



MAJAC

M I L L S



2023-2024

MAJAC MILLS PREMIUM CARBIDE

GENERAL PURPOSE

Shank Tolerance: +0.0000"/-0.0004"
Diameter Tolerance: +0.0000"/-0.0020"

General Purpose 30 Degree Helix 10% micrograin carbide. All tools honed to improve tool life. Available Uncoated & TiALN Coated.

Good

GENERAL PURPOSE

Square End 2, 3 & 4 Flute - Fractional	3-5
Square End 2, 3 & 4 Flute - Metric	6
Ball Nose 2, 3 & 4 Flute - Fractional	7-9
Engraving Tools	9
Spot Drills	9
Ball Nose 2 & 4 Flute - Metric	10
90 Degree Drill/Mills 2 & 4 Flute - Fractional	10
Double Ended Square End 2 & 4 Flute - Fractional	11
Double Ended Ball Nose End 2 & 4 Flute - Fractional	12

HIGH PERFORMANCE

Shank Tolerance: +0.0000"/-0.0004"
Diameter Tolerance: +0.0000"/-0.0015"

High Performance Variable Pitch to reduce chatter. General Purpose 10% micrograin carbide. All tools honed to improve tool life. TiALN Coated for enhanced heat & abrasion resistance providing higher tool life. Special core & heal design to enhance rigidity.

Better

HP Variable Pitch

Square End & Corner Radius 4 & 5 Flute - Fractional	14-15
Ball Nose 4 Flute - Fractional	16
Long Reach Neck Relief Square & Corner Radius 4 Flute - Fractional	16-17
Long Reach Neck Relief Ball Nose 4 Flute - Fractional	16-17

ULTRA HIGH PERFORMANCE

Shank Tolerance: +0.0000"/-0.0004"
Diameter Tolerance: +0.0000"/-0.0015"

Extreme Production Variable Pitch to reduce chatter. Ultra Premium 10% micrograin carbide. All tools honed to improve tool life. TiALN Coated with a unique post coating polishing process to reduce built up edge. Special core & heal design to enhance rigidity. Experience the highest performance & tool life.

Best

HP Ultra Variable Pitch - EXTREME PRODUCTION

Square End & Corner Radius 4 & 5 Flute - Fractional	19-20
Ball Nose 4 Flute - Fractional	21
Square & Corner Radius HEM 5, 6 & 7 Flute - Fractional	22-24

ALUMINUM

Shank Tolerance: +0.0000"/-0.0004"
Diameter Tolerance: +0.0000"/-0.0004"

Specifically designed for high performance Aluminum machining. Medium/Finishing applications & Medium/Roughing applications. Unique variable pitch & variable helix combined with a polished surface, chipbreaking geometry & cylindrical margin. Available Uncoated, ZrN Coated & DLC Coated.

Best

HP Ultra Variable Pitch for Aluminum - EXTREME PRODUCTION

Square End & Corner Radius - Fractional Medium/Roughing	27
Square End & Corner Radius - Fractional Medium/Finishing	28
Ball Nose - Fractional	29

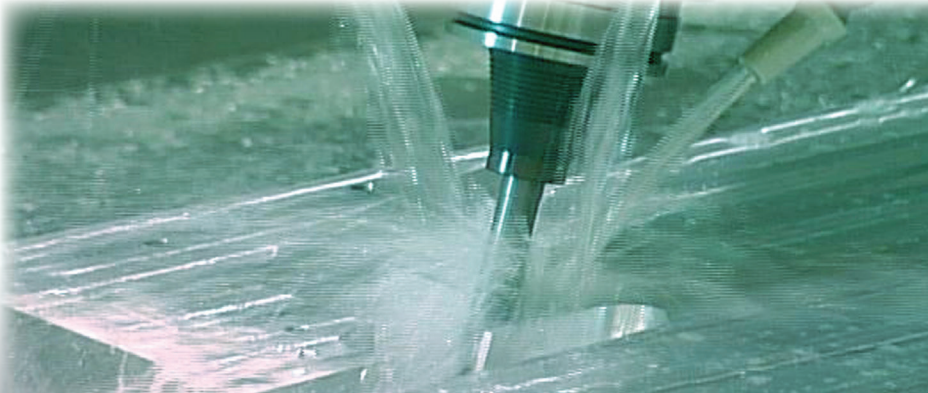
GENERAL PURPOSE

Speeds & Feeds

Material Classification	Speed (SFM)		Feed Per Tooth By End Mill Diameter (IPT)							
	Uncoated	TiALN	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
Aluminum Alloys & Aluminum	600-1200	900-1800	.0020	.0025	.0030	.0035	.0040	.0050	.0060	.0080
Copper Alloys & Copper	350-850	525-1275	.0020	.0025	.0025	.0030	.0030	.0035	.0040	.0060
Bronze & Brass	250-400	375-600	.0020	.0025	.0025	.0030	.0030	.0035	.0040	.0050
Graphite	500-800	500-1200	.0030	.0035	.0025	.0030	.0030	.0040	.0050	.0070
Plastics	600-1100	600-1650	.0030	.0035	.0040	.0050	.0060	.0080	.0100	.0150
Softer Cast Iron	250-450	375-650	.0020	.0022	.0025	.0027	.0030	.0045	.0060	.0080
Harder Cast Iron	100-250	100-375	.0008	.0010	.0015	.0017	.0020	.0025	.0030	.0040
Ductile Iron	80-400	100-600	.0010	.0012	.0015	.0017	.0020	.0030	.0040	.0060
Malleable Iron	150-500	225-650	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0070
Low Carbon Steels (1020 & Under)	200-400	300-600	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0070
Medium Carbon Steels (1030-1060)	100-250	150-375	.0015	.0016	.0017	.0018	.0020	.0030	.0040	.0050
Alloy Steels Hardened to 35 Rc	130-230	130-345	.0010	.0011	.0012	.0013	.0015	.0017	.0020	.0030
Alloy Steels Hardened to 40-50 Rc	70-130	70-160	.0007	.0007	.0008	.0009	.0010	.0015	.0020	.0030
Die Steels Hardened to 51-60 Rc	--	--	--	--	--	--	--	--	--	--
Tool Steels	100-250	150-375	.0010	.0012	.0015	.0017	.0020	.0025	.0030	.0040
Mold Steels	200-350	300-525	.0010	.0012	.0015	.0017	.0020	.0025	.0030	.0040
Softer Stainless Steels	200-350	300-450	.0010	.0012	.0015	.0012	.0020	.0030	.0040	.0060
Harder Stainless Steels	100-200	150-300	.0005	.0006	.0007	.0008	.0010	.0020	.0030	.0050
Monel & High Nickel Steel	75-175	75-200	.0010	.0012	.0015	.0017	.0020	.0025	.0030	.0040
Softer Titanium	125-300	125-375	.0010	.0012	.0015	.0017	.0020	.0030	.0040	.0060
Harder Titanium	50-150	50-175	.0005	.0006	.0007	.0008	.0010	.0015	.0020	.0020
Nickel Based High Temp Alloys	50-100	50-125	.0008	.0008	.0009	.0009	.0010	.0012	.0015	.0020

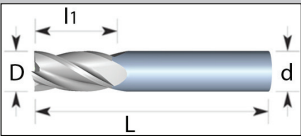
Note: These are guidelines only & the following points are important to consider:

- Higher Feed Per Tooth should be used to start for radial depths of cut less than 25% of the tool diameter. Lower Feed Per Tooth should be used to start for radial depths of cut greater than 25% of the tool diameter.
- The above recommendations are for axial lengths of cut not to exceed 1 times the tool diameter for profiling and .5 times the diameter for full slotting.
- The above parameters are recommended starting points only. If the tool is working well, without vibrations or significant noise, increase the SFM and/or Feed Per Tooth in 5-10% increments.
- Optimum speeds & feeds will depend upon material, setup, machine conditions & tool deflection. Higher or lower parameters may be required to achieve optimum machining conditions.
- For Light Radial Depths of cut, make certain to increase the feed rate to compensate for Radial Chip Thinning Factor (RCTF). Consult a formula or app to calculate.
- For Plunging or Ramping the feed rate should be reduced by about 50%.
- Climb Milling is preferred to Conventional Milling.



