

End Mills

Micrograin Solid Carbide – Uncoated & TiAlN Coated – 4 Flute – Center Cut

Regular Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated
				Code	Code					Code	Code
1/32	1/8	3/32	1-1/2	932957	933186	5/16	5/16	13/16	2-1/2	933011	933240
3/64	1/8	1/8	1-1/2	932960	933189	21/64	3/8	7/8	2-1/2	933014	933243
1/16	1/8	3/16	1-1/2	932963	933192	11/32	3/8	7/8	2-1/2	933017	933246
5/64	1/8	3/16	1-1/2	932966	933195	23/64	3/8	7/8	2-1/2	933020	933249
3/32	1/8	3/8	1-1/2	932969	933198	3/8	3/8	7/8	2-1/2	933023	933252
7/64	1/8	3/8	1-1/2	932972	933201	25/64	7/16	1	2-3/4	933026	933255
1/8	1/8	1/2	1-1/2	932975	933204	13/32	7/16	1	2-3/4	933029	933258
9/64	3/16	9/16	2	932978	933207	27/64	7/16	1	2-3/4	933032	933261
5/32	3/16	9/16	2	932981	933210	7/16	7/16	1	2-3/4	933035	933264
11/64	3/16	5/8	2	932984	933213	29/64	1/2	1	3	933038	933267
3/16	3/16	5/8	2	932987	933216	15/32	1/2	1	3	933041	933270
13/64	1/4	5/8	2-1/2	932990	933219	31/64	1/2	1	3	933044	933273
7/32	1/4	5/8	2-1/2	932993	933222	1/2	1/2	1	3	933047	933276
15/64	1/4	3/4	2-1/2	932996	933225	9/16	9/16	1-1/4	3	933050	933279
1/4	1/4	3/4	2-1/2	932999	933228	5/8	5/8	1-1/4	3-1/2	933053	933282
17/64	5/16	3/4	2-1/2	933002	933231	11/16	3/4	1-1/2	4	933056	933285
9/32	5/16	3/4	2-1/2	933005	933234	3/4	3/4	1-1/2	4	933059	933288
19/64	5/16	13/16	2-1/2	933008	933237	7/8	7/8	1-1/2	4	933062	933291
						1	1	1-1/2	4	933065	933294

Metric – Regular Length



Cutter Diameter (mm)	Shank Diameter (mm)	Length of Cut (mm)	Overall Length (mm)	Uncoated
				Code
1.0	3.0	4.0	38.0	934373
1.5	3.0	4.5	38.0	934376
2.0	3.0	6.0	38.0	934379
2.5	3.0	8.0	38.0	934382
3.0	3.0	10.0	38.0	934385
3.5	4.0	12.0	50.0	934388
4.0	4.0	12.0	50.0	934391
4.5	5.0	14.0	50.0	934394
5.0	5.0	15.0	50.0	934397
6.0	6.0	18.0	63.0	934400
7.0	8.0	20.0	63.0	934403
8.0	8.0	20.0	63.0	934406
9.0	10.0	22.0	63.0	934409
10.0	10.0	22.0	63.0	934412
11.0	12.0	25.0	75.0	934415
12.0	12.0	25.0	75.0	934418
14.0	14.0	25.0	75.0	934421
16.0	16.0	32.0	90.0	934424
18.0	18.0	32.0	100.0	934427
20.0	20.0	38.0	100.0	934430
22.0	22.0	38.0	102.0	934433
25.0	25.0	38.0	100.0	934436

Stub Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated
				Code
1/32	1/8	5/64	1-1/2	932070
3/64	1/8	3/32	1-1/2	932073
1/16	1/8	1/8	1-1/2	932076
5/64	1/8	5/32	1-1/2	932079
3/32	1/8	3/16	1-1/2	932082
7/64	1/8	7/32	1-1/2	932085
1/8	1/8	1/4	1-1/2	932088
9/64	3/16	9/32	2	932091
5/32	3/16	5/16	2	932094
11/64	3/16	5/16	2	932097
3/16	3/16	3/8	2	932100
13/64	1/4	3/8	2	932103
7/32	1/4	7/16	2	932106
15/64	1/4	7/16	2	932109
1/4	1/4	1/2	2	932112
5/16	5/16	1/2	2	932115
3/8	3/8	5/8	2	932118
7/16	7/16	5/8	2-1/2	932121
1/2	1/2	5/8	2-1/2	932124
5/8	5/8	3/4	3	932127
3/4	3/4	1	3	932130

End Mills



Micrograin Solid Carbide – Uncoated & TiAlN-Futura Coated – 4 Flute – Center Cut



- Suitable for cutting hardened and high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics

Tolerance: 0/-0.0012

Long Length



Extra Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN-Futura Coated	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN-Futura Coated
				Code	Code					Code	Code
1/8	1/8	3/4	2-1/4	932892	934580	1/8	1/8	1	3	932744	934620
3/16	3/16	3/4	2-1/4	932895	934900	3/16	3/16	1-1/8	3	932747	934911
1/4	1/4	1-1/8	3	932898	934582	1/4	1/4	1-1/2	4	932750	934622
5/16	5/16	1-1/8	3	932901	934583	5/16	5/16	1-5/8	4	932753	934623
3/8	3/8	1-1/8	3	932904	934901	3/8	3/8	1-3/4	4	932756	934912
7/16	7/16	2	4	932907	934585	7/16	7/16	3	6	932759	934625
1/2	1/2	2	4	932910	934586	1/2	1/2	3	6	932762	934626
5/8	5/8	2-1/4	5	932913	934902	5/8	5/8	3	6	932765	934913
3/4	3/4	2-1/4	5	932916	934588	3/4	3/4	3	6	932768	934628
1	1	2-1/4	5	932919	934589	1	1	3	6	932771	934629

End Mills

Micrograin Solid Carbide – Uncoated & TiAlN Coated – 4 Flute – Ball Nose

Regular Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated
				Code	Code					Code	Code
1/32	1/8	3/32	1-1/2	933422	933658	11/32	3/8	7/8	2-1/2	933482	933718
3/64	1/8	1/8	1-1/2	933425	933661	23/64	3/8	7/8	2-1/2	933485	933721
1/16	1/8	3/16	1-1/2	933428	933664	3/8	3/8	7/8	2-1/2	933488	933724
5/64	1/8	3/16	1-1/2	933431	933667	25/64	7/16	1	2-3/4	933491	933727
3/32	1/8	3/8	1-1/2	933434	933670	13/32	7/16	1	2-3/4	933494	933730
7/64	1/8	3/8	1-1/2	933437	933673	27/64	7/16	1	2-3/4	933497	933733
1/8	1/8	1/2	1-1/2	933440	933676	7/16	7/16	1	2-3/4	933500	933736
9/64	3/16	9/16	2	933443	933679	29/64	1/2	1	3	933503	933739
5/32	3/16	9/16	2	933446	933682	15/32	1/2	1	3	933506	933742
11/64	3/16	5/8	2	933449	933685	31/64	1/2	1	3	933509	933745
3/16	3/16	5/8	2	933452	933688	1/2	1/2	1	3	933512	933748
13/64	1/4	5/8	2-1/2	933455	933691	9/16	9/16	1-1/4	3	933515	933751
7/32	1/4	5/8	2-1/2	933458	933694	5/8	5/8	1-1/4	3-1/2	933518	933754
15/64	1/4	3/4	2-1/2	933461	933697	11/16	3/4	1-1/2	4	933521	933757
1/4	1/4	3/4	2-1/2	933464	933700	3/4	3/4	1-1/2	4	933524	933760
17/64	5/16	3/4	2-1/2	933467	933703	7/8	7/8	1-1/2	4	933527	933763
9/32	5/16	3/4	2-1/2	933470	933706	1	1	1-1/2	4	933530	933766
19/64	5/16	13/16	2-1/2	933473	933709						
5/16	5/16	13/16	2-1/2	933476	933712						
21/64	3/8	7/8	2-1/2	933479	933715						

End Mills

Micrograin Solid Carbide – Uncoated – 4 Flute – Ball Nose (continued)

Metric – Regular Length



Stub Length



Cutter Diameter (mm)	Shank Diameter (mm)	Length of Cut (mm)	Overall Length (mm)	Uncoated	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated
				Code					Code
1.0	3.0	4.0	38.0	934519	1/32	1/8	5/64	1-1/2	932210
1.5	3.0	4.5	38.0	934521	3/64	1/8	3/32	1-1/2	932213
2.0	3.0	6.0	38.0	934523	1/16	1/8	1/8	1-1/2	932216
2.5	3.0	8.0	38.0	934525	5/64	1/8	5/32	1-1/2	932219
3.0	3.0	10.0	38.0	934527	3/32	1/8	3/16	1-1/2	932222
3.5	4.0	12.0	50.0	934529	7/64	1/8	7/32	1-1/2	932225
4.0	4.0	12.0	50.0	934531	1/8	1/8	1/4	1-1/2	932228
4.5	5.0	14.0	50.0	934533	9/64	3/16	9/32	2	932231
5.0	5.0	15.0	50.0	934535	5/32	3/16	5/16	2	932234
6.0	6.0	18.0	63.0	934537	11/64	3/16	5/16	2	932237
7.0	8.0	20.0	63.0	934539	3/16	3/16	3/8	2	932240
8.0	8.0	20.0	63.0	934541	13/64	1/4	3/8	2	932243
9.0	10.0	22.0	63.0	934543	7/32	1/4	7/16	2	932246
10.0	10.0	22.0	63.0	934545	15/64	1/4	7/16	2	932249
11.0	12.0	25.0	75.0	934547	1/4	1/4	1/2	2	932252
12.0	12.0	25.0	75.0	934549	5/16	5/16	1/2	2	932255
14.0	14.0	25.0	75.0	934551	3/8	3/8	5/8	2	932258
16.0	16.0	32.0	90.0	934553	7/16	7/16	5/8	2-1/2	932261
18.0	18.0	32.0	100.0	934555	1/2	1/2	5/8	2-1/2	932264
20.0	20.0	38.0	100.0	934557	5/8	5/8	3/4	3	932267
25.0	25.0	38.0	100.0	934561	3/4	3/4	1	3	932270

End Mills



Micrograin Solid Carbide – Uncoated & TiAlN-Futura Coated – 4 Flute – Ball Nose



- Suitable for cutting hardened and high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics

Tolerance: 0/-0.0012

Long Length



Extra Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN-Futura Coated	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated
				Code	Code					Code
1/8	1/8	3/4	2-1/4	932670	934600	1/8	1/8	1	3	932818
3/16	3/16	3/4	2-1/4	932673	934601	3/16	3/16	1-1/8	3	932821
1/4	1/4	1-1/8	3	932676	934907	1/4	1/4	1-1/2	4	932824
5/16	5/16	1-1/8	3	932679	934603	5/16	5/16	1-5/8	4	932827
3/8	3/8	1-1/8	3	932682	934604	3/8	3/8	1-3/4	4	932830
7/16	7/16	2	4	932685	934605	7/16	7/16	3	6	932833
1/2	1/2	2	4	932688	934606	1/2	1/2	3	6	932836
5/8	5/8	2-1/4	5	932691	934607	5/8	5/8	3	6	932839
3/4	3/4	2-1/4	5	932694	934608	3/4	3/4	3	6	932842
1	1	2-1/4	5	932697	934609	1	1	3	6	932845

Roughers

Solid Carbide – Uncoated & TiAlN Coated – 4 Flute – Center Cut



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated
				Code	Code
1/4	1/4	3/4	2-1/2	934584	934615
5/16	5/16	3/4	2-1/2	934587	934618
3/8	3/8	7/8	2-1/2	934590	934621
1/2	1/2	1	3	934593	934624

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated
				Code	Code
5/8	5/8	1-1/4	3-1/2	934596	934627
3/4	3/4	1-1/2	4	934599	934630
1	1	1-3/4	4	934602	934633

End Mills

Micrograin Solid Carbide – Uncoated & TiAlN Coated – 2 Flute – Center Cut

TITANIUM ALUMINUM NITRIDE (TiAlN): A titanium based PVD coating having a high content of aluminum. About 30% harder than TiN, this coating provides a unique ability to work well in extremely high temperatures as it has the highest oxidation threshold temperature of any coating available today for solid round tools. TiAlN coated tools run extremely well in dry milling applications, potentially saving the user significant dollars from reduced coolant costs and related environmental issues.

