44350	20.57
5/64	.0781	15/64	2 1/4	43404	18.76	44351	21.21
3/32	.0938	9/32	2 1/4	43405	18.76	44352	21.21
7/64	.1094	21/64	2 1/4	43406	18.31	44353	20.70
1/8	.1250	3/8	2 1/4	43407	17.44	44354	19.73
9/64	.1406	13/32	2 1/4	43408	18.31	44355	20.70
5/32	.1562	7/16	2 1/4	43409	18.11	44356	20.46
11/64	.1719	1/2	2 1/4	43410	19.00	44357	21.66
3/16	.1875	1/2	2 1/4	43411	17.44	44358	19.73

CUTTING FLUIDS SELECTION

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

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

2-Flute Miniature Long Length Double End Mills



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

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

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. Center Cutting end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

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

STANDARD All sizes — 1 each
PACKAGE

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1894 High Speed Steel		1894C COBALT	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	.0625	7/32	2 1/2	43251	\$25.99	43256	\$29.63
3/32	.0938	9/32	2 5/8	43252	24.36	43257	27.81
1/8	.1250	3/4	3 1/8	43253	24.36	43258	27.81
5/32	.1562	7/8	3 1/4	43254	24.36	43259	27.81
3/16	.1875	1	3 3/8	43255	24.36	43260	27.81

2-Flute Stub Length Double End Mills



List No. 4563 High Speed Steel

High Speed Steel — Center Cutting

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. Center Cutting end allows for plunge cutting like a drill into solid material.

Stub Length provides increased rigidity when milling shallow slots, keyways and pockets.

STANDARD All sizes — 1 each
PACKAGE

TOOL COATINGS
AVAILABLE
TiN TiCN TiAlN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/16	2 3/4	44313	\$20.25
5/32	.1562	3/8	15/64	2 3/4	44314	21.23
3/16	.1875	3/8	9/32	2 3/4	44315	20.25
7/32	.2188	3/8	21/64	2 7/8	44316	20.25
1/4	.2500	3/8	3/8	2 7/8	44317	20.25

With MORSE® Modifications Why Start From Scratch?

When standard cutting tools aren't quite right for your application, let Morse® Modifications make them perfect for the task. Morse®-modified off-the-shelf standard cutting tools let you start with a standard tool at a standard price. Add a little for modifications, and save by not having to go with expensive custom-designed special cutting tools.

With MORSE® Specials Fast Delivery on Custom Tools.

When your application requires special custom designed cutting tools, Morse® Specials offers complete tool design and manufacturing services. Fast quotes, quick delivery, specifically designed for your machining application. Engineered cutting tools optimized for lower overall machining costs.

3-Flute Single End Mills

High Speed Steel
Center Cutting

3-Flute end mills provide a compromise between the chip capacity of 2-flute end mills and the improved surface finish, greater core strength and higher feed rate of multi-flute end mills. They are recommended for general milling and for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 1880 Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	25/16	42050	\$18.99
3/16	.1875	3/8	1/2	23/8	42051	18.99
1/4	.2500	3/8	5/8	27/16	42052	18.99
5/16	.3125	3/8	3/4	21/2	42053	18.99
3/8	.3750	3/8	3/4	21/2	42054	21.68
7/16	.4375	3/8	1	211/16	42055	26.76
1/2	.5000	3/8	1	211/16	42056	27.75
1/2	.5000	1/2	1 1/4	3 1/4	42057	30.91
9/16	.5625	1/2	1 3/8	3 3/8	42058	37.12
5/8	.6250	1/2	1 3/8	3 3/8	42059	37.73
5/8	.6250	5/8	1 5/8	3 3/4	42060	38.31

List No. 1881 Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	1 1/4	3 1/16	42080	\$23.85
5/16	.3125	3/8	1 3/8	3 1/8	42081	23.85
3/8	.3750	3/8	1 1/2	3 1/4	42082	23.85
7/16	.4375	1/2	1 3/4	3 3/4	42083	33.37
1/2	.5000	1/2	2	4	42084	33.37
5/8	.6250	5/8	2 1/2	4 5/8	42085	42.05



List No. 1880 – Regular Length



List No. 1881 – Long Length

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
3/4	.7500	3/4	1 5/8	3 3/8	42061	\$41.40
7/8	.8750	3/4	1 7/8	4 1/8	42062	52.38
7/8	.8750	7/8	1 7/8	4 1/8	42063	53.32
1	1.0000	3/4	1 7/8	4 1/8	42064	63.13
1	1.0000	1	2	4 1/2	42065	65.42
1 1/8	1.1250	1	2	4 1/2	42066	87.46
1 1/4	1.2500	1	2	4 1/2	42067*	96.17
1 1/4	1.2500	1 1/4	2	4 1/2	42068*	97.13
1 1/2	1.5000	1 1/4	2	4 1/2	42069	116.62
1 3/4	1.7500	1 1/4	2	4 1/2	42070*	141.01
2	2.0000	2	3	6 3/4	42071	240.00

* Available While Supplies Last

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
3/4	.7500	3/4	3	5 1/4	42086	\$52.41
7/8	.8750	7/8	3 1/2	5 3/4	42087*	64.28
1	1.0000	1	4	6 1/2	42088	85.27
1 1/4	1.2500	1 1/4	4	6 1/2	42089	125.29
1 1/2	1.5000	1 1/4	4	6 1/2	42091*	158.94
2	2.0000	1 1/4	4	6 1/2	42092*	251.70

* Available While Supplies Last

3-Flute Double End Mills

High Speed Steel
Center Cutting

3-Flute end mills provide a compromise between the chip capacity of 2-flute end mills and the improved surface finish, greater core strength and higher feed rate of multi-flute end mills. They are recommended for general milling and for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	42100	\$26.37
3/16	.1875	3/8	1/2	3 1/4	42101	26.37
1/4	.2500	3/8	5/8	3 3/8	42102	27.46
5/16	.3125	3/8	3/4	3 1/2	42103	27.46
3/8	.3750	3/8	3/4	3 1/2	42104	31.01
7/16	.4375	1/2	1	4 1/8	42105	42.56



List No. 1882

TOOL COATINGS AVAILABLE TiN TiCN TiAlN
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STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/2	.5000	1/2	1	4 1/8	42106	\$44.83
9/16	.5625	5/8	1 3/8	5	42107	56.58
5/8	.6250	5/8	1 3/8	5	42108	58.82
3/4	.7500	3/4	1 5/8	5 5/8	42109	71.24
7/8	.8750	7/8	1 7/8	6 1/8	42110	91.10
1	1.0000	1	1 7/8	6 3/8	42111	110.94

3-Flute High Helix Coarse Pitch Roughing End Mills



High Speed Steel – Center Cutting

Designed for higher speeds and feeds when milling **Aluminum**, aluminum alloys, magnesium, zinc alloys and other soft non-ferrous materials. **Deep Flutes** and **38° High Helix** angle provide positive shearing action and fast chip evacuation. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 4605 — Regular Length
List No. 4606 — Medium & Long Length

STANDARD PACKAGE All sizes — 1 each

**TOOL COATINGS
AVAILABLE**
TiN TiCN TiALN

List No. 4605 - Uncoated / 4605G - TiN / 4605C - TiCN - Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		TiN COATED		TiCN COATED	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
3/8	.3750	3/8	3/4	2 1/2	44748	\$34.19	44762	\$38.14	44776	\$39.83
1/2	.5000	1/2	1 1/4	3 1/4	44749	33.72	44763	41.66	44777	45.07
5/8	.6250	5/8	1 5/8	3 3/4	44750	46.15	44764	56.74	44778	60.61
3/4	.7500	3/4	1 5/8	3 7/8	44751	49.04	44765	60.37	44779	65.24
7/8	.8750	3/4	1 7/8	4 1/8	44752	64.77	44766	84.73	44780	92.01
1	1.0000	1	2	4 1/2	44753	79.48	44767	103.25	44781	113.45
1 1/4	1.2500	1 1/4	2	4 1/2	44754	117.40	44768	147.84	44782	158.95
1 1/2	1.5000	1 1/4	2	4 1/2	44755	140.82	44769	178.69	44783	192.50
2	2.0000	2	2	5 3/4	44757*	240.73	44771*	311.80	44785*	337.69
2	2.0000	2	3	6 3/4	44758*	257.67	44772*	338.88	44786*	368.47
2	2.0000	2	4	7 3/4	44759*	263.66	44773*	355.03	44787*	388.31
2	2.0000	2	6	9 3/4	44760*	338.15	44774*	449.82	44788*	490.51
2	2.0000	2	8	11 3/4	44761*	535.20	44775*	669.00	44789*	715.25

* Available while supplies last

List No. 4606 - Uncoated / 4606G - TiN / 4606C - TiCN - Medium & Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	UNCOATED		TiN COATED		TiCN COATED	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/2	.5000	1/2	2	4	44790	\$50.01	44799	\$58.47	44808	\$61.58
5/8	.6250	5/8	2 1/2	4 5/8	44791	60.20	44800	72.94	44809	77.57
3/4	.7500	3/4	3	5 1/4	44792	67.21	44801	83.38	44810	90.33
1	1.0000	1	3	5 1/2	44793	98.64	44802	128.23	44811	139.04
1	1.0000	1	4	6 1/2	44794	108.38	44803	142.18	44812	154.51
1 1/4	1.2500	1 1/4	3	5 1/2	44795	135.63	44804	171.16	44813	184.10
1 1/4	1.2500	1 1/4	4	6 1/2	44796	153.85	44805	194.46	44814	209.24
1 1/2	1.5000	1 1/4	3	5 1/2	44797	157.92	44806	202.35	44815	218.54
1 1/2	1.5000	1 1/4	4	6 1/2	44798	176.57	44807	227.32	44816	245.82

End Mills with 2" dia. shanks are provided with a dual drive shank

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiALN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

Multi-Flute Single End Mills



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

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

Center Cutting end allows for plunge cutting like a drill into solid material.

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

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

- List No. 1897 High Speed Steel
- List No. 4550 High Speed Steel Center Cutting
- List No. 4550G High Speed Steel Center Cutting
TiN Coated
- List No. 4586 M42 8% Cobalt Center Cutting

STANDARD PACKAGE All sizes — 1 each

**TOOL COATINGS
AVAILABLE**

TiN TiCN TiAlN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1897 High Speed Steel NON-CENTER CUTTING		4550 High Speed Steel CENTER CUTTING		4550G High Speed Steel CENTER CUTTING TIN COATED		4586 COBALT CENTER CUTTING	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	25/16	4	43501	\$16.16	44135	\$18.59	96100	\$21.38	44426	\$22.30
9/64	.1406	3/8	1/2	23/8	4	—	—	43020	20.02	—	—	—	—
5/32	.1562	3/8	1/2	23/8	4	43541	17.41	43021	20.02	96102	23.02	44415	24.02
11/64	.1719	3/8	1/2	23/8	4	43562	20.24	43022	23.27	—	—	—	—
3/16	.1875	3/8	1/2	23/8	4	43502	16.16	44136	18.58	96104	21.37	44427	22.30
19/64	.2031	3/8	5/8	27/16	4	43563	20.24	43023	23.28	—	—	—	—
7/32	.2188	3/8	5/8	27/16	4	43542	17.41	44149	20.02	96106	23.02	44416	24.02
15/64	.2344	3/8	5/8	27/16	4	43564	20.24	43024	23.28	—	—	—	—
1/4	.2500	3/8	5/8	27/16	4	43503	16.16	44137	18.58	96108	21.37	44428	22.30
17/64	.2656	3/8	3/4	21/2	4	43565	20.24	43025	23.28	—	—	—	—
9/32	.2812	3/8	3/4	21/2	4	43543	17.41	44150	20.02	96110	23.02	44417	24.02
19/64	.2969	3/8	3/4	21/2	4	43566	20.24	43026	23.28	—	—	—	—
5/16	.3125	3/8	3/4	21/2	4	43504	16.16	44138	18.58	96112	21.37	44429	22.30
21/64	.3281	3/8	3/4	21/2	4	43567	20.24	43027	23.28	—	—	—	—
11/32	.3438	3/8	3/4	21/2	4	43544	17.41	44151	20.02	96114	23.02	44418	24.02
23/64	.3594	3/8	3/4	21/2	4	43568	20.24	43028	23.28	—	—	—	—
3/8	.3750	3/8	3/4	21/2	4	43505	16.16	44139	18.58	96116	21.37	44430	22.30
25/64	.3906	3/8	1	211/16	4	43569	27.75	43029	31.91	—	—	—	—
13/32	.4062	3/8	1	211/16	4	43545	23.37	44152	26.88	96118	30.92	44419	32.26
27/64	.4219	3/8	1	211/16	4	43570	27.75	43030	31.92	—	—	—	—
7/16	.4375	3/8	1	211/16	4	43506	21.83	44153	25.10	96120	28.87	44420	30.12
29/64	.4531	1/2	11/4	31/4	4	43571	27.75	43031	31.92	—	—	—	—
15/32	.4688	1/2	11/4	31/4	4	43546	23.37	44154	28.02	96122	34.10	44421	35.80
31/64	.4844	1/2	11/4	31/4	4	43572	27.75	43032	31.92	—	—	—	—
1/2	.5000	3/8	1	211/16	4	43507	21.83	43033	25.10	—	—	—	—
1/2	.5000	1/2	11/4	31/4	4	43508	22.27	44140	25.61	96124	29.45	44431	30.73
17/32	.5312	1/2	13/8	33/8	4	43547	27.20	44155	32.30	96096	37.85	—	—
9/16	.5625	1/2	13/8	33/8	4	43509	28.04	44156	35.16	96125	40.53	44422	44.66
19/32	.5938	1/2	13/8	33/8	4	43548	30.66	—	—	—	—	—	—
5/8	.6250	1/2	13/8	33/8	4	43510	30.66	43034	35.26	96098	40.55	—	—
5/8	.6250	5/8	13/8	33/4	4	43511	33.29	44141	38.28	96126	44.03	44432	45.94
5/8	.6250	5/8	13/8	33/4	6	—	—	—	—	—	—	44433	45.94
21/32	.6562	5/8	13/8	33/4	4	43549	35.76	—	—	—	—	—	—
11/16	.6875	1/2	13/8	33/8	4	43512	33.13	—	—	—	—	—	—
11/16	.6875	5/8	13/8	33/4	4	43513	35.39	44142	40.70	96127	46.81	—	—

(continued)

Multi-Flute Single End Mills (continued)

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1897 High Speed Steel NON-CENTER CUTTING		4550 High Speed Steel CENTER CUTTING		4550G High Speed Steel CENTER CUTTING TIN COATED		4586 COBALT CENTER CUTTING	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
.29/32	.7188	3/4	1 1/8	3 7/8	4	43550	\$37.69	—	—	—	—	—	—
3/4	.7500	1/2	1 1/8	3 5/8	4	43514	36.69	—	—	—	—	—	—
3/4	.7500	5/8	1 1/8	3 3/4	4	43515	36.69	43035	\$42.19	96133	\$48.52	—	—
3/4	.7500	3/4	1 1/8	3 7/8	4	43516	38.04	44143	43.75	96128	50.31	44434	\$53.75
3/4	.7500	3/4	1 1/8	3 7/8	6	—	—	—	—	—	—	44435	53.75
.29/32	.7812	3/4	1 7/8	4 1/8	4	43551	47.47	—	—	—	—	—	—
13/16	.8125	5/8	1 7/8	4	4	—	—	44161	57.68	—	—	—	—
13/16	.8125	5/8	1 7/8	4	6	43517	46.74	—	—	—	—	—	—
13/16	.8125	3/4	1 7/8	4	4	43518	47.48	44157	57.68	96129	66.34	—	—
27/32	.8438	7/8	1 7/8	4 1/8	4	43552	48.84	—	—	—	—	—	—
7/8	.8750	5/8	1 7/8	4	6	43519	47.99	—	—	—	—	—	—
7/8	.8750	3/4	1 7/8	4 1/8	4	43520	49.71	43036	57.17	96130	65.75	—	—
7/8	.8750	7/8	1 7/8	4 1/8	4	43521	47.48	44144	54.60	—	—	44423	65.52
.29/32	.9062	7/8	1 7/8	4 1/8	4	43553	55.88	—	—	—	—	—	—
15/16	.9375	5/8	1 7/8	4 1/8	4	43522*	50.95	—	—	—	—	—	—
15/16	.9375	3/4	1 7/8	4 1/8	4	43523	56.61	43037	65.10	96131	74.87	—	—
15/16	.9375	7/8	1 7/8	4 1/8	4	43524	56.61	44158	65.10	—	—	—	—
3 1/32	.9688	1	2	4 1/2	4	43554*	56.56	—	—	—	—	—	—
1	1.0000	5/8	2	4	6	43525	55.10	—	—	—	—	—	—
1	1.0000	3/4	2	4 1/8	4	43526	54.10	43038	62.22	96134	71.55	—	—
1	1.0000	7/8	2	4 1/8	4	43527	54.10	—	—	—	—	—	—
1	1.0000	1	2	4 1/2	4	43528	57.18	44145	65.76	96132	75.62	44436	83.03
1	1.0000	1	2	4 1/2	6	—	—	—	—	—	—	44437	83.03
1 1/8	1.1250	3/4	1 1/2	3 7/8	6	43555	87.15	43039	100.22	—	—	—	—
1 1/8	1.1250	7/8	2	4 1/4	6	43529*	75.71	—	—	—	—	—	—
1 1/8	1.1250	1	2	4 1/2	4	—	—	44146	89.88	96135	103.36	—	—
1 1/8	1.1250	1	2	4 1/2	6	43530	78.15	43040	89.88	—	—	—	—
1 1/4	1.2500	3/4	1 1/2	3 7/8	6	43556	98.86	—	—	—	—	—	—
1 1/4	1.2500	7/8	2	4 1/4	6	43531	82.24	—	—	—	—	—	—
1 1/4	1.2500	1	2	4 1/2	6	43532	85.36	43041	98.16	96136	112.88	—	—
1 1/4	1.2500	1 1/4	2	4 1/2	4	—	—	44147	104.94	—	—	44438	120.69
1 1/4	1.2500	1 1/4	2	4 1/2	6	43533	91.26	43042	104.94	—	—	44439	120.69
1 3/8	1.3750	3/4	1 1/2	3 7/8	6	43557	110.55	—	—	—	—	—	—
1 3/8	1.3750	1	2	4 1/2	6	43534	101.68	43043	116.93	96137	134.47	—	—
1 1/2	1.5000	3/4	1 1/2	3 7/8	6	43558	127.56	—	—	—	—	—	—
1 1/2	1.5000	1	2	4 1/2	6	43535	115.03	—	—	—	—	—	—
1 1/2	1.5000	1 1/4	2	4 1/2	4	—	—	—	—	—	—	44440	158.74
1 1/2	1.5000	1 1/4	2	4 1/2	6	43536	115.03	44148	132.28	96138	152.12	44441	158.74
1 5/8	1.6250	1 1/4	2	4 1/2	6	43537	125.61	43044	144.45	—	—	—	—
1 3/4	1.7500	3/4	1 1/2	3 7/8	6	43559	152.00	—	—	—	—	—	—
1 3/4	1.7500	1 1/4	2	4 1/2	6	43538	136.22	44159	156.65	—	—	44424	187.89
1 7/8	1.8750	1 1/4	2	4 1/2	8	43539	146.63	43045	168.62	—	—	—	—
2	2.0000	3/4	1 1/2	3 7/8	8	43560	180.18	—	—	—	—	—	—
2	2.0000	1 1/4	2	4 1/2	6	—	—	44160	160.41	—	—	44425	198.67
2	2.0000	1 1/4	2	4 1/2	8	43540	164.09	43046	189.62	—	—	—	—
2	2.0000	2	4	7 3/4	6	—	—	—	—	—	—	44442	317.54

* Available While Supplies Last

CUTTING FLUIDS SELECTION

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

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

Multi-Flute Long Length Single End Mills

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

Multi-Flute end mills offer higher feed rates and improved surface finish in a wide variety of medium hardness materials. They also feature greater core strength for reduced tool deflection.