P	●	Steel
M	●	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

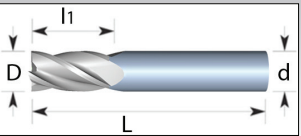
- Square End
- 2, 3, 4 Flute
- Single End
- Round Shanks
- Center Cutting
- Fractional Sizes
- General Purpose
- Micrograin Carbide
- Uncoated & TiALN Coated
- Plunging, Pocketing
- Slotting, Ramping
- Profiling



Square End - Fractional									
Cutter D	Shank d	LOC l1	Overall L	Uncoated			TiALN		
				2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
1/32	1/8	1/16	1-1/2	870213	870214	870215	870261	870262	870263
		3/32		870309	870310	870311	870498	870499	870500
3/64	1/8	3/32	1-1/2	870216	870217	870218	870264	870265	870266
		1/8		870312	870313	870314	870501	870502	870503
1/16	1/8	1/8	1-1/2	870219	870220	870221	870267	870268	870269
		3/16		870315	870316	870317	870504	870505	870506
5/64	1/8	1/4	1-1/2	870318	870319	870320	870507	870508	870509
3/32	1/8	3/16	1-1/2	870222	870223	870224	870270	870271	870272
		3/8		870321	870322	870323	870510	870511	870512
7/64	1/8	3/8	1-1/2	870327	870328	870329	870516	870517	870518
1/8	1/8	1/4	1-1/2	870228	870229	870230	870276	870277	870278
		1/2		870330	870331	870332	870519	870520	870521
		3/4	2-1/2	870689	--	870690	870711	--	870712
		1		870735	--	870736	870767	--	870768
9/64	3/16	9/16	2	870333	870334	870335	870522	870523	870524
5/32	3/16	5/16	2	870231	870232	870233	870279	870280	870281
		9/16		870336	870337	870338	870525	870526	870527
11/64	3/16	9/16	2	870339	870340	870341	870528	870529	870530
3/16	3/16	3/8	2	870234	870235	870236	870282	870283	870284
		5/8		870342	870343	870344	870531	870532	870533
		3/4	2-1/2	870691	--	870692	870713	--	870714
		1-1/8		870737	--	870738	870769	--	870770
13/64	1/4	5/8	2-1/2	870345	870346	870347	870534	870535	870536
7/32	1/4	7/16	2	870237	870238	870239	870285	870286	870287
		5/8	2-1/2	870348	870349	870350	870537	870538	870539
15/64	1/4	3/4	2-1/2	870351	870352	870353	870540	870541	870542
1/4	1/4	1/2	2	870240	870241	870242	870288	870289	870290
		3/4	2-1/2	870354	870355	870356	870543	870544	870545
		1-1/8	3	870693	--	870694	870715	--	870716
		1-1/2	4	870739	--	870740	870771	--	870772
17/64	5/16	7/8	2-1/2	870357	870358	870359	870546	870547	870548
9/32	5/16	7/8	2-1/2	870360	870361	870362	870549	870550	870551
19/64	5/16	7/8	2-1/2	870363	870364	870365	870552	870553	870554
5/16	5/16	1/2	2	870243	870244	870245	870291	870292	870293
		7/8	2-1/2	870366	870367	870368	870555	870556	870557
		1-1/8	3	870695	--	870696	870717	--	870718
		1-5/8	4	870743	--	870744	870775	--	870776
21/64	3/8	7/8	2-1/2	870369	870370	870371	870558	870559	870560

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- Square End
- 2, 3, 4 Flute
- Single End
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Square End - Fractional									
Cutter D	Shank d	LOC l1	Overall L	Uncoated			TiALN		
				2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
11/32	3/8	7/8	2-1/2	870372	870373	870374	870561	870562	870563
23/64	3/8	7/8	2-1/2	870375	870376	870377	870564	870565	870566
3/8	3/8	5/8	2	870246	870247	870248	870294	870295	870296
		1	2-1/2	870378	870379	870380	870567	870568	870569
		1-1/8	3	870697	--	870698	870719	--	870720
		1-3/4	4	870749	--	870750	870781	--	870782
25/64	7/16	1	2-1/2	870381	870382	870383	870570	870571	870572
13/32	7/16	1	2-1/2	870384	870385	870386	870573	870574	870575
27/64	7/16	1	2-1/2	870387	870388	870389	870576	870577	870578
7/16	7/16	5/8	2-1/2	870249	870250	870251	870297	870298	870299
		1	2-1/2	870390	870391	870392	870579	870580	870581
		2	4	870699	--	870700	870721	--	870722
29/64	1/2	1	3	870393	870394	870395	870582	870583	870584
15/32	1/2	1	3	870396	870397	870398	870585	870586	870587
31/64	1/2	1	3	870399	870400	870401	870588	870589	870590
1/2	1/2	5/8	2-1/2	870252	870253	870254	870300	870301	870302
		1	3	870402	870403	870404	870591	870592	870593
		1-1/4	3	--	--	872519	--	--	872518
		2	4	870701	--	870702	870723	--	870724
		3	6	870753	--	870754	870785	--	870786
33/64	9/16	1-1/4	3-1/2	870405	870406	870407	870594	870595	870596
17/32	9/16	1-1/4	3-1/2	870408	870409	870410	870597	870598	870599
35/64	9/16	1-1/4	3-1/2	870411	870412	870413	870600	870601	870602
9/16	9/16	1-1/4	3-1/2	870414	870415	870416	870603	870604	870605
37/64	5/8	1-1/4	3-1/2	870417	870418	870419	870606	870607	870608
19/32	5/8	1-1/4	3-1/2	870420	870421	870422	870609	870610	870611
39/64	5/8	1-1/4	3-1/2	870423	870424	870425	870612	870613	870614
5/8	5/8	3/4	3	870255	870256	870257	870303	870304	870305
		1-1/4	3-1/2	870426	870427	870428	870615	870616	870617
		2-1/4	5	870705	--	870706	870727	--	870728
		3	6	870757	--	870758	870789	--	870790
41/64	3/4	1-1/2	4	870429	870430	870431	870618	870619	870620
21/32	3/4	1-1/2	4	870432	870433	870434	870621	870622	870623
43/64	3/4	1-1/2	4	870435	870436	870437	870624	870625	870626
11/16	3/4	1-1/2	4	870438	870439	870440	870627	870628	870629
45/64	3/4	1-1/2	4	870441	870442	870443	870630	870631	870632
23/32	3/4	1-1/2	4	870444	870445	870446	870633	870634	870635
47/64	3/4	1-1/2	4	870447	870448	870449	870636	870637	870638