TiAlN coated end mills produce excellent results in:

- Stainless steels
- Hardened materials
- Titanium alloys
- Cast irons
- Dry milling applications
- Applications with interrupted cutting
- High speed machining applications (HSM)

Regular Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated
				Code	Code
1/32	1/8	5/64	1-1/2	932920	933075
3/64	1/8	7/64	1-1/2	932921	933078
1/16	1/8	3/16	1-1/2	932922	933081
5/64	1/8	3/16	1-1/2	932923	933084
3/32	1/8	3/8	1-1/2	932924	933087
7/64	1/8	3/8	1-1/2	932925	933090
1/8	1/8	1/2	1-1/2	932926	933093
9/64	3/16	1/2	2	932927	933096
5/32	3/16	9/16	2	932928	933099
11/64	3/16	5/8	2	932929	933102
3/16	3/16	5/8	2	932930	933105
13/64	1/4	5/8	2-1/2	932931	933108
7/32	1/4	5/8	2-1/2	932932	933111
15/64	1/4	3/4	2-1/2	932933	933114
1/4	1/4	3/4	2-1/2	932934	933117
17/64	5/16	3/4	2-1/2	932935	933120
9/32	5/16	3/4	2-1/2	932936	933123
19/64	5/16	13/16	2-1/2	932937	933126

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated
				Code	Code
5/16	5/16	13/16	2-1/2	932938	933129
21/64	3/8	7/8	2-1/2	932939	933132
11/32	3/8	7/8	2-1/2	932940	933135
23/64	3/8	7/8	2-1/2	932941	933138
3/8	3/8	1	2-1/2	932942	933141
25/64	7/16	1	2-3/4	932943	933144
13/32	7/16	1	2-3/4	932944	933147
27/64	7/16	1	2-3/4	932945	933150
7/16	7/16	1	2-3/4	932946	933153
29/64	1/2	1	3	932947	933156
15/32	1/2	1	3	932948	933159
31/64	1/2	1	3	932949	933162
1/2	1/2	1	3	932950	933165
9/16	9/16	1-1/4	3	932951	933168
5/8	5/8	1-1/4	3-1/2	932952	933171
11/16	3/4	1-1/2	4	932953	933174
3/4	3/4	1-1/2	4	932954	933177
7/8	7/8	1-1/2	4	932955	933180
1	1	1-1/2	4	932956	933183

End Mills

Micrograin Solid Carbide – Uncoated & TiAlN Coated – 2 Flute – Center Cut (continued)

Metric – Regular Length



Stub Length



Cutter Diameter (mm)	Shank Diameter (mm)	Length of Cut (mm)	Overall Length (mm)	Uncoated	
				Code	
1.0	3.0	4.0	38.0	934300	
1.5	3.0	4.5	38.0	934303	
2.0	3.0	6.0	38.0	934306	
2.5	3.0	8.0	38.0	934309	
3.0	3.0	10.0	38.0	934312	
3.5	4.0	12.0	50.0	934315	
4.0	4.0	12.0	50.0	934318	
4.5	5.0	14.0	50.0	934321	
5.0	5.0	15.0	50.0	934324	
6.0	6.0	18.0	63.0	934327	
7.0	8.0	20.0	63.0	934330	
8.0	8.0	20.0	63.0	934333	
9.0	10.0	22.0	63.0	934336	
10.0	10.0	22.0	63.0	934339	
11.0	12.0	25.0	75.0	934342	
12.0	12.0	25.0	75.0	934345	
14.0	14.0	25.0	75.0	934348	
16.0	16.0	32.0	90.0	934351	
18.0	18.0	32.0	100.0	934354	
20.0	20.0	38.0	100.0	934357	
22.0	22.0	38.0	102.0	934360	
25.0	25.0	38.0	100.0	934363	

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	
				Code	
1/32	1/8	5/64	1-1/2	932000	
3/64	1/8	3/32	1-1/2	932003	
1/16	1/8	1/8	1-1/2	932006	
5/64	1/8	5/32	1-1/2	932009	
3/32	1/8	3/16	1-1/2	932012	
7/64	1/8	7/32	1-1/2	932015	
1/8	1/8	1/4	1-1/2	932018	
9/64	3/16	9/32	2	932021	
5/32	3/16	5/16	2	932024	
11/64	3/16	5/16	2	932027	
3/16	3/16	3/8	2	932030	
13/64	1/4	3/8	2	932033	
7/32	1/4	7/16	2	932036	
15/64	1/4	7/16	2	932039	
1/4	1/4	1/2	2	932042	
5/16	5/16	1/2	2	932045	
3/8	3/8	5/8	2	932048	
7/16	7/16	5/8	2-1/2	932051	
1/2	1/2	5/8	2-1/2	932054	
5/8	5/8	3/4	3	932057	
3/4	3/4	1	3	932060	

End Mills



Micrograin Solid Carbide – Uncoated & TiAlN-Futura Coated – 2 Flute – Center Cut



- Suitable for cutting hardened and high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics

Tolerance: 0/-0.0012

Long Length



Extra Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated		TiAlN-Futura Coated	
				Code		Code	
1/8	1/8	3/4	2-1/4	932855		934570	
3/16	3/16	3/4	2-1/4	932858		934571	
1/4	1/4	1-1/8	3	932861		934572	
5/16	5/16	1-1/8	3	932864		934573	
3/8	3/8	1-1/8	3	932867		934574	
7/16	7/16	2	4	932870		934575	
1/2	1/2	2	4	932873		934576	
5/8	5/8	2-1/4	5	932876		934577	
3/4	3/4	2-1/4	5	932879		934578	
1	1	2-1/4	5	932882		934579	

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated		TiAlN-Futura Coated	
				Code		Code	
1/8	1/8	1	3	932707		934610	
3/16	3/16	1-1/8	3	932710		934611	
1/4	1/4	1-1/2	4	932713		934908	
5/16	5/16	1-5/8	4	932716		934613	
3/8	3/8	1-3/4	4	932719		934614	
7/16	7/16	3	6	932722		934909	
1/2	1/2	3	6	932725		934616	
5/8	5/8	3	6	932728		934617	
3/4	3/4	3	6	932731		934910	
1	1	3	6	932734		934619	

End Mills

Micrograin Solid Carbide – Uncoated & TiAlN Coated – 2 Flute – Ball Nose

Regular Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN Coated
				Code	Code					Code	Code
1/32	1/8	3/32	1-1/2	933304	933540	5/16	5/16	13/16	2-1/2	933358	933594
3/64	1/8	1/8	1-1/2	933307	933543	21/64	3/8	7/8	2-1/2	933361	933597
1/16	1/8	3/16	1-1/2	933310	933546	11/32	3/8	7/8	2-1/2	933364	933600
5/64	1/8	3/16	1-1/2	933313	933549	23/64	3/8	7/8	2-1/2	933367	933603
3/32	1/8	3/8	1-1/2	933316	933552	3/8	3/8	7/8	2-1/2	933370	933606
7/64	1/8	3/8	1-1/2	933319	933555	25/64	7/16	1	2-3/4	933373	933609
1/8	1/8	1/2	1-1/2	933322	933558	13/32	7/16	1	2-3/4	933376	933612
9/64	3/16	9/16	2	933325	933561	27/64	7/16	1	2-3/4	933379	933615
5/32	3/16	9/16	2	933328	933564	7/16	7/16	1	2-3/4	933382	933618
11/64	3/16	5/8	2	933331	933567	29/64	1/2	1	3	933385	933621
3/16	3/16	5/8	2	933334	933570	15/32	1/2	1	3	933388	933624
13/64	1/4	5/8	2-1/2	933337	933573	31/64	1/2	1	3	933391	933627
7/32	1/4	5/8	2-1/2	933340	933576	1/2	1/2	1	3	933394	933630
15/64	1/4	3/4	2-1/2	933343	933579	9/16	9/16	1-1/4	3	933397	933633
1/4	1/4	3/4	2-1/2	933346	933582	5/8	5/8	1-1/4	3-1/2	933400	933636
17/64	5/16	3/4	2-1/2	933349	933585	11/16	3/4	1-1/2	4	933403	933639
9/32	5/16	3/4	2-1/2	933352	933588	3/4	3/4	1-1/2	4	933406	933642
19/64	5/16	13/16	2-1/2	933355	933591	7/8	7/8	1-1/2	4	933409	933645
						1	1	1-1/2	4	933412	933648

Metric – Regular Length



Cutter Diameter (mm)	Shank Diameter (mm)	Length of Cut (mm)	Overall Length (mm)	Uncoated
				Code
1.0	3.0	4.0	38.0	934446
1.5	3.0	4.5	38.0	934449
2.0	3.0	6.0	38.0	934452
2.5	3.0	8.0	38.0	934455
3.0	3.0	10.0	38.0	934458
3.5	4.0	12.0	50.0	934461
4.0	4.0	12.0	50.0	934464
4.5	5.0	14.0	50.0	934467
5.0	5.0	15.0	50.0	934470
6.0	6.0	18.0	63.0	934473
7.0	8.0	20.0	63.0	934476
8.0	8.0	20.0	63.0	934479
9.0	10.0	22.0	63.0	934482
10.0	10.0	22.0	63.0	934485
11.0	12.0	25.0	75.0	934488
12.0	12.0	25.0	75.0	934491
14.0	14.0	25.0	75.0	934494
16.0	16.0	32.0	90.0	934497
18.0	18.0	32.0	100.0	934500
20.0	20.0	38.0	100.0	934503
22.0	22.0	38.0	102.0	934506
25.0	25.0	38.0	100.0	934509

Stub Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated
				Code
1/32	1/8	5/64	1-1/2	932140
3/64	1/8	3/32	1-1/2	932143
1/16	1/8	1/8	1-1/2	932146
5/64	1/8	5/32	1-1/2	932149
3/32	1/8	3/16	1-1/2	932152
7/64	1/8	7/32	1-1/2	932155
1/8	1/8	1/4	1-1/2	932158
9/64	3/16	9/32	2	932161
5/32	3/16	5/16	2	932164
11/64	3/16	5/16	2	932167
3/16	3/16	3/8	2	932170
13/64	1/4	3/8	2	932173
7/32	1/4	7/16	2	932176
15/64	1/4	7/16	2	932179
1/4	1/4	1/2	2	932182
5/16	5/16	1/2	2	932185
3/8	3/8	5/8	2	932188
7/16	7/16	5/8	2-1/2	932191
1/2	1/2	5/8	2-1/2	932194
5/8	5/8	3/4	3	932197
3/4	3/4	1	3	932200

End Mills



Micrograin Solid Carbide – Uncoated & TiAlN-Futura Coated – 2 Flute – Ball Nose



- Suitable for cutting hardened and high alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics

Tolerance: 0/-0.0012

Long Length



Extra Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN-Futura Coated
				Code	Code
1/8	1/8	3/4	2-1/4	932633	934903
3/16	3/16	3/4	2-1/4	932636	934591
1/4	1/4	1-1/8	3	932639	934592
5/16	5/16	1-1/8	3	932642	—
3/8	3/8	1-1/8	3	932645	934594
7/16	7/16	2	4	932648	934595
1/2	1/2	2	4	932651	934905
5/8	5/8	2-1/4	5	932654	934597
3/4	3/4	2-1/4	5	932657	934598
1	1	2-1/4	5	932660	934906

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN-Futura Coated
				Code	Code
1/8	1/8	1	3	932781	934914
3/16	3/16	1-1/8	3	932784	934631
3/16	3/16	1	4	—	935426
1/4	1/4	1-1/2	4	932787	934632
1/4	1/4	1-1/2	6	—	935417
5/16	5/16	1-5/8	4	932790	934915
3/8	3/8	1-3/4	4	932793	934634
3/8	3/8	1-1/2	6	—	935420
7/16	7/16	3	6	932796	934635
1/2	1/2	1-1/2	6	—	935423
1/2	1/2	3	6	932799	934636
5/8	5/8	3	6	932802	934637
3/4	3/4	3	6	932805	934638
1	1	3	6	932808	934639

End Mills



Micrograin Solid Carbide – Uncoated & TiAlN-Futura Coated – 3 & 5 Flute – 45° Helix



Tolerance: 0/-0.0012

3 Flute – Regular Length



- Designed to machine stainless steel, inconel, titanium and other hard to machine materials
- The 3 flute design gives high stability and allows good chip removal in plunging and slotting operations
- The normal rake angle and 45° medium helix allows an extremely wide range of application

5 Flute – Regular Length



- Designed to machine stainless steels, inconels, and other alloys
- 5 flute and 45° medium helix allow harmonic balance and smooth cutting

Cutter Diameter (Inch)	Shank Diameter (Inch)	Shank Style	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN-Futura Coated
					Code	Code
1/8	1/8	Plain	3/8	1-1/2	935237	935864
3/16	3/16	Plain	9/16	2	935240	935867
1/4	1/4	Plain	3/4	2-1/2	935243	935870
5/16	5/16	Plain	13/16	2-1/2	935246	935873
3/8	3/8	Weldon	7/8	2-1/2	935249	935876
1/2	1/2	Weldon	1	3	935252	935879
9/16	9/16	Weldon	1-1/4	3-1/2	935255	935882
5/8	5/8	Weldon	1-1/4	3-1/2	935258	935885
3/4	3/4	Weldon	1-1/2	4	935261	935888
1	1	Weldon	1-1/2	4	935264	935891

Cutter Diameter (Inch)	Shank Diameter (Inch)	Shank Style	Length of Cut (Inch)	Overall Length (Inch)	Uncoated	TiAlN-Futura Coated
					Code	Code
1/8	1/8	Plain	1/2	1-1/2	935081	935708
5/32	3/16	Plain	9/16	2	935084	935711
3/16	3/16	Plain	9/16	2	935087	935714
7/32	1/4	Plain	3/4	2-1/2	935090	935717
1/4	1/4	Plain	3/4	2-1/2	935093	935720
5/16	5/16	Plain	13/16	2-1/2	935096	935723
3/8	3/8	Plain	1	2-1/2	935099	935726
7/16	7/16	Plain	1	2-3/4	935102	935729
1/2	1/2	Plain	1-1/4	3	935105	935732
5/8	5/8	Plain	1-5/8	3-1/2	935108	935735
3/4	3/4	Plain	1-5/8	4	935111	935738
7/8	7/8	Plain	2	4	935114	935741
1	1	Plain	2	4	935117	935744