Center Cutting end allows for plunge cutting like a drill into solid material.

Long Length end mills provide a longer length of cut for deeper milling applications.

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



- List No. 1900 High Speed Steel
- List No. 4551 High Speed Steel Center Cutting
- List No. 4551G High Speed Steel Center Cutting
TiN Coated
- List No. 4587 M42 8% Cobalt Center Cutting

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

STANDARD PACKAGE All sizes — 1 each

**TOOL COATINGS
AVAILABLE**
TiN TiCN TiAlN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1900 High Speed Steel NON-CENTER CUTTING		4551 High Speed Steel CENTER CUTTING		4551G High Speed Steel CENTER CUTTING TIN COATED		4587 COBALT CENTER CUTTING	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
3/16	.1875	3/8	1 1/4	3 1/16	4	—	—	44169	\$25.84	96230	\$29.72	—	—
7/32	.2188	3/8	1 1/4	3 1/16	4	—	—	44170	25.84	96231	29.72	—	—
1/4	.2500	3/8	1 1/4	3 1/16	4	43776	\$20.80	44171	23.92	96232	27.51	44534	\$28.71
9/32	.2812	3/8	1 3/8	3 1/8	4	—	—	44180	25.84	96233	29.72	44535	31.01
5/16	.3125	3/8	1 3/8	3 1/8	4	43777	20.80	44172	23.92	96234	27.51	44536	28.71
11/32	.3438	3/8	1 1/2	3 1/4	4	—	—	44181	25.84	96235	29.72	44537	31.01
3/8	.3750	3/8	1 1/2	3 1/4	4	43778	20.80	44173	23.92	96236	27.51	44541	28.71
13/32	.4062	1/2	1 3/4	3 3/4	4	—	—	44182	28.61	96237	32.91	44538	34.33
7/16	.4375	1/2	1 3/4	3 3/4	4	43779	28.96	44183	31.86	96238	36.63	44539	38.23
15/32	.4688	1/2	2	4	4	—	—	44184	33.30	96239	38.29	—	—
1/2	.5000	1/2	2	4	4	43780	28.96	44174	33.30	96240	38.29	44542	39.96
5/8	.6250	5/8	2 1/2	4 5/8	4	43781	40.53	44175	46.61	96241	53.61	44543	55.93
3/4	.7500	3/4	3	5 1/4	4	43782	49.52	44176	56.95	96242	65.50	44544	68.34
3/4	.7500	3/4	3	5 1/4	6	—	—	—	—	—	—	44545	68.34
7/8	.8750	7/8	3 1/2	5 3/4	4	43783	62.34	44177	71.69	96244	82.44	44540	86.03
1	1.0000	1	4	6 1/2	4	43784	81.31	44178	93.51	96245	107.54	44546	112.22
1	1.0000	1	4	6 1/2	6	—	—	—	—	—	—	44547	112.22
1 1/8	1.1250	1	4	6 1/2	4	—	—	44185	119.82	—	—	—	—
1 1/8	1.1250	1	4	6 1/2	6	43785	107.75	—	—	—	—	—	—
1 1/4	1.2500	1	4	6 1/2	4	—	—	44186	139.83	—	—	—	—
1 1/4	1.2500	1	4	6 1/2	6	43786	127.12	—	—	—	—	—	—
1 1/4	1.2500	1 1/4	4	6 1/2	4	—	—	44179	139.83	—	—	44548	160.81
1 1/4	1.2500	1 1/4	4	6 1/2	6	43787	127.12	—	—	—	—	44549	160.81
1 3/8	1.3750	1	4	6 1/2	6	43788	141.91	—	—	—	—	—	—
1 1/2	1.5000	1	4	6 1/2	4	—	—	44187	173.56	—	—	—	—
1 1/2	1.5000	1	4	6 1/2	6	43789	157.78	—	—	—	—	—	—
1 1/2	1.5000	1 1/4	4	6 1/2	4	—	—	44188	173.56	—	—	—	—
1 1/2	1.5000	1 1/4	4	6 1/2	6	43790	157.78	—	—	—	—	—	—
1 3/4	1.7500	1 1/4	4	6 1/2	4	—	—	44189	226.96	—	—	—	—
1 3/4	1.7500	1 1/4	4	6 1/2	6	43791	197.68	—	—	—	—	—	—
2	2.0000	1 1/4	4	6 1/2	4	—	—	44190	227.47	—	—	—	—
2	2.0000	1 1/4	4	6 1/2	8	43792	242.72	—	—	—	—	—	—

Multi-Flute Extra Long Length Single End Mills



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

Multi-Flute end mills offer higher feed rates and improved surface finish in a wide variety of medium hardness materials. They also feature greater core strength for reduced tool deflection.

Center Cutting end allows for plunge cutting like a drill into solid material.

Long Length end mills provide a longer length of cut for deeper milling applications.

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

- List No. 1901 High Speed Steel
- List No. 4552 High Speed Steel Center Cutting
- List No. 4552G High Speed Steel Center Cutting
TiN Coated
- List No. 4588 M42 8% Cobalt Center Cutting

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

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1901 High Speed Steel NON-CENTER CUTTING		4552 High Speed Steel CENTER CUTTING		4552G High Speed Steel CENTER CUTTING TIN COATED		4588 COBALT CENTER CUTTING	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
3/16	.1875	3/8	1 1/4	3 1/16	4	—	—	44199	\$28.02	96250	\$30.82	—	—
7/32	.2188	3/8	1 1/4	3 1/16	4	—	—	44200	28.02	96251	30.82	—	—
1/4	.2500	3/8	1 1/4	3 1/16	4	43826	\$24.37	44201	28.02	96252	30.82	45390	\$32.23
9/32	.2812	3/8	2	3 3/4	4	—	—	44210	30.70	96253	33.77	45391	35.31
5/16	.3125	3/8	2	3 3/4	4	43827	25.43	44202	29.24	96254	32.16	45392	33.63
1 1/32	.3438	3/8	2 1/2	4 1/4	4	—	—	44211	32.14	96255	35.35	45393	36.97
3/8	.3750	3/8	2 1/2	4 1/4	4	43828	26.62	44203	30.61	96256	33.68	44520	35.21
1 3/32	.4062	3/8	2 3/4	4 1/2	4	—	—	44212	32.85	96257	36.14	45394	37.78
7/16	.4375	3/8	2 3/4	4 1/2	4	—	—	44213	35.09	96258	38.60	45395	40.36
1 5/32	.4688	1/2	3	5	4	—	—	44214	37.33	96259	41.06	—	—
1/2	.5000	1/2	3	5	4	43829	34.41	44204	39.57	96260	43.53	44521	45.51
5/8	.6250	5/8	4	6 1/8	4	43830	48.96	44205	56.30	96261	61.93	44522	66.06
3/4	.7500	3/4	4	6 1/4	4	43831	57.57	44206	66.20	96262	72.82	44523	78.29
3/4	.7500	3/4	4	6 1/4	6	—	—	—	—	—	—	44524	78.29
7/8	.8750	7/8	5	7 1/4	4	43832	75.87	44207	87.25	96264	95.98	45396	100.34
1	1.0000	1	6	8 1/2	4	43833	100.38	44208	115.43	96265	126.97	44525	132.75
1	1.0000	1	6	8 1/2	6	—	—	—	—	—	—	44526	132.75
1 1/4	1.2500	1 1/4	6	8 1/2	4	—	—	44209	166.17	—	—	44527	191.10
1 1/4	1.2500	1 1/4	6	8 1/2	6	43834	151.06	44215	166.17	—	—	44528	191.10
1 1/2	1.5000	1 1/4	8	10 1/2	6	43835	215.17	44216	236.68	—	—	45397	272.19

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiAlN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

Metric 4-Flute Single End Mills

High Speed Steel
Center Cutting

Multi-Flute end mills offer higher feed rates and improved surface finish in a wide variety of medium hardness materials. They also feature greater core strength for reduced tool deflection.



List No. 1897M

STANDARD All sizes — 1 each
PACKAGE

TOOL COATINGS AVAILABLE		
TiN	TiCN	TiALN

DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
4.5	.1772	3/8	1/2	2 3/8	43360	\$20.38
5.0	.1968	3/8	1/2	2 3/8	43361	20.38
5.5	.2165	3/8	5/8	2 7/16	43362	20.38
6.0	.2362	3/8	5/8	2 7/16	43363	20.38
6.5	.2559	3/8	5/8	2 7/16	43364	20.38
7.0	.2756	3/8	5/8	2 7/16	43365	20.38
7.5	.2953	3/8	3/4	2 1/2	43366	20.38
8.0	.3150	3/8	3/4	2 1/2	43367	20.38
8.5	.3346	3/8	3/4	2 1/2	43368	20.38
9.0	.3543	3/8	3/4	2 1/2	43369	20.38
9.5	.3740	3/8	3/4	2 1/2	43370	20.38
10.0	.3937	3/8	1	2 11/16	43371	31.07
10.5	.4134	3/8	1	2 11/16	43372	31.07
11.0	.4331	3/8	1	2 11/16	43373	31.07
11.5	.4528	3/8	1	2 11/16	43374	31.07
12.0	.4724	3/8	1	2 11/16	43375	31.07

DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
12.5	.4921	1/2	1 1/4	3 1/4	43376	\$31.07
13.0	.5118	1/2	1 1/4	3 1/4	43377	42.02
13.5	.5315	1/2	1 3/8	3 3/8	43378	42.02
14.0	.5512	1/2	1 3/8	3 3/8	43379	42.02
14.5	.5709	1/2	1 3/8	3 3/8	43380	45.98
15.0	.5906	1/2	1 3/8	3 3/8	43381	45.98
16.0	.6299	5/8	1 3/8	3 3/4	43382	45.98
17.0	.6693	5/8	1 3/8	3 3/4	43383	53.55
18.0	.7087	3/4	1 3/8	3 7/8	43384	53.55
19.0	.7480	3/4	1 3/8	3 7/8	43385	59.67
20.0	.7874	3/4	1 7/8	4 1/8	43386	59.67
21.0	.8268	7/8	1 7/8	4 1/8	43387	68.82
22.0	.8661	7/8	1 7/8	4 1/8	43388	68.82
23.0	.9055	7/8	1 7/8	4 1/8	43389	82.46
24.0	.9449	1	2	4 1/2	43390	82.46
25.0	.9843	1	2	4 1/2	43391	82.46

Morse® Plastic Wall Chart



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

List No. 1007 EDP No. 01650 List Price \$7.00

Decimal Equivalent Pocket Chart

List No. 1005



Front



Back

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

Pack of 50
EDP No. 20412
List Price \$51.50

Pack of 100
EDP No. 20413
List Price \$96.45

Left Hand Cut 4-Flute Single End Mills

High Speed Steel — Left Hand Cut

Left Hand Cut end mills feature a left hand helix and left hand cut for use in applications with left hand spindle rotation.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
3/16	.1875	3/8	1/2	23/8	43602*	\$40.17
1/4	.2500	3/8	5/8	27/16	43603*	36.65
5/16	.3125	3/8	3/4	2 1/2	43604*	46.07
3/8	.3750	3/8	3/4	2 1/2	43605*	46.07

* Available While Supplies Last



List No. 1897L

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/2	.5000	1/2	1 1/4	3 1/4	43606*	\$46.07
5/8	.6250	5/8	1 5/8	3 3/4	43607*	55.82
3/4	.7500	3/4	1 5/8	3 7/8	43608*	59.03

Left Hand Cut 4-Flute Double End Mills

High Speed Steel – Left Hand Cut

Left Hand Cut end mills feature a left hand helix and left hand cut for use in applications with left hand spindle rotation.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	43351*	\$36.49
5/32	.1562	3/8	7/16	3 1/8	43352*	36.49
3/16	.1875	3/8	1/2	3 1/4	43353*	36.49
1/4	.2500	3/8	5/8	3 3/8	43354*	36.49
5/16	.3125	3/8	3/4	3 1/2	43355*	36.49

* Available While Supplies Last



List No. 1895L

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS
AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
3/8	.3750	3/8	3/4	3 1/2	43356*	\$38.14
1/2	.5000	1/2	1	4 1/8	43357*	50.01
5/8	.6250	5/8	1 3/8	5	43358*	79.98
3/4	.7500	3/4	1 5/8	5 5/8	43359*	96.97

With MORSE® Modifications Why Start From Scratch?

When standard cutting tools aren't quite right for your application, let **Morse® Modifications** make them perfect for the task. Morse®-modified off-the-shelf standard cutting tools let you start with a standard tool at a standard price. Add a little for modifications, and save by not having to go with expensive custom-designed special cutting tools.

With MORSE® Specials Fast Delivery on Custom Tools.

When your application requires special custom designed cutting tools, **Morse® Specials** offers complete tool design and manufacturing services. Fast quotes, quick delivery, specifically designed for your machining application. Engineered cutting tools optimized for lower overall machining costs.

4-Flute Double End Mills

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

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

Center Cutting end allows for plunge cutting like a drill into solid material.

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



- List No. 1895 High Speed Steel
- List No. 4553 High Speed Steel Center Cutting
- List No. 4553G High Speed Steel Center Cutting
TiN Coated
- List No. 4582 M42 8% Cobalt Center Cutting

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

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1895 High Speed Steel NON-CENTER CUTTING		4553 High Speed Steel CENTER CUTTING		4553G High Speed Steel CENTER CUTTING TIN COATED		4582 COBALT CENTER CUTTING	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	43266	\$22.87	44251	\$25.16	96000	\$27.67	44580	\$28.93
9/64	.1406	3/8	7/16	3 1/8	43286	25.23	43050	27.75	—	—	—	—
5/32	.1562	3/8	7/16	3 1/8	43267	24.15	43051	26.57	96002	29.22	44581	30.55
1 1/64	.1719	3/8	1/2	3 1/4	43287	26.22	43052	28.84	—	—	—	—
3/16	.1875	3/8	1/2	3 1/4	43268	22.87	44252	25.16	96004	27.67	44582	28.93
1 3/64	.2031	3/8	9/16	3 1/4	43288	26.22	43053	28.84	—	—	—	—
7/32	.2188	3/8	9/16	3 1/4	43269	24.11	43054	26.52	96006	29.17	44583	30.50
1 5/64	.2344	3/8	5/8	3 3/8	43289	26.22	43055	28.84	—	—	—	—
1/4	.2500	3/8	5/8	3 3/8	43270	22.87	44253	25.16	96008	27.67	44584	28.93
1 7/64	.2656	3/8	1 1/16	3 3/8	43290	26.22	43056	28.84	—	—	—	—
9/32	.2812	3/8	1 1/16	3 3/8	43271	24.11	43057	26.52	96010	29.17	44585	30.50
1 9/64	.2969	3/8	3/4	3 1/2	43291	26.52	43058	29.18	—	—	—	—
5/16	.3125	3/8	3/4	3 1/2	43272	22.87	44254	25.16	96012	27.67	44586	28.93
2 1/64	.3281	3/8	3/4	3 1/2	43292	26.52	43059	29.18	—	—	—	—
1 1/32	.3438	3/8	3/4	3 1/2	43273	24.11	43060	26.52	96014	29.17	44587	30.50
2 3/64	.3594	3/8	3/4	3 1/2	43293	26.52	43061	29.18	—	—	—	—
3/8	.3750	3/8	3/4	3 1/2	43274	21.99	44255	24.19	96016	26.60	44588	27.81
2 5/64	.3906	1/2	1	4 1/8	43294	30.16	43062	33.17	—	—	—	—
1 3/32	.4062	1/2	1	4 1/8	43275	36.35	43063	39.99	96018	43.98	44589	45.98
2 7/64	.4219	1/2	1	4 1/8	43295	38.31	43064	42.15	—	—	—	—
7/16	.4375	1/2	1	4 1/8	43276	33.41	43065	36.75	96020	40.43	44590	42.26
2 9/64	.4531	1/2	1	4 1/8	43296	38.31	43066	42.15	—	—	—	—
1 5/32	.4687	1/2	1	4 1/8	43277	36.35	43067	39.99	96022	43.98	—	—
3 1/64	.4844	1/2	1	4 1/8	43297	38.31	43068	42.15	—	—	—	—
1/2	.5000	1/2	1	4 1/8	43278	35.04	44256	38.54	96024	42.40	44591	44.32
1 7/32	.5312	5/8	1 3/8	5	43298*	49.31	—	—	—	—	—	—
9/16	.5625	5/8	1 3/8	5	43279	47.84	43069	52.62	—	—	44592	60.52
1 9/32	.5938	5/8	1 3/8	5	43299*	50.12	—	—	—	—	—	—
5/8	.6250	5/8	1 3/8	5	43280	49.75	44257	54.73	96026	60.20	44593	62.93
2 1/32	.6562	3/4	1 5/8	5 5/8	43300*	62.92	—	—	—	—	—	—
1 1/16	.6875	3/4	1 5/8	5 5/8	43281	59.72	43070	65.69	—	—	44597	75.55
2 3/32	.7188	3/4	1 5/8	5 5/8	43301*	69.34	—	—	—	—	—	—
3/4	.7500	3/4	1 5/8	5 5/8	43282	61.75	44258	67.93	96028	74.72	44594	78.11
2 5/32	.7812	7/8	1 7/8	6 1/8	43302*	76.22	—	—	—	—	—	—
1 3/16	.8125	7/8	1 7/8	6 1/8	43283	76.08	43071	87.58	—	—	44598	100.98
2 7/32	.8438	7/8	1 7/8	6 1/8	43303*	76.22	—	—	—	—	—	—
7/8	.8750	7/8	1 7/8	6 1/8	43284	84.26	44259	92.69	—	—	44595	106.59
2 9/32	.9062	1	1 7/8	6 3/8	43304*	92.66	—	—	—	—	—	—
1 5/16	.9375	1	1 7/8	6 3/8	43305	88.89	43072	97.78	—	—	44599	113.35
3 1/32	.9688	1	1 7/8	6 3/8	43306*	93.66	—	—	—	—	—	—
1	1.0000	1	1 7/8	6 3/8	43285	92.65	44260	101.92	96032	112.11	44596	117.20

* Available While Supplies Last

4-Flute Miniature Stub Length Double End Mills

**3/16" Shank — Center Cutting
High Speed Steel & M42 8% Cobalt**

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. Center Cutting end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.