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- Square End

■ 2, 3, 4 Flute

■ Single End

■ Round Shanks

■ Center Cutting

■ Fractional & Metric
- General Purpose

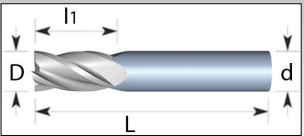
■ Micrograin Carbide

■ Uncoated & TiALN Coated

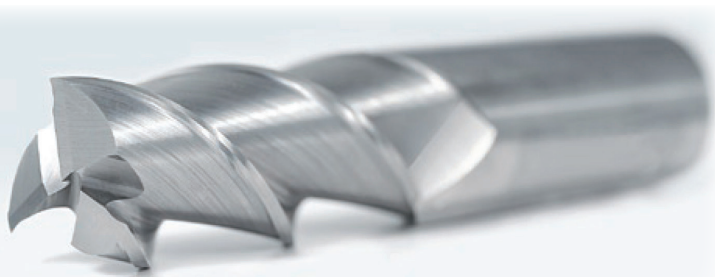
■ Plunging, Pocketing

■ Slotting, Ramping

■ Profiling



Square End - Fractional									
Cutter	Shank	LOC	Overall	Uncoated			TiALN		
D	d	L1	L	2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
3/4	3/4	1	3	870258	870259	870260	870306	870307	870308
		1-1/2	4	870450	870451	870452	870639	870640	870641
		2-1/4	5	870707	--	870708	870729	--	870730
		3	6	870759	--	870760	870791	--	870792
49/64	7/8	1-1/2	4	870453	870454	870455	870642	870643	870644
25/32	7/8	1-1/2	4	870456	870457	870458	870645	870646	870647
51/64	7/8	1-1/2	4	870459	870460	870461	870648	870649	870650
13/16	7/8	1-1/2	4	870462	870463	870464	870651	870652	870653
53/64	7/8	1-1/2	4	870465	870466	870467	870654	870655	870656
27/32	7/8	1-1/2	4	870468	870469	870470	870657	870658	870659
55/64	7/8	1-1/2	4	870471	870472	870473	870660	870661	870662
7/8	7/8	1-1/2	4	870474	870475	870476	870663	870664	870665
57/64	1	1-1/2	4	870477	870478	870479	870666	870667	870668
29/32	1	1-1/2	4	870480	870481	870482	870669	870670	870671
59/64	1	1-1/2	4	870483	870484	870485	870672	870673	870674
15/16	1	1-1/2	4	870486	870487	870488	870675	870676	870677
61/64	1	1-1/2	4	870489	870490	870491	870678	870679	870680
31/32	1	1-1/2	4	870492	870493	870494	870681	870682	870683
63/64	1	1-1/2	4	870495	870496	870497	870684	870685	870686
1	1	1	3	870225	870226	870227	870273	870274	870275
		1-1/2	4	870324	870325	870326	870513	870514	870515
		2-1/4	5	870687	--	870688	870709	--	870710
		3	6	870731	--	870732	870763	--	870764



Precision Grinding with
high quality surface
finishes for maximum
tool life!

Square End - Metric									
Cutter	Shank	LOC	Overall	Uncoated			TiALN		
D	d	L1	L	2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
1	1	3	38	871617	871618	871619	871683	871684	871685
1.5	2	5	38	871620	871621	871622	871686	871687	871688
2	2	6	38	871623	871624	871625	871689	871690	871691

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- Square End

■ 2, 3, 4 Flute

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■ Metric Sizes
- General Purpose

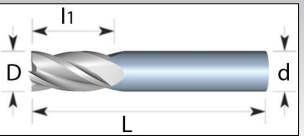
■ Micrograin Carbide

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■ Profiling



Square End - Metric									
Cutter	Shank	LOC	Overall	Uncoated			TiALN		
D	d	L1	L	2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
3	3	12	38	871629	871630	871631	871695	871696	871697
		25	75	871837	--	871838	871861	--	871862
		25	100	871885	--	871886	871901	--	871902
3.5	4	12	50	871632	871633	871634	871698	871699	871700
4	4	14	50	871635	871636	871637	871701	871702	871703
		25	75	871839	--	871840	871863	--	871864
		50	100	871887	--	871888	871903	--	871904
4.5	5	14	50	871638	871639	871640	871704	871705	871706
5	5	16	50	871641	871642	871643	871707	871708	871709
		25	75	871841	--	871842	871865	--	871866
		30	100	871889	--	871890	871905	--	871906
6	6	19	63	871644	871645	871646	871710	871711	871712
		25	75	871843	--	871844	871867	--	871868
		50	100	871891	--	871892	871907	--	871908
7	7	19	63	871647	871648	871649	871713	871714	871715
8	8	19	63	871650	871651	871652	871716	871717	871718
		30	100	871845	--	871846	871869	--	871870
		50	150	871893	--	871894	871909	--	871910
9	10	22	70	871653	871654	871655	871719	871720	871721
10	10	22	70	871656	871657	871658	871722	871723	871724
		38	100	871847	--	871848	871871	--	871872
		75	150	871895	--	871896	871911	--	871912
11	12	25	70	871659	871660	871661	871725	871726	871727
12	12	25	75	871662	871663	871664	871728	871729	871730
		50	100	871849	--	871850	871873	--	871874
		75	150	871897	--	871898	871913	--	871914
14	14	30	88	871665	871666	871667	871731	871732	871733
		50	125	871851	--	871852	871875	--	871876
		75	150	871899	--	871900	871915	--	871916
16	16	32	88	871668	871669	871670	871734	871735	871736
		75	150	871853	--	871854	871877	--	871878
18	18	36	100	871671	871672	871673	871737	871738	871739
		75	150	871855	--	871856	871879	--	871880
20	20	38	100	871674	871675	871676	871740	871741	871742
		75	150	871857	--	871858	871881	--	871882
22	25	38	100	871677	871678	871679	871743	871744	871745
		38	100	871680	871681	871682	871746	871747	871748
25	25	75	150	871859	--	871860	871883	--	871884

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M	●	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