Carbide End Mills – General Purpose

Speeds, Feeds & Technical Information – Uncoated & TiAlN Coated

Speeds & Feeds

Material	Inch							Metric						
	Speed (SFM)		Feed (Inches per Tooth)					Speed (SFM)		Feed (Inches per Tooth)				
	Uncoated	TiAlN	1/8	1/4	1/2	3/4	1	Uncoated	TiAlN	3.0	6.0	12.0	19.0	25.0
Aluminum	300-400	500-600	.0007	.0020	.0040	.0060	.0080	91-122	152-183	.0178	.0508	.1016	.1524	.2032
Aluminum Alloys	300-400	500-600	.0007	.0020	.0040	.0060	.0080	91-122	152-183	.0178	.0508	.1016	.1524	.2032
Brass and Bronze	225-275	400-600	.0010	.0020	.0030	.0040	.0050	69-84	122-183	.0254	.0508	.0762	.1016	.1270
Copper	275-350	350-450	.0010	.0010	.0020	.0040	.0060	84-107	107-137	.0254	.0254	.0508	.1016	.1524
Copper Alloys	275-350	350-450	.0010	.0010	.0020	.0040	.0060	84-107	107-137	.0254	.0254	.0508	.1016	.1524
Graphite	350-500	600-1000	.0015	.0025	.0035	.0050	.0070	107-152	183-305	.0381	.0635	.0889	.1270	.1778
Plastics	400-500	600-900	.0015	.0030	.0060	.0100	.0150	122-152	183-274	.0381	.0762	.1524	.2540	.3810
Magnesium	350-500	600-1000	.0010	.0020	.0040	.0060	.0100	107-152	183-305	.0254	.0508	.1016	.1524	.2540
Magnesium Alloys	350-500	600-1000	.0010	.0020	.0040	.0060	.0100	107-152	183-305	.0254	.0508	.1016	.1524	.2540
Cast Iron Grey	200-200	400-500	.0010	.0020	.0030	.0045	.0060	61-91	122-152	.0254	.0508	.0762	.1143	.1524
Cast Iron Ductile	200-250	275-400	.0004	.0008	.0020	.0035	.0045	61-76	84-122	.0102	.0203	.0508	.0889	.1143
Cast Iron Malleable	150-225	275-350	.0003	.0005	.0015	.0025	.0035	46-69	84-107	.0076	.0127	.0381	.0635	.0889
Steel-Low Carbon	225-275	275-400	.0010	.0020	.0030	.0045	.0060	69-84	84-122	.0254	.0508	.0762	.1143	.1524
Steel-Medium Carbon	175-225	250-325	.0006	.0012	.0025	.0040	.0050	53-69	76-99	.0152	.0305	.0635	.1016	.1270
Tool Steels (<38 RC)	175-225	250-325	.0006	.0012	.0025	.0040	.0050	53-69	76-99	.0152	.0305	.0635	.1016	.1270
Tool Steels (38-50 RC)	100-150	200-300	.0004	.0008	.0020	.0030	.0040	30-46	61-99	.0102	.0203	.0508	.0762	.1016
Tool Steels (>50 RC)	25-50	35-70	.0003	.0006	.0015	.0020	.0030	7-15	11-21	.0076	.0152	.0381	.0508	.0762
Stainless Steel 300 series	150-250	225-325	.0003	.0010	.0020	.0035	.0045	46-76	69-99	.0076	.0254	.0508	.0889	.1143
Stainless Steel 400 series	125-225	225-300	.0004	.0008	.0015	.0025	.0030	38-69	69-91	.0102	.0203	.0381	.0635	.0762
Stainless Steel PH series	60-90	100-225	.0003	.0007	.0015	.0025	.0030	18-27	30-69	.0076	.0178	.0381	.0635	.0762
Titanium	50-90	150-200	.0003	.0007	.0015	.0020	.0030	15-27	46-61	.0076	.0178	.0381	.0508	.0762
High Temp Alloys	25-50	50-80	.0002	.0005	.0008	.0013	.0016	7-15	15-24	.0051	.0127	.0203	.0330	.0406

NOTE: Speeds listed are starting parameters

General Recommendations for Speeds & Feeds

Lower Speeds are used for...	Higher Speeds are used for...	Less Feed is used for...	More Feed is used for...
Hard Materials	Soft Materials	Frail cutters	Lighter cuts
Abrasive Materials	Better Finishes	Better finishes	Abrasive materials
Sandy Castings	Small diameter cutters	Deep slotting cuts	Scaly surface conditions
Heavy Cuts	lighter cuts	Long chip materials	Excessive land wear
High Nickel Content	frail setups	Cutting edge chipping	Chatter problems
Excessive land wear	excessive chipping		Easy to machine materials

Troubleshooting

Condition	Causes	Solution
Tool deflection or uneven widths of cut	Tool size	Always select the largest diameter possible for the cut to be made
Poor surface finish	Number of flutes on tool Rigidity of setup Depth of cut	Increase the number of flutes Make a secure and rigid setup Take a lighter cut at a higher speed
Tool breakage	Setup Loose or worn toolholders Tool extension	End Mills should be mounted as true to the spindle as possible Replace loose or worn toolholders Keep overhang to a minimum
Tool Life	Heat End mill style Improper speeds and feeds	Use a coated tool Use tooling designed for specific materials and applications Increase the number of flutes Lighten the chip load Use proper speeds and feeds for tool style and material

End Mills



Cobalt M42 – 4 Flute – Center Cut – Weldon Shanks



Tolerance: +0.0010/0

Regular Length – Inch

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/8	3/8	3/8	2-5/16	930260
5/32	3/8	1/2	2-3/8	930265
3/16	3/8	1/2	2-3/8	930270
7/32	3/8	5/8	2-7/16	930275
1/4	3/8	5/8	2-7/16	930280
9/32	3/8	3/4	2-1/2	930285
5/16	3/8	3/4	2-1/2	930290
11/32	3/8	3/4	2-1/2	930295
3/8	3/8	3/4	2-1/2	930300
13/32	3/8	1	2-11/16	930305
7/16	3/8	1	2-11/16	930310
15/32	3/8	1	2-11/16	930311
1/2	1/2	1-1/4	3-1/4	930315
9/16	1/2	1-3/8	3-3/8	930320
5/8	5/8	1-5/8	3-3/4	930325
11/16	5/8	1-5/8	3-3/4	930326
3/4	3/4	1-5/8	3-7/8	930330
13/16	3/4	1-7/8	4-1/8	930331
7/8	3/4	1-7/8	4-1/8	930335
7/8	7/8	1-7/8	4-1/8	930340
15/16	3/4	1-7/8	4-1/8	930341
1	3/4	1-7/8	4-1/8	930345
1	1	2	4-1/2	930350
1-1/8	1	2	4-1/2	930355

Long Length – Inch



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	1-1/4	3-1/16	930375
5/16	3/8	1-3/8	3-1/8	930380
3/8	3/8	1-1/2	3-1/4	930385
7/16	1/2	1-3/4	3-3/4	930386
1/2	1/2	2	4	930390
5/8	5/8	2-1/2	4-5/8	930395
3/4	3/4	3	5-1/4	930400
7/8	7/8	3-1/2	5-3/4	930405
1	1	4	6-1/2	930410

Extra Long Length – Inch



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	1-3/4	3-9/16	930420
3/8	3/8	2-1/2	4-1/4	930425
1/2	1/2	3	5	930430
5/8	5/8	4	6-1/8	930435
3/4	3/4	4	6-1/4	930440
1	1	6	8-1/2	930445
1-1/4	1-1/4	6	8-1/2	930450

Regular Length – Metric

- Standard regular length in metric diameter
- End mills with center cutting are recommended for a wide range of cutting jobs, including slotting, shallow pocketing and tracer milling

Cutter Diameter (mm)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
12.5	1/2	1-1/4	3-1/4	931826
36	1	2	4-1/2	931828
40	1-1/4	2	4-1/2	931830
45	1-1/4	2	4-1/2	931832

Tolerance: k10

Cutter Diameter (mm)	Shank Diameter (mm)	Length of Cut (mm)	Overall Length (mm)	Code
2.0	6.0	7.0	51.0	931300
2.5	6.0	8.0	52.0	931301
3.0	6.0	8.0	52.0	931302
3.5	6.0	10.0	54.0	931303
4.0	6.0	11.0	55.0	931304
4.5	6.0	11.0	55.0	931305
5.0	6.0	13.0	57.0	931306
5.5	6.0	13.0	57.0	931307
6.0	6.0	13.0	57.0	931308
6.5	10.0	16.0	66.0	931309
7.0	10.0	16.0	66.0	931310
7.5	10.0	16.0	69.0	931311
8.0	10.0	19.0	69.0	931312
8.5	10.0	19.0	69.0	931313
9.0	10.0	19.0	69.0	931314
9.5	10.0	19.0	69.0	931315
10.0	10.0	22.0	72.0	931316
11.0	12.0	22.0	79.0	931317
12.0	12.0	26.0	83.0	931318
13.0	12.0	26.0	83.0	931319
14.0	12.0	26.0	83.0	931320
15.0	12.0	26.0	83.0	931321
16.0	16.0	32.0	92.0	931322
17.0	16.0	32.0	92.0	931323
18.0	16.0	32.0	92.0	931324
19.0	16.0	32.0	92.0	931325
20.0	20.0	38.0	104.0	931326

End Mills



Cobalt M42 – Ball Nose – Weldon Shanks

4 Flute – Regular Length



2 Flute – Regular Length



Tolerance: +0.0010/0

- Designed for milling of radius bottom slots, fillets and special contours
- The end teeth are cut to center allowing these end mills to drill into material at the beginning of a slotting cut
- 2 flute design provides good chip removal ability in slotting

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/8	3/8	3/8	2-5/16	930455
3/16	3/8	1/2	2-3/8	930460
1/4	3/8	5/8	2-7/16	930465
5/16	3/8	3/4	2-1/2	930470
3/8	3/8	3/4	2-1/2	930475
1/2	1/2	1-1/4	3-1/4	930480
5/8	5/8	1-5/8	3-3/4	930485
3/4	3/4	1-5/8	3-7/8	930490
1	1	2	4-1/2	930495

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/8	3/8	3/8	2-5/16	930180
3/16	3/8	1/2	2-3/8	930185
1/4	3/8	5/8	2-7/16	930190
5/16	3/8	3/4	2-1/2	930195
3/8	3/8	3/4	2-1/2	930200
7/16	1/2	1	3	931668
1/2	1/2	1	3	930205
9/16	1/2	1-1/8	3-1/8	931670
5/8	1/2	1-1/8	3-1/8	931684
5/8	5/8	1-3/8	3-3/8	930210
3/4	1/2	1-5/16	3-5/16	931686
3/4	3/4	1-5/8	3-7/8	930215
7/8	3/4	2	4-1/4	931696
7/8	7/8	2	4-1/4	931672
1	3/4	2-1/4	4-1/2	931698
1	1	2-1/4	4-3/4	930220
1-1/8	3/4	1-5/8	3-7/8	931688
1-1/8	1	2-1/4	4-3/4	931674
1-1/4	3/4	1-5/8	3-7/8	931690
1-1/4	1-1/4	2-1/2	5	931676
1-3/8	3/4	1-5/8	4-1/8	931692
1-3/8	1-1/4	2-1/2	5	931678
1-1/2	3/4	1-5/8	4-1/8	931694
1-1/2	1-1/4	2-1/2	5	931680
2	1-1/4	2-1/2	5	931682

4 Flute – Long Length



Tolerance: +0.0010/0

- Longer flute length suitable for high efficient copying process and deep cutting of die mold corner radius

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	1-1/4	3-1/16	931600
5/16	3/8	1-3/8	3-1/8	931602
3/8	3/8	1-1/2	3-1/4	931604
1/2	1/2	2	4	931606
5/8	5/8	2-1/2	4-5/8	931608
3/4	3/4	3	5-1/4	931610
7/8	7/8	3-1/2	5-3/4	931612
1	1	4	6-1/2	931614

End Mills

Cobalt M42 – 2 Flute – 3 Inch Cutting Length – Center Cut – Weldon Shanks



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/2	1/2	3	5	930155
5/8	5/8	3	5-1/8	930160
3/4	3/4	3	5-1/4	930165
1	1	3	5-1/2	930170
1-1/4	1-1/4	3	5-1/2	930175
1-3/8	1	3	5-1/2	930176

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1-1/2	1-1/4	3	5-1/2	930177
1-5/8	1-1/4	3	5-1/2	930178
1-3/4	1-1/4	3	5-1/2	930179
1-7/8	1-1/4	3	5-1/2	930173
2	1-1/4	3	5-1/2	930174



End Mills

Cobalt M42 – 2 Flute – Center Cut – Weldon Shanks



Regular Length – Inch

Regular Length – Metric

Cutting Tolerance: e8

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/8	3/8	3/8	2-5/16	930000
5/32	3/8	7/16	2-5/16	930005
3/16	3/8	7/16	2-5/16	930010
7/32	3/8	1/2	2-5/16	930015
1/4	3/8	1/2	2-5/16	930020
9/32	3/8	9/16	2-5/16	930025
5/16	3/8	9/16	2-5/16	930030
11/32	3/8	9/16	2-5/16	930035
3/8	3/8	9/16	2-5/16	930040
13/32	3/8	13/16	2-1/2	930045
7/16	3/8	13/16	2-1/2	930050
15/32	3/8	13/16	2-1/2	930051
1/2	1/2	1	3	930055
9/16	1/2	1-1/8	3-1/8	930060
5/8	5/8	1-5/16	3-7/16	930065
11/16	5/8	1-5/16	3-7/16	930070
3/4	3/4	1-5/16	3-9/16	930075
13/16	3/4	1-1/2	3-3/4	930080
7/8	3/4	1-1/2	3-3/4	930085
7/8	7/8	1-1/2	3-3/4	930090
15/16	3/4	1-1/2	3-3/4	930091
1	3/4	1-1/2	3-3/4	930095
1	1	1-5/8	4-1/8	930100
1-1/16	3/4	1-5/8	3-7/8	930101
1-1/8	1	1-5/8	4-1/8	930102
1-3/16	3/4	1-5/8	3-7/8	930103
1-1/4	1-1/4	1-5/8	4-1/8	930105
1-5/16	3/4	1-5/8	3-7/8	930106
1-3/8	1	1-5/8	4-1/8	930107
1-1/2	1-1/4	1-5/8	4-1/8	930110
1-5/8	1-1/4	1-5/8	4-1/8	930111
1-3/4	1-1/4	1-5/8	4-1/8	930112
1-7/8	1-1/4	1-5/8	4-1/8	930113
2	1-1/4	1-5/8	4-1/8	930115