List No. 4569 High Speed Steel

List No. 4569C M42 8% Cobalt

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

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	4569 High Speed Steel		4569C COBALT	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	.0625	3/32	2	44120	\$15.88	44126	\$18.14
3/32	.0938	9/64	2	44121	15.88	44128	18.14
1/8	.1250	3/16	2	44122	15.88	44130	18.14
5/32	.1562	15/64	2	44123	15.88	44132	18.14
3/16	.1875	9/32	2	44124	17.40	44134	20.43

TOOL COATINGS AVAILABLE
TiN TiCN TiAlN

4-Flute Miniature Regular Length Double End Mills

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

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. Center Cutting end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.



List No. 1895 High Speed Steel

List No. 1895C M42 8% Cobalt

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

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1895 High Speed Steel		1895C COBALT	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	.0625	3/16	2 1/4	43261	\$18.94	43220	\$21.62
3/32	.0938	9/32	2 1/4	43262	18.94	43222	21.62
1/8	.1250	3/8	2 1/4	43263	18.94	43224	21.62
5/32	.1562	7/16	2 1/4	43264	18.94	43226	21.62
3/16	.1875	1/2	2 1/4	43265	18.94	43228	21.62

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiAlN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

4-Flute Miniature Long Length Double End Mills

$\frac{3}{16}$ " Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

Miniature $\frac{3}{16}$ " Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.



List No. 1893 High Speed Steel

List No. 1893C M42 8% Cobalt

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

STANDARD All sizes — 1 each
PACKAGE

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1893 High Speed Steel		1893C COBALT	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
$\frac{1}{16}$	.0625	$\frac{7}{32}$	$2\frac{1}{2}$	43241	\$24.35	44320	\$27.81
$\frac{3}{32}$	.0938	$\frac{9}{32}$	$2\frac{5}{8}$	43242	24.35	44321	27.81
$\frac{1}{8}$	.1250	$\frac{3}{4}$	$3\frac{1}{8}$	43243	24.35	44322	27.81
$\frac{9}{32}$	.1562	$\frac{7}{8}$	$3\frac{1}{4}$	43244	24.35	44323	27.81
$\frac{3}{16}$	.1875	1	$3\frac{3}{8}$	43245	24.35	44324	27.81

TOOL COATINGS AVAILABLE
TiN TiCN TiAlN

4-Flute Stub Length Double End Mills

High Speed Steel

Multi-Flute end mills offer higher feed rates and improved surface finish in a wide variety of medium hardness materials. They also feature greater core strength for reduced tool deflection.

Stub Length provides increased rigidity in shallow milling applications.



List No. 4561 High Speed Steel

STANDARD All sizes — 1 each
PACKAGE

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
$\frac{1}{8}$	.1250	$\frac{3}{8}$	$\frac{3}{16}$	$2\frac{3}{4}$	44193	\$20.69
$\frac{9}{32}$	.1562	$\frac{3}{8}$	$\frac{15}{64}$	$2\frac{3}{4}$	44194	24.03
$\frac{3}{16}$	.1875	$\frac{3}{8}$	$\frac{9}{32}$	$2\frac{3}{4}$	44195	20.69
$\frac{7}{32}$	.2188	$\frac{3}{8}$	$\frac{21}{64}$	$2\frac{7}{8}$	44196	22.12
$\frac{1}{4}$	.2500	$\frac{3}{8}$	$\frac{3}{8}$	$2\frac{7}{8}$	44197	20.60

TOOL COATINGS AVAILABLE
TiN TiCN TiAlN

CUTTING FLUIDS SELECTION

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

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

2-Flute Ball Nose Single End Mills

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

Ball Nose end mills are designed for milling die cavities, fillets, round bottomed holes and radius bottom slots. 2-Flute end mills provide increased chip capacity. Center Cutting end allows for plunge cutting like a drill into solid material.



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

STANDARD All sizes — 1 each
PACKAGE

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1887 High Speed Steel		1887G High Speed Steel TIN COATED		4583 COBALT	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	43111	\$23.16	96460	\$25.48	44401	\$26.64
3/16	.1875	3/8	1/2	2 3/8	43112	23.16	96461	25.48	44402	26.64
1/4	.2500	3/8	5/8	2 7/16	43113	23.16	96462	25.48	44403	26.64
5/16	.3125	3/8	3/4	2 1/2	43114	26.02	96463	28.63	44404	29.93
3/8	.3750	3/8	3/4	2 1/2	43115	26.02	96464	28.63	44405	29.93
7/16	.4375	1/2	1	3 1/4	43116	34.25	96465	37.68	—	—
1/2	.5000	1/2	1	3 1/4	43117	34.25	96466	37.68	44406	39.39
9/16	.5625	1/2	1 1/8	3 3/8	43118	42.49	—	—	—	—
5/8	.6250	1/2	1 1/8	3 3/8	43119*	48.78	—	—	—	—
5/8	.6250	5/8	1 3/8	3 3/4	43120	48.78	96467	53.66	44407	56.10
3/4	.7500	1/2	1 5/16	3 5/8	43121*	57.61	—	—	—	—
3/4	.7500	3/4	1 5/8	3 7/8	43122	57.61	96468	63.38	44408	66.25
13/16	.8125	3/4	2	4 1/4	43128	65.56	—	—	—	—
7/8	.8750	7/8	2	4 1/4	43123	73.51	96469	80.87	44412	84.54
15/16	.9375	3/4	2 1/4	4 1/2	43129	83.05	—	—	—	—
1	1.0000	1	2 1/4	4 3/4	43124	92.60	96470	101.87	44409	106.49
1 1/8	1.1250	1	2 1/4	4 3/4	43125	108.76	—	—	—	—
1 1/4	1.2500	1 1/4	2 1/2	5	43126	125.27	—	—	44410	144.06
1 1/2	1.5000	1 1/4	2 1/2	5	43127	154.38	—	—	44411	185.99

* Available While Supplies Last

2-Flute Ball Nose Extended Length Single End Mills

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

Extended Length for applications that require longer reach but not a longer length of cut. The increased rigidity of the unfluted shank reduces deflection.



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

STANDARD All sizes — 1 each
PACKAGE

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	LENGTH BELOW SHANK	OAL	1888 High Speed Steel		1888G High Speed Steel TIN COATED		4590 COBALT	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	1 1/16	2 3/8	43136	\$30.66	96480	\$35.26	45405	\$38.33
3/16	.1875	3/8	1/2	1 1/8	2 1 1/16	43137	30.66	96481	35.26	45406	38.33
1/4	.2500	3/8	5/8	1 1/2	3 1/16	43138	30.66	96482	35.26	45407	38.33
5/16	.3125	3/8	3/4	1 3/4	3 5/16	43139	37.74	96483	43.40	45408	47.17
3/8	.3750	3/8	3/4	1 3/4	3 5/16	43140	36.78	96484	42.29	45409	45.98
7/16	.4375	1/2	1	1 7/8	3 3/4	43141	49.61	96485	57.05	—	—
1/2	.5000	1/2	1	2 1/4	4	43142	47.08	96486	54.14	45410	58.85
5/8	.6250	5/8	1 3/8	2 3/4	4 5/8	43143	65.69	—	—	—	—
3/4	.7500	3/4	1 5/8	3 3/8	5 3/8	43144	69.74	96487	80.20	45411	87.18
7/8	.8750	7/8	2	4	6	43148	90.79	—	—	—	—
1	1.0000	1	2 1/2	5	7 1/4	43146	111.84	96488	128.61	45412	139.80
1 1/4	1.2500	1 1/4	3	5	7 1/4	43147	142.36	—	—	—	—

2-Flute Ball Nose Double End Mills

High Speed Steel
Bright Finish & TiN Coated
Center Cutting

Ball Nose end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots. 2-Flute end mills provide increased chip capacity. Center Cutting end allows for plunge cutting like a drill into solid material.



List No. 1889 High Speed Steel
List No. 1889G High Speed Steel TiN Coated

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

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1889 High Speed Steel		1889G High Speed Steel TiN COATED	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	43161	\$37.97	96495	\$43.67
5/32	.1562	3/8	7/16	3 1/8	43172	41.76	—	—
3/16	.1875	3/8	7/16	3 1/4	43162	37.97	96496	43.67
7/32	.2188	3/8	1/2	3 1/4	43173	41.76	—	—
1/4	.2500	3/8	1/2	3 3/8	43163	37.97	96497	43.67
9/32	.2812	3/8	9/16	3 3/8	43174	41.76	—	—
5/16	.3125	3/8	9/16	3 1/2	43164	37.97	96498	43.67
1 1/32	.3438	3/8	9/16	3 1/2	43175	41.76	—	—
3/8	.3750	3/8	9/16	3 1/2	43165	37.97	96499	43.67
13/32	.4062	1/2	13/16	4 1/8	43176	41.76	—	—
7/16	.4375	1/2	13/16	4 1/8	43166	53.33	—	—
1/2	.5000	1/2	13/16	4 1/8	43167	53.33	96500	61.33
5/8	.6250	5/8	1 1/8	5	43168	73.04	—	—
3/4	.7500	3/4	1 5/16	5 5/8	43169	92.73	—	—
7/8	.8750	7/8	1 9/16	6 1/8	43170	115.06	—	—
1	1.0000	1	1 5/8	6 3/8	43171	141.07	—	—

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

Morse® Plastic Wall Chart



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

List No. 1007 EDP No. 01650 List Price \$7.00

Decimal Equivalent Pocket Chart

List No. 1005



Front



Back

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

Pack of 50
EDP No. 20412
List Price \$51.50

Pack of 100
EDP No. 20413
List Price \$96.45

2-Flute Miniature Ball Nose Stub Length Double End Mills

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

Miniature 3/16" Shank ball nose end mills are designed for small diameter milling of die cavities, fillets, round bottom holes and radius bottom slots. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	4570 High Speed Steel		4570C COBALT	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	.0625	3/32	2	44340	\$29.24	43210	\$33.38
3/32	.0938	9/64	2	44341	26.03	43212	30.45
1/8	.1250	3/16	2	44342	26.03	43214	30.45
5/32	.1562	15/64	2	44343	26.03	43216	30.45
3/16	.1875	9/32	2	44344	26.03	43218	30.45

**TOOL COATINGS
AVAILABLE**

TiN TiCN TiALN



List No. 4570 High Speed Steel

List No. 4570C M42 8% Cobalt

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

STANDARD PACKAGE All sizes — 1 each

2-Flute Miniature Ball Nose Regular Length Double End Mills

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

Miniature 3/16" Shank ball nose end mills are designed for small diameter milling of die cavities, fillets, round bottom holes and radius bottom slots. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1890 High Speed Steel		1890C COBALT	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/32	.0312	3/32	2 1/4	43186	\$30.33	—	—
1/16	.0625	3/16	2 1/4	43188	30.33	43200	\$34.64
3/32	.0938	9/32	2 1/4	43190	30.33	43202	34.64
1/8	.1250	3/8	2 1/4	43192	30.33	43204	34.64
5/32	.1562	7/16	2 1/4	43194	30.33	43206	34.64
3/16	.1875	1/2	2 1/4	43196	30.33	43208	34.64

**TOOL COATINGS
AVAILABLE**

TiN TiCN TiALN



List No. 1890 High Speed Steel

List No. 1890C M42 8% Cobalt

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

STANDARD PACKAGE All sizes — 1 each

Multi-Flute Ball Nose Single End Mills

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

Ball Nose end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots.

Multi-Flute end mills offer improved surface finish and feature greater core strength for reduced tool deflection.

Center Cutting end allows for plunge cutting like a drill into solid material.



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

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	4554 High Speed Steel		4554G High Speed Steel TIN COATED		4589 COBALT	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	4	44272	\$32.94	96510	\$36.24	44451	\$37.88
3/16	.1875	3/8	1/2	2 3/8	4	44273	32.94	96511	36.24	44452	37.88
1/4	.2500	3/8	5/8	2 7/16	4	44274	32.94	96512	36.24	44453	37.88
5/16	.3125	3/8	3/4	2 1/2	4	44275	32.94	96513	36.24	44454	37.88
3/8	.3750	3/8	3/4	2 1/2	4	44276	39.16	96514	43.08	44455	45.03
1/2	.5000	1/2	1 1/4	3 1/4	4	44277	45.34	96515	49.88	44456	52.14
5/8	.6250	5/8	1 5/8	3 3/4	4	44278	67.77	96516	74.54	44457	77.93
3/4	.7500	3/4	1 5/8	3 7/8	4	44279	78.61	96517	86.47	44458	90.40
7/8	.8750	7/8	1 7/8	4 1/8	4	44280	108.85	96518	119.74	—	—
1	1.0000	1	2	4 1/2	4	44281	131.45	96519	144.59	44460	151.67
1	1.0000	1	2	4 1/2	6	—	—	—	—	44461	151.67
1 1/4	1.2500	1 1/4	2	4 1/2	4	44282	142.54	—	—	—	—
1 1/4	1.2500	1 1/4	2	4 1/2	6	—	—	—	—	—	—
1 1/2	1.5000	1 1/4	2	4 1/2	4	44283	185.32	—	—	—	—
1 1/2	1.5000	1 1/4	2	4 1/2	6	—	—	—	—	—	—

Multi-Flute Long Length Ball Nose Single End Mills

High Speed Steel
Bright Finish & TiN Coated
Center Cutting



List No. 4555 High Speed Steel
List No. 4555G High Speed Steel TiN Coated

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiAlN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	4555 High Speed Steel		4555G High Speed Steel TIN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/4	.2500	3/8	1 1/4	3 1/16	4	44298	\$40.11	96525	\$46.13
5/16	.3125	3/8	1 5/8	3 3/8	4	44299	42.05	96526	48.36
3/8	.3750	3/8	1 1/2	3 1/4	4	44300	45.54	96527	52.37
1/2	.5000	1/2	2	4	4	44301	52.02	96528	59.82
5/8	.6250	5/8	2 1/2	4 5/8	4	44302	73.72	96529	84.78
3/4	.7500	3/4	3	5 1/4	4	44303	92.31	96530	106.16
1	1.0000	1	4	6 1/2	4	44304	149.40	—	—
1 1/4	1.2500	1 1/4	4	6 1/2	4	44305	228.29	—	—
1 1/2	1.5000	1 1/4	4	6 1/2	4	44306	239.71	—	—

Multi-Flute Coarse Pitch Roughing End Mills

High Speed Steel

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. Economical **High Speed Steel** roughing end mills are recommended for most materials of low to medium hardness.



List No. 4593

STANDARD
PACKAGE

All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiAlN

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	3/8	5/8	27/16	3	44464	\$26.23
5/16	.3125	3/8	3/4	2 1/2	3	44465	26.23
3/8	.3750	3/8	3/4	2 1/2	4	44466	26.23
1/2	.5000	1/2	1 1/4	3 1/4	4	44476	40.55
5/8	.6250	5/8	1 5/8	3 3/4	4	44477	47.69
3/4	.7500	3/4	1 5/8	3 3/8	4	44478	58.44
1	1.0000	3/4	2	4 1/4	5	44463	95.28
1	1.0000	1	2	4 1/2	5	44480	96.82
1	1.0000	1	3	5 1/2	5	44468	109.18
1 1/4	1.2500	3/4	2	4 1/4	6	44469	128.97
1 1/4	1.2500	1 1/4	2	4 1/2	6	44482	125.33
1 1/2	1.5000	3/4	2	4 1/4	6	44470	140.98
1 1/2	1.5000	1 1/4	2	4 1/2	6	44483	152.13
2	2.0000	1 1/4	2	4 1/2	8	44471	201.53

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/2	.5000	1/2	2	4	4	44467	\$44.29
3/4	.7500	3/4	3	5 1/4	4	44488	72.43
1	1.0000	1	4	6 1/2	5	44490	107.32
1 1/4	1.2500	1 1/4	4	6 1/2	6	44491	141.91
1 1/2	1.5000	1 1/4	4	6 1/2	6	44492	173.15
2	2.0000	2	4	7 3/4	8	44485	306.22
2	2.0000	2	6	9 3/4	8	44494	344.62
2	2.0000	2	8	11 3/4	8	44495	486.47

Technical Publications

Machinist's Practical Guide

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



Machinist's Guide for Taps

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



Machinist's Guide for Carbide Tooling

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



GUIDES	LIST NO.	DISPLAY BOX OF 50 (1 BOX)	LIST	INDIVIDUAL COPIES	LIST
		EDP NO.	PRICE	EDP NO.	PRICE
Machinist's Practical Guide	1001	20401	\$336.00	20402	\$7.20
Machinist's Guide for Taps	1002	20403	336.00	20404	7.20
Machinist's Guide for Carbide Tooling	1004	20407	336.00	20408	7.20

End Mill Sets

Single End and Double End
High Speed Steel
In Wooden Stand



2-Flute 6-Pc. Sets

Sizes 1/8", 3/16", 1/4", 5/16", 3/8", 1/2"

(Sizes 1/8" - 3/8" are 3/8" shank, size 1/2" is 1/2" shank)

High Speed Steel
Center Cutting

SET NO.	LIST NO.	DESCRIPTION	EDP NO.	LIST PRICE
W-11	1887	2 Flute, Single End, Ball Nose	45001	\$152.28
W-13	1896	2 Flute, Double End	45015	144.37
W-15	1898	2 Flute, Single End	45025	101.40



4-Flute 6-Pc. Sets

Sizes 1/8", 3/16", 1/4", 5/16", 3/8", 1/2"

(Sizes 1/8" - 3/8" are 3/8" shank, size 1/2" is 1/2" shank)

High Speed Steel
Non-Center Cutting

SET NO.	LIST NO.	DESCRIPTION	EDP NO.	LIST PRICE
W-12	1895	4 Flute, Double End	45010	\$145.40
W-14	1897	4 Flute, Single End	45020	100.80



3/4" Shank 6-Pc. Multi-Flute Set

Sizes 3/4", 7/8", 1", 1-1/8", 1-1/4", 1-1/2"

High Speed Steel
Non-Center Cutting

SET NO.	LIST NO.	DESCRIPTION	EDP NO.	LIST PRICE
W-21	1897	Multi-Flute, Single End	45021	\$445.32

M42 8% Cobalt Coarse Pitch Roughing End Mills

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys.