- Ball Nose End

▪ 2, 3, 4 Flute

▪ Single End

▪ Round Shanks

▪ Center Cutting

▪ Fractional Sizes
- General Purpose

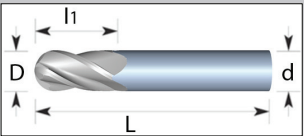
▪ Micrograin Carbide

▪ Uncoated & TiAlN Coated

▪ Plunging, Pocketing

▪ Slotting, Ramping

▪ Profiling



Ball Nose - Fractional									
Cutter D	Shank d	LOC l1	Overall L	Uncoated			TiAlN		
				2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
1/32	1/8	1/16	1-1/2	870795	870796	870797	870843	870844	870845
		3/32		870891	870892	870893	871080	871081	871082
3/64	1/8	3/32	1-1/2	870798	870799	870800	870846	870847	870848
		1/8		870894	870895	870896	871083	871084	871085
1/16	1/8	1/8	1-1/2	870801	870802	870803	870849	870850	870851
		3/16		870897	870898	870899	871086	871087	871088
5/64	1/8	1/4	1-1/2	870900	870901	870902	871089	871090	871091
3/32	1/8	3/16	1-1/2	870804	870805	870806	870852	870853	870854
		3/8		870903	870904	870905	871092	871093	871094
7/64	1/8	3/8	1-1/2	870909	870910	870911	871098	871099	871100
1/8	1/8	1/4	1-1/2	870810	870811	870812	870858	870859	870860
		1/2		870912	870913	870914	871101	871102	871103
		3/4	2-1/2	871271	--	871272	871293	--	871294
		1		871317	--	871318	871349	--	871350
9/64	3/16	9/16	2	870915	870916	870917	871104	871105	871106
5/32	3/16	5/16	2	870813	870814	870815	870861	870862	870863
		9/16		870918	870919	870920	871107	871108	871109
11/64	3/16	9/16	2	870921	870922	870923	871110	871111	871112
3/16	3/16	3/8	2	870816	870817	870818	870864	870865	870866
		5/8		870924	870925	870926	871113	871114	871115
		3/4	2-1/2	871273	--	871274	871295	--	871296
		1-1/8		871319	--	871320	871351	--	871352
13/64	1/4	5/8	2-1/2	870927	870928	870929	871116	871117	871118
7/32	1/4	7/16	2	870819	870820	870821	870867	870868	870869
		5/8	2-1/2	870930	870931	870932	871119	871120	871121
15/64	1/4	3/4	2-1/2	870933	870934	870935	871122	871123	871124
1/4	1/4	1/2	2	870822	870823	870824	870870	870871	870872
		3/4	2-1/2	870936	870937	870938	871125	871126	871127
		1-1/8	3	871275	--	871276	871297	--	871298
		1-1/2	4	871321	--	871322	871353	--	871354
17/64	5/16	7/8	2-1/2	870939	870940	870941	871128	871129	871130
9/32	5/16	7/8	2-1/2	870942	870943	870944	871131	871132	871133
19/64	5/16	7/8	2-1/2	870945	870946	870947	871134	871135	871136
5/16	5/16	1/2	2	870825	870826	870827	870873	870874	870875
		7/8	2-1/2	870948	870949	870950	871137	871138	871139
		1-1/8	3	871277	--	871278	871299	--	871300
		1-5/8	4	871325	--	871326	871357	--	871358

P	●	Steel
M	●	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S		High Temp. Alloys
H		Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

- Ball Nose End

▪ 2, 3, 4 Flute

▪ Single End

▪ Round Shanks

▪ Center Cutting

▪ Fractional Sizes
- General Purpose

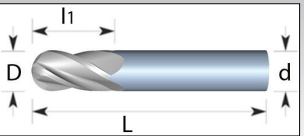
▪ Micrograin Carbide

▪ Uncoated & TiAlN Coated

▪ Plunging, Pocketing

▪ Slotting, Ramping

▪ Profiling

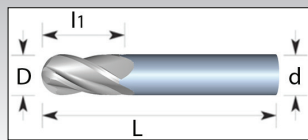


Ball Nose - Fractional									
Cutter D	Shank d	LOC l1	Overall L	Uncoated			TiAlN		
				2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
11/32	3/8	7/8	2-1/2	870951	870952	870953	871140	871141	871142
23/64	3/8	7/8	2-1/2	870954	870955	870956	871143	871144	871145
3/8	3/8	5/8	2	870957	870958	870959	871146	871147	871148
		1	2-1/2	870828	870829	870830	870876	870877	870878
		1-1/8	3	870960	870961	870962	871149	871150	871151
25/64	7/16	1-3/4	4	871279	--	871280	871301	--	871302
		1	2-1/2	871331	--	871332	871363	--	871364
		1	2-1/2	870963	870964	870965	871152	871153	871154
13/32	7/16	1	2-1/2	870966	870967	870968	871155	871156	871157
27/64	7/16	1	2-1/2	870969	870970	870971	871158	871159	871160
7/16	7/16	5/8	2-1/2	870831	870832	870833	870879	870880	870881
		1	2	870972	870973	870974	871161	871162	871163
		2	4	870975	--	870976	871164	871165	871166
29/64	1/2	1	3	871281	--	871282	871303	--	871304
15/32	1/2	1	3	870975	870976	870977	871164	871165	871166
31/64	1/2	1	3	870978	870979	870980	871167	871168	871169
1/2	1/2	5/8	2-1/2	870981	870982	870983	871170	871171	871172
		1	3	870834	870835	870836	870882	870883	870884
		1-1/4	3	870984	870985	870986	871173	871174	871175
		2	4	871283	--	871284	871305	--	871306
33/64	9/16	3	6	871335	--	871336	871367	--	871368
		1-1/4	3-1/2	870987	870988	870989	871176	871177	871178
		1-1/4	3-1/2	870990	870991	870992	871179	871180	871181
17/32	9/16	1-1/4	3-1/2	870993	870994	870995	871182	871183	871184
35/64	9/16	1-1/4	3-1/2	870996	870997	870998	871185	871186	871187
9/16	9/16	1-1/4	3-1/2	870999	871000	871001	871188	871189	871190
37/64	5/8	1-1/4	3-1/2	871002	871003	871004	871191	871192	871193
19/32	5/8	1-1/4	3-1/2	871005	871006	871007	871194	871195	871196
39/64	5/8	1-1/4	3-1/2	5/8	5/8	5/8	870885	870886	870887
5/8	5/8	3/4	3						
		1-1/4	3-1/2						
		2-1/4	5						
		3	6						
41/64	3/4	1-1/2	4	871011	871012	871013	871200	871201	871202
21/32	3/4	1-1/2	4	871014	871015	871016	871203	871204	871205
43/64	3/4	1-1/2	4	871017	871018	871019	871206	871207	871208
11/16	3/4	1-1/2	4	871020	871021	871022	871209	871210	871211
45/64	3/4	1-1/2	4	871023	871024	#N/A	871212	871213	871214
23/32	3/4	1-1/2	4	871026	871027	871028	871215	871216	871217
47/64	3/4	1-1/2	4	871029	871030	871031	871218	871219	871220

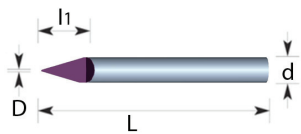
P	●	Steel
M	●	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	○	Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

- Ball Nose End
- 2, 3, 4 Flute
- Single End
- Round Shanks
- Center Cutting
- Fractional Sizes

- General Purpose
- Micrograin Carbide
- Uncoated & TiALN Coated
- Plunging, Pocketing
- Slotting, Ramping
- Profiling