Cutter Diameter (mm)	Shank Diameter (mm)	Length of Cut (mm)	Overall Length (mm)	Code
2.0	6.0	4.0	48.0	931250
2.5	6.0	5.0	49.0	931251
3.0	6.0	5.0	49.0	931252
3.5	6.0	6.0	50.0	931253
4.0	6.0	7.0	51.0	931254
4.5	6.0	7.0	51.0	931255
5.0	6.0	8.0	52.0	931256
5.5	6.0	8.0	52.0	931257
6.0	6.0	8.0	52.0	931258
6.5	10.0	10.0	60.0	931259
7.0	10.0	10.0	60.0	931260
7.5	10.0	10.0	60.0	931261
8.0	10.0	11.0	61.0	931262
8.5	10.0	11.0	61.0	931263
9.0	10.0	11.0	61.0	931264
9.5	10.0	11.0	61.0	931265
10.0	10.0	13.0	63.0	931266
11.0	12.0	13.0	70.0	931267
12.0	12.0	16.0	73.0	931268
13.0	12.0	16.0	73.0	931269
14.0	12.0	16.0	73.0	931270
15.0	12.0	16.0	73.0	931271
16.0	16.0	19.0	79.0	931272
17.0	16.0	19.0	79.0	931273
18.0	16.0	19.0	79.0	931274
19.0	16.0	19.0	79.0	931275
20.0	20.0	22.0	88.0	931276
22.0	20.0	22.0	88.0	931277
24.0	25.0	26.0	102.0	931278
25.0	25.0	26.0	102.0	931279
28.0	25.0	26.0	102.0	931280
30.0	25.0	26.0	102.0	931281
32.0	32.0	32.0	112.0	931282
*36.0	1"	50.0	112.0	931820
*40.0	1-1/4"	50.0	112.0	931822
*45.0	1-1/4"	32.0	112.0	931824

*Inch shank

Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	1	3-1/16	930120
5/16	3/8	1-1/2	3-1/4	930125
3/8	3/8	1-1/2	3-1/4	930130
1/2	1/2	2	4	930135
5/8	5/8	2	4-1/8	930140
3/4	3/4	2-1/4	4-1/2	930145

Extended Length



Tolerance: +0.0010/0

- Provided with the longest flute length and suitable for high accuracy machining of deep step

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	5/8	3-1/16	931700
5/16	3/8	3/4	3-5/16	931702
3/8	3/8	3/4	3-5/16	931704
1/2	1/2	1	4	931706
5/8	5/8	1-3/8	4-5/8	931708
3/4	3/4	1-5/8	5-3/8	931710



Throw Away Cutters

Cobalt M42 – 3 Flute – Center Cut – Weldon Shanks



Stub Length



Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/16	1/4	3/32	31/32	313164
3/32	1/4	5/32	1-1/64	313165
1/8	1/4	3/16	1-3/32	313166
5/32	1/4	1/4	1-9/32	313167
3/16	1/4	9/32	1-11/32	313168
7/32	1/4	5/16	1-13/32	313169
1/4	1/4	3/8	1-13/32	313170

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/16	1/4	5/32	1-3/32	313171
3/32	1/4	1/4	1-1/4	313172
1/8	1/4	5/16	1-11/32	313173
5/32	1/4	3/8	1-17/32	313174
3/16	1/4	7/16	1-21/32	313175
7/32	1/4	1/2	1-3/4	313176
1/4	1/4	5/8	1-3/4	313177

Throw Away Cutters

Metric – Cobalt M42 – 3 Flute – Center Cut – Weldon Shanks

Regular Length

Cutter Diameter (mm)	Shank Diameter (Inch)	Length of Cut (mm)	Overall Length (mm)	Code
1.5	1/4	2.5	24.5	313178
2.0	1/4	3.0	25.5	313179
2.5	1/4	4.0	26.0	313180
3.0	1/4	4.5	28.0	313181
3.5	1/4	5.5	30.0	313182
4.0	1/4	6.5	32.5	313183
5.0	1/4	7.5	36.0	313184
6.0	1/4	9.5	36.0	313185

Long Length

Cutter Diameter (mm)	Shank Diameter (Inch)	Length of Cut (mm)	Overall Length (mm)	Code
1.5	1/4	4.0	28.0	313186
2.0	1/4	4.5	29.0	313187
2.5	1/4	6.5	32.0	313188
3.0	1/4	7.5	34.0	313189
3.5	1/4	8.5	36.5	313190
4.0	1/4	9.5	39.0	313191
5.0	1/4	12.5	44.5	313192
6.0	1/4	16.0	44.5	313193

End Mills

Cobalt M42 – 6 Flute – Center Cut – Weldon Shanks

Regular Length – Inch

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1-1/16	3/4	1-1/2	3-7/8	930351
1-3/16	3/4	2	4-1/4	930356
1-1/4	1-1/4	2	4-1/2	930360
1-5/16	3/4	2	4-3/8	930361
1-3/8	1	2	4-1/2	930362
1-1/2	1-1/4	2	4-1/2	930365
1-5/8	1-1/4	2	4-1/2	930366
1-3/4	1-1/4	2	4-1/2	930367
1-7/8	1-1/4	2	4-3/8	930368
2	1-1/4	2	4-1/2	930370

Long Length – Inch

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1-1/16	3/4	2	4-1/4	930411
1-1/8	1	4	6-1/2	930412
1-1/4	1-1/4	4	6-1/2	930415
1-1/2	1-1/4	4	6-1/2	930416
1-3/4	1-1/4	4	6-1/2	930417



End Mills

Cobalt M42 – 6 Flute – Center Cut – Weldon Shanks



Regular Length – Metric

Cutting Tolerance: k10

Cutter Diameter (mm)	Shank Diameter (mm)	Length of Cut (mm)	Overall Length (mm)	Code
22.0	20.0	38.0	104.0	931327
24.0	25.0	45.0	121.0	931328
25.0	25.0	45.0	121.0	931329
28.0	25.0	45.0	121.0	931331
30.0	25.0	45.0	121.0	931332
32.0	32.0	53.0	133.0	931333

Long Length – Inch



Tolerance: +0.0010/0

- Longer flute length allows deeper cutting

Extra Long Length – Inch



Tolerance: +0.0010/0

- Longest flute length suitable for high accuracy machining of deep step

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/2	1/2	2	4	931740
5/8	5/8	2-1/2	4-5/8	931742
3/4	3/4	3	5-1/4	931744
7/8	7/8	3-1/2	5-3/4	931746
1	1	4	6-1/2	931748
1-1/4	1-1/4	4	6-1/2	930415
1-1/2	1-1/4	4	6-1/2	930416
2	1-1/4	4	6-1/2	931756
2	2	4	7-3/4	931754
2	2	6	9-3/4	931758

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/2	1/2	3	5	931782
5/8	5/8	4	6-1/8	931784
3/4	3/4	4	6-1/4	931786
7/8	7/8	5	7-1/4	931788
1	1	6	8-1/2	931790
1-1/2	1-1/4	8	10-1/2	931792
2	2	8	11-3/4	931794

Roughers



Cobalt M42 – Coarse Pitch – Non-Center Cut – Weldon Shanks

Regular Length – Uncoated & TiAlN Futura Coated



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Cobalt	TiAlN-Futura Coated
					Code	Code
1/4	3/8	5/8	2-7/16	3	930530	930531
5/16	3/8	3/4	2-1/2	3	930535	930536
3/8	3/8	3/4	2-1/2	4	930540	930541
7/16	3/8	1	2-11/16	4	930545	930546
1/2	1/2	1-1/4	3-1/4	4	930550	930551
9/16	1/2	1-3/8	3-3/8	4	930555	930556
5/8	5/8	1-5/8	3-3/4	4	930560	930561
11/16	5/8	1-5/8	3-3/4	4	930565	930566
3/4	3/4	1-5/8	3-3/4	4	930570	930571
7/8	3/4	1-7/8	4-1/8	5	930575	930576
1	1	2	4-1/2	5	930580	930581
1-1/8	1	2	4-1/2	6	930585	930586
1-1/4	1-1/4	2	4-1/2	6	930590	930591
1-1/2	1-1/4	2	4-1/2	6	930595	930596
1-3/4	1-1/4	2	4-1/2	6	930597	-
2	1-1/4	2	4-1/2	8	930600	930601
2	2	2	5-3/4	8	930605	930606
2	2	3	6-3/4	8	930610	930611
2	2	4	7-3/4	8	930615	930616

Cobalt M42 – Fine Pitch – Non-Center Cut – Weldon Shanks

Regular Length – Uncoated & TiAlN Futura Coated



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Cobalt	TiAlN-Futura Coated
					Code	Code
1/4	3/8	5/8	2-7/16	3	930620	930621
5/16	3/8	3/4	2-1/2	3	930625	930626
3/8	3/8	3/4	2-1/2	4	930630	930631
7/16	3/8	1	2-11/16	4	930635	930636
1/2	1/2	1-1/4	3-1/4	4	930640	930641
5/8	5/8	1-5/8	3-3/4	4	930645	930646
3/4	3/4	1-5/8	3-3/4	4	930650	930651
7/8	3/4	1-7/8	4-1/8	5	930653	-
1	1	2	4-1/2	5	930655	930656
1-1/8	1	2	4-1/2	6	930658	-
1-1/4	1-1/4	2	4-1/2	6	930660	930661
1-1/2	1-1/4	2	4-1/2	6	930665	930666
2	1-1/4	2	4-1/2	8	930670	930671

Roughers

Cobalt M42 – Coarse Pitch – Non-Center Cut – Weldon Shanks

Long & Extra Long Length – Uncoated & TiAlN Coated



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Cobalt	TiAlN Coated
					Code	Code
1/4	3/8	1-3/8	3-1/8	3	930687	–
5/16	3/8	1-3/8	3-1/8	3	930688	–
3/8	3/8	1-5/8	3-3/16	4	930689	–
1/2	1/2	2	4	4	930690	930691
1/2	1/2	3	5	4	930695	930696
5/8	5/8	2-1/2	4-5/8	4	930700	930701
5/8	5/8	3-1/8	5-1/4	4	930705	930706
3/4	3/4	3	5-1/4	4	930710	930711
7/8	7/8	3-1/2	5-5/8	5	930715	930716
1	1	4	6-1/2	5	930720	930721
1	1	6	8-1/2	5	930725	930726
1-1/4	1-1/4	4	6-1/2	6	930735	930731
1-1/4	1-1/4	6	8-1/2	6	–	930736
1-1/2	1-1/4	4	6-1/2	6	930740	930741
1-3/4	1-1/4	4	6-1/2	6	930742	–
2	1-1/4	4	6-1/2	8	930745	930746
2	2	8	11-3/4	8	930750	930751

Cobalt M42 – Fine Pitch – Non-Center Cut – Weldon Shanks

Long & Extra Long Length – Uncoated & TiAlN Coated



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Cobalt	TiAlN-Futura Coated
					Code	Code
5/16	3/8	1-3/8	3-1/8	3	930753	–
3/8	3/8	1-5/8	3-3/16	4	930754	–
1/2	1/2	2	4	4	930755	930756
5/8	5/8	2-1/2	4-5/8	4	930780	930781
3/4	3/4	3	5-1/4	4	930805	930806
7/8	7/8	3-1/2	5-5/8	5	930830	930831
1	1	4	6-1/2	5	930835	930836
1-1/4	1-1/4	4	6-1/2	6	930840	930841
1-1/2	1-1/4	4	6-1/2	6	930845	930846

Roughers



Cobalt M42 – For Aluminum – Coarse Pitch – Center Cut – 37° Helix – Weldon Shanks

3 Flute – Regular Length



3 Flute – Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	5/8	2-7/16	930955
5/16	3/8	3/4	2-1/2	930960
3/8	3/8	3/4	2-1/2	930965
1/2	1/2	1-1/4	3-1/4	930970
5/8	5/8	1-5/8	3-3/4	930975
3/4	3/4	1-5/8	3-7/8	930980
1	1	2	4-1/2	930985
1-1/4	1-1/4	2	4-1/2	930990

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/2	1/2	2	4	930995
5/8	5/8	2-1/2	4-5/8	931000
3/4	3/4	3	5-1/4	931005
1	1	4	6-1/2	931010
1-1/4	1-1/4	4	6-1/2	931015
1-1/2	1-1/4	4	6-1/2	931020

Finishers

Cobalt M42 – For Aluminum – Center Cut – 45° Hi-Helix – Weldon Shanks

3 Flute – Regular Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	5/8	2-7/16	931145
5/16	3/8	3/4	2-1/2	931150
3/8	3/8	3/4	2-1/2	931155
1/2	1/2	1-1/4	3-1/4	931160
5/8	5/8	1-5/8	3-3/4	931165
3/4	3/4	1-5/8	3-7/8	931170
1	1	2	4-1/2	931180

Roughers



Cobalt M42 – Coarse Pitch – Center Cut – Weldon Shanks

Regular Length – Uncoated & TiAIN-Futura Coated



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Cobalt	TiAIN-Futura Coated
					Code	Code
1/2	1/2	1-1/4	3-1/4	4	930850	930851
5/8	5/8	1-5/8	3-3/4	4	930855	930856
3/4	3/4	1-5/8	3-3/4	4	930860	930861
1	1	2	4-1/2	5	930865	930866
1-1/4	1-1/4	2	4-1/2	6	930870	930871
1-1/2	1-1/4	2	4-1/2	6	930875	930876

Roughers

Cobalt M42 – Coarse Pitch – Center Cut – Weldon Shanks

Long Length – Uncoated & TiAlN Coated



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Cobalt	TiAlN Coated
					Code	Code
1/2	1/2	2	4	4	930880	930881
5/8	5/8	2-1/2	4-5/8	4	930885	930886
3/4	3/4	3	5-1/4	4	930890	930892
7/8	3/4	3-1/2	5-5/8	5	930891	930893
1	1	4	6-1/2	5	930895	930896

Regular Length – Fine & Coarse Pitch – Center Cut – Weldon Shanks – PMX-TiAlN Coated