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	3/8	5/8	27/16	3	44496	\$30.09
5/16	.3125	3/8	3/4	2 1/2	3	44497	30.09
3/8	.3750	3/8	3/4	2 1/2	4	44498	30.09
1/2	.5000	1/2	1 1/4	3 3/4	4	44501	41.88
5/8	.6250	5/8	1 1/8	3 3/4	4	44502	48.30
3/4	.7500	5/8	1 1/8	3 3/8	4	44635	69.80
3/4	.7500	3/4	1 1/8	3 3/8	4	44503	65.90
7/8	.8750	3/4	1 1/8	4 1/8	5	44636	93.46
7/8	.8750	7/8	1 1/8	4 1/8	5	44637	105.79
1	1.0000	3/4	2	4 1/4	5	44500	96.13
1	1.0000	1	2	4 1/2	5	44505	99.52
1 1/8	1.1250	1	2	4 1/2	6	44638	117.25
1 1/4	1.2500	1 1/4	2	4 1/2	6	44508	126.97
1 1/4	1.2500	3/4	2	4 1/4	6	44639	134.61
1 1/2	1.5000	3/4	2	4 1/4	6	44640	170.74
1 1/2	1.5000	1 1/4	2	4 1/2	6	44511	184.20
1 3/4	1.7500	1 1/4	2	4 1/2	6	44641	187.55
2	2.0000	1 1/4	2	4 1/2	6	44519	222.57
2	2.0000	2	2	5 3/4	8	44642	293.04

M42 8% Cobalt Fine Pitch Roughing End Mills

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Fine Pitch** is recommended for difficult-to-machine, high tensile strength, abrasive and harder materials up to 40 Rc.

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	3/8	5/8	27/16	3	44650	\$35.70
5/16	.3125	3/8	3/4	2 1/2	3	44651	35.70
3/8	.3750	3/8	3/4	2 1/2	4	44652	35.70
7/16	.4375	3/8	1	2 11/16	4	44653	51.41
1/2	.5000	1/2	1 1/4	3 3/4	4	44654	51.41
5/16	.5625	1/2	1 1/8	3 3/8	4	44655	61.79
5/8	.6250	5/8	1 1/8	3 3/4	4	44656	58.91
3/4	.7500	5/8	1 1/8	3 3/4	4	44657	78.79
3/4	.7500	3/4	1 1/8	3 3/8	4	44658	78.79
7/8	.8750	3/4	1 1/8	4 1/8	5	44659	102.59
7/8	.8750	7/8	1 1/8	4 1/8	5	44660	105.08
1	1.0000	3/4	2	4 1/8	5	44661	113.62
1	1.0000	1	2	4 1/2	5	44662	113.62
1 1/8	1.1250	1	2	4 1/2	6	44663	134.74
1 1/4	1.2500	3/4	3 1/2	4 1/2	6	44664	154.79
1 1/4	1.2500	1 1/4	2	4 1/2	6	44665	154.79
1 1/2	1.5000	3/4	1 1/2	4 1/2	6	44666	215.98
1 1/2	1.5000	1 1/4	2	4 1/2	6	44667	196.35
1 3/4	1.7500	1 1/4	2	4 1/2	6	44668	225.45
2	2.0000	3/4	2	4 1/2	6	44669	233.38
2	2.0000	1 1/4	2	4 1/2	6	44670	233.38



List No. 4594

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

STANDARD PACKAGE All sizes — 1 each

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/2	.2500	1/2	2	4	4	44499	\$59.83
5/8	.6250	5/8	2 1/2	4 5/8	4	44643	82.31
3/4	.7500	3/4	3	5 1/8	4	44504	81.50
1	1.0000	1	4	6 1/2	5	44507	113.34
1 1/4	1.2500	1 1/4	4	6 1/2	6	44510	182.85
1 1/2	1.5000	1 1/4	4	6 1/2	6	44513	218.49
1 3/4	1.7500	1 1/4	4	6 1/2	6	44644	294.91
2	2.0000	1 1/4	4	6 1/2	6	44645	353.45
2	2.0000	2	4	7 3/4	8	44516	304.08
2	2.0000	2	6	9 3/4	8	44517	379.78
2	2.0000	2	8	11 1/4	8	44518	568.15

End Mills with 2" dia. shanks are provided with a dual drive shank.



List No. 4596

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

STANDARD PACKAGE All sizes — 1 each

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/2	.5000	1/2	2	4	4	44671	\$62.35
5/8	.6250	5/8	2 1/2	4 5/8	4	44672	94.66
3/4	.7500	3/4	3	5 1/8	4	44673	99.33
7/8	.8750	7/8	3 1/2	5 3/4	5	44674	104.76
1	1.0000	1	4	6 1/2	5	44675	134.33
1 1/2	1.5000	1 1/4	4	6 1/2	6	44678*	254.64
2	2.0000	1 1/4	4	6 1/2	6	44679*	393.12

* Available While Supplies Last

M42 8% Cobalt Coarse Pitch Center Cutting Roughing End Mills



List No. 4611 — Regular Length

List No. 4612 — Medium & Long Length

Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys. **Center Cutting** end allows for plunge cutting like a drill into solid material.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4611 - Uncoated / 4611G - TiN / 4611C - TiCN - Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED		TIN COATED		TICN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/2	.5000	1/2	1 1/4	3 1/4	4	44910	\$55.53	44921	\$63.46	44932	\$64.10
5/8	.6250	5/8	1 5/8	3 3/4	4	44911	75.46	44922	86.04	44933	89.92
3/4	.7500	3/4	1 5/8	3 7/8	4	44912	85.82	44923	97.13	44934	98.02
7/8	.8750	3/4	1 7/8	4 1/8	5	44913	104.24	44924	124.18	44935	131.46
1	1.0000	1	2	4 1/2	5	44914	122.82	44925	146.58	44936	156.80
1 1/4	1.2500	1 1/4	2	4 1/2	6	44915	170.70	44926	201.13	44937	212.26
1 1/2	1.5000	1 1/4	2	4 1/2	6	44916	197.67	44927	235.52	44938	249.35
2	2.0000	2	2	5 3/4	8	44917*	386.29	44928*	459.10	44939*	483.25
2	2.0000	2	3	6 3/4	8	44918*	411.44	44929*	492.66	44940*	522.23
2	2.0000	2	4	7 3/4	8	44919*	454.56	44930*	545.91	44941*	579.22
2	2.0000	2	6	9 3/4	8	44920*	585.71	44931*	697.38	44942*	738.06

End Mills with 2" dia. shanks are provided with a dual drive shank

* Available while supplies last

List No. 4612 - Uncoated / 4612G - TiN / 4612C - TiCN - Medium & Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED		TIN COATED		TICN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/2	.5000	1/2	2	4	4	44943	\$95.73	44952	\$103.82	44961	\$107.30
5/8	.6250	5/8	2 1/2	4 5/8	4	44944	111.40	44953	124.14	44962	128.77
3/4	.7500	3/4	3	5 1/4	4	44945	113.22	44954	129.38	44963	131.36
1	1.0000	1	3	5 1/2	5	44946	150.93	44955	180.50	44964	191.31
1	1.0000	1	4	6 1/2	5	44947	170.70	44956	204.50	44965	216.83
1 1/4	1.2500	1 1/4	3	5 1/2	6	44948	203.01	44957	238.54	44966	251.50
1 1/4	1.2500	1 1/4	4	6 1/2	6	44949	233.57	44958	274.10	44967	288.97
1 1/2	1.5000	1 1/4	3	5 1/2	6	44950	231.79	44959	276.21	44968	292.41
1 1/2	1.5000	1 1/4	4	6 1/2	6	44951	276.70	44960	327.45	44969	345.95

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiAlN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

M42 8% Cobalt Fine Pitch Center Cutting Roughing End Mills

Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Fine Pitch** is recommended for difficult-to-machine, high tensile strength, abrasive and harder materials up to 40 Rc. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 4613 — Regular Length

List No. 4614 — Medium & Long Length

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4613 - Uncoated / 4613G - TiN / 4613C - TiCN - Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED		TIN COATED		TICN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/2	.5000	1/2	1 1/4	3 1/4	4	44970	\$58.16	44981	\$66.47	45050	\$69.52
5/8	.6250	5/8	1 3/8	3 3/4	4	44971	75.46	44982	86.04	45051	100.99
3/4	.7500	3/4	1 3/8	3 3/4	4	44972	96.31	44983	97.94	45052	102.82
7/8	.8750	3/4	1 3/8	4 1/8	5	44973	104.24	44984	124.18	45053	131.46
1	1.0000	1	2	4 1/2	5	44974	131.14	44985	156.53	45054	165.78
1 1/4	1.2500	1 1/4	2	4 1/2	6	44975	170.70	44986	201.13	45055	212.25
1 1/2	1.5000	1 1/4	2	4 1/2	6	44976	197.67	44987	235.52	45056	249.35
2	2.0000	2	2	5 3/4	8	44977*	386.29	—	—	45057*	563.58
2	2.0000	2	3	6 3/4	8	44978*	411.44	44989*	546.49	45058*	614.03
2	2.0000	2	4	7 3/4	8	44979*	457.05	44990*	608.99	45059*	684.99
2	2.0000	2	6	9 3/4	8	44980*	585.71	44991*	771.43	45060*	864.31

End Mills with 2" dia. shanks are provided with a dual drive shank

* Available while supplies last

List No. 4614 - Uncoated / 4614G - TiN / 4614C - TiCN - Medium & Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED		TIN COATED		TICN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/2	.5000	1/2	2	4	4	45061	\$95.73	45070	\$103.82	45079	\$107.30
5/8	.6250	5/8	2 1/2	4 5/8	4	45062	111.40	45071	124.14	45080	128.77
3/4	.7500	3/4	3	5 1/4	4	45063	118.61	45072	135.54	45081	141.72
1	1.0000	1	3	5 1/2	5	45064	150.93	45073	180.50	45082	191.31
1	1.0000	1	4	6 1/2	5	45065	170.70	45074	204.50	45083	216.83
1 1/4	1.2500	1 1/4	3	5 1/2	6	45066	203.01	45075	238.54	45084	251.50
1 1/4	1.2500	1 1/4	4	6 1/2	6	45067	233.57	45076	274.10	45085	288.97
1 1/2	1.5000	1 1/4	3	5 1/2	6	45068	231.79	45077	276.21	45086	292.41
1 1/2	1.5000	1 1/4	4	6 1/2	6	45069	276.70	45078	327.45	45087	345.95

CUTTING FLUIDS SELECTION

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

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

M42 8% Cobalt Coarse Pitch Ball Nose Roughing End Mills



Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Ball Nose** end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 4607 — Regular Length
List No. 4608 — Medium & Long Length

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4607 - Uncoated / 4607G - TiN / 4607C - TiCN - Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED		TIN COATED		TICN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/2	.5000	1/2	1 1/4	3 1/4	4	44817*	\$92.53	44826*	\$100.47	44835*	\$103.89
5/8	.6250	5/8	1 5/8	3 3/4	4	44818*	123.99	44827*	134.55	44836*	138.44
3/4	.7500	3/4	1 5/8	3 7/8	4	44819*	134.62	44828*	145.95	44837*	150.82
1	1.0000	1	2	4 1/2	5	44820*	226.39	44829*	251.76	44838*	261.01
1 1/4	1.2500	1 1/4	2	4 1/2	6	44821*	283.88	44830*	314.33	44839*	325.43
1 1/2	1.5000	1 1/4	2	4 1/2	6	44822*	359.31	—	—	—	—
2	2.0000	2	4	7 3/4	8	44824*	598.28	44833*	689.65	44842*	722.94
2	2.0000	2	6	9 3/4	8	44825*	770.77	44834*	882.44	44843*	923.11

End Mills with 2" dia. shanks are provided with a dual drive shank

*Available while supplies last

List No. 4608 - Uncoated / 4608G - TiN / 4608C - TiCN - Medium & Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED		TIN COATED		TICN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/2	.5000	1/2	2	4	4	44844*	\$123.99	44850*	\$132.46	44856*	\$135.50
5/8	.6250	5/8	2 1/2	4 5/8	4	44845*	154.53	44851*	167.26	44857*	171.89
3/4	.7500	3/4	3	5 1/4	4	44846*	167.08	44852*	184.03	44858*	190.20
1	1.0000	1	4	6 1/2	5	44847*	260.50	44853*	294.32	44859*	306.63
1 1/4	1.2500	1 1/4	4	6 1/2	6	44848*	344.96	44854*	385.57	44860*	400.37
1 1/2	1.5000	1 1/4	4	6 1/2	6	44849*	404.23	44855*	455.00	44861*	473.48

*Available while supplies last

With MORSE® Modifications Why Start From Scratch?

When standard cutting tools aren't quite right for your application, let **Morse® Modifications** make them perfect for the task. Morse®-modified off-the-shelf standard cutting tools let you start with a standard tool at a standard price. Add a little for modifications, and save by not having to go with expensive custom-designed special cutting tools.

With MORSE® Specials Fast Delivery on Custom Tools.

When your application requires special custom designed cutting tools, **Morse® Specials** offers complete tool design and manufacturing services. Fast quotes, quick delivery, specifically designed for your machining application. Engineered cutting tools optimized for lower overall machining costs.

M42 8% Cobalt Fine Pitch Ball Nose Roughing End Mills

Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Ball Nose** end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots. **Fine Pitch** is recommended for difficult-to-machine, high tensile strength, abrasive and harder materials up to 40 Rc. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 4609

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4609 - Uncoated / 4609G - TiN / 4609C - TiCN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED		TIN COATED		TiCN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/2	.5000	1/2	1 1/4	3 1/4	4	44862*	\$98.81	44871*	\$107.28	44880*	\$110.39
5/8	.6250	5/8	1 5/8	3 3/4	4	44863*	123.99	44872*	134.55	44881*	138.44
3/4	.7500	3/4	1 5/8	3 7/8	4	44864*	143.75	44873*	155.85	44882*	160.27
1	1.0000	1	2	4 1/2	5	44865*	226.39	44874*	251.76	44883*	261.01
1 1/4	1.2500	1 1/4	2	4 1/2	6	—	—	44875*	314.33	44884*	325.43
1 1/2	1.5000	1 1/4	2	4 1/2	6	44867*	359.31	44876*	397.19	44885*	411.00
2	2.0000	2	4	7 3/4	8	44869*	598.28	44878*	689.65	44887*	722.94
2	2.0000	2	6	9 3/4	8	44870*	770.77	44879*	882.44	44888*	923.11

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

M42 8% Cobalt Coarse Pitch Stub Length Roughing End Mills

Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Stub Length** provides increased rigidity in shallow milling applications. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 4610

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4610 - Uncoated / 4610G - TiN / 4610C - TiCN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED		TIN COATED		TiCN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/4	.2500	3/8	1/4	2 1/16	3	44889	\$31.54	44896	\$34.76	44903	\$36.63
3/8	.3750	3/8	3/8	2 5/32	4	44890	32.52	44897	36.29	44904	38.17
1/2	.5000	1/2	1/2	2 1/2	4	44891	43.55	44898	49.60	44905	61.45
5/8	.6250	5/8	5/8	2 3/4	4	44892	54.55	44899	62.11	44906	74.89
3/4	.7500	3/4	3/4	2 7/8	4	44893	65.03	44900	72.82	44907	90.22
1	1.0000	1	1	3 1/2	5	44894	98.08	44901	116.97	44908	142.62
1 1/4	1.2500	1 1/4	1 1/4	3 3/4	6	44895*	130.09	44902*	152.74	—	—

*Available while supplies last

M42 8% Cobalt Roughing / Finishing End Mills Center Cutting



List No. 4640 — Bright Finish

List No. 4640G — TiN Coated

List No. 4640C — TiCN Coated

Roughing / Finishing end mills rough and finish in a single pass, removing material at roughing rates while producing a finish near that produced by standard end mills.

Recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys.

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

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	UNCOATED		TIN COATED		TICN COATED	
						EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
3/16	.1875	3/8	1/2	2 3/8	4	45100	\$28.58	45200	\$36.51	45300	\$40.46
1/4	.2500	3/8	5/8	2 7/16	4	45101	28.58	45201	36.51	45301	40.46
5/16	.3125	3/8	3/4	2 1/2	4	45102	28.58	45202	36.51	45302	40.46
5/16	.3125	3/8	1 3/8	3 3/8	4	45103	35.71	45203	45.93	45303	51.11
3/8	.3750	3/8	3/4	2 1/2	4	45104	28.58	45204	36.51	45304	40.46
7/16	.4375	3/8	1	2 11/16	4	45105	43.86	45205	53.72	45305	58.67
1/2	.5000	1/2	1 1/4	3 1/4	4	45106	43.86	45206	56.45	45306	62.75
1/2	.5000	1/2	2	4	4	45107	53.57	45207	66.14	45307	72.44
1/2	.5000	1/2	3	5	4	45108	61.14	45208	76.49	45308	84.14
1/2	.5000	1/2	1	3	4	45109*	39.12	45209*	48.53	—	—
1/2	.5000	1/2	1 3/8	3 5/8	4	45110*	46.15	—	—	45310*	64.15
1/2	.5000	1/2	2 1/2	4 1/2	4	45111*	53.85	45211*	68.44	—	—
9/16	.5625	1/2	1 3/8	3 3/8	4	45112	55.14	45212	69.23	45312	76.28
5/8	.6250	5/8	1 3/8	3 3/4	4	45113	55.14	45213	69.23	45313	76.28
5/8	.6250	5/8	2 1/2	4 5/8	4	45114	71.43	45214	88.16	45314	96.58
5/8	.6250	5/8	3 1/8	5 1/4	4	45115*	81.54	45215*	97.58	45315*	105.60
5/8	.6250	5/8	3/4	2 7/8	4	45116*	42.86	45216*	53.67	45316*	59.08
5/8	.6250	5/8	1 1/4	3 3/8	4	45117*	47.25	45217*	60.66	45317*	67.36
5/8	.6250	5/8	2 1/8	4 1/4	4	45118*	61.10	45218*	71.91	45318*	77.32
1 1/16	.6875	5/8	1 5/8	3 3/4	4	45119	69.14	45219	86.31	45319	94.97
3/4	.7500	5/8	1 5/8	3 3/4	4	45120	69.14	45220	86.31	45320	94.97
3/4	.7500	3/4	1 5/8	3 3/4	4	45121	69.14	45221	86.31	45321	94.97
3/4	.7500	3/4	3	5 1/4	4	45122	85.43	45222	105.14	45322	115.02
3/4	.7500	3/4	4 1/8	6 3/8	4	45123	99.71	45223	128.86	45323	142.80
3/4	.7500	3/4	3/4	3	4	45124*	56.48	45224*	69.45	45324*	75.93
3/4	.7500	3/4	1 1/4	3 1/2	4	45125*	60.44	45225*	76.92	45325*	85.16
3/4	.7500	3/4	2 1/2	4 5/8	4	45126*	73.41	45226*	92.22	45326*	101.63
13/16	.8125	3/4	1 7/8	4 1/8	5	45127	76.29	45227	95.91	45327	105.79
7/8	.8750	3/4	1 7/8	4 1/8	5	45128	86.00	45228	115.76	45328	130.59
7/8	.8750	3/4	1 1/8	3 3/8	5	45129*	75.82	45229*	99.38	—	—
7/8	.8750	7/8	1 7/8	4 1/8	5	45130*	81.98	45230*	110.24	45330*	124.37
7/8	.8750	7/8	3 1/2	5 3/4	5	45131*	95.38	45231*	129.05	45331*	145.89
1	1.0000	3/4	2	4 1/4	5	45132	104.29	45232	133.75	45332	148.60
1	1.0000	3/4	4	6 1/4	5	45133*	112.97	45233*	146.64	45333*	163.47
1	1.0000	3/4	1 1/8	3 3/8	5	45134*	79.78	45234*	103.34	45334*	115.12
1	1.0000	3/4	1 1/2	3 3/4	5	45135*	89.01	45235*	112.57	45335*	124.35
1	1.0000	3/4	3	5 1/4	5	45136*	103.96	45236*	137.63	45336*	154.46
1	1.0000	1	2	4 1/2	5	45137	104.29	45237	133.75	45337	148.68
1	1.0000	1	4	6 1/2	5	45138	118.86	45238	153.98	45338	171.65
1	1.0000	1	6	8 1/2	5	45139	155.00	45239	202.30	45339	226.02
1	1.0000	1	1 1/8	3 5/8	5	45140*	79.78	45240*	103.34	45340*	115.12
1	1.0000	1	1 5/8	4 1/8	5	45141*	89.01	45241*	117.27	—	—
1	1.0000	1	3	5 1/2	5	45142	109.29	45242	138.84	45342	153.67
1 1/8	1.1250	3/4	2	4 1/4	6	45143	121.43	45243	159.47	45343	178.50
1 1/8	1.1250	1	2	4 1/2	6	45144*	115.60	45244*	151.87	45344*	170.00
1 1/4	1.2500	3/4	2	4 1/4	6	45145	145.14	45245	183.24	45345	202.28
1 1/4	1.2500	3/4	1 1/8	3 3/8	6	45146*	125.71	45246*	155.16	45346*	169.89
1 1/4	1.2500	1 1/4	2	4 1/2	6	45147	145.14	45247	183.24	45347	202.28
1 1/4	1.2500	1 1/4	4	6 1/2	6	45148	176.57	45248	222.05	45348	244.80
1 1/4	1.2500	1 1/4	6	8 1/2	6	45149	230.29	45249	283.25	45349	309.84
1 1/4	1.2500	1 1/4	3	5 1/2	6	45150*	157.14	45250*	193.41	45350*	211.54
1 3/8	1.3750	3/4	2	4 1/4	6	45151*	147.91	45251*	205.58	45351*	234.42
1 3/8	1.3750	3/4	1 1/8	3 3/8	6	45152*	132.31	45252*	179.38	45352*	202.92
1 1/2	1.5000	3/4	2	4 1/2	6	45153	173.14	45253	233.64	45353	263.91
1 1/2	1.5000	3/4	1 1/8	3 3/8	6	45154*	143.52	45254*	190.59	45354*	214.13
1 1/2	1.5000	3/4	1 1/2	3 3/4	6	45155*	150.33	45255*	224.48	45355*	261.56
1 1/2	1.5000	1 1/4	2	4 1/2	6	45156	173.14	45256	233.64	45356	263.91
1 1/2	1.5000	1 1/4	4	6 1/2	6	45157	223.57	45257	322.25	45357	371.68
1 1/2	1.5000	1 1/4	6	8 1/2	6	45158	308.57	45258	426.65	45358	487.20
1 1/2	1.5000	1 1/4	3	5 1/2	6	45159*	196.04	45259*	270.20	45359*	307.27