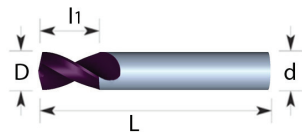


Ball Nose - Fractional									
Cutter	Shank	LOC	Overall	Uncoated			TiALN		
D	d	l1	L	2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
3/4	3/4	1	3	870840	870841	870842	870888	870889	870890
		1-1/2	4	871032	871033	871034	871221	871222	871223
		2-1/4	5	871289	--	871290	871311	--	871312
		3	6	871341	--	871342	871373	--	871374
49/64	7/8	1-1/2	4	871035	871036	871037	871224	871225	871226
25/32	7/8	1-1/2	4	871038	871039	871040	871227	871228	871229
51/64	7/8	1-1/2	4	871041	871042	871043	871230	871231	871232
13/16	7/8	1-1/2	4	871044	871045	871046	871233	871234	871235
53/64	7/8	1-1/2	4	871047	871048	871049	871236	871237	871238
27/32	7/8	1-1/2	4	871050	871051	871052	871239	871240	871241
55/64	7/8	1-1/2	4	871053	871054	871055	871242	871243	871244
7/8	7/8	1-1/2	4	871056	871057	871058	871245	871246	871247
57/64	1	1-1/2	4	871059	871060	871061	871248	871249	871250
29/32	1	1-1/2	4	871062	871063	871064	871251	871252	871253
59/64	1	1-1/2	4	871065	871066	871067	871254	871255	871256
15/16	1	1-1/2	4	871068	871069	871070	871257	871258	871259
61/64	1	1-1/2	4	871071	871072	871073	871260	871261	871262
31/32	1	1-1/2	4	871074	871075	871076	871263	871264	871265
63/64	1	1-1/2	4	871077	871078	871079	871266	871267	871268
1	1	1	3	870807	870808	870809	870855	870856	870857
		1-1/2	4	870906	870907	870908	871095	871096	871097
		2-1/4	5	871269	--	871270	871291	--	871292
		3	6	871313	--	871314	871345	--	871346



- Engraving Tools with 30 Degree angle
- 3 tip sizes to choose from

Engraving Tools				
Tip	Shank	LOC	Overall	TiALN
D	d	l1	L	1 Flute
.005	1/4	1/2	2-1/2	872509
.010	1/4	1/2	2-1/2	872510
.020	1/4	1/2	2-1/2	872511



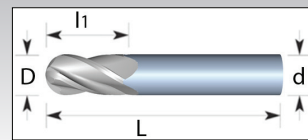
- Allows High Performance drills to center properly without damaging their outside edge
- 145 Degree Point Carbide with honed edges

Spot Drills				
Drill	Shank	LOC	Overall	TiALN
D	d	l1	L	2 Flute
1/4	1/4	1/2	3	872512
3/8	3/8	3/4	3	872513
1/2	1/2	1	4	872514
5/8	5/8	1	4	872515
3/4	3/4	1-1/8	4	872516

P	●	Steel
M	●	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	○	Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

- Ball Nose End
- 2 & 4 Flute
- Single End
- Round Shanks
- Center Cutting
- Metric Sizes

- General Purpose
- Micrograin Carbide
- Uncoated & TiALN Coated
- Plunging, Pocketing
- Slotting, Ramping
- Profiling

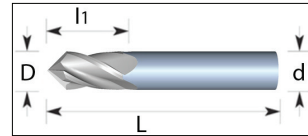


Ball Nose - Metric									
Cutter	Shank	LOC	Overall	Uncoated			TiALN		
D	d	l1	L	2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
1	1	3	38	871749	--	871750	871793	--	871794
1.5	2	5	38	871751	--	871752	871795	--	871796
2	2	6	38	871753	--	871754	871797	--	871798
3	3	12	38	871757	--	871758	871801	--	871802
3.5	4	12	50	871759	--	871760	871803	--	871804
4	4	14	50	871761	--	871762	871805	--	871806
4.5	5	14	50	871763	--	871764	871807	--	871808
5	5	16	50	871765	--	871766	871809	--	871810
6	6	19	63	871767	--	871768	871811	--	871812
7	7	19	63	871769	--	871770	871813	--	871814
8	8	19	63	871771	--	871772	871815	--	871816
9	9	22	70	871773	--	871774	871817	--	871818
10	10	22	70	871775	--	871776	871819	--	871820
11	11	25	70	871777	--	871778	871821	--	871822
12	12	25	75	871779	--	871780	871823	--	871824
14	14	30	88	871781	--	871782	871825	--	871826
16	16	32	88	871783	--	871784	871827	--	871828
18	18	36	100	871785	--	871786	871829	--	871830
20	20	38	100	871787	--	871788	871831	--	871832
22	25	38	100	871789	--	871790	871833	--	871834
25	25	38	100	871791	--	871792	871835	--	871836

- 90 Degree End
- 2 & 4 Flute
- Single End
- Round Shanks

- Center Cutting
- Fractional Sizes
- General Purpose
- Micrograin Carbide

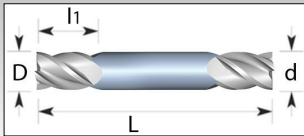
- Uncoated & TiALN Coated
- Milling, Drilling
- Countersinking
- Chamfering, De-burring



Drill/Mill 90 Degree - Fractional									
Cutter	Shank	LOC	Overall	Uncoated			TiALN		
D	d	l1	L	2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
1/8	1/8	1/2	1-1/2	871917	--	871918	871935	--	871936
3/16	3/16	5/8	2	871919	--	871920	871937	--	871938
1/4	1/4	3/4	2-1/2	871921	--	871922	871939	--	871940
5/16	5/16	7/8	2-1/2	871923	--	871924	871941	--	871942
3/8	3/8	1	2-1/2	871925	--	871926	871943	--	871944
7/16	7/16	1	2-3/4	871927	--	871928	871945	--	871946
1/2	1/2	1	3	871929	--	871930	871947	--	871948
5/8	5/8	1-1/4	3-1/2	871931	--	871932	871949	--	871950
3/4	3/4	1-1/2	4	871933	--	871934	871951	--	871952

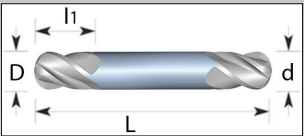
P	●	Steel
M	●	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	○	Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

- Square End
- 2 & 4 Flute
- Double End
- 1/32-7/32 Round Shanks
- 1/4-3/4 Weldon Shanks
- Fractional Sizes
- General Purpose
- Micrograin Carbide
- Uncoated & TiALN Coated
- Plunging, Pocketing
- Slotting, Ramping
- Profiling



P	●	Steel
M	●	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	○	Hardened Steel
● GOOD ● OK ○ NOT OPTIMAL		

- Ball Nose End
- 2 & 4 Flute
- Double End
- 1/32-7/32 Round Shanks
- 1/4-3/4 Weldon Shanks
- Fractional Sizes
- General Purpose
- Micrograin Carbide
- Uncoated & TiALN Coated
- Plunging, Pocketing
- Slotting, Ramping
- Profiling