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	PMX-TiAlN Coarse Pitch	PMX-TiAlN Fine Pitch
					Code	Code
1/4	3/8	5/8	2-7/16	3	931065	931025
5/16	3/8	3/4	2-1/2	3	931070	931030
3/8	3/8	3/4	2-1/2	4	931075	931035
1/2	1/2	1-1/4	3-1/4	4	931080	931040
5/8	5/8	1-5/8	3-3/4	4	931085	931045
3/4	3/4	1-5/8	3-3/4	4	931090	931050
1	1	2	4-1/2	5	931095	931055
1-1/4	1-1/4	2	4-1/2	6	931100	931060

Finishers

Coarse Pitch – 4 Flute – 30° Helix – Center Cut – Weldon Shanks – PMX-TiAlN Coated



Tolerance: +0.0015"
-0.0000"

- PMX - TiAlN is a powdered metal substrate coated with TiAlN
- The result is an extremely abrasive cutting edge that will allow you to increase speeds and ultimately reduce production time

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	PMX-TiAlN Coarse Pitch
					Code
1/4	3/8	5/8	2-7/16	4	931105
5/16	3/8	3/4	2-1/2	4	931110
3/8	3/8	3/4	2-1/2	4	931115
7/16	3/8	1	2-11/16	4	931120
1/2	1/2	1-1/4	3-1/4	4	931125
5/8	5/8	1-5/8	3-3/4	4	931130
1	1	2	4-1/2	4	931140

PMX = Powdered Metal

PMX-TiAlN End Mills

Work Conditions for Longer End Mill Life

Machining Material			Application Group			Conditions		
Denomination	Tensile Strength N/mm ²		N 7600 N Flutes	NR-F 7644 N Flutes	NR 7640 N Flutes	V _C +TiAlN (SFM)	Feed material group	Cooling E = Emulsion O = Oil D = Dry
	From	To						
Easy Machining Steel	370	660	●	○	●	180/279	1	E
	550	1000	●	●	○	148/246	2/3	E
General Construction Steel	-	600	●	○	●	180/246	2	E
	500	900	●	○	●	148/213	3	E
Unalloyed Case Hardening Steel	-	600	●	○	●	180/246	2	E
Alloyed Case Hardening Steel	500	800	●	○	●	148/213	3	E
Martensitic Stainless Steel	450	950	●	●	●	98/148	5	O
Austenitic Stainless Steel	450	800	○	●	●	98/148	5	O
Heat-Resistant Steel	800	-	○	●	●	49/66	5	O
Nitriding Steel	700	900	●	○	●	115/180	3	E
Tempering Steel	800	1250	●	●	○	66/115	5	O
Soft or Normalized Heat-Treatable Steel	500	750	●	○	●	148/213	2	E
Unalloyed Heat-Treated Heat-Treatable Steel	700	1000	●	●	○	98/148	4	E
	700	1000	●	●	○	98/148	4	E
Alloyed Heat-Treated Heat-Treatable Steel	900	1250	●	●	○	66/115	5	O
	900	1250	●	●	○	66/115	5	O
Alloyed - Heat Treated Tool Steel	900	1250	●	●	○	66/115	5	O
Unalloyed or Alloyed	Brinell Hardness (HB)							
Dead Annealed Tool Steel	180	240	●	○	●	98/148	4	E
High Carbon and/or High-Alloy	Brinell Hardness (HB)							
Dead Annealed Tool Steel	220	300	●	●	○	66/115	5	O

Machining Material			Application Group			Conditions		
Denomination	Brinell Hardness HB		N 7600 N Flutes	NR-F 7644 N Flutes	NR 7640 N Flutes	V _C +TiAlN (SFM)	Feed Material Group	Cooling E = Emulsion O = Oil D = Dry
	From	To						
Cast Iron with Lamellar Graphite	100	240	●	○	●	115/213	2	E/D
	230	320	●	○	●	82/148	4	E/D
Cast Iron with Spheroidal Graphite	100	240	●	○	●	115/213	2	E/D
	230	320	●	○	●	82/148	4	E/D
Malleable Cast Iron	100	270	●	○	●	82/148	2	E/D

Machining Material			Application Group			Conditions		
Denomination	Tensile Strength N/mm ²		N 7600 N Flutes	NR-F 7644 N Flutes	NR 7640 N Flutes	V _C +TiAlN (SFM)	Feed Material Group	Cooling E = Emulsion O = Oil D = Dry
	From	To						
Wrought and Cast Aluminum Alloys Silicon Contents up to 10%	-	180	○	-	○	951/1378	8	E
Cast Aluminum Alloys Silicon Contents up to 10%	150	250	●	-	●	295/558	1	E
Copper	200	400	○	-	○	361/689	1/8	E
Short Chips Brass up to 650	200	550	●	-	○	295/623	2	E
Short Chips Bronze up to 850	250	850	●	-	○	295/623	2	E/O
Long Chips Bronze up to 850	250	500	●	-	○	295/623	2	O
Wrought and Cast Magnesium Alloys	150	300	○	-	○	951/1378	2	D
Medium Strength Titanium Alloys	-	700	●	○	●	98/148	9	O
High Strength Titanium Alloys	600	1100	○	●	○	49/115	10	O

On Long Length End Mills it is recommend to reduce the feed by 50%
When an End Mill is Drilling, a reduction on the feed of 1/2 - 1/3 is recommended

● POSSIBLE APPLICATION ○ VERY SUITABLE

PMX-TiAlN End Mills

Feed per Tooth

MATERIAL GROUP	5/32"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"
1	0,0008	0,0012	0,0014	0,0023	0,0027	0,0045	0,0045	0,0045	0,0045	0,0045	0,0045	0,0045
2	0,0008	0,0012	0,0014	0,0023	0,0027	0,0045	0,0045	0,0045	0,0045	0,0045	0,0045	0,0045
3	0,0008	0,0012	0,0014	0,0023	0,0027	0,0045	0,0045	0,0045	0,0045	0,0045	0,0045	0,0045
4	0,0006	0,0012	0,0014	0,0023	0,0027	0,0045	0,0045	0,0045	0,0045	0,0045	0,0045	0,0045
5	0,0005	0,0010	0,0012	0,0020	0,0020	0,0030	0,0030	0,0030	0,0030	0,0030	0,0030	0,0030
6	0,0010	0,0024	0,0031	0,0036	0,0045	0,0068	0,0068	0,0068	0,0068	0,0068	0,0068	0,0068
7	0,0006	0,0008	0,0011	0,0017	0,0021	0,0032	0,0041	0,0041	0,0041	0,0041	0,0041	0,0041
8	0,0010	0,0017	0,0024	0,0030	0,0036	0,0050	0,0059	0,0059	0,0059	0,0059	0,0059	0,0059
9	0,0010	0,0017	0,0024	0,0030	0,0036	0,0050	0,0059	0,0059	0,0059	0,0059	0,0059	0,0059
10	0,0006	0,0008	0,0011	0,0017	0,0021	0,0032	0,0041	0,0041	0,0041	0,0041	0,0041	0,0041

★ For LONG SERIES End Mills $fz = fz/2$

$$Vc = 0.262 \times d \times \text{RPM}$$

$$\text{RPM} = \frac{Vc}{d \times 0.262}$$

$$Vf = \text{RPM} \times z \times fz \times k$$

Vc = Cutting Speed

d = Diameter of End Mill

z = Number of Teeth

fz = Feed per Tooth

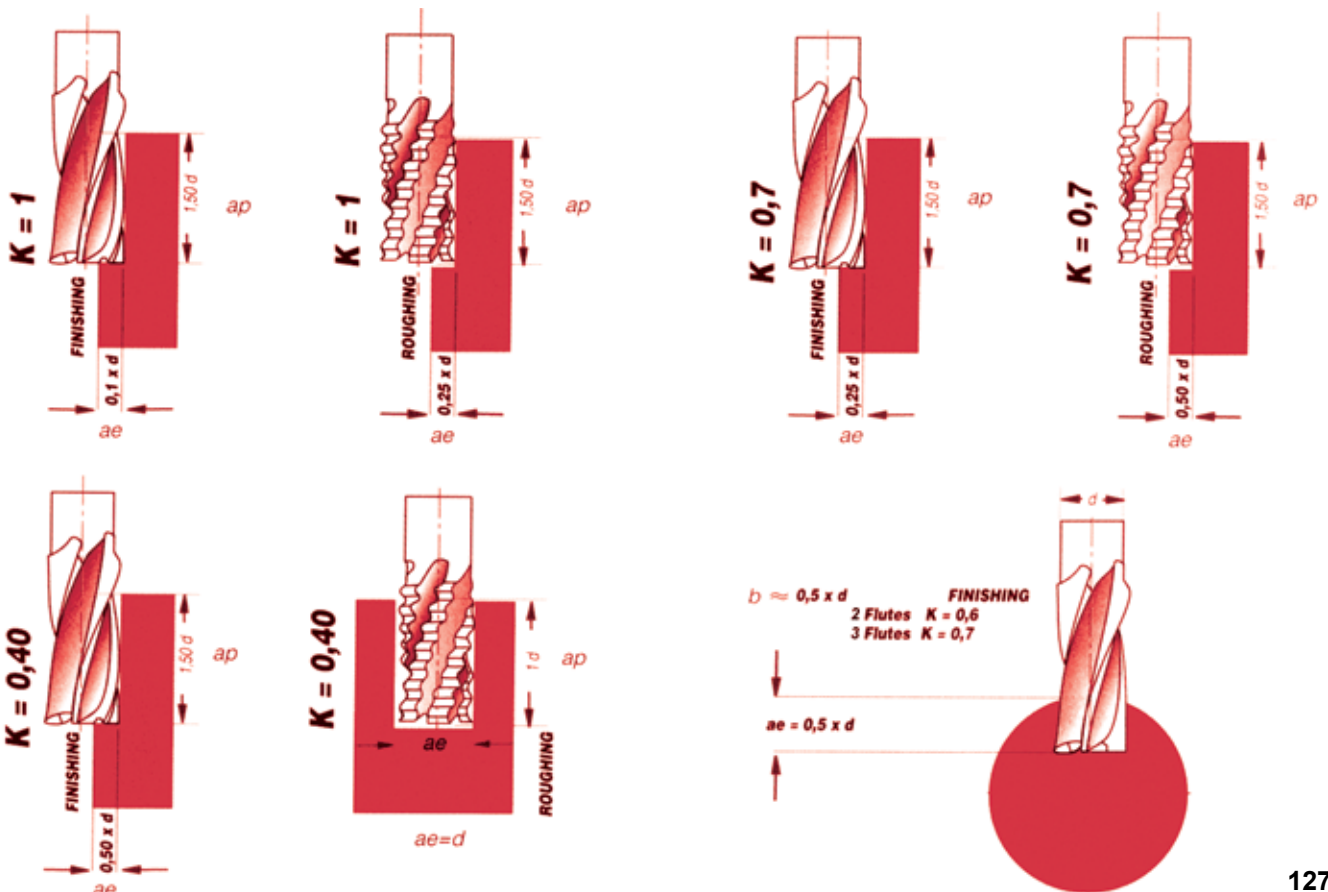
K = Constant to multiply depending on the work conditions

ae = Axis Cut Depth

vf = Feed in inch per minute

Constant (K) Chart

Multiply by K depending on conditions shown



End Mills

High Speed Steel – Multi Flute – Non-Center Cut

Regular Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Code	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Code
1/8	3/8	3/8	2-5/16	4	704000	7/8	5/8	1-7/8	4	6	704024
5/32	3/8	7/16	2-5/16	4	704001	7/8	3/4	1-7/8	4-1/8	4	704025
3/16	3/8	1/2	2-3/8	4	704002	7/8	7/8	1-7/8	4-1/8	4	704026
7/32	3/8	5/8	2-1/4	4	704003	15/16	5/8	1-7/8	4	4	704027
1/4	3/8	5/8	2-1/2	4	704004	15/16	3/4	1-7/8	4-1/8	4	704028
9/32	3/8	11/16	2-1/2	4	704005	1	1/2	1-7/8	3-7/8	4	704029
5/16	3/8	3/4	2-1/2	4	704006	1	5/8	1-7/8	4	4	704030
11/32	3/8	3/4	2-1/2	4	704007	1	3/4	1-7/8	4-1/8	4	704031
3/8	3/8	3/4	2-1/2	4	704008	1	1	2	4-1/2	4	704032
13/32	3/8	1	2-11/16	4	704009	1-1/8	1	2	4-1/2	6	704033
7/16	3/8	1	2-11/16	4	704010	1-1/4	1-1/4	2	4-1/2	4	704034
15/32	3/8	1	2-11/16	4	704011	1-1/4	1	2	4-1/2	6	704035
1/2	3/8	1	2-11/16	4	704012	1-1/4	1-1/4	2	4-1/2	6	704036
1/2	1/2	1-1/4	3-1/4	4	704013	1-3/8	1	2	4-1/2	6	704037
9/16	1/2	1-3/8	3-3/8	4	704014	1-1/2	1	2	4-1/2	6	704038
5/8	1/2	1-3/8	3-3/8	4	704015	1-1/2	1-1/4	2	4-1/2	4	704039
5/8	5/8	1-5/8	3-3/4	4	704016	1-1/2	1-1/4	2	4-1/2	6	704040
11/16	1/2	1-5/8	3-5/8	4	704017	1-5/8	1-1/4	2	4-1/2	6	704041
11/16	5/8	1-5/8	3-3/4	4	704018	1-3/4	1-1/4	2	4-1/2	6	704042
3/4	1/2	1-5/8	3-5/8	4	704019	1-7/8	1-1/4	2	4-1/2	6	704043
3/4	5/8	1-5/8	3-3/4	4	704020	2	1-1/4	2	4-1/2	6	704044
3/4	3/4	1-5/8	3-7/8	4	704021	2	1-1/4	2	4-1/2	8	704045
13/16	5/8	1-7/8	4	4	704022						
13/16	3/4	1-7/8	4-1/8	4	704023						

Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Code	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Code
1/4	3/8	1-1/4	3-1/16	4	704046	1	1	4	6-1/2	4	704054
5/16	3/8	1-3/8	3-1/8	4	704047	1-1/8	1	4	6-1/2	6	704055
3/8	3/8	1-1/2	3-1/4	4	704048	1-1/4	1	4	6-1/2	6	704056
7/16	1/2	1-3/4	3-3/4	4	704049	1-1/4	1-1/4	4	6-1/2	6	704057
1/2	1/2	2	4	4	704050	1-1/2	1	4	6-1/2	6	704058
5/8	5/8	2-1/2	4-5/8	4	704051	1-1/2	1-1/4	4	6-1/2	6	704059
3/4	3/4	3	5-1/4	4	704052	1-3/4	1-1/4	4	6-1/2	6	704060
7/8	7/8	3-1/2	5-3/4	4	704053	2	1-1/4	4	6-1/2	6	704061

Extra Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Code	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	No. of Flutes	Code
1/4	3/8	1-3/4	3-9/16	4	704062	5/8	5/8	4	6-1/8	4	704066
5/16	3/8	2	3-3/4	4	704063	3/4	3/4	4	6-1/4	4	704067
3/8	3/8	2-1/2	4-1/4	4	704064	7/8	7/8	5	7-1/4	4	704068
1/2	1/2	3	5	4	704065	1	1	6	8-1/2	4	704069
						1-1/4	1-1/4	6	8-1/2	4	704070
						1-1/2	1-1/4	8	10-1/2	4	704071

End Mills High Speed Steel

Heavy Duty – Non-Center Cut – Combination Shank

4 Flute



6 Flute



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
2	2	2	5-3/4	704077
2	2	4	7-3/4	704078
2	2	6	9-3/4	704079
2	2	8	11-3/4	704080

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
2	2	4	7-3/4	704072
2	2	6	9-3/4	704073
2	2	8	11-3/4	704074
2	2	10	13-3/4	704075
2	2	12	15-3/4	704076

2 Flute – Regular Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
3/32	3/8	5/16	2-1/4	704081
1/8	3/8	3/8	2-5/16	704082
5/32	3/8	7/16	2-5/16	704083
3/16	3/8	7/16	2-5/16	704084
7/32	3/8	1/2	2-5/16	704085
1/4	3/8	1/2	2-5/16	704086
9/32	3/8	9/16	2-5/16	704087
5/16	3/8	9/16	2-5/16	704088
11/32	3/8	9/16	2-5/16	704089
3/8	3/8	9/16	2-5/16	704090
13/32	3/8	13/16	2-1/2	704091
7/16	3/8	13/16	2-1/2	704092
15/32	3/8	13/16	2-1/2	704093
1/2	3/8	13/16	2-1/2	704094
1/2	1/2	1	3	704095
9/16	1/2	1-1/8	3-1/8	704096
5/8	1/2	1-1/8	3-1/8	704097
5/8	5/8	1-5/16	3-7/16	704098
11/16	1/2	1-5/16	3-5/16	704099
11/16	5/8	1-5/16	3-7/16	704100
3/4	1/2	1-5/16	3-5/16	704101
3/4	5/8	1-5/16	3-7/16	704102
3/4	3/4	1-5/16	3-9/16	704103
13/16	5/8	1-5/16	3-5/8	704104

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
13/16	3/4	1-5/16	3-3/4	704105
7/8	5/8	1-5/16	3-5/8	704106
7/8	3/4	1-5/16	3-3/4	704107
7/8	7/8	1-1/2	3-3/4	704108
15/16	5/8	1-1/2	3-5/8	704109
15/16	3/4	1-1/2	3-3/4	704110
1	1/2	1-1/2	3-1/2	704111
1	5/8	1-1/2	3-5/8	704112
1	3/4	1-1/2	3-3/4	704113
1	7/8	1-5/8	3-3/4	704114
1	1	1-5/8	4-1/8	704115
1-1/8	1	1-5/8	4-1/8	704116
1-1/4	7/8	1-5/8	3-7/8	704117
1-1/4	1	1-5/8	4-1/8	704118
1-1/4	1-1/4	1-5/8	4-1/8	704119
1-3/8	1	1-5/8	4-1/8	704120
1-1/2	1	1-5/8	4-1/8	704121
1-1/2	1-1/4	1-5/8	4-1/8	704122
1-5/8	1-1/4	1-5/8	4-1/8	704123
1-3/4	1-1/4	1-5/8	4-1/8	704124
1-7/8	1-1/4	1-5/8	4-1/8	704125
2	1-1/4	1-5/8	4-1/8	704126

2 Flute – Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	1-1/4	3-1/16	704127
5/16	3/8	1-3/8	3-1/8	704128
3/8	3/8	1-1/2	3-1/4	704129
1/2	1/2	2	4	704130
5/8	5/8	2	4-1/8	704131
3/4	3/4	2-1/4	4-1/2	704132

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
7/8	7/8	2-1/2	4-3/4	704133
1	1	3	5-1/2	704134
1-1/4	1	3	5-1/2	704135
1-1/4	1-1/4	3	5-1/2	704136
1-1/2	1-1/4	3	5-1/2	704137
2	1-1/4	3	5-1/2	704138

End Mills High Speed Steel

4 Flute – Regular Length – Ball Nose



2 Flute – Regular Length – Ball Nose



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/8	3/8	3/8	2-5/16	704162
3/16	3/8	1/2	2-3/8	704163
1/4	3/8	5/8	2-7/16	704164
5/16	3/8	3/4	2-1/2	704165
3/8	3/8	3/4	2-1/2	704166
1/2	1/2	1-1/4	3-1/4	704167
5/8	5/8	1-5/8	3-3/4	704168
3/4	3/4	1-5/8	3-7/8	704169
7/8	7/8	1-7/8	4-1/2	704170
1	1	2	4-1/2	704171
1-1/4	1-1/4	2	4-1/2	704172
1-1/2	1-1/4	2	4-1/2	704173

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/8	3/8	1/2	2-3/8	704148
3/16	3/8	1/2	2-3/8	704149
1/4	3/8	5/8	2-7/16	704150
5/16	3/8	3/4	2-1/2	704151
3/8	3/8	3/4	2-1/2	704152
7/16	1/2	1	3	704153
1/2	1/2	1	3	704154
9/16	1/2	1-1/8	3-1/8	704155
5/8	5/8	1-1/8	3-1/2	704156
3/4	3/4	1-1/8	3-7/8	704157
7/8	7/8	2	4-1/4	704158
1	1	2-1/4	4-3/4	704159
1-1/4	1-1/4	2-1/2	5	704160
1-1/2	1-1/4	2-1/2	5	704161

2 Flute – Extended Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	5/8	3-1/16	704139
5/16	3/8	3/4	3-5/16	704140
3/8	3/8	3/4	3-5/16	704141
1/2	1/2	1	4	704142

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
5/8	5/8	1-3/8	4-5/8	704143
3/4	3/4	1-5/8	5-3/8	704144
7/8	7/8	2	6	704145
1	1	2-1/2	7-1/4	704146
1-1/4	1-1/4	3	7-1/4	704147

Metric – 2 Flute – Regular Length – Center Cut – Inch Weldon Shanks



Cutter Diameter (mm)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
3.0	3/8	5/16	2-5/16	704223
4.0	3/8	7/16	2-5/16	704224
5.0	3/8	1/2	2-5/16	704225
6.0	3/8	1/2	2-5/16	704226
7.0	3/8	9/16	2-5/16	704227
8.0	3/8	9/16	2-5/16	704228
9.0	3/8	9/16	2-5/16	704229
10.0	3/8	13/16	2-1/2	704230
11.0	3/8	13/16	2-1/2	704231
12.0	3/8	13/16	2-1/2	704232
13.0	1/2	1-1/8	3-1/8	704233
14.0	1/2	1-1/8	3-1/8	704234

Cutter Diameter (mm)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
16.0	1/2	1-5/16	3-7/16	704235
18.0	1/2	1-5/16	3-7/16	704236
20.0	3/4	1-1/2	3	704237
22.0	3/4	1-1/2	3-3/4	704238
24.0	3/4	2	4-1/2	704239
25.0	3/4	2	4-1/2	704240
26.0	3/4	1-5/8	3-7/8	704241
30.0	1	1-5/8	4-1/8	704242
32.0	1	1-5/8	4-1/8	704243
36.0	1	1-5/8	4-1/8	704244

High Helix Cutters

High Speed Steel – 2 Flute – For Machining Aluminum

Regular Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	5/8	2-7/16	704264	3/4	3/4	1-5/8	3-7/8	704270
5/16	3/8	3/4	2-1/2	704265	7/8	7/8	1-7/8	4-1/8	704271
3/8	3/8	3/4	2-1/2	704266	1	1	2	4-1/2	704272
7/16	3/8	1	2-11/16	704267	1-1/4	1-1/4	2	4-1/2	704273
1/2	1/2	1-1/4	3-1/4	704268	1-1/2	1-1/4	2	4-1/2	704274
5/8	5/8	1-5/8	3-3/4	704269	1-3/4	1-1/4	2	4-1/2	704275
					2	1-1/4	2	4-1/2	704276

Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	1-1/4	3-1/8	704277	3/4	3/4	3	5-1/4	704283
5/16	3/8	1-3/8	3-1/8	704278	1	1	4	6-1/2	704284
3/8	3/8	1-1/2	3-1/4	704279	1-1/4	1-1/4	4	6-1/2	704285
7/16	1/2	1-3/4	3-3/4	704280	1-1/2	1-1/4	4	6-1/2	704286
1/2	1/2	2	4	704281	2	1-1/4	4	6-1/2	704287
5/8	5/8	2-1/2	4-5/8	704282					

Extra Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/4	3/8	1-3/4	3-9/16	704288	5/8	5/8	4	6-1/8	704292
5/16	3/8	2	3-3/4	704289	3/4	3/4	4	6-1/4	704293
3/8	3/8	2-1/2	4-1/4	704290	1	1	6	8-1/2	704294
1/2	1/2	3	5	704291	1-1/4	1-1/4	6	8-1/2	704295
					1-1/2	1-1/4	8	10-1/2	704296

End Mills – High Performance V7 INOX



Micrograin Solid Carbide – NANO AlTiN Coated – 4 Flute – Square End & Corner Radius



- Minimizes tool deflection
- Low amplitude – eliminates vibration
- Allows deeper cuts and faster speeds
- Increases metal removal rates
- Supreme surface finish
- For machining of most materials under 40HRC



Regular Length

Tolerance of Cutting Diameter: 0/-0.0012

Tolerance of Shank Diameter: h6

Cutter Diameter (Inch)	Shank Diameter (Inch)	Shank Style	Length of Cut (Inch)	Overall Length (Inch)	Square End	Corner Radius	
					Code	*Radius (Inch)	Code
1/8	1/8	Plain	3/8	1-1/2	888000	0.015	888034
5/32	3/16	Plain	7/16	2	888002	0.015	–
3/16	3/16	Plain	7/16	2	888004	0.015	888036
7/32	1/4	Plain	7/16	2-1/2	888006	–	–
1/4	1/4	Plain	1/2	2-1/2	888008	0.020	888038
5/16	5/16	Plain	13/16	2-1/2	888012	0.020	888040
3/8	3/8	Flat	7/8	2-1/2	888016	0.020	888042
7/16	7/16	Flat	1	2-3/4	888020	0.020	888044
1/2	1/2	Flat	1	3	888024	0.030	888046
9/16	9/16	Flat	1-1/8	3-1/2	888026	0.030	888048
5/8	5/8	Flat	1-1/4	3-1/2	888028	0.040	888050
3/4	3/4	Flat	1-1/2	4	888030	0.040	888052
1	1	Flat	1-1/2	4	888032	0.040	888054

*Radius +0 -0.005"

Metric – Regular Length

Tolerance of Cutting Diameter: 0/-0.03

Tolerance of Shank Diameter: h6

Cutter Diameter (mm)	Shank Diameter (mm)	Shank Style	Length of Cut (mm)	Overall Length (mm)	Square End	Corner Radius	
					Code	*Radius (mm)	Code
3	6	Plain	8	57	888056	0.38	888080
4	6	Plain	11	57	888058	0.38	888082
5	6	Plain	13	57	888060	0.38	888084
6	6	Plain	13	57	888062	0.51	888086
8	8	Plain	19	63	888064	0.51	888088
10	10	Plain	22	72	888066	0.51	888090
12	12	Flat	26	83	888068	0.76	888092
14	14	Flat	26	83	888070	0.76	888094
16	16	Flat	32	92	888072	1.02	888096
18	18	Flat	32	92	888074	1.02	888098
20	20	Flat	38	104	888076	1.02	888100
25	25	Flat	38	104	888078	1.02	888102

*Radius +0 -0.13"

Technical Information – High Performance V7 INOX



Micrograin Solid Carbide – NANO AlTiN Coated – 4 Flute – Square End & Corner Radius

Square End & Corner Radius V7 End Mills

Material	Alloy Steels Cast Iron		Stainless Steel 300 Series		Stainless Steel 400 Series		Titanium		Inconel	
Hardness	HRC 20									
Strength	1000N/mm ²									
Cutting Diameter (Inch)	RPM	Feed (Inch/Min.)	RPM	Feed (Inch/Min.)	RPM	Feed (Inch/Min.)	RPM	Feed (Inch/Min.)	RPM	Feed (Inch/Min.)
1/8	12,735	10.23	9,625	7.25	13,475	7.63	8,320	7.63	2,565	2.05
3/16	8,490	10.91	6,385	8.27	12,000	8.43	5,550	8.43	1,685	1.82
1/4	6,370	11.46	4,810	9.60	6,815	9.60	4,160	9.61	1,285	2.48
5/16	5,100	12.95	3,850	10.71	5,390	10.71	3,330	10.71	1,025	2.83
3/8	4,245	18.35	3,210	15.38	4,490	15.38	2,770	15.38	855	4.13
7/16	4,010	24.45	2,750	20.90	3,850	20.90	2,380	20.73	735	5.49
1/2	3,500	25.85	2,400	21.02	3,370	21.02	2,080	21.02	640	5.58
9/16	3,110	26.01	2,140	21.16	2,990	21.16	1,850	21.16	570	5.73
5/8	2,800	26.11	1,925	21.20	2,700	21.20	1,660	21.20	510	5.58
3/4	2,340	23.96	1,600	19.43	2,250	19.43	1,390	19.43	425	5.17
1	1,755	17.44	1,200	14.73	1,685	15.11	1,040	15.11	315	4.26

D
[0.6D]

1.5D
(1.2D)
[0.6D]

0.5D

0.5D

D

1.0D
[0.6D]

0.35D

*() : Short length Type
*[] : Stub length Type

*1.2 x D Axial cutting depth should be applied for Short length series – diameter over 5/16”
*0.6 x D Axial cutting depth should be applied for Stub length series

TITANIUM MACHINING: On full slot cuts reduce RPM and FEED by 35%. Speeds and feeds subject to coolant quality, quantity and pressure.