* Available while supplies last

Carbide Tipped End Mills for High Strength and Hardened Steels

6° Left Hand Helix – Right Hand Cut

Left Hand Helix flutes absorb the impact shock when entering the cut, keep a constant pressure on the workpiece and minimize chatter. Recommended for peripheral milling of tough high strength steel alloys and hardened steels.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	3/8	1/2	2 1/2	2	57701	\$73.43
5/16	.3125	3/8	5/8	2 1/2	2	57702	79.19
3/8	.3750	3/8	5/8	2 1/2	2	57703	84.16
7/16	.4375	3/8	1	2 1/16	2	57704	84.20
1/2	.5000	1/2	1	3	4	57705	94.06
9/16	.5625	1/2	1	3 3/8	4	57706	101.17
5/8	.6250	1/2	1	3 3/8	4	57707	124.70
3/4	.7500	5/8	1	3 3/8	4	57708	134.15

Carbide Tipped Shear Cut End Mills for Non-Ferrous Materials

25° Right Hand Helix – Center Cutting 2-Flutes

25° Helix Shear Cut design improves cutting action, surface finish, chip removal and tool life. **2-Flutes** feature a large flute capacity for heavy milling of long chipping non-ferrous materials. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 5964

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
7/8	.8750	5/8	1 1/4	4	4	57709	\$149.05
1	1.0000	7/8	1 1/4	4	6	57710	171.33
1 1/8	1.1250	1	1 1/4	4 1/4	6	57711	181.87
1 1/4	1.2500	1	1 1/4	4 1/4	6	57712	211.53
1 1/2	1.5000	1 1/4	1 1/2	4 1/2	6	57713	247.82
1 3/4	1.7500	1 1/4	1 1/2	4 1/2	8	57714	298.26
2	2.0000	1 1/4	1 1/2	4 1/2	8	57715	333.11



List No. 5966

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	EDP NO.	LIST PRICE
1/2	.5000	1/2	1	3	57751*	\$216.26
5/8	.6250	5/8	1 1/4	3 3/8	57752*	241.77
3/4	.7500	3/4	1 1/4	3 3/8	57753*	256.04
7/8	.8750	7/8	1 1/2	3 3/4	57754*	281.65
1	1.0000	1	1 1/2	4	57755*	323.70
1 1/4	1.2500	1 1/4	1 3/4	4 1/4	57756*	403.57
1 1/2	1.5000	1 1/2	2	4 3/4	57757*	476.71

* Available While Supplies Last

TOOL COATING SERVICE

Morse Cutting tools now offers a variety of tool coatings for enhanced cutting performance and increased tool life. Please inquire.

TiN — Titanium Carbide

TiCN — Titanium Carbonitride

TiAlN — Titanium Aluminum Nitride

CrN — Chromium Nitride

Carbide Tipped End Mills for Non-Ferrous Materials

6° Right Hand Helix

Spiral Flutes improve cutting action and chip flow for increased speeds and feeds. Recommended for milling of zinc, aluminum and other non-ferrous materials.



List No. 5921

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

STANDARD PACKAGE

All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
¼	.2500	⅜	½	2½	2	57301*	\$63.60
⅝	.3125	⅜	⅝	2½	2	57302*	66.00
⅜	.3750	⅜	⅝	2½	2	57303*	70.69
7/16	.4375	⅜	1	2 11/16	2	57304*	70.78
½	.5000	½	1	3	2	57305*	75.30
9/16	.5625	½	1	3⅜	2	57306*	83.37
⅝	.6250	½	1	3⅜	4	57307*	93.39

* Available While Supplies Last

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
¾	.7500	⅝	1	3⅝	4	57308*	\$102.82
1	1.0000	7/8	1¼	4	4	57310*	140.52
1⅝	1.1250	1	1¼	4¼	4	57311*	159.31
1¼	1.2500	1	1¼	4¼	4	57312*	172.50
1½	1.5000	1¼	1½	4½	4	57313*	205.80

Carbide Tipped Straight Flute End Mills

Straight Flutes for general purpose milling in a variety of materials.

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.



List No. 5923 2-Flute for Cast Iron and Short Chipping Non-Ferrous Materials

List No. 5923 — 2-Flute

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	EDP NO. 5923	LIST PRICE
¼	.2500	⅜	½	2½	57331*	\$72.05
⅝	.3125	⅜	⅝	2½	57332*	74.79
⅜	.3750	⅜	⅝	2½	57333*	80.09
7/16	.4375	⅜	1	2 11/16	57334*	80.09
½	.5000	½	1	3	57335*	85.29
9/16	.5625	½	1	3⅜	57336*	85.87
⅝	.6250	½	1	3⅜	57337*	85.87
11/16	.6875	⅝	1	3⅜	57338*	98.92
¾	.7500	⅝	1	3⅜	57339*	102.04
13/16	.8125	⅝	1	3⅜	57340*	112.97
7/8	.8750	⅝	1¼	4	57341*	124.25
15/16	.9375	7/8	1¼	4	57342*	127.81
1	1.0000	7/8	1¼	4	57343*	133.46
1⅝	1.1250	1	1¼	4¼	57344*	136.93
1¼	1.2500	1	1¼	4¼	57345*	147.08
1½	1.5000	1¼	1½	4½	57346*	173.65



List No. 5935 3-Flute – Center Cutting for Cast Iron and Short Chipping Non-Ferrous Materials

List Nos. 5935 - 5936 — 3-Flute

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	EDP NO. 5935	LIST PRICE	EDP NO. 5936	LIST PRICE
⅜	.3750	⅜	½	2½	57431*	\$118.38	57442*	\$118.38
7/16	.4375	⅜	¾	2½	57432*	121.04	57443*	121.04
½	.5000	½	¾	3	57433*	128.80	57444*	128.80
9/16	.5625	½	¾	3	57434*	133.93	57445*	133.93
⅝	.6250	⅝	¾	3¼	57435*	156.72	57446*	156.74
¾	.7500	⅝	¾	3⅜	57436*	164.04	57447*	164.04
7/8	.8750	7/8	¾	3 27/32	57437*	191.52	57448*	191.52
1	1.0000	7/8	¾	3¾	57438*	210.25	57449*	210.25
1⅝	1.1250	1	¾	4	57439*	225.23	57450*	225.23
1¼	1.2500	1	¾	4	57440*	304.20	57451*	251.40
1½	1.5000	1¼	¾	4	57441*	306.27	57452*	298.81

List No. 5936 3-Flute – Center Cutting for Low to Medium Strength Steels

* Available While Supplies Last

Carbide Tipped Shear Cut

End Mills

Multi-Flute

Shear Cut design improves cutting action, surface finish, chip removal and tool life.

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.



List No. 5958
25° Right Hand Helix
for Long Chipping Non-Ferrous Materials

List No. 5960
15° Right Hand Helix
for Low to Medium Strength Steels

List No. 5962
15° Right Hand Helix
for Cast Iron and Other Non-Ferrous Materials

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CARBIDE TIP	OAL	LIST NO. 5958			LIST NO. 5960			LIST NO. 5962		
					EDP NO. 5958	NO. OF FLUTES	LIST PRICE	EDP NO. 5960	NO. OF FLUTES	LIST PRICE	EDP NO. 5962	NO. OF FLUTES	LIST PRICE
1/2	.5000	3/8	1	3	57551*	2	\$131.49	57601*	4	\$131.49	57651*	2	\$122.99
1/2	.5000	1/2	1	3	57552*	2	131.49	—	—	—	57652*	2	122.99
9/16	.5625	1/2	1	3	57553*	2	141.26	57603*	4	141.30	57653*	2	132.32
5/8	.6250	1/2	1 1/4	3 1/4	—	—	—	57604*	4	151.94	57654*	2	142.12
5/8	.6250	3/8	1 1/4	3 3/8	57555*	2	151.94	57605*	4	151.94	57655*	2	142.12
11/16	.6875	1/2	1 1/4	3 1/4	57556*	2	158.27	—	—	—	57656*	2	148.07
11/16	.6875	3/8	1 1/4	3 3/8	57557*	2	158.27	57607*	4	158.27	57657*	2	148.07
3/4	.7500	1/2	1 1/4	3 1/4	57558*	2	162.99	57608*	4	162.99	57658*	2	152.50
3/4	.7500	3/8	1 1/4	3 3/8	57559*	2	162.99	57609*	4	162.99	57659*	2	152.50
13/16	.8125	3/8	1 1/2	3 5/8	57560*	2	175.68	—	—	—	57660*	2	180.79
7/8	.8750	3/8	1 1/2	3 3/8	57561*	2	186.60	57611*	4	177.78	57661*	2	174.59
7/8	.8750	7/8	1 1/2	3 3/4	57562*	2	186.60	57612*	4	186.60	57662*	2	174.59
15/16	.9375	5/8	1 1/2	3 5/8	57563*	2	201.14	57613*	4	276.39	57663*	3	258.58
15/16	.9375	7/8	1 1/2	3 3/4	57564*	2	211.16	57614*	4	276.39	—	—	—
1	1.0000	7/8	1 1/2	3 3/4	57565*	2	215.44	57615*	6	249.29	57665*	3	244.89
1	1.0000	1	1 1/2	4	57566*	2	215.44	57616*	6	249.29	57666*	3	244.89
1 1/8	1.1250	1	1 3/4	4 1/4	57567*	2	224.67	—	—	—	57667*	3	288.20
1 1/4	1.2500	1	1 3/4	4 1/4	57568*	3	301.46	—	—	—	57668*	4	318.14
1 3/8	1.3750	1 1/4	1 3/4	4 1/4	57569*	3	311.40	—	—	—	57669*	4	371.63
1 1/2	1.5000	1 1/4	2	4 1/2	57570*	3	308.69	57620*	6	376.85	57670*	4	352.54
1 5/8	1.6250	1 1/4	2	4 1/2	57571*	3	382.70	57621*	8	444.38	57671*	4	404.10
1 3/4	1.7500	1 1/4	2	4 1/2	57572*	3	410.74	57622*	8	473.89	57672*	4	443.35
1 7/8	1.8750	1 1/4	2	4 1/2	57573*	3	442.03	57623*	8	506.88	57673*	4	474.40
2	2.0000	1 1/4	2	4 1/2	57574*	3	472.64	57624*	8	535.49	—	—	—

* Available While Supplies Last

With MORSE® Modifications Why Start From Scratch?

When standard cutting tools aren't quite right for your application, let **Morse® Modifications** make them perfect for the task. Morse®-modified off-the-shelf standard cutting tools let you start with a standard tool at a standard price. Add a little for modifications, and save by not having to go with expensive custom-designed special cutting tools.

With MORSE® Specials Fast Delivery on Custom Tools.

When your application requires special custom designed cutting tools, **Morse® Specials** offers complete tool design and manufacturing services. Fast quotes, quick delivery, specifically designed for your machining application. Engineered cutting tools optimized for lower overall machining costs.

Carbide Tipped Straight Flute End Mills for Cast Iron or Steel

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

Straight Flutes for general purpose milling in a variety of materials



List No. 5925
4-Flute for Cast Iron and Short Chipping
Non-Ferrous Materials



List No. 5927
2-Flute for Low to Medium Strength Steels

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CARBIDE TIP	OAL	EDP NO. 5925	LIST PRICE	EDP NO. 5927	LIST PRICE
1/4	.2500	3/8	1/2	2 1/2	57361	\$65.09	57401*	\$71.12
5/16	.3125	3/8	5/8	2 1/2	57362	70.62	57402*	74.27
3/8	.3750	3/8	5/8	2 1/2	57363	73.38	57403*	79.32
7/16	.4375	3/8	1	2 11/16	57364	73.49	57404*	79.36
1/2	.5000	1/2	1	3 1/4	57365	80.22	57405*	84.33
9/16	.5625	1/2	1	3 3/8	57366	87.66	57406*	93.40
5/8	.6250	1/2	1	3 3/8	57367	91.72	57407*	93.40
3/4	.7500	5/8	1	3 3/8	57368	100.95	57408*	100.99
7/8	.8750	5/8	1 1/4	4	57369	119.36	57409*	119.34
1	1.0000	7/8	1 1/4	4	57370	137.92	57410*	131.94
1 1/8	1.1250	1	1 1/4	4 1/4	57371	156.37	57411*	135.05
1 1/4	1.2500	1	1 1/4	4 1/4	57372	169.31	57412*	145.16
1 1/2	1.5000	1 1/4	1 1/2	4 1/2	57373	202.22	57413*	180.24
1 3/4	1.7500	1 1/4	1 1/2	4 1/2	57374*	260.80	57414*	201.93
2	2.0000	1 1/4	1 1/2	4 1/2	57375*	300.33	57415*	241.09

* Available While Supplies Last

Technical Publications

Machinist's Practical Guide

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



Machinist's Guide for Taps

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



Machinist's Guide for Carbide Tooling

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



GUIDES	LIST NO.	DISPLAY BOX OF 50 (1 BOX)		INDIVIDUAL COPIES	
		EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
Machinist's Practical Guide	1001	20401	\$336.00	20402	\$7.20
Machinist's Guide for Taps	1002	20403	336.00	20404	7.20
Machinist's Guide for Carbide Tooling	1004	20407	336.00	20408	7.20

Solid Carbide 2-Flute Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. Ideal for plunge cutting and slotting. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOLERANCES

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

STANDARD PACKAGE

All sizes – 1 each



List No. 5944 Regular Length



List No. 5954 Long Length



List No. 5950 Extra Long Length

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

List No. 5944 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TiCN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	1/8	3/16	1 1/2	58004	\$9.60	90002	\$11.36	90039	\$12.25	90076	\$12.88
5/64	1/8	3/16	1 1/2	58005	10.11	90003	11.87	90040	12.76	90077	13.39
3/32	1/8	3/8	1 1/2	58006	9.60	90004	11.36	90041	12.25	90078	12.88
7/64	1/8	3/8	1 1/2	58007	10.11	90005	11.87	90042	12.76	90079	13.39
1/8	1/8	1/2	1 1/2	58008	9.60	90006	11.36	90043	12.25	90080	12.88
9/64	3/16	3/16	2	58009	13.57	90007	15.77	90044	16.88	90081	17.68
5/32	3/16	3/16	2	58010	13.57	90008	15.77	90045	16.88	90082	17.68
11/64	3/16	5/8	2	58011	13.57	90009	15.77	90046	16.88	90083	17.68
3/16	3/16	5/8	2	58012	13.57	90010	15.77	90047	16.88	90084	17.68
13/64	1/4	5/8	2 1/2	58013	17.86	90011	22.64	90048	25.04	90085	26.77
7/32	1/4	5/8	2 1/2	58014	17.86	90012	22.64	90049	25.04	90086	26.77
1/4	1/4	3/4	2 1/2	58016	17.14	90014	21.92	90051	24.32	90088	26.05
9/32	5/16	3/4	2 1/2	58018	23.47	90016	30.45	90053	33.96	90090	36.50
5/16	5/16	13/16	2 1/2	58020	23.47	90018	30.45	90055	33.96	90092	36.50
3/8	3/8	7/8	2 1/2	58024	26.67	90022	33.65	90059	37.16	90096	39.70
7/16	7/16	7/8	2 1/2	58028	41.10	90026	49.84	90063	54.20	90100	57.41
1/2	1/2	1	3	58032	43.09	90030	51.83	90067	56.19	90104	59.40
9/16	9/16	1 1/4	3 1/2	58036	74.73	90031	87.18	90068	93.42	90105	97.97
5/8	5/8	1 1/4	3 1/2	58040	83.57	90032	96.02	90069	102.26	90106	106.81
11/16	3/4	1 1/2	4	58044	129.85	90033	145.16	90070	152.83	90107	158.42
3/4	3/4	1 1/2	4	58048	125.27	90034	140.58	90071	148.25	90108	153.84
7/8	7/8	1 1/2	4	58056	184.62	90035	206.50	90072	217.44	90109	225.46
1	1	1 1/2	4	58064	208.79	90036	230.67	90073	241.61	90110	249.63

List No. 5954 Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TiCN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	3/4	2 1/4	58238	\$14.05	90120	\$16.46	90130	\$17.68	90140	\$18.55
3/16	3/16	3/4	2 1/2	58239	17.38	90121	20.85	90131	22.61	90141	23.86
1/4	1/4	1 1/8	3	58241	22.34	90122	27.12	90132	29.52	90142	31.25
5/16	5/16	1 1/8	3	58250	28.57	90123	35.55	90133	39.06	90143	41.60
3/8	3/8	1 1/8	3	58254	34.76	90124	41.74	90134	45.25	90144	47.79
7/16	7/16	2	4	58258	58.37	90125	69.51	90135	75.11	90145	79.17
1/2	1/2	2	4	58262	62.65	90126	73.79	90136	79.39	90146	83.45
5/8	5/8	2 1/4	5	58270	111.25	90127	126.15	90137	133.62	90147	139.06
3/4	3/4	2 1/4	5	58278	175.39	90128	192.86	90138	201.59	90148	208.00
1	1	2 1/4	5	58294	294.05	90129	320.30	90139	333.44	90149	343.04

List No. 5950 Extra Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TiCN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	1	3	58408	\$18.57	90160	\$20.98	90170	\$22.20	90180	\$23.07
3/16	3/16	1 1/8	3	58412	20.20	90161	23.67	90171	25.43	90181	26.68
1/4	1/4	1 1/2	4	58416	25.49	90162	30.96	90172	33.69	90182	35.70
5/16	5/16	1 5/8	4	58420	37.14	90163	46.32	90173	50.94	90183	54.28
3/8	3/8	1 3/4	4	58424	41.76	90164	50.94	90174	55.56	90184	58.90
7/16	7/16	3	6	58428	75.92	90165	94.49	90175	103.80	90185	110.59
1/2	1/2	3	6	58432	104.95	90166	123.52	90176	132.83	90186	139.62
5/8	5/8	3	6	58440	144.62	90167	166.50	90177	177.44	90187	185.46
3/4	3/4	3	6	58448	211.84	90168	237.39	90178	250.17	90188	259.54
1	1	3	6	58464	352.88	90169	384.15	90179	399.78	90189	411.24

Solid Carbide Metric 2-Flute Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

TOLERANCES

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

STANDARD PACKAGE

All sizes – 1 each



List No. 5959

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

Center Cutting end allows for plunge cutting like a drill into solid material.