Square Double End - Fractional									
Cutter D	Shank d	LOC l1	Overall L	Uncoated			TiALN		
				2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
1/32	1/8	1/16	1-1/2	871377	--	871378	871413	--	871414
3/64	1/8	3/32	1-1/2	871379	--	871380	871415	--	871416
1/16	1/8	1/8	1-1/2	871381	--	871382	871417	--	871418
3/32	1/8	3/16	1-1/2	871383	--	871384	871419	--	871420
7/64	1/8	7/32	1-1/2	871385	--	871386	871421	--	871422
1/8	1/8	1/4	1-1/2	871387	--	871388	871423	--	871424
5/32	3/16	5/16	2	871389	--	871390	871425	--	871426
		7/16	3	871521	--	871522	871545	--	871546
3/16	3/16	5/16	2	871391	--	871392	871427	--	871428
		1/2	3	871523	--	871524	871547	--	871548
7/32	1/4	3/8	2-1/2	871393	--	871394	871429	--	871430
		9/16	4	871525	--	871526	871549	--	871550
1/4	1/4	1/2	2-1/2	871395	--	871396	871431	--	871432
		5/8	4	871527	--	871528	871551	--	871552
9/32	5/16	1/2	2-1/2	871397	--	871398	871433	--	871434
5/16	5/16	1/2	2-1/2	871399	--	871400	871435	--	871436
		3/4	4	871529	--	871530	871553	--	871554
3/8	3/8	9/16	2-1/2	871401	--	871402	871437	--	871438
		3/4	4	871533	--	871534	871557	--	871558
7/16	1/2	9/16	2-3/4	871403	--	871404	871439	--	871440
		7/8	4	871535	--	871536	871559	--	871560
1/2	1/2	5/8	3	871405	--	871406	871441	--	871442
		1	4	871537	--	871538	871561	--	871562
9/16	5/8	11/16	3-1/2	871407	--	871408	871443	--	871444
5/8	5/8	11/16	3-1/2	871409	--	871410	871445	--	871446
		1-1/2	6	871541	--	871542	871565	--	871566
3/4	3/4	7/8	4	871411	--	871412	871447	--	871448
		1-1/2	6	871543	--	871544	871567	--	871568

Ball Nose Double End - Fractional									
Cutter D	Shank d	LOC l1	Overall L	Uncoated			TiALN		
				2 Flute	3 Flute	4 Flute	2 Flute	3 Flute	4 Flute
1/32	1/8	1/16	1-1/2	871449	--	871450	871485	--	871486
3/64	1/8	3/32	1-1/2	871451	--	871452	871487	--	871488
1/16	1/8	1/8	1-1/2	871453	--	871454	871489	--	871490
3/32	1/8	3/16	1-1/2	871455	--	871456	871491	--	871492
7/64	1/8	7/32	1-1/2	871457	--	871458	871493	--	871494
1/8	1/8	1/4	1-1/2	871459	--	871460	871495	--	871496
5/32	3/16	5/16	2	871461	--	871462	871497	--	871498
		7/16	3	871569	--	871570	871593	--	871594
3/16	3/16	5/16	2	871463	--	871464	871499	--	871500
		1/2	3	871571	--	871572	871595	--	871596
7/32	1/4	3/8	2-1/2	871465	--	871466	871501	--	871502
		9/16	4	871573	--	871574	871597	--	871598
1/4	1/4	1/2	2-1/2	871467	--	871468	871503	--	871504
		5/8	4	871575	--	871576	871599	--	871600
9/32	5/16	1/2	2-1/2	871469	--	871470	871505	--	871506
5/16	5/16	1/2	2-1/2	871471	--	871472	871507	--	871508
		3/4	4	871577	--	871578	871601	--	871602
3/8	3/8	9/16	2-1/2	871473	--	871474	871509	--	871510
		3/4	4	871581	--	871582	871605	--	871606
7/16	1/2	9/16	2-3/4	871475	--	871476	871511	--	871512
		7/8	4	871583	--	871584	871607	--	871608
1/2	1/2	5/8	3	871477	--	871478	871513	--	871514
		1	4	871585	--	871586	871609	--	871610
9/16	5/8	11/16	3-1/2	871479	--	871480	871515	--	871516
5/8	5/8	11/16	3-1/2	871481	--	871482	871517	--	871518
		1-1/2	6	871589	--	871590	871613	--	871614
3/4	3/4	7/8	4	871483	--	871484	871519	--	871520
		1-1/2	6	871591	--	871592	871615	--	871616

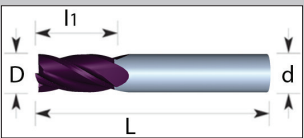
HIGH PERFORMANCE

Speeds & Feeds

Material Classification	Speed SFM	Feed Per Tooth By End Mill Diameter (IPT)							
		1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
Aluminum Alloys & Aluminum	900-1800	.0025	.0030	.0035	.0040	.0045	.0055	.0065	.0085
Copper Alloys & Copper	525-1275	.0025	.0030	.0030	.0035	.0035	.0040	.0045	.0065
Bronze & Brass	375-600	.0025	.0030	.0030	.0035	.0035	.0040	.0045	.0055
Graphite	--	--	--	--	--	--	--	--	--
Plastics	--	--	--	--	--	--	--	--	--
Softer Cast Iron	375-650	.0025	.0027	.0030	.0032	.0035	.0040	.0065	.0085
Harder Cast Iron	100-375	.0013	.0015	.0020	.0022	.0025	.0030	.0035	.0045
Ductile Iron	100-600	.0015	.0017	.0020	.0022	.0025	.0035	.0045	.0065
Malleable Iron	225-650	.0015	.0020	.0025	.0030	.0035	.0045	.0055	.0075
Low Carbon Steels (1020 & Under)	300-600	.0015	.0020	.0025	.0030	.0035	.0045	.0055	.0075
Medium Carbon Steels (1030-1060)	150-375	.0020	.0021	.0022	.0023	.0025	.0035	.0045	.0055
Alloy Steels Hardened to 35 Rc	130-345	.0015	.0016	.0017	.0018	.0020	.0022	.0025	.0035
Alloy Steels Hardened to 40-50 Rc	70-160	.0012	.0012	.0013	.0014	.0015	.0020	.0025	.0035
Die Steels Hardened to 51-60 Rc	--	--	--	--	--	--	--	--	--
Tool Steels	150-375	.0015	.0017	.0020	.0022	.0025	.0030	.0035	.0045
Mold Steels	300-525	.0015	.0017	.0020	.0022	.0025	.0030	.0035	.0045
Softer Stainless Steels	300-450	.0015	.0017	.0020	.0017	.0025	.0035	.0045	.0065
Harder Stainless Steels	150-300	.0010	.0011	.0012	.0013	.0015	.0025	.0035	.0055
Monel & High Nickel Steel	75-200	.0015	.0017	.0020	.0021	.0025	.0030	.0035	.0045
Softer Titanium	125-375	.0015	.0017	.0020	.0021	.0025	.0035	.0045	.0065
Harder Titanium	50-175	.0010	.0011	.0012	.0012	.0014	.0017	.0022	.0023
Nickel Based High Temp Alloys	50-125	.0013	.0012	.0011	.0011	.0014	.0015	.0017	.0023

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High Temp. Alloys
H	Hardened Steel
● BETTER ◐ OK ○ NOT OPTIMAL	

- Square & Corner Radius End
 - 4 Flute TiAlN Coated
 - Variable Pitch, Reduces Chatter
 - Round & Weldon Shanks
 - Center Cutting
 - Fractional Sizes
- High Performance
 - Micrograin Carbide
 - Unique Honing Process
 - Plunging, Pocketing
 - Slotting, Ramping
 - Profiling