End Mills – ALU-POWER

Micrograin Solid Carbide – 2 & 3 Flute – 42° & 45° Helix

- For high velocity milling of aluminum and other non-ferrous materials
- Provides improved surface roughness
- Tightly controlled cylindrical margin

2 Flute – 42° Helix – Regular Length – “Banshee”

- Excellent plunging capabilities
- Excellent chip removal due to higher rake angle, higher helix angle (42°) and bigger chip pocket



Tolerance: 0/-0.0012

Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/16	1/8	1/8	1-1/2	888310	1/2	1/2	2	4	888319
1/8	1/4	5/16	1-3/4	888312	5/8	5/8	1-1/4	3-1/2	888320
3/16	1/4	7/16	2	888313	3/4	3/4	1-1/2	4	888321
1/4	3/8	3/4	2-1/2	888314	3/4	3/4	3	5-1/2	888322
5/16	3/8	13/16	2-1/2	888315	1	1	1-1/2	4	888323
3/8	3/8	1	2-1/2	888316	1	1	3	5-1/2	888324
7/16	7/16	1	2-3/4	888317					
1/2	1/2	1	3	888318					

3 Flute – 45° Helix

- 3 flute and 45° helix allow harmonic balance at high speed conditions and smooth cutting
- Maximum material removal, chip evacuation, and stability



Tolerance: 0/-0.0005

Regular Length



Long Length



Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code	Cutter Diameter (Inch)	Shank Diameter (Inch)	Length of Cut (Inch)	Overall Length (Inch)	Code
1/8	1/8	3/8	1-1/2	888409	1/4	1/4	1-1/4	3-1/4	888419
3/16	3/16	9/16	2	888410	5/16	5/16	1-1/4	3-1/2	888420
1/4	1/4	5/8	2-1/2	888411	3/8	3/8	1-1/2	3-1/2	888421
5/16	5/16	5/8	2-1/2	888412	7/16	7/16	2	4	888422
3/8	3/8	1	2-1/2	888413	1/2	1/2	2	4	888423
7/16	7/16	1-1/4	2-3/4	888414	5/8	5/8	2-1/2	5	888424
1/2	1/2	1-1/4	3	888415	3/4	3/4	3-1/4	6	888425
5/8	5/8	1-5/8	3-1/2	888416	1	1	3-1/4	6	888426
3/4	3/4	1-5/8	4	888417					
1	1	2	5	888418					



Technical Information – ALU-POWER

Micrograin Solid Carbide – 2 & 3 Flute – 42° & 45° Helix

2 Flute – 42° Helix – “Banshee”

Slotting		
Material	Aluminum Non-Ferrous Metals	
Cutting Diameter (Inch)	RPM	Feed (Inch/Minute)
1/8	10,000	27.56
5/32	10,000	35.43
3/16	10,000	39.37
1/4	10,000	47.24
5/16	8,000	55.12
3/8	8,000	66.93
1/2	8,000	82.68
9/16	6,000	70.87
5/8	6,000	74.80
11/16	4,000	55.12
13/16	4,000	62.99

0.5 x D

Side Cutting		
Material	Aluminum Non-Ferrous Metals	
Cutting Diameter (Inch)	RPM	Feed (Inch/Minute)
1/8	10,000	35.43
5/32	10,000	43.31
3/16	10,000	51.18
1/4	10,000	59.06
5/16	8,000	70.387
3/8	8,000	82.68
1/2	8,000	102.40
9/16	6,000	86.61
5/8	6,000	94.49
11/16	4,000	70.87
13/16	4,000	74.80

A: $\varnothing 1/8 - \varnothing 3/8 = 0.25 \times D$
 $\varnothing 1/2 - \varnothing 13/16 = 0.5 \times D$

FEED: In long and extra-long types the feed should be reduced by approximately 50%

3 Flute – 45° Helix – Finish

Slotting		
Material	Aluminum Non-Ferrous Metals	
Cutting Diameter (Inch)	RPM	Feed (Inch/Minute)
1/8	10,000	33.05
5/32	10,000	42.50
3/16	10,000	47.25
1/4	10,000	56.70
5/16	8,000	66.15
3/8	8,000	80.30
1/2	8,000	99.15
9/16	6,000	85.05
5/8	6,000	89.75
11/16	4,000	66.15
13/16	4,000	75.60

0.5 x D

Side Cutting		
Material	Aluminum Non-Ferrous Metals	
Cutting Diameter (Inch)	RPM	Feed (Inch/Minute)
1/8	10,000	42.50
5/32	10,000	52.00
3/16	10,000	61.40
1/4	10,000	70.90
5/16	8,000	85.05
3/8	8,000	99.20
1/2	8,000	122.90
9/16	6,000	103.95
5/8	6,000	113.40
11/16	4,000	85.05
13/16	4,000	89.75

A: $\varnothing 1/8 - \varnothing 3/8 = 0.25 \times D$
 $\varnothing 1/2 - \varnothing 13/16 = 0.5 \times D$

FEED: In long and extra-long types the feed should be reduced by approximately 50%

Tapered End Mills

Micrograin Solid Carbide – 3 Flute



• Center cut

Ball End available
Please inquire

1/2° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	3/4	1/8	2-1/2	313707
1/8	3/4	1/4	2-1/2	313708

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1	1/4	3	313709
3/16	3/4	1/4	2-1/2	313710

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	1-1/4	1/4	3	313711
1/4	3/4	3/8	2-1/2	313712
1/4	1-1/4	3/8	3	313713

1° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1/2	1/8	2-1/2	313714
3/32	1	1/4	3	313715
1/8	3/4	1/4	2-1/2	313716
1/8	1	1/4	3	313717

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1-1/2	1/4	3	313718
3/16	3/4	1/4	2-1/2	313719
3/16	1-1/4	1/4	3	313720
3/16	1-3/4	1/4	3-1/2	313721

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	3/4	3/8	2-1/2	313722
1/4	1-1/4	3/8	3	313723
1/4	2	3/8	4	313724

1-1/2° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1	1/4	3	313725
1/8	3/4	1/4	2-1/2	313726

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1-1/2	1/4	3	313727
3/16	1-1/4	3/8	3	313728

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	1-3/4	3/8	3-1/2	313729
1/4	3/4	3/8	2-1/2	313730
1/4	1-1/4	3/8	3	313731

2° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	3/4	1/4	2-1/2	313732
3/32	1	1/4	3	313733
1/8	3/4	1/4	2-1/2	313734
1/8	1-1/4	1/4	3	313735

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	3/4	1/4	2-1/2	313736
3/16	1-1/4	3/8	3	313737
3/16	1-3/4	3/8	3-1/2	313738
1/4	3/4	3/8	2-1/2	313739

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	1-1/4	3/8	3	313740
1/4	2	1/2	4	313741

3° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1	1/4	3	313742
3/32	1-1/2	1/4	3	313743
1/8	3/4	1/4	2-1/2	313744
1/8	1	1/4	3	313745

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1-1/2	3/8	3-1/2	313746
1/8	2	3/8	3-1/2	313747
5/32	1-1/4	3/8	3	313748
5/32	1-3/4	3/8	3-1/2	313749

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	3/4	3/8	2-1/2	313750
3/16	1-1/4	3/8	3	313751
1/4	3/4	3/8	2-1/2	313752
1/4	1-1/4	3/8	3	313753
1/4	2	1/2	4	313754

4° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1	1/4	3	313755
1/8	3/4	1/4	2-1/2	313756

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1	3/8	3	313757
3/16	3/4	3/8	2-1/2	313758

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	1-1/4	3/8	3	313759
1/4	3/4	1/2	2-1/2	313760
1/4	1-1/4	1/2	3-1/2	313761

Tapered End Mills

Micrograin Solid Carbide – 3 Flute (continued)

5° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	3/4	1/4	2-1/2	313762
3/32	1	3/8	3	313763
3/32	1-1/2	3/8	3-1/2	313764
1/8	3/4	1/4	2-1/2	313765

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1	3/8	3	313766
1/8	1-1/2	3/8	3-1/2	313767
3/16	3/4	3/8	2-1/2	313768
3/16	1-1/4	1/2	3	313769

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	3/4	1/2	2-1/2	313770
1/4	1	1/2	3	313771
1/4	1-1/4	1/2	3-1/2	313772
1/4	2	5/8	4	313773

7° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1	3/8	3	313774
1/8	1/2	3/8	2-1/2	313775
1/8	3/4	3/8	2-1/2	313776
1/8	1	3/8	3	313777

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1-1/2	1/2	3-1/2	313778
5/32	3/4	3/8	2-1/2	313779
3/16	1-1/4	1/2	3-1/2	313780
1/4	3/4	1/2	2-1/2	313781

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	1-1/4	5/8	3-1/2	313782

10° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1/2	3/8	2-1/2	313784
3/32	1-1/2	5/8	3-1/2	313785
1/8	3/4	3/8	2-1/2	313786
1/8	1	1/2	3	313787

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1-1/4	5/8	3-1/2	313788
3/16	1-1/4	5/8	3-1/2	313789

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	3/4	5/8	2-1/2	313790
1/4	1	5/8	3	313791

Tapered End Mills

High Speed Steel



- For extrusion dies, die cast dies and molds
- Center cut
- Shanks within 0.0005"
- Hollow ground
- Polished flutes

1/2° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1/2	3/8	2-1/2	313377
3/32	3/4	3/8	2-1/2	313378
3/32	1-1/4	3/8	3-1/8	313379
1/8	1/4	3/8	2-1/2	313380
1/8	1/2	3/8	2-1/2	313381
1/8	3/4	3/8	2-1/2	313382
1/8	1	3/8	2-7/8	313383
1/8	1-1/4	3/8	3-1/8	313384
3/16	3/4	3/8	2-1/2	313385
3/16	1-1/4	3/8	3-1/8	313386

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	3/4	3/8	2-1/2	313384
1/4	1-1/4	3/8	3-1/8	313388
1/4	2-1/4	1/2	4-1/4	313389
1/4	3-1/4	1/2	5-1/2	313390
3/8	1-1/4	1/2	3-1/8	313391
3/8	2-1/4	1/2	4-1/4	313392
3/8	3-1/4	1/2	5-1/2	313393
1/2	1-1/4	1/2	3-1/8	313394
1/2	2-1/4	1/2	4-1/4	313395
1/2	3-1/4	1/2	5-1/2	313396

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
5/8	2-1/4	5/8	4-1/2	313397
5/8	3-1/4	5/8	5-1/2	313398
5/8	4-1/4	5/8	6-1/2	313399
3/4	2-1/4	3/4	4-1/2	313400
3/4	3-1/4	3/4	5-3/4	313401
3/4	4-1/4	3/4	7-3/4	313402
3/4	5-1/4	3/4	7-3/4	313403

Tapered End Mills High Speed Steel (continued)



1° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1/2	3/8	2-1/2	313404
3/32	3/4	3/8	2-1/2	313405
3/32	1-1/4	3/8	3-1/8	313406
1/8	1/4	3/8	2-1/2	313407
1/8	1/2	3/8	2-1/2	313408
1/8	3/4	3/8	2-1/2	313409
1/8	1	3/8	2-7/8	313410
1/8	1-1/4	3/8	3-1/8	313411
3/16	3/4	3/8	2-1/2	313412
3/16	1-1/4	3/8	3-1/8	313413

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	3/4	3/8	2-1/2	313414
1/4	1-1/4	3/8	3-1/8	313415
1/4	2-1/4	1/2	4-1/4	313416
1/4	3-1/4	1/2	5-1/2	313417
3/8	1-1/4	1/2	3-1/8	313418
3/8	2-1/4	1/2	4-1/4	313419
3/8	3-1/4	1/2	5-1/2	313420
1/2	1-1/4	1/2	3-1/8	313421
1/2	2-1/4	1/2	4-1/4	313422
1/2	3-1/4	5/8	5-3/8	313423

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
5/8	2-1/4	5/8	4-1/2	313424
5/8	3-1/4	5/8	5-1/2	313425
5/8	4-1/4	5/8	6-1/2	313426
3/4	2-1/4	3/4	4-1/2	313427
3/4	3-1/4	3/4	5-3/4	313428
3/4	4-1/4	3/4	7-3/4	313429
3/4	5-1/4	3/4	7-3/4	313430

1-1/2° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1/2	3/8	2-1/2	313431
3/32	1	3/8	2-7/8	313432
3/32	1-1/4	3/8	3-1/8	313433
3/32	1-1/2	3/8	3-1/4	313434
7/64	1	3/8	2-7/8	313435
7/64	1-1/2	3/8	3-1/4	313436
7/64	2	3/8	3-7/8	313437
1/8	1/2	3/8	2-1/2	313438
1/8	3/4	3/8	2-1/2	313439
1/8	1	3/8	2-7/8	313440
1/8	1-1/4	3/8	3-1/8	313441
1/8	1-1/2	3/8	3-1/4	313442