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1 mm	3 mm	3 mm	39 mm	59280	\$14.25	90200	\$16.01	90220	\$16.90	90240	\$17.53
1.5 mm	3 mm	5 mm	39 mm	59281	13.41	90201	15.17	90221	16.06	90241	16.69
2 mm	3 mm	7 mm	39 mm	59282	13.41	90202	15.17	90222	16.06	90242	16.69
2.5 mm	3 mm	7 mm	39 mm	59283	13.41	90203	15.17	90223	16.06	90243	16.69
3 mm	3 mm	9 mm	39 mm	59284	13.41	90204	15.17	90224	16.06	90244	16.69
3.5 mm	4 mm	12 mm	51 mm	59285	17.90	90205	21.37	90225	23.13	90245	24.38
4 mm	4 mm	14 mm	51 mm	59286	17.90	90206	21.37	90226	23.13	90246	24.38
4.5 mm	5 mm	14 mm	51 mm	59287	19.78	90207	23.25	90227	25.01	90247	26.26
5 mm	5 mm	16 mm	51 mm	59288	19.78	90208	24.56	90228	26.96	90248	28.69
6 mm	6 mm	19 mm	64 mm	59289	25.80	90209	30.58	90229	32.98	90249	34.71
7 mm	8 mm	19 mm	64 mm	59290	33.24	90210	40.22	90230	43.73	90250	46.27
8 mm	8 mm	21 mm	64 mm	59291	36.43	90211	43.41	90231	46.92	90251	49.46
9 mm	10 mm	22 mm	70 mm	59292	49.92	90212	56.90	90232	60.41	90252	62.95
10 mm	10 mm	22 mm	70 mm	59293	49.92	90213	58.66	90233	63.02	90253	66.23
11 mm	11 mm	25 mm	70 mm	59294	57.02	90214	65.76	90234	70.12	90254	73.33
12 mm	12 mm	25 mm	76 mm	59295	68.91	90215	80.05	90235	85.65	90255	89.71
14 mm	14 mm	31 mm	89 mm	59297	93.62	90216	106.07	90236	112.31	90256	116.86
16 mm	16 mm	32 mm	89 mm	59298	107.90	90217	123.21	90237	130.88	90257	136.47
18 mm	18 mm	35 mm	102 mm	59299	152.49	90218	169.96	90238	178.69	90258	185.10
20 mm	20 mm	38 mm	102 mm	59300	183.94	90219	210.19	90239	223.33	90259	232.93
22 mm	22 mm	38 mm	102 mm	59301*	267.05	—	—	—	—	—	—
25 mm	25 mm	38 mm	102 mm	59302*	284.25	—	—	—	—	—	—

* Available While Supplies Last

Solid Carbide 2-Flute Double End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

Speeds & Feeds:
Page 248



List No. 5947 Stub Length



List No. 5896 Regular Length

List No. 5947 Stub Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	1/8	1/8	1 1/2	57250	\$14.69	90300	\$17.34	90311	\$18.69	90322	\$19.64
3/32	1/8	3/16	1 1/2	57251	14.69	90301	17.34	90312	18.69	90323	19.64
1/8	3/16	1/4	2	57252	13.88	90302	16.53	90313	17.88	90324	18.83
5/32	3/16	5/16	2	57253	18.78	90303	22.09	90314	23.76	90325	24.95
3/16	3/16	3/8	2	57254	18.78	90304	22.09	90315	23.76	90326	24.95
7/32	1/4	1/2	2 1/2	57255	22.86	90305	30.04	90316	33.64	90327	36.27
1/4	1/4	1/2	2 1/2	57256	22.86	90306	30.04	90317	33.64	90328	36.27
5/16	5/16	1/2	2 1/2	57257	36.65	90307	47.14	90318	52.41	90329	56.23
3/8	3/8	9/16	3	57258	38.98	90308	49.47	90319	54.74	90330	58.56
7/16	7/16	9/16	3	57259	55.96	90309	69.06	90320	75.63	90331	80.42
1/2	1/2	5/8	3	57260	62.86	90310	75.96	90321	82.53	90332	87.32

List No. 5896 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	3/8	3/8	3 1/8	57158	\$36.26	90350	\$50.06	90360	\$56.95	90370	\$62.01
5/32	3/8	7/16	3 1/8	57160	38.57	90351	52.37	90361	59.26	90371	64.32
3/16	3/8	1/2	3 1/4	57162	38.57	90352	52.37	90362	59.26	90372	64.32
7/32	3/8	9/16	3 3/8	57164	45.00	90353	58.80	90363	65.69	90373	70.75
1/4	3/8	5/8	3 3/8	57166	45.00	90354	58.80	90364	65.69	90374	70.75
9/32	3/8	1 1/16	3 3/8	57168	50.17	90355	63.97	90365	70.86	90375	75.92
5/16	3/8	3/4	3 1/2	57170	52.04	90356	65.84	90366	72.73	90376	77.79
3/8	3/8	3/4	3 1/2	57174	54.51	90357	68.31	90367	75.20	90377	80.26
7/16	7/16	7/8	4	57178	86.79	90358	103.53	90368	111.89	90378	118.03
1/2	1/2	1	4	57182	89.80	90359	106.54	90369	114.90	90379	121.04

Solid Carbide 2-Flute Ball Nose Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOLERANCES

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

STANDARD PACKAGE

All sizes – 1 each



List No. 5940 Regular Length



List No. 5956 Long Length



List No. 5952 Extra Long Length

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

List No. 5940 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	1/8	3/16	1 1/2	58104	\$12.86	90400	\$14.62	90423	\$15.51	90446	\$16.14
5/64	1/8	3/16	1 1/2	58105	14.08	90401	15.84	90424	16.73	90447	17.36
3/32	1/8	3/8	1 1/2	58106	12.86	90402	14.62	90425	15.51	90448	16.14
7/64	1/8	3/8	1 1/2	58107	14.08	90403	15.84	90426	16.73	90449	17.36
1/8	1/8	1/2	1 1/2	58108	12.86	90404	14.62	90427	15.51	90450	16.14
9/64	3/16	9/16	2	58109	17.36	90405	19.56	90428	20.67	90451	21.47
5/32	3/16	9/16	2	58110	16.53	90406	18.73	90429	19.84	90452	20.64
11/64	3/16	5/8	2	58111	17.36	90407	19.56	90430	20.67	90453	21.47
3/16	3/16	5/8	2	58112	16.53	90408	18.73	90431	19.84	90454	20.64
13/64	1/4	5/8	2 1/2	58113	25.51	90409	30.29	90432	32.69	90455	34.42
7/32	1/4	3/8	2 1/2	58114	22.34	90410	27.12	90433	29.52	90456	31.25
1/4	1/4	3/4	2 1/2	58116	20.48	90411	25.26	90434	27.66	90457	29.39
9/32	5/16	3/4	2 1/2	58118	28.65	90412	35.63	90435	39.14	90458	41.68
5/16	5/16	13/16	2 1/2	58120	27.92	90413	34.90	90436	38.41	90459	40.95
3/8	3/8	7/8	2 1/2	58124	32.09	90414	39.07	90437	42.58	90460	45.12
7/16	7/16	1	2 3/4	58128	48.15	90415	56.89	90438	61.25	90461	64.46
1/2	1/2	1	3	58132	56.19	90416	64.93	90439	69.29	90462	72.50
9/16	9/16	1 1/4	3 1/2	58136	90.20	90417	102.65	90440	108.89	90463	113.44
5/8	5/8	1 1/4	3 1/2	58140	108.10	90418	120.55	90441	126.79	90464	131.34
11/16	3/4	1 1/2	4	58144	162.62	90419	177.93	90442	185.60	90465	191.19
3/4	3/4	1 1/2	4	58148	153.51	90420	168.82	90443	176.49	90466	182.08
7/8	7/8	1 1/2	4	58156	222.86	90421	244.74	90444	255.68	90467	263.70
1	1	1 1/2	4	58164	252.04	90422	273.92	90445	284.86	90468	292.88

List No. 5956 Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	3/4	2 1/4	57575	\$19.18	90470	\$21.59	90480	\$22.81	90490	\$23.68
3/16	3/16	3/4	2 1/2	57577	21.76	90471	25.23	90481	26.99	90491	28.24
1/4	1/4	1 1/8	3	57581	26.67	90472	31.45	90482	33.85	90492	35.58
5/16	5/16	1 1/8	3	57583	37.14	90473	44.12	90483	47.63	90493	50.17
3/8	3/8	1 1/8	3	57585	38.78	90474	45.76	90484	49.27	90494	51.81
7/16	7/16	2	4	57587	75.92	90475	87.06	90485	92.66	90495	96.72
1/2	1/2	2	4	57589	81.43	90476	92.57	90486	98.17	90496	102.23
5/8	5/8	2 1/4	5	57591	134.29	90477	149.19	90487	156.66	90497	162.10
3/4	3/4	2 1/4	5	57593	211.84	90478	229.31	90488	238.04	90498	244.45
1	1	2 1/4	5	57595	352.97	90479	379.22	90489	392.36	90499	401.96

List No. 5952 Extra Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	1	3	58608	\$24.08	90500	\$26.49	90510	\$27.71	90520	\$28.58
3/16	3/16	1 1/8	3	58612	27.35	90501	30.82	90511	32.58	90521	33.83
1/4	1/4	1 1/2	4	58616	30.82	90502	36.29	90512	39.02	90522	41.03
5/16	5/16	1 3/8	4	58620	48.38	90503	57.56	90513	62.18	90523	65.52
3/8	3/8	1 3/4	4	58624	50.41	90504	59.59	90514	64.21	90524	67.55
7/16	7/16	3	6	58628	98.78	90505	117.35	90515	126.66	90525	133.45
1/2	1/2	3	6	58632	146.12	90506	164.69	90516	174.00	90526	180.79
5/8	5/8	3	6	58640	174.49	90507	196.37	90517	207.31	90527	215.33
3/4	3/4	3	6	58648	275.51	90508	301.06	90518	313.84	90528	323.21
1	1	3	6	58664	382.29	90509	413.56	90519	429.19	90529	440.65

Solid Carbide Metric 2-Flute Ball Nose Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 5963

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

TOLERANCES

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

STANDARD PACKAGE

All sizes – 1 each

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TiCN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1 mm	3 mm	3 mm	39 mm	59400	\$16.68	90540	\$18.44	90560	\$19.33	90580	\$19.96
1.5 mm	3 mm	5 mm	39 mm	59401	15.43	90541	17.19	90561	18.08	90581	18.71
2 mm	3 mm	7 mm	39 mm	59402	15.43	90542	17.19	90562	18.08	90582	18.71
2.5 mm	3 mm	7 mm	39 mm	59403	15.43	90543	17.19	90563	18.08	90583	18.71
3 mm	3 mm	9 mm	39 mm	59404	15.43	90544	17.19	90564	18.08	90584	18.71
3.5 mm	4 mm	12 mm	51 mm	59405	20.55	90545	24.02	90565	25.78	90585	27.03
4 mm	4 mm	14 mm	51 mm	59406	20.55	90546	24.02	90566	25.78	90586	27.03
4.5 mm	5 mm	14 mm	51 mm	59407	22.77	90547	26.24	90567	28.00	90587	29.25
5 mm	5 mm	16 mm	51 mm	59408	22.77	90548	27.55	90568	29.95	90588	31.68
6 mm	6 mm	19 mm	64 mm	59409	29.19	90549	33.97	90569	36.37	90589	38.10
7 mm	8 mm	19 mm	64 mm	59410	38.23	90550	45.21	90570	48.72	90590	51.26
8 mm	8 mm	21 mm	64 mm	59411	41.90	90551	48.88	90571	52.39	90591	54.93
9 mm	10 mm	22 mm	70 mm	59412	57.36	90552	64.34	90572	67.85	90592	70.39
10 mm	10 mm	22 mm	70 mm	59413	57.36	90553	66.10	90573	70.46	90593	73.67
11 mm	11 mm	25 mm	70 mm	59414	65.59	90554	74.33	90574	78.69	90594	81.90
12 mm	12 mm	25 mm	76 mm	59415	79.20	90555	90.34	90575	95.95	90595	100.00
14 mm	14 mm	31 mm	89 mm	59417	107.61	90556	120.06	90576	126.30	90596	130.85
16 mm	16 mm	32 mm	89 mm	59418	124.08	90557	139.39	90577	147.06	90597	152.65
18 mm	18 mm	35 mm	102 mm	59419	175.34	90558	192.81	90578	201.54	90598	207.95
20 mm	20 mm	38 mm	102 mm	59420	211.65	90559	237.90	90579	251.04	90599	260.64
22 mm	22 mm	38 mm	102 mm	59421*	307.10	—	—	—	—	—	—
25 mm	25 mm	38 mm	102 mm	59422*	326.50	—	—	—	—	—	—

* Available While Supplies Last

Speeds & Feeds:
Page 248

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

Micrograin Carbide – Center Cutting
30° Helix Angle

TOLERANCES

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

STANDARD PACKAGE

All sizes – 1 each



List No. 5948

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TiCN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	1/8	1/8	1 1/2	58304	\$18.82	90600	\$21.47	90611	\$22.82	90622	\$23.77
3/32	1/8	3/16	1 1/2	58306	18.82	90601	21.47	90612	22.82	90623	23.77
1/8	3/16	1/4	2	58308	17.43	90602	20.08	90613	21.43	90624	22.38
5/32	3/16	5/16	2	58310	25.63	90603	28.94	90614	30.61	90625	31.80
3/16	3/16	3/8	2	58312	25.63	90604	28.94	90615	30.61	90626	31.80
7/32	1/4	1/2	2 1/2	58314	33.96	90605	41.14	90616	44.74	90627	47.37
1/4	1/4	1/2	2 1/2	58316	32.45	90606	39.63	90617	43.23	90628	45.86
5/16	5/16	1/2	2 1/2	58320	45.63	90607	56.12	90618	61.39	90629	65.21
3/8	3/8	9/16	3	58324	48.78	90608	59.27	90619	64.54	90630	68.36
7/16	7/16	9/16	3	58328	62.69	90609	75.79	90620	82.36	90631	87.15
1/2	1/2	5/8	3	58332	82.20	90610	95.30	90621	101.87	90632	106.66

Solid Carbide 4-Flute Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOLERANCES

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

STANDARD PACKAGE

All sizes – 1 each



List No. 5943 Regular Length



List No. 5955 Long Length



List No. 5951 Extra Long Length

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

List No. 5943 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	1/8	3/16	1 1/2	57904	\$9.60	90702	\$11.36	90739	\$12.25	90776	\$12.88
5/64	1/8	3/16	1 1/2	57905	10.11	90703	11.87	90740	12.76	90777	13.39
3/32	1/8	3/8	1 1/2	57906	9.60	90704	11.36	90741	12.25	90778	12.88
7/64	1/8	3/8	1 1/2	57907	10.11	90705	11.87	90742	12.76	90779	13.39
1/8	1/8	1/2	1 1/2	57908	9.60	90706	11.36	90743	12.25	90780	12.88
9/64	3/16	9/16	2	57909	13.57	90707	15.77	90744	16.88	90781	17.68
5/32	3/16	9/16	2	57910	13.57	90708	15.77	90745	16.88	90782	17.68
11/64	3/16	5/8	2	57911	13.57	90709	15.77	90746	16.88	90783	17.68
3/16	3/16	5/8	2	57912	13.57	90710	15.77	90747	16.88	90784	17.68
13/64	1/4	5/8	2 1/2	57913	17.86	90711	22.64	90748	25.04	90785	26.77
7/32	1/4	5/8	2 1/2	57914	17.86	90712	22.64	90749	25.04	90786	26.77
1/4	1/4	3/4	2 1/2	57916	17.14	90714	21.92	90751	24.32	90788	26.05
9/32	5/16	3/4	2 1/2	57918	23.47	90716	30.45	90753	33.96	90790	36.50
5/16	5/16	13/16	2 1/2	57920	23.47	90718	30.45	90755	33.96	90792	36.50
3/8	3/8	7/8	2 1/2	57924	26.67	90722	33.65	90759	37.16	90796	39.70
7/16	7/16	7/8	2 1/2	57928	41.10	90726	49.84	90763	54.20	90800	57.41
1/2	1/2	1	3	57932	43.09	90730	51.83	90767	56.19	90804	59.40
9/16	9/16	1 1/4	3 1/2	57936	74.73	90731	87.18	90768	93.42	90805	97.97
5/8	5/8	1 1/4	3 1/2	57940	83.57	90732	96.02	90769	102.26	90806	106.81
11/16	3/4	1 1/2	4	57944	129.85	90733	145.16	90770	152.83	90807	158.42
3/4	3/4	1 1/2	4	57948	125.27	90734	140.58	90771	148.25	90808	153.84
7/8	7/8	1 1/2	4	57956	184.62	90735	206.50	90772	217.44	90809	225.46
1	1	1 1/2	4	57964	208.79	90736	230.67	90773	241.61	90810	249.63