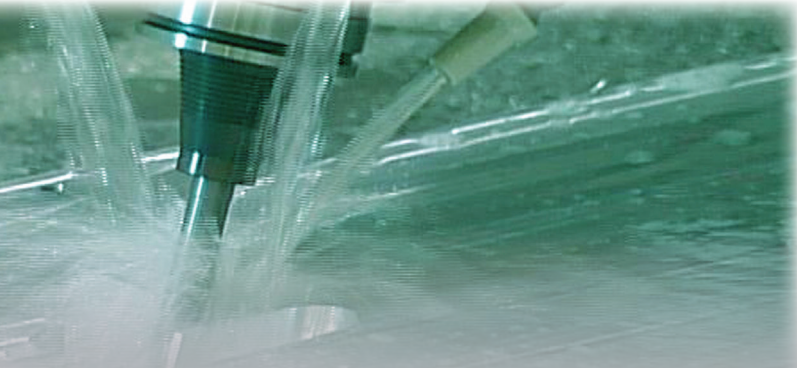


Square & Corner Radius End - Fractional

Cutter D	Shank d	LOC l1	Overall L	End Face	TiAlN		
					4 Flute Round Shank	4 Flute Weldon Shank	5 Flute Round Shank
1/8	1/8	1/2	1-1/2	SQ	872520	--	--
		1/2	1-1/2	.010"R	872521	--	--
3/16	3/16	3/8	2	SQ	872447	--	--
		3/8	2	.015"R	872448	--	--
		5/8	2	SQ	872304	--	--
		5/8	2	.015"R	872305	--	--
		3/4	2-1/2	SQ	872353	--	--
		3/4	2-1/2	.015"R	872354	--	--
1/4	1/4	1-1/8	3	SQ	872432	--	--
		1-1/8	3	.015"R	872523	--	--
		3/8	2	SQ	872449	--	--
		3/8	2	.015"R	872450	--	--
		3/4	2-1/2	SQ	872306	872330	872540
		3/4	2-1/2	.020"R	872307	872331	872541
5/16	5/16	1-1/8	3	SQ	872355	872378	872554
		1-1/8	3	.020"R	872356	872379	872555
		1-1/2	4	SQ	872433	--	872568
		1-1/2	4	.020"R	872524	--	872569
		3/8	2	SQ	872451	--	--
		3/8	2	.020"R	872452	--	--
3/8	3/8	13/16	2-1/2	SQ	872308	872332	872542
		13/16	2-1/2	.020"R	872309	872333	872543
		1-1/8	3	SQ	872357	872380	872556
		1-1/8	3	.020"R	872358	872381	872557
		1-5/8	4	SQ	872434	--	872570
		1-5/8	4	.020"R	872525	--	872571
7/16	7/16	1/2	2	SQ	872453	--	--
		1/2	2	.020"R	872454	--	--
		7/8	2-1/2	SQ	872310	872334	872544
		7/8	2-1/2	.020"R	872311	872335	872545
		1-1/8	3	SQ	872359	872382	872558
		1-1/8	3	.020"R	872360	872383	872559
1/2	1/2	1-3/4	4	SQ	872435	--	872572
		1-3/4	4	.020"R	872526	--	872573
		1	2-3/4	SQ	872313	872336	--
		2	4	SQ	872361	872384	--
		5/8	2-1/2	SQ	872455	872461	--
		5/8	2-1/2	.030"R	872456	872462	--
1/2	1/2	1-1/4	3	SQ	872314	872337	872546
		1-1/4	3	.015"R	872315	872338	--
		1-1/4	3	.030"R	872316	872339	872547
		1-1/4	3	.060"R	872317	872340	--

Note: These are guidelines only & the following points are important to consider:

- Higher Feed Per Tooth should be used to start for radial depths of cut less than 25% of the tool diameter.
- The above recommendations are for axial lengths of cut not to exceed 1.25 times the tool diameter for profiling and .75 times the diameter for full slotting.
- The above parameters are recommended starting points only. If the tool is working well, without vibrations or significant noise, increase the SFM and/or Feed Per Tooth in 5-10% increments.
- Optimum speeds & feeds will depend upon material, setup, machine conditions & tool deflection. Higher or lower parameters may be required to achieve optimum machining conditions.
- For Light Radial Depths of cut, make certain to increase the feed rate to compensate for Radial Chip Thinning Factor (RCTF). Consult a formula or app to calculate.
- For Plunging or Ramping the feed rate should be reduced by about 50%.
- Climb Milling is preferred to Conventional Milling.



P	●	Steel
M	◐	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H		Hardened Steel
● BETTER ◐ OK ○ NOT OPTIMAL		

- Square & Corner Radius End

▪ 4 Flute TiALN Coated

▪ Variable Pitch, Reduces Chatter

▪ Round & Weldon Shanks

▪ Center Cutting

▪ Fractional Sizes
- High Performance

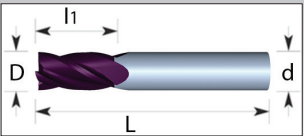
▪ Micrograin Carbide

▪ Unique Honing Process

▪ Plunging, Pocketing

▪ Slotting, Ramping

▪ Profiling



Square & Corner Radius End - Fractional								
Cutter D	Shank d	LOC l1	Overall L	End Face	TiALN			
					4 Flute Round Shank	4 Flute Weldon Shank	5 Flute Round Shank	
1/2	1/2	2	4	SQ	872362	872385	872560	
		2	4	.015"R	872363	872386	--	
		2	4	.030"R	872364	872387	872561	
		2	4	.060"R	872365	872388	--	
		3	6	SQ	872436	--	872574	
		3	6	.030"R	872527	--	872575	
5/8	5/8	3/4	3	SQ	872457	872463	--	
		3/4	3	.030"R	872458	872464	--	
		1-1/4	3-1/2	SQ	872318	872341	872548	
		1-1/4	3-1/2	.030"R	872319	872342	872549	
		1-1/4	3-1/2	.060"R	872320	872343	--	
		1-1/4	3-1/2	.125"R	872321	872344	--	
		2-1/4	5	SQ	872366	872389	872562	
		2-1/4	5	.030"R	872367	872390	872563	
		2-1/4	5	.060"R	872368	872391	--	
		2-1/4	5	.125"R	872369	872392	--	
		3	6	SQ	872437	--	872576	
		3	6	.030"R	872528	--	872577	
		1	3	SQ	872459	872465	--	
		1	3	.030"R	872460	872466	--	
3/4	3/4	1-1/2	4	SQ	872322	872345	872550	
		1-1/2	4	.030"R	872323	872346	872551	
		1-1/2	4	.060"R	872324	872347	--	
		1-1/2	4	.125"R	872325	872348	--	
		2-1/4	5	SQ	872370	872393	872564	
		2-1/4	5	.030"R	872371	872394	872565	
		2-1/4	5	.060"R	872372	872395	--	
		2-1/4	5	.125"R	872373	872396	--	
		3	6	SQ	872438	--	872578	
		3	6	.030"R	872529	--	872579	
		1-1/2	4	SQ	872300	872326	872538	
		1-1/2	4	.030"R	872301	872327	872539	
1	1	1-1/2	4	.060"R	872302	872328	--	
		1-1/2	4	.125"R	872303	872329	--	
		2-1/4	5	SQ	872349	872374	872552	
		2-1/4	5	.030"R	872350	872375	872553	
		2-1/4	5	.060"R	872351	872376	--	
		2-1/4	5	.125"R	872352	872377	--	
		3	6	SQ	872431	--	872566	
		3	6	.030"R	872522	--	872567	

P	●	Steel
M	◐	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H		Hardened Steel
● BETTER ◐ OK ○ NOT OPTIMAL		