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	2	3/8	3-7/8	313443
5/32	1	3/8	2-7/8	313444
5/32	1-1/2	3/8	3-1/4	313445
3/16	3/4	3/8	2-1/2	313446
3/16	1-1/4	3/8	3-1/8	313447
3/16	2-1/4	3/8	4-1/4	313448
1/4	3/4	3/8	2-1/2	313449
1/4	1-1/4	3/8	3-1/8	313450
1/4	2-1/4	1/2	4-1/4	313451
1/4	3-1/4	1/2	5-1/2	313452

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/8	1-1/4	1/2	3-1/8	313453
3/8	2-1/4	1/2	4-1/4	313454
3/8	3-1/4	5/8	5-1/2	313455
1/2	1-1/4	1/2	3-1/8	313456
1/2	2-1/4	5/8	4-1/4	313457
1/2	3-1/4	5/8	5-1/2	313458
5/8	2-1/4	3/4	5-1/2	313460
5/8	3-1/4	3/4	6-1/2	313461
3/4	2-1/4	3/4	4-3/4	313462
3/4	5-1/4	1	7-3/4	313463

2° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1/2	3/8	2-1/2	313464
3/32	3/4	3/8	2-1/2	313465
1/8	1/2	3/8	2-1/2	313466
1/8	3/4	3/8	2-1/2	313467
1/8	1	3/8	2-7/8	313468
1/8	1-1/4	3/8	3-1/8	313469
1/8	1-1/2	3/8	3-1/4	313470
3/16	3/4	3/8	2-1/2	313471

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	1-1/4	3/8	3-1/8	313472
1/4	3/4	3/8	2-1/2	313473
1/4	1-1/4	3/8	3-1/8	313474
1/4	2-1/4	1/2	4-1/4	313475
1/4	3-1/4	1/2	5-1/2	313476
3/8	1-1/4	1/2	3-1/8	313477
3/8	2-1/4	1/2	4-1/4	313478
3/8	3-1/4	5/8	5-1/2	313479

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/2	1-1/4	1/2	3-1/8	313480
1/2	2-1/4	1/2	4-1/4	313481
1/2	3-1/4	5/8	5-1/2	313482
5/8	2-1/4	3/4	4-1/2	313483
5/8	3-1/4	3/4	5-1/2	313484
5/8	4-1/4	3/4	6-1/2	313485
3/4	3-1/4	1	5-3/4	313486
3/4	5-1/4	1	7-3/4	313487

Tapered End Mills High Speed Steel (continued)

3° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
0.062	1	3/8	2-7/8	313488
0.070	1-1/2	3/8	3-1/4	313489
3/32	1	3/8	2-7/8	313490
3/32	1-1/4	3/8	3-1/8	313491
3/32	1-1/2	3/8	3-1/4	313492
3/32	2	3/8	3-5/8	313493
3/32	2-1/2	3/8	4-1/2	313494
7/64	1	3/8	2-7/8	313495
7/64	1-1/2	3/8	3-1/4	313496
7/64	2	3/8	3-5/8	313497
1/8	3/4	3/8	2-1/2	313498
1/8	1	3/8	2-7/8	313499
1/8	1-1/4	3/8	3-1/8	313500
1/8	1-1/2	3/8	3-1/4	313501
1/8	2	3/8	3-5/8	313502
1/8	2-1/2	3/8	4-1/2	313503
1/8	3	3/8	5	313504
1/8	1-1/8	3/8	2-3/4	313505
5/32	1	3/8	2-7/8	313506
5/32	1-1/4	3/8	3-1/8	313507

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
5/32	1-1/2	3/8	3-1/4	313508
5/32	2	3/8	3-5/8	313509
3/16	3/4	3/8	2-1/2	313510
3/16	1-1/4	3/8	3-1/8	313511
3/16	1-1/2	3/8	3-1/8	313512
3/16	2-1/2	1/2	4-1/2	313513
3/16	3	1/2	5	313514
3/16	3-1/4	5/8	5-1/2	313515
3/16	4	5/8	6-1/2	313516
3/16	5	3/4	7-1/4	313517
1/4	3/4	3/8	2-1/2	313518
1/4	1	3/8	2-3/4	313519
1/4	1-1/4	3/8	3-1/8	313520
1/4	2-1/4	1/2	4-1/4	313521
1/4	3-1/4	5/8	5-1/2	313522
1/4	4	5/8	6-1/2	313523
1/4	5	3/4	7-3/8	313524
3/8	1-1/4	1/2	3-1/8	313525

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/8	2-1/4	5/8	4-1/4	313526
3/8	3-1/4	3/4	5-1/2	313527
3/8	4	3/4	6-1/2	313528
3/8	5	3/4	7-1/2	313529
1/2	1-1/4	1/2	3-1/8	313530
1/2	2-1/4	5/8	4-1/4	313531
1/2	2-1/4	1/2	4-1/8	313532
1/2	2-1/4	3/4	5-1/2	313533
1/2	4	3/4	6-1/2	313534
1/2	5	1	7-1/2	313535
5/8	2-1/4	3/4	4-1/2	313536
5/8	3-1/4	3/4	5-1/2	313537
5/8	4	1	6-1/2	313538
5/8	5	1	7-1/2	313539
3/4	2-1/4	1	4-3/4	313540
3/4	3-1/4	1	5-3/4	313541
3/4	4	1	6-1/2	313542
3/4	5	1	7-1/2	313543

4° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	3/4	3/8	2-1/2	313544
1/8	1	3/8	2-7/8	313545
1/8	1-1/2	3/8	3-1/4	313546
1/8	2	1/2	3-7/8	313547
1/8	2-1/2	1/2	4-1/2	313548
3/16	3/4	3/8	2-1/2	313549
3/16	1-1/4	3/8	3-1/8	313550
3/16	2-1/2	1/2	4-1/2	313551

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	3-1/4	5/8	5-1/2	313552
3/16	4	3/4	6-1/2	313553
1/4	3/4	3/8	2-1/2	313554
1/4	1-1/4	1/2	3-1/8	313555
1/4	2-1/4	5/8	4-1/4	313556
1/4	3-1/4	3/4	5-1/2	313557
1/4	4	3/4	6-1/2	313558
3/8	1-1/4	1/2	3-1/8	313559

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/8	2-1/4	5/8	4-1/4	313560
3/8	3-1/4	3/4	5-1/2	313561
3/8	4	3/4	6-1/2	313562
1/2	1-1/4	1/2	3-1/8	313563
1/2	2-1/4	3/4	4-1/2	313564
1/2	3-1/4	3/4	5-1/2	313565
1/2	4	1	6-1/2	313566

5° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
0.062	1-1/2	3/8	3-1/4	313567
0.070	1-1/2	3/8	3-1/4	313568
3/32	3/4	3/8	2-1/2	313569
3/32	1	3/8	2-7/8	313570
3/32	1-1/4	3/8	3-1/8	313571
3/32	1-1/2	3/8	3-1/4	313572
3/32	1-3/4	1/2	3-7/8	313573
3/32	2	1/2	3-7/8	313574
3/32	2-1/2	1/2	4-1/2	313575
7/64	1	3/8	2-7/8	313576
7/64	1-1/2	3/8	3-1/4	313577
7/64	2	1/2	3-7/8	313578
1/8	3/4	3/8	2-1/2	313579
1/8	1	3/8	2-7/8	313580
1/8	1-1/8	3/8	3	313581
1/8	1-1/4	3/8	3-1/8	313582

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1-1/2	3/8	3-1/4	313583
1/8	2	1/2	3-7/8	313584
1/8	2	3/4	3-7/8	313585
1/8	2-1/2	1/2	4-1/2	313586
1/8	3	3/4	5-1/2	313587
1/8	3	1/2	5-1/2	313588
5/32	1	3/8	2-7/8	313589
5/32	1-1/2	1/2	3-3/4	313590
3/16	3/4	3/8	2-1/2	313591
3/16	1-1/4	1/2	3-1/8	313592
3/16	1-1/2	1/2	3-1/8	313593
3/16	2-1/2	1/2	4-1/2	313594
3/16	3	1/2	5	313595
3/16	3	3/4	5-1/2	313596
3/16	3-1/4	3/4	5-1/2	313597
3/16	4	3/4	6-1/2	313598

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	5	1	7-1/2	313599
1/4	3/4	3/8	2-1/2	313600
1/4	1	1/2	2-7/8	313601
1/4	1-1/4	1/2	3-1/8	313602
1/4	2-1/4	5/8	4-1/4	313603
1/4	3-1/4	3/4	5-1/2	313604
1/4	4	3/4	6-1/2	313605
3/8	1-1/4	1/2	3-1/8	313606
3/8	2-1/4	3/4	4-1/4	313607
3/8	3-1/4	3/4	5-1/2	313608
3/8	4	1	6-1/2	313609
1/2	1-1/4	1/2	3-1/8	313610
1/2	2-1/4	3/4	4-1/4	313611
1/2	3-1/4	3/4	5-3/4	313612
1/2	4	1	6-1/2	313613
3/4	4	1-1/4	6-1/2	313614

END MILLS & ROUGHERS

Tapered End Mills High Speed Steel (continued)



7° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
0.062	1	3/8	2-7/8	313615
0.070	1	3/8	2-3/4	313616
3/32	1	3/8	2-7/8	313617
3/32	1-1/4	1/2	3-1/8	313618
3/32	1-1/2	1/2	3-1/4	313619
1/8	3/4	3/8	2-1/2	313621
1/8	1	3/8	2-7/8	313622
1/8	1-1/4	1/2	3-1/4	313623
1/8	2	5/8	4-1/8	313624
1/8	3	3/4	5-1/4	313625

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	1-1/4	1/2	3-1/8	313626
3/16	3	3/4	5-1/4	313627
1/4	3/4	1/2	2-1/2	313628
1/4	1-1/4	1/2	3-1/8	313629
1/4	2-1/4	3/4	4-1/2	313630
1/4	3-1/4	1	5-3/4	313631
1/4	4	1	6-1/2	313632
5/16	3-1/4	1	5-3/4	313633
3/8	2-1/4	3/4	4-1/4	313634
3/8	3-1/4	1	5-3/4	313635

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/8	4	1-1/4	6-1/2	313636
1/2	1-1/4	3/4	3-1/2	313637
1/2	2-1/4	1	4-3/4	313638
1/2	3-1/4	1-1/4	5-3/4	313639
1/2	4	1-1/4	6-1/2	313640
5/8	4	1-1/4	6-1/2	313641
3/4	4	1-1/4	5-3/4	313642
3/4	4	1-1/4	6-1/2	313643

10° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	1/2	3/8	2-1/2	313644
3/32	1-1/2	1/2	3-3/8	313645
1/8	3/4	3/8	2-1/2	313646
1/8	1-1/4	1/2	3-1/8	313647
3/16	1-1/4	1/2	2-1/8	313648
1/4	3/4	1/2	2-1/2	313649

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	1-1/4	1/2	3-1/8	313650
1/4	2-1/4	3/4	4-1/4	313651
3/8	1-1/4	5/8	3-1/4	313652
3/8	2-1/4	1	4-5/8	313653

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/8	3-1/4	1-1/4	4-3/4	313654
1/2	1-1/4	3/4	3-3/8	313655
1/2	2-1/4	1	4-5/8	313656
1/2	3-1/4	1-1/4	4-3/4	313657

15° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/32	3/4	1/2	2-3/4	313658
3/32	1	1/2	2-7/8	313659
3/32	1-1/2	1/2	3-7/16	313660
1/8	1/2	3/8	2-1/2	313661
1/8	3/4	1/2	2-1/2	313662
1/8	1	1/2	3	313663
1/8	1-1/4	1/2	3-1/8	313664
3/16	1	1/2	3	313665

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/16	1-1/4	3/4	3-1/2	313666
3/16	1-1/4	1/2	3-1/4	313667
1/4	1	1/2	3	313668
1/4	1-1/4	3/4	3-1/2	313669
1/4	1-1/4	1/2	3-1/4	313670
1/4	1-1/2	3/4	3-3/4	313671
1/4	2-1/4	1	4-3/8	313672
5/16	1	3/4	3-1/4	313673

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/8	1-1/4	3/4	3-1/2	313674
3/8	2-1/4	1-1/4	4-3/4	313675
1/2	1	3/4	3-1/4	313676
1/2	1-1/4	3/4	3-1/2	313677
1/2	1-3/4	1	4-1/4	313678
1/2	2-1/4	1-1/4	4-3/4	313679

20° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1/2	3/8	2-1/2	313680
1/8	1	1/2	3	313681
3/16	1	1/2	3	313682
1/4	1	1/2	3	313683

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	1-1/2	3/4	3-3/4	313684
5/16	1	3/4	3-1/4	313685
5/16	1-1/2	3/4	3-3/4	313686
3/8	1-1/2	3/4	3-3/4	313687

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/8	2	1	4-1/2	313688

Tapered End Mills High Speed Steel (continued)

25° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1/2	1/2	2-1/2	313689
1/8	1	1/2	3	313690
1/4	1	5/8	3-1/4	313691
1/4	1-1/2	3/4	3-3/4	313692

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
5/16	3/4	5/8	3	313693
5/16	1	3/4	3-1/4	313694
5/16	1-1/2	1	4	313695
3/8	3/4	5/8	3	313696

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/8	1	3/4	3-1/4	313697
3/8	1-1/2	1	4	313698
1/2	1-1/4	1	3-3/4	313699

30° per Side

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/8	1/2	1/2	2-1/2	313700
1/8	1	1/2	3	313701

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
1/4	1	3/4	3-1/4	313702
1/4	1-1/2	1	4	313703

Tip Diameter (Inch)	Flute Length (Inch)	Shank Diameter (Inch)	Overall Length (Inch)	Code
3/8	1-1/4	1	3-3/4	313704
3/8	1-1/2	1	4	313705
1/2	1-1/4	1	3-3/4	313706