List No. 5955 Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	3/4	2 1/4	58138	\$14.05	90820	\$16.46	90830	\$17.68	90840	\$18.55
3/16	3/16	3/4	2 1/2	58139	17.38	90821	20.85	90831	22.61	90841	23.86
1/4	1/4	1 1/8	3	58141	22.34	90822	27.12	90832	29.52	90842	31.25
5/16	5/16	1 1/8	3	58150	28.57	90823	35.55	90833	39.06	90843	41.60
3/8	3/8	1 1/8	3	58154	34.76	90824	41.74	90834	45.25	90844	47.79
7/16	7/16	2	4	58158	58.37	90825	69.51	90835	75.11	90845	79.17
1/2	1/2	2	4	58162	62.65	90826	73.79	90836	79.39	90846	83.45
5/8	5/8	2 1/4	5	58170	111.25	90827	126.15	90837	133.62	90847	139.06
3/4	3/4	2 1/4	5	58178	175.39	90828	192.86	90838	201.59	90848	208.00
1	1	2 1/4	5	58194	294.05	90829	320.30	90839	333.44	90849	343.04

List No. 5951 Extra Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	1	3	58508	\$18.57	90860	\$20.98	90870	\$22.20	90880	\$23.07
3/16	3/16	1 1/8	3	58512	20.20	90861	23.67	90871	25.43	90881	26.68
1/4	1/4	1 1/2	4	58516	25.49	90862	30.96	90872	33.69	90882	35.70
5/16	5/16	1 5/8	4	58520	37.14	90863	46.32	90873	50.94	90883	54.28
3/8	3/8	1 3/4	4	58524	41.76	90864	50.94	90874	55.56	90884	58.90
7/16	7/16	3	6	58528	75.92	90865	94.49	90875	103.80	90885	110.59
1/2	1/2	3	6	58532	104.95	90866	123.52	90876	132.83	90886	139.62
5/8	5/8	3	6	58540	144.62	90867	166.50	90877	177.44	90887	185.46
3/4	3/4	3	6	58548	211.84	90868	237.39	90878	250.17	90888	259.54
1	1	3	6	58564	352.88	90869	384.15	90879	399.78	90889	411.24

Solid Carbide Metric 4-Flute Single End Mills

Micrograin Carbide
Center Cutting
30° Helix Angle

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



List No. 5961

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1 mm	3 mm	3 mm	39 mm	59310	\$14.25	90900	\$16.01	90920	\$16.90	90940	\$17.53
1.5 mm	3 mm	5 mm	39 mm	59311	13.41	90901	15.17	90921	16.06	90941	16.69
2 mm	3 mm	7 mm	39 mm	59312	13.41	90902	15.17	90922	16.06	90942	16.69
2.5 mm	3 mm	7 mm	39 mm	59313	13.41	90903	15.17	90923	16.06	90943	16.69
3 mm	3 mm	9 mm	39 mm	59314	13.41	90904	15.17	90924	16.06	90944	16.69
3.5 mm	4 mm	12 mm	51 mm	59315	17.90	90905	21.37	90925	23.13	90945	24.38
4 mm	4 mm	14 mm	51 mm	59316	17.90	90906	21.37	90926	23.13	90946	24.38
4.5 mm	5 mm	14 mm	51 mm	59317	19.78	90907	23.25	90927	25.01	90947	26.26
5 mm	5 mm	16 mm	51 mm	59318	19.78	90908	24.56	90928	26.96	90948	28.69
6 mm	6 mm	19 mm	64 mm	59319	25.80	90909	30.58	90929	32.98	90949	34.71
7 mm	8 mm	19 mm	64 mm	59320	33.24	90910	40.22	90930	43.73	90950	46.27
8 mm	8 mm	21 mm	64 mm	59321	36.43	90911	43.41	90931	46.92	90951	49.46
9 mm	10 mm	22 mm	70 mm	59322	49.92	90912	56.90	90932	60.41	90952	62.95
10 mm	10 mm	22 mm	70 mm	59323	49.92	90913	58.66	90933	63.02	90953	66.23
11 mm	11 mm	25 mm	70 mm	59324	57.02	90914	65.76	90934	70.12	90954	73.33
12 mm	12 mm	25 mm	76 mm	59325	68.91	90915	80.05	90935	85.65	90955	89.71
14 mm	14 mm	31 mm	89 mm	59327	93.62	90916	106.07	90936	112.31	90956	116.86
16 mm	16 mm	32 mm	89 mm	59328	107.90	90917	123.21	90937	130.88	90957	136.47
18 mm	18 mm	35 mm	102 mm	59329	152.49	90918	169.96	90938	178.69	90958	185.10
20 mm	20 mm	38 mm	102 mm	59330	183.94	90919	210.19	90939	223.33	90959	232.93
22 mm	22 mm	38 mm	102 mm	59331*	267.05	—	—	—	—	—	—

* Available While Supplies Last

Solid Carbide 4-Flute Double End Mills

Micrograin Carbide - Center Cutting
30° Helix Angle

Speeds & Feeds:
Page 248



List No. 5946 Stub Length



List No. 5895 Regular Length

STANDARD PACKAGE
All sizes - 1 each

List No. 5946 Stub Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	1/8	1/8	1 1/2	57270	\$14.69	91000	\$17.34	91011	\$18.69	91022	\$19.64
3/32	1/8	3/16	1 1/2	57271	14.69	91001	17.34	91012	18.69	91023	19.64
1/8	3/16	1/4	2	57272	13.88	91002	16.53	91013	17.88	91024	18.83
5/32	3/16	5/16	2	57273	18.78	91003	22.09	91014	23.76	91025	24.95
3/16	3/16	3/8	2	57274	18.78	91004	22.09	91015	23.76	91026	24.95
7/32	1/4	1/2	2 1/2	57275	22.86	91005	30.04	91016	33.64	91027	36.27
1/4	1/4	1/2	2 1/2	57276	22.86	91006	30.04	91017	33.64	91028	36.27
5/16	5/16	1/2	2 1/2	57277	36.65	91007	47.14	91018	52.41	91029	56.23
3/8	3/8	9/16	3	57278	38.98	91008	49.47	91019	54.74	91030	58.56
7/16	7/16	9/16	3	57279	55.96	91009	69.06	91020	75.63	91031	80.42
1/2	1/2	5/8	3	57280	62.86	91010	75.96	91021	82.53	91032	87.32

List No. 5895 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	3/8	3/8	3 1/8	57108	\$36.26	91050	\$50.06	91060	\$56.95	91070	\$62.01
5/32	3/8	7/16	3 1/8	57110	38.57	91051	52.37	91061	59.26	91071	64.32
3/16	3/8	1/2	3 1/4	57112	38.57	91052	52.37	91062	59.26	91072	64.32
7/32	3/8	9/16	3 3/8	57114	45.00	91053	58.80	91063	65.69	91073	70.75
1/4	3/8	5/8	3 3/8	57116	45.00	91054	58.80	91064	65.69	91074	70.75
9/32	3/8	1 1/16	3 3/8	57118	50.17	91055	63.97	91065	70.86	91075	75.92
5/16	3/8	3/4	3 1/2	57120	52.04	91056	65.84	91066	72.73	91076	77.79
3/8	3/8	3/4	3 1/2	57124	54.51	91057	68.31	91067	75.20	91077	80.26
7/16	7/16	7/8	4	57128	86.79	91058	103.53	91068	111.89	91078	118.03
1/2	1/2	1	4	57132	89.80	91059	106.54	91069	114.90	91079	121.04

Solid Carbide 4-Flute Ball Nose Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.



List No. 5942 Regular Length



List No. 5957 Long Length



List No. 5953 Extra Long Length

TOLERANCES

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

STANDARD PACKAGE

All sizes – 1 each

List No. 5942 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	1/16	3/16	1 1/2	58204	\$12.86	91100	\$14.62	91123	\$15.51	91146	\$16.14
5/64	1/8	3/16	1 1/2	58205	14.08	91101	15.84	91124	16.73	91147	17.36
3/32	1/8	3/8	1 1/2	58206	12.86	91102	14.62	91125	15.51	91148	16.14
7/64	1/8	3/8	1 1/2	58207	14.08	91103	15.84	91126	16.73	91149	17.36
1/8	1/8	1/2	1 1/2	58208	12.86	91104	14.62	91127	15.51	91150	16.14
9/64	3/16	9/16	2	58209	17.36	91105	19.56	91128	20.67	91151	21.47
5/32	3/16	9/16	2	58210	16.53	91106	18.73	91129	19.84	91152	20.64
11/64	3/16	5/8	2	58211	17.36	91107	19.56	91130	20.67	91153	21.47
3/16	3/16	5/8	2	58212	16.53	91108	18.73	91131	19.84	91154	20.64
13/64	1/4	5/8	2 1/2	58213	25.51	91109	30.29	91132	32.69	91155	34.42
7/32	1/4	5/8	2 1/2	58214	22.34	91110	27.12	91133	29.52	91156	31.25
1/4	1/4	3/4	2 1/2	58216	20.48	91111	25.26	91134	27.66	91157	29.39
9/32	5/16	3/4	2 1/2	58218	28.65	91112	35.63	91135	39.14	91158	41.68
5/16	5/16	13/16	2 1/2	58220	27.92	91113	34.90	91136	38.41	91159	40.95
3/8	3/8	7/8	2 1/2	58224	32.09	91114	39.07	91137	42.58	91160	45.12
7/16	7/16	1	2 3/4	58228	48.15	91115	56.89	91138	61.25	91161	64.46
1/2	1/2	1	3	58232	56.19	91116	64.93	91139	69.29	91162	72.50
9/16	9/16	1 1/4	3 1/2	58236	90.20	91117	102.65	91140	108.89	91163	113.44
5/8	5/8	1 1/4	3 1/2	58240	108.10	91118	120.55	91141	126.79	91164	131.34
11/16	3/4	1 1/2	4	58244	162.62	91119	177.93	91142	185.60	91165	191.19
3/4	3/4	1 1/2	4	58248	153.51	91120	168.82	91143	176.49	91166	182.08
7/8	7/8	1 1/2	4	58256	222.86	91121	244.74	91144	255.68	91167	263.70
1	1	1 1/2	4	58264	252.04	91122	273.92	91145	284.86	91168	292.88

List No. 5957 Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	3/4	2 1/4	58838	\$19.18	91170	\$21.59	91180	\$22.81	91190	\$23.68
3/16	3/16	3/4	2 1/2	58840	21.76	91171	25.23	91181	26.99	91191	28.24
1/4	1/4	1 1/8	3	58844	26.67	91172	31.45	91182	33.85	91192	35.58
5/16	5/16	1 1/8	3	58850	37.14	91173	44.12	91183	47.63	91193	50.17
3/8	3/8	1 1/8	3	58854	38.78	91174	45.76	91184	49.27	91194	51.81
7/16	7/16	2	4	58858	75.92	91175	87.06	91185	92.66	91195	96.72
1/2	1/2	2	4	58862	81.43	91176	92.57	91186	98.17	91196	102.23
5/8	5/8	2 1/4	5	58870	134.29	91177	149.19	91187	156.66	91197	162.10
3/4	3/4	2 1/4	5	58878	211.84	91178	229.31	91188	238.04	91198	244.45
1	1	2 1/4	5	58894	352.97	91179	379.22	91189	392.36	91199	401.96

List No. 5953 Extra Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	1	3	58708	\$24.08	91200	\$26.49	91210	\$27.71	91220	\$28.58
3/16	3/16	1 1/8	3	58712	27.35	91201	30.82	91211	32.58	91221	33.83
1/4	1/4	1 1/2	4	58716	30.82	91202	36.29	91212	39.02	91222	41.03
5/16	5/16	1 5/8	4	58720	48.38	91203	57.56	91213	62.18	91223	65.52
3/8	3/8	1 3/4	4	58724	50.41	91204	59.59	91214	64.21	91224	67.55
7/16	7/16	3	6	58728	98.78	91205	117.35	91215	126.66	91225	133.45
1/2	1/2	3	6	58732	146.12	91206	164.69	91216	174.00	91226	180.79
5/8	5/8	3	6	58740	174.49	91207	196.37	91217	207.31	91227	215.33
3/4	3/4	3	6	58748	275.51	91208	301.06	91218	313.84	91228	323.21
1	1	3	6	58764	382.29	91209	413.56	91219	429.19	91229	440.65

Solid Carbide Metric 4-Flute Ball Nose Single End Mills



List No. 5965

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

Micrograin Carbide – Center Cutting
30° Helix Angle

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOLERANCE

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

STANDARD PACKAGE

All sizes – 1 each

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1 mm	3 mm	3 mm	39 mm	59440	\$16.68	91240	\$18.44	91260	\$19.33	91280	\$19.96
1.5 mm	3 mm	5 mm	39 mm	59441	15.43	91241	17.19	91261	18.08	91281	18.71
2 mm	3 mm	7 mm	39 mm	59442	15.43	91242	17.19	91262	18.08	91282	18.71
2.5 mm	3 mm	7 mm	39 mm	59443	15.43	91243	17.19	91263	18.08	91283	18.71
3 mm	3 mm	9 mm	39 mm	59444	15.43	91244	17.19	91264	18.08	91284	18.71
3.5 mm	4 mm	12 mm	51 mm	59445	20.55	91245	24.02	91265	25.78	91285	27.03
4 mm	4 mm	14 mm	51 mm	59446	20.55	91246	24.02	91266	25.78	91286	27.03
4.5 mm	5 mm	14 mm	51 mm	59447	22.77	91247	26.24	91267	28.00	91287	29.25
5 mm	5 mm	16 mm	51 mm	59448	22.77	91248	27.55	91268	29.95	91288	31.68
6 mm	6 mm	19 mm	64 mm	59449	29.19	91249	33.97	91269	36.37	91289	38.10
7 mm	8 mm	19 mm	64 mm	59450	38.23	91250	45.21	91270	48.72	91290	51.26
8 mm	8 mm	21 mm	64 mm	59451	41.90	91251	48.88	91271	52.39	91291	54.93
9 mm	10 mm	22 mm	70 mm	59452	57.36	91252	64.34	91272	67.85	91292	70.39
10 mm	10 mm	22 mm	70 mm	59453	57.36	91253	66.10	91273	70.46	91293	73.67
11 mm	11 mm	25 mm	70 mm	59454	65.59	91254	74.33	91274	78.69	91294	81.90
12 mm	12 mm	25 mm	76 mm	59455	79.20	91255	90.34	91275	95.94	91295	100.00
14 mm	14 mm	31 mm	89 mm	59457	107.61	91256	120.06	91276	126.30	91296	130.85
16 mm	16 mm	32 mm	89 mm	59458	124.08	91257	139.39	91277	147.06	91297	152.65
18 mm	18 mm	35 mm	102 mm	59459	175.34	91258	192.81	91278	201.54	91298	207.95
20 mm	20 mm	38 mm	102 mm	59460	211.65	91259	237.90	91279	251.04	91299	260.64
22 mm	22 mm	38 mm	102 mm	59461*	307.10	—	—	—	—	—	—
25 mm	25 mm	38 mm	102 mm	59462*	326.50	—	—	—	—	—	—

* Available While Supplies Last

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



List No. 5949

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Micrograin Carbide – Center Cutting
30° Helix Angle

TOLERANCES

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

STANDARD PACKAGE

All sizes – 1 each

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TIN COATED		TICN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/16	1/8	1/8	1 1/2	58354	\$18.82	91300	\$21.47	91311	\$22.82	91322	\$23.77
3/32	1/8	3/16	1 1/2	58356	18.82	91301	21.47	91312	22.82	91323	23.77
1/8	3/16	1/4	2	58358	17.43	91302	20.08	91313	21.43	91324	22.38
5/32	3/16	5/16	2	58360	25.63	91303	28.94	91314	30.61	91325	31.80
3/16	3/16	3/8	2	58362	25.63	91304	28.94	91315	30.61	91326	31.80
7/32	1/4	1/2	2 1/2	58364	33.96	91305	41.14	91316	44.74	91327	47.37
1/4	1/4	1/2	2 1/2	58366	32.45	91306	39.63	91317	43.23	91328	45.86
5/16	5/16	1/2	2 1/2	58370	45.63	91307	56.12	91318	61.39	91329	65.21
3/8	3/8	9/16	3	58374	48.78	91308	59.27	91319	64.54	91330	68.36
7/16	7/16	9/16	3	58378	62.69	91309	75.79	91320	82.36	91331	87.15
1/2	1/2	5/8	3	58382	82.20	91310	95.30	91321	101.87	91332	106.66

Solid Carbide Corner Radius Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

Corner Radius strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

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

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



List No. 5967 2-Flute



List No. 5968 4-Flute

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

Speeds & Feeds: Page 248

TOLERANCES

Size to 1/4" +.000 - .002
5/16" to 1" +.000 - .003
Shank Dia. +.0000 - .0005

STANDARD PACKAGE

All sizes – 1 each

List No. 5967 – 2-Flute

DIA.	SHANK DIA.	LOC	OAL	CORNER RADIUS	UNCOATED		TIN COATED		TiCN COATED		TiAlN COATED	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	1/2	1 1/2	.020	58910	\$15.10	94830	\$16.16	94875	\$16.91	94920	\$16.91
3/16	3/16	5/8	2	.020	58913	19.80	94833	21.18	94878	22.17	94923	22.17
3/16	3/16	5/8	2	.030	58914	19.80	94834	21.18	94879	22.17	94924	22.17
1/4	1/4	3/4	2 1/2	.020	58916	24.49	94836	26.20	94881	27.43	94926	27.43
1/4	1/4	3/4	2 1/2	.030	58917	24.49	94837	26.20	94882	27.43	94927	27.43
5/16	5/16	13/16	2 1/2	.020	58920	31.43	94840	33.63	94885	35.20	94930	35.20
5/16	5/16	13/16	2 1/2	.030	58921	31.43	94841	33.63	94886	35.20	94931	35.20
3/8	3/8	1	2 1/2	.020	58924	39.39	94844	42.14	94889	44.11	94934	44.11
3/8	3/8	1	2 1/2	.030	58925	39.39	94845	42.14	94890	44.11	94935	44.11
1/2	1/2	1	3	.020	58929	68.57	94849	73.37	94894	76.80	94939	76.80
1/2	1/2	1	3	.030	58930	68.57	94850	73.37	94895	76.80	94940	76.80
1/2	1/2	1	3	.060	58932	68.57	94852	73.37	94897	76.80	94942	76.80
5/8	5/8	1 1/4	3 1/2	.020	58936	114.69	94856	122.72	94901	128.46	94946	128.46
5/8	5/8	1 1/4	3 1/2	.030	58937	114.69	94857	122.72	94902	128.46	94947	128.46
5/8	5/8	1 1/4	3 1/2	.060	58939	114.69	94859	122.72	94904	128.46	94949	128.46
5/8	5/8	1 1/4	3 1/2	.090	58940	114.69	94860	122.72	94905	128.46	94950	128.46
3/4	3/4	1 1/2	4	.020	58942	163.06	94862	174.48	94907	182.63	94952	182.63
3/4	3/4	1 1/2	4	.030	58943	163.06	94863	174.48	94908	182.63	94953	182.63
3/4	3/4	1 1/2	4	.060	58945	163.06	94865	174.48	94910	182.63	94955	182.63
3/4	3/4	1 1/2	4	.090	58946	163.06	94866	174.48	94911	182.63	94956	182.63
3/4	3/4	1 1/2	4	.125	58947	163.06	94867	174.48	94912	182.63	94957	182.63
1	1	1 1/2	4	.020	58949	301.43	94869	322.53	94914	337.60	94959	337.60
1	1	1 1/2	4	.030	58950	301.43	94870	322.53	94915	337.60	94960	337.60
1	1	1 1/2	4	.060	58952	301.43	94872	322.53	94917	337.60	94962	337.60
1	1	1 1/2	4	.090	58953	301.43	94873	322.53	94918	337.60	94963	337.60
1	1	1 1/2	4	.125	58954	301.43	94874	322.53	94919	337.60	94964	337.60

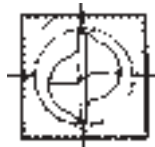
(continued)

Solid Carbide Corner Radius Single End Mills (continued)

List No. 5968 – 4-Flute

DIA.	SHANK DIA.	LOC	OAL	CORNER RADIUS	UNCOATED		TIN COATED		TiCN COATED		TiAlN COATED	
					EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	1/2	1 1/2	.020	59000	\$15.10	94965	\$16.16	95010	\$16.91	95055	\$16.91
3/16	3/16	5/8	2	.020	59003	19.80	94968	21.18	95013	22.17	95058	22.17
3/16	3/16	5/8	2	.030	59004	19.80	94969	21.18	95014	22.17	95059	22.17
1/4	1/4	3/4	2 1/2	.020	59006	24.49	94971	26.20	95016	27.43	95061	27.43
1/4	1/4	3/4	2 1/2	.030	59007	24.49	94972	26.20	95017	27.43	95062	27.43
5/16	5/16	13/16	2 1/2	.020	59010	31.43	94975	33.63	95020	35.20	95065	35.20
5/16	5/16	13/16	2 1/2	.030	59011	31.43	94976	33.63	95021	35.20	95066	35.20
3/8	3/8	1	2 1/2	.020	59014	39.39	94979	42.14	95024	44.11	95069	44.11
3/8	3/8	1	2 1/2	.030	59015	39.39	94980	42.14	95025	44.11	95070	44.11
1/2	1/2	1	3	.020	59019	68.57	94984	73.37	95029	76.80	95074	76.80
1/2	1/2	1	3	.030	59020	68.57	94985	73.37	95030	76.80	95075	76.80
1/2	1/2	1	3	.060	59022	68.57	94987	73.37	95032	76.80	95077	76.80
5/8	5/8	1 1/4	3 1/2	.020	59026	114.69	94991	122.72	95036	128.46	95081	128.46
5/8	5/8	1 1/4	3 1/2	.030	59027	114.69	94992	122.72	95037	128.46	95082	128.46
5/8	5/8	1 1/4	3 1/2	.060	59029	114.69	94994	122.72	95039	128.46	95084	128.46
5/8	5/8	1 1/4	3 1/2	.090	59030	114.69	94995	122.72	95040	128.46	95085	128.46
3/4	3/4	1 1/2	4	.020	59032	163.06	94997	174.48	95042	182.63	95087	182.63
3/4	3/4	1 1/2	4	.030	59033	163.06	94998	174.48	95043	182.63	95088	182.63
3/4	3/4	1 1/2	4	.060	59035	163.06	95000	174.48	95045	182.63	95090	182.63
3/4	3/4	1 1/2	4	.090	59036	163.06	95001	174.48	95046	182.63	95091	182.63
3/4	3/4	1 1/2	4	.125	59037	163.06	95002	174.48	95047	182.63	95092	182.63
1	1	1 1/2	4	.020	59039	301.43	95004	322.53	95049	337.60	95094	337.60
1	1	1 1/2	4	.030	59040	301.43	95005	322.53	95050	337.60	95095	337.60
1	1	1 1/2	4	.060	59042	301.43	95007	322.53	95052	337.60	95097	337.60
1	1	1 1/2	4	.090	59043	301.43	95008	322.53	95053	337.60	95098	337.60
1	1	1 1/2	4	.125	59044	301.43	95009	322.53	95054	337.60	95099	337.60

CARBIDE DRILL-MILL™



Micrograin Carbide

DRILL-MILL performs drilling, spotting, countersinking, chamfering, slotting, side milling, profile milling, "V" grooving and other drilling & milling operations with the same tool in vertical milling machine applications.

TOLERANCE +.000 - .002

List No. 5989

90° Point Angle

2-Flute

30° Right Hand Helix

STANDARD PACKAGE All sizes — 1 each

DIA.	SHANK DIA.	LOC*	OAL*	UNCOATED		TIN COATED		TiCN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/8	1/8	1/2	1 1/2	59060	\$16.94	95300	\$20.69	95320	\$20.69	95340	\$20.69
1/8**	1/8	1/2	1 1/2	59061	16.94	95301	20.69	95321	20.69	95341	20.69
3/16	3/16	5/8	2	59062	23.88	95302	27.59	95322	27.59	95342	27.59
3/16**	3/16	5/8	2	59063	23.88	95303	27.59	95323	27.59	95343	27.59
1/4	1/4	3/4	2 1/2	59064	29.84	95304	38.16	95324	38.16	95344	38.16
1/4**	1/4	3/4	2 1/2	59065	29.84	95305	38.16	95325	38.16	95345	38.16
5/16	5/16	13/16	2 1/2	59066	37.02	95306	46.98	95326	46.98	95346	46.98
5/16**	5/16	13/16	2 1/2	59067	37.02	95307	46.98	95327	46.98	95347	46.98
3/8	3/8	1	2 1/2	59068	46.53	95308	56.49	95328	56.49	95348	56.49
3/8**	3/8	1	2 1/2	59069	46.53	95309	56.49	95329	56.49	95349	56.49
7/16	7/16	1	2 3/4	59070	62.94	95310	74.20	95330	74.20	95350	74.20
1/2	1/2	1	3	59071	77.14	95311	88.41	95331	88.41	95351	88.41
1/2**	1/2	1	3	59072	77.14	95312	88.41	95332	88.41	95352	88.41
5/8	5/8	1 1/4	3 1/2	59073	147.47	95313	164.86	95333	164.86	95353	164.86
5/8**	5/8	1 1/4	3 1/2	59074	147.47	95314	164.86	95334	164.86	95354	164.86
3/4	3/4	1 1/2	4	59075	217.02	95315	245.43	95335	245.43	95355	245.43

* Lengths include the 90° conical cutting point

** Features sharper point with a .005"/.008" tip diameter for "V" grooving where a sharper point is required. (Standard carbide Drill-Mills supplied with tip diameter of .030" or larger to provide strength.)

Solid Carbide 3-Flute 60° High Helix Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

3-Flute end mills are a compromise between the chip capacity of 2-Flute mills and the strength and wear resistance of 4-Flute mills. 60° High Helix angle keeps the cutting edges constantly engaged in the workpiece reducing cutting load variations. The result is a clean efficient cutting action with decreased cutting resistance, enhanced chip control, excellent surface finish and long tool life. Recommended for difficult-to-machine materials including stainless steels, alloy steels, titanium, inconel and other materials that generate high cutting forces. Center Cutting end allows for plunge cutting like a drill into solid material.



List No. 5945

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. Tool Coatings further enhance milling performance in a wide range of applications.

TOLERANCES

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

STANDARD PACKAGE

All sizes – 1 each

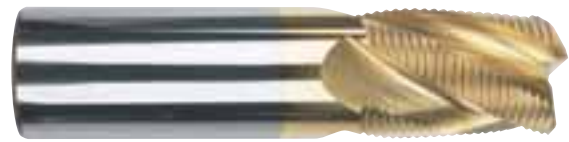
DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED		TiN COATED		TiCN COATED		TiAlN COATED	
				EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/4	1/4	3/4	2 1/2	57677	\$38.69	90640	\$43.47	90648	\$45.87	90656	\$47.60
5/16	5/16	13/16	2 1/2	57678	46.51	90641	53.49	90649	57.00	90657	59.54
3/8	3/8	7/8	2 1/2	57679	81.55	90642	88.53	90650	92.04	90658	94.58
7/16	7/16	1	2 3/4	57680	97.90	90643	106.64	90651	111.00	90659	114.21
1/2	1/2	1	3	57681	97.90	90644	106.64	90652	111.00	90660	114.21
5/8	5/8	1 1/4	3 1/2	57682	170.62	90645	183.07	90653	189.31	90661	193.86
3/4	3/4	1 1/2	4	57683	250.13	90646	265.44	90654	273.11	90662	278.70
1	1	1 1/2	4	57684	463.06	90647	484.94	90655	495.88	90663	503.90

Solid Carbide Multi-Flute Roughing End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. Recommended for a wide range of materials including mild steel, steel alloys, stainless steel, cast iron and many other applications. Center Cutting end allows for plunge cutting like a drill into solid material.

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. Tool Coatings further enhance milling performance in a wide range of applications.



List No. 5972G — TiN Coated



List No. 5972C — TiCN Coated

STANDARD PACKAGE

All sizes – 1 each

DIA.	SHANK DIA.	L.O.C.	OAL	NO. OF FLUTES	5972G TiN EDP NO.	LIST PRICE	5972C TiCN EDP NO.	LIST PRICE
1/4	1/4	3/4	2 1/2	4	56760	\$75.08	56780	\$77.45
5/16	5/16	13/16	2 1/2	4	56761	85.05	56781	88.04
3/8	3/8	7/8	2 1/2	4	56762	93.85	56782	96.84
7/16	7/16	1	3	4	56763	110.64	56783	115.43
1/2	1/2	1	3	4	56764	128.22	56784	133.01
5/8	5/8	1 1/4	3 1/2	4	56765	221.49	56785	228.97
3/4	3/4	1 1/2	4	4	56766	289.54	56786	298.07
1	1	1 1/2	4	4	56767	456.13	56787	471.03

OmegaCut Ultra™ Solid Carbide – TiALN Coated 2-Flute Single End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
30° Helix Angle

STANDARD PACKAGE All sizes — 1 each



List No. 5980

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
3/16	.1875	3/16	5/8	2	56202*	25.93
5/16	.3125	5/16	19/16	2 1/2	56204*	45.49
5/8	.6250	5/8	1 1/4	3 1/2	56207*	150.55
3/4	.7500	3/4	1 1/2	4	56208*	212.75
1	1.0000	1	1 1/2	4	56209*	357.80

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	1/8	3/4	2 1/4	56210*	\$30.55
3/16	.1875	3/16	3/4	2 1/2	56211*	32.53
1/4	.2500	1/4	1 1/8	3	56212*	41.54
5/16	.3125	5/16	1 1/8	3	56213*	60.00
3/8	.3750	3/8	1 1/8	3	56214*	64.40
1/2	.5000	1/2	2	4	56215*	113.19
5/8	.6250	5/8	2 1/4	5	56216*	233.63
3/4	.7500	3/4	2 1/4	5	56217*	330.33
1	1.0000	1	2 1/4	5	56218*	458.68

* Available While Supplies Last

OmegaCut Ultra™ Solid Carbide – TiALN Coated 4-Flute Single End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
30° Helix Angle

STANDARD PACKAGE All sizes — 1 each



List No. 5981

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/16	.0625	1/8	3/16	1 1/2	56219*	\$23.08
1/8	.1250	1/8	1/2	1 1/2	56220*	23.08
1/4	.2500	1/4	3/4	2 1/2	56222*	31.43
3/8	.3750	3/8	1	2 1/2	56224*	53.85
5/8	.6250	5/8	1 1/4	3 1/2	56226*	150.55
3/4	.7500	3/4	1 1/2	4	56227*	212.75
1	1.0000	1	1 1/2	4	56228*	357.80

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	1/8	3/4	2 1/4	56229*	\$30.55
3/16	.1875	3/16	3/4	2 1/2	56230*	32.53
1/4	.2500	1/4	1 1/8	3	56231*	41.54
5/16	.3125	5/16	1 1/8	3	56232*	60.00
1/2	.5000	1/2	2	4	56234*	113.19
5/8	.6250	5/8	2 1/4	5	56235*	233.63
3/4	.7500	3/4	2 1/4	5	56236*	330.33

* Available While Supplies Last

OmegaCut Ultra™ Solid Carbide – TiALN Coated 2-Flute Ball Nose Extra Long Length Single End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
30° Helix Angle

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	1/8	5/16	2 3/8	56238*	\$41.10
5/16	.3125	5/16	9/16	4	56241*	81.54
1/2	.5000	1/2	7/8	4 1/4	56243*	143.96
5/8	.6250	5/8	1 1/4	5 1/2	56244*	300.22
3/4	.7500	3/4	1 1/2	6 1/4	56245*	468.35
1	1.0000	1	2	7 1/8	56246*	749.23

* Available While Supplies Last



List No. 5982

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

STANDARD PACKAGE All sizes — 1 each

OmegaCut Ultra™ Solid Carbide – TiALN Coated 4-Flute Ball Nose Extra Long Length Single End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
30° Helix Angle

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
5/16	.3125	5/16	9/16	4	56250*	\$94.07
5/8	.6250	5/8	1 1/4	5 1/2	56253*	338.68
3/4	.7500	3/4	1 1/2	6 1/4	56254*	563.96
1	1.0000	1	2	7 1/8	56255*	902.42

* Available While Supplies Last



List No. 5982

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

STANDARD PACKAGE All sizes — 1 each

OmegaCut Ultra™ Solid Carbide – TiALN Coated Multi-Flute High Helix Single End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
45° Helix Angle

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
¼	.2500	¼	½	2¼	6	56256*	\$61.98
⅝	.3125	⅝	¾	2½	6	56257*	78.46

* Available While Supplies Last



List No. 5983

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

STANDARD PACKAGE All sizes — 1 each

OmegaCut Rough™ Solid Carbide – TiALN Coated Multi-Flute Roughing End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
20° Helix Angle

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
⅝	.3125	⅝	¾	2½	3	56263*	\$88.06
¾	.7500	¾	1⅝	4	4	56267*	298.06
1	1.0000	1	1¾	4	5	56268*	471.03

* Available While Supplies Last



List No. 5984

OmegaCut Rough high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

STANDARD PACKAGE All sizes — 1 each

TOOL COATING SERVICE

Morse Cutting tools now offers a variety of tool coatings for enhanced cutting performance and increased tool life. Please inquire.

TiN — Titanium Carbide

TiCN — Titanium Carbonitride

TiALN — Titanium Aluminum Nitride

CrN — Chromium Nitride

Solid Carbide End Mill

Speed and Feed Recommendations

MATERIAL	SPEED (SFM)	FEED PER TOOTH BY END MILL DIA.				
		1/8"	1/4"	1/2"	3/4"	1"
Aluminum and Aluminum Alloys	600-1200	.0005	.0020	.0040	.0060	.0080
Copper and Copper Alloys	350-850	.0010	.0020	.0030	.0040	.0060
Brass and Bronze	250-400	.0010	.0020	.0030	.0040	.0050
Graphite	500-800	.0020	.0030	.0040	.0050	.0070
Plastics	600-1100	.0020	.0030	.0060	.0100	.0150
Plastics, Glass Filled	300-800	.0020	.0030	.0040	.0060	.0120
Iron, Cast (Soft)	250-450	.0010	.0020	.0030	.0060	.0080
Iron, Cast (Hard)	100-250	.0004	.0008	.0020	.0030	.0040
Iron, Ductile	80-400	.0005	.0010	.0020	.0040	.0060
Iron, Malleable	150-500	.0005	.0010	.0030	.0050	.0070
Steel, Low Carbon	200-400	.0005	.0010	.0030	.0050	.0070
Steel, Medium Carbon	100-250	.0006	.0015	.0020	.0040	.0050
Steel, Hardened to 35 Rc	130-230	.0005	.0010	.0015	.0020	.0030
Steel, Hardened to 50 Rc	70-130	.0003	.0007	.0010	.0020	.0030
Steel, Hardened to 60 Rc	30-70	.0002	.0005	.0010	.0015	.0020
Steel, Mold	200-350	.0005	.0010	.0020	.0030	.0040
Steel, Tool	100-250	.0005	.0010	.0020	.0030	.0040
Stainless Steel, Soft	250-400	.0005	.0010	.0020	.0040	.0060
Stainless Steel, Hard	150-200	.0002	.0005	.0010	.0030	.0050
Magnesium and Magnesium Alloys	800-1300	.0010	.0020	.0040	.0060	.0100
Monel and High-Nickel Steel	75-175	.0005	.0010	.0020	.0030	.0040
Titanium, Soft	125-300	.0005	.0010	.0020	.0040	.0060
Titanium, Hard	50-150	.0003	.0005	.0010	.0020	.0040
Nickel-Based High-Temp Alloys	50-100	.0004	.0008	.0010	.0015	.0020
Cobalt-Based Alloys	20-80	.0005	.0008	.0010	.0015	.0020
Refractory Alloys	80-300	.0005	.0010	.0010	.0015	.0020

The speeds and feeds shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions.

In general: Use lower speeds for hard or abrasive materials and heavier cuts. Use lower feeds for slotting cuts, smaller cutter diameters and better finishes. Use higher speeds for softer materials, lighter cuts, small cutter diameters and better finishes. Use higher feeds for easy-to-machine materials, lighter cuts and abrasive materials.

For slotting applications, reduce speed 20% from the low end of the speed recommendations.

For lighter radial depths of cut, use the higher end of the speed recommendations. For greater radial depths of cut, use the lower end of the speed recommendations.

For long and extra-long end mills, reduce feed per tooth by 50%.

For TiN coated tools, increase speed by 20% with the feed rate unchanged. For TiCN coated tools, start at the high end of the speed recommendations with the feed rate unchanged. For TiAlN coated tools, increase speed by 50% with the feed rate unchanged.

Three Coatings Now in Stock!



TiN—Titanium Nitride (gold in color)

Is an excellent general-purpose coating that is ideal for a wide range of applications. TiN offers:

- Increased hardness
- Excellent wear resistance
- High lubricity
- Improved surface finish
- Thermal stability
- Reduced edge build-up
- Higher speeds and feeds
- Longer tool life

Applications: TiN is a good general coating for carbon steels, high-tensile steels and stainless steels.



TiAlN—Titanium Aluminum Nitride (violet in color)

Is recommended for high thermal stress applications including:

- Dry machining
- Abrasive materials
- Hard-to-machine materials which generate higher cutting temperatures

TiAlN actually forms a hard aluminum oxide layer in hot dry machining applications. This reflects heat back into the chip and away from the tool for longer tool life. TiAlN allows for higher speeds and feeds.

Applications: High-strength steels, hard die steels and high-temperature alloys, including nickel-based classes.



TiCN—Titanium Carbonitride (blue-gray in color)

Has the same lubricity as TiN but is 30% harder for increased wear resistance and toughness. TiCN is excellent for:

- Maximizing tool life in long production runs
- Operating at aggressive speeds and feeds
- Cutting extremely abrasive or difficult-to-machine materials
- High-shock applications

Applications: Excellent for cast irons, high silicon aluminum alloys, copper and all abrasive materials. Because of TiCN's low oxidation temperature, coolant must be applied to control the temperature at the cutting edge.