- Ball Nose End

▪ 4 Flute TiALN Coated

▪ Variable Pitch, Reduces Chatter

▪ Round & Weldon Shanks

▪ Center Cutting

▪ Fractional Sizes
- High Performance

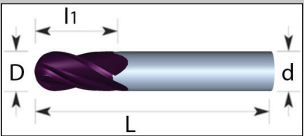
▪ Micrograin Carbide

▪ Unique Honing Process

▪ Plunging, Pocketing

▪ Slotting, Ramping

▪ Profiling

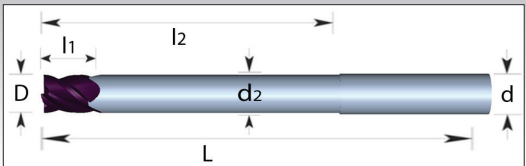


Ball Nose - Fractional								
Cutter D	Shank d	LOC l1	Overall L	End Face	TiALN			
					4 Flute Round Shank	4 Flute Weldon Shank		
3/16	3/16	5/8	2	BN	872398	--		
		3/4	2-1/2	BN	872415	--		
		1-1/8	3	BN	872440	--		
1/4	1/4	3/4	2-1/2	BN	872399	872407		
		1-1/8	3	BN	872416	872424		
		1-1/2	4	BN	872441	--		
5/16	5/16	13/16	2-1/2	BN	872400	872408		
		1-1/8	3	BN	872417	872425		
		1-5/8	4	BN	872442	--		
3/8	3/8	7/8	2-1/2	BN	872401	872409		
		1-1/8	3	BN	872418	872426		
		1-3/4	4	BN	872443	--		
7/16	7/16	1	2-3/4	BN	872402	872410		
		2	4	BN	872419	872427		
1/2	1/2	1	3	BN	872403	872411		
		2	4	BN	872420	872428		
		3	6	BN	872444	--		
5/8	5/8	1-1/4	3-1/2	BN	872404	872412		
		2-1/4	5	BN	872421	872429		
		3	6	BN	872445	--		
3/4	3/4	1-1/2	4	BN	872405	872413		
		2-1/4	5	BN	872422	872430		
		3	6	BN	872446	--		
1	1	1-1/2	4	BN	872397	872406		
		2-1/4	5	BN	872414	872423		
		3	6	BN	872439	--		

Long Reach Neck Relief - Fractional								
Cutter D	Shank d	Neck d2	LOC l1	L.B.S l2	Overall L	End Face	TiALN	
							4 Flute Round Shank	
3/16	3/16	.1775	3/8	2-1/2	4	SQ	872473	
		.1775	3/8	2-1/2	4	.015"R	872474	
		.1775	3/8	2-1/2	4	BN	872498	
1/4	1/4	.2400	3/8	2-1/2	4	SQ	872475	
		.2400	3/8	2-1/2	4	.015"R	872476	
		.2400	3/8	2-1/2	4	BN	872499	

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High Temp. Alloys
H	Hardened Steel
● BETTER ● OK ○ NOT OPTIMAL	

- Long Reach & Neck Relieved
- Same design features as all ICEPICK HP End Mills
- Square, Corner Radius & Ball Nose
- 4 Flute TiALN Coated
- Center Cutting, Fractional Sizes
- Long Reach with side wall clearance



Long Reach Neck Relief - Fractional							
Cutter	Shank	Neck	LOC	L.B.S	Overall	End	TiALN
D	d	d2	l1	l2	L	Face	4 Flute Round Shank
5/16	5/16	.3025	7/16	2-1/2	4	SQ	872477
		.3025	7/16	2-1/2	4	.015"R	872478
		.3025	7/16	2-1/2	4	BN	872500
3/8	3/8	.3650	1/2	2-1/2	4	SQ	872479
		.3650	1/2	2-1/2	4	.015"R	872480
		.3650	1/2	2-1/2	4	BN	872501
1/2	1/2	.4800	5/8	3	5	SQ	872481
		.4800	5/8	3	5	.020"R	872482
		.4800	5/8	3	5	BN	872502
		.4800	5/8	4	6	SQ	872484
		.4800	5/8	4	6	.020"R	872483
		.4800	5/8	4	6	BN	872503
5/8	5/8	.6050	3/4	3	5	SQ	872485
		.6050	3/4	3	5	.020"R	872486
		.6050	3/4	3	5	BN	872504
		.6050	3/4	4	6	SQ	872488
		.6050	3/4	4	6	.020"R	872487
		.6050	3/4	4	6	BN	872505
3/4	3/4	.7300	1	3	5	SQ	872489
		.7300	1	3	5	.020"R	872490
		.7300	1	3	5	BN	872506
		.7300	1	4	6	SQ	872493
		.7300	1	4	6	.020"R	872491
		.7300	1	4	6	BN	872507
		.7300	1	5	7	SQ	872494
		.7300	1	5	7	.020"R	872492
		.7300	1	5	7	BN	872508
1	1	.9800	1-1/4	3	5	SQ	872467
		.9800	1-1/4	3	5	.020"R	872468
		.9800	1-1/4	3	5	BN	872495
		.9800	1-1/4	4	6	SQ	872471
		.9800	1-1/4	4	6	.020"R	872469
		.9800	1-1/4	4	6	BN	872496
		.9800	1-1/4	5	7	SQ	872472
		.9800	1-1/4	5	7	.020"R	872470
		.9800	1-1/4	5	7	BN	872497



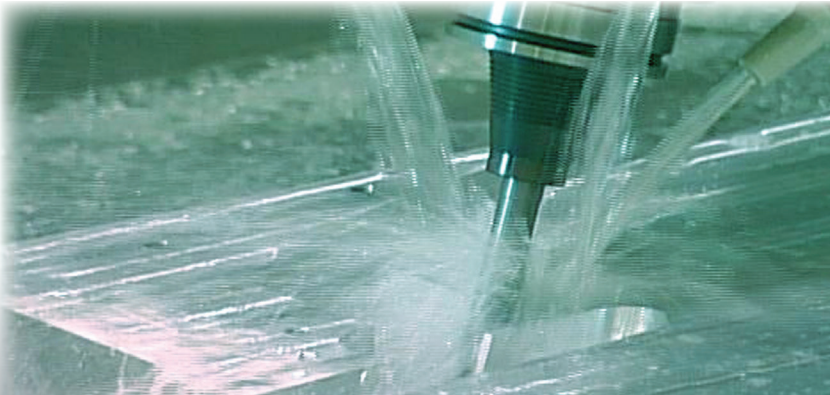
ICEBERG ULTRA HP

Speeds & Feeds

Material Classification	Speed	Feed Per Tooth By End Mill Diameter (IPT)							
	SFM	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
Aluminum Alloys & Aluminum	900-1800	.0025	.0030	.0035	.0040	.0045	.0055	.0065	.0085
Copper Alloys & Copper	525-1275	.0025	.0030	.0030	.0035	.0035	.0040	.0045	.0065
Bronze & Brass	375-600	.0025	.0030	.0030	.0035	.0035	.0040	.0045	.0055
Graphite	--	--	--	--	--	--	--	--	--
Plastics	--	--	--	--	--	--	--	--	--
Softer Cast Iron	375-650	.0030	.0032	.0035	.0037	.0040	.0045	.0070	.0090
Harder Cast Iron	100-375	.0018	.0020	.0025	.0027	.0030	.0035	.0040	.0050
Ductile Iron	100-600	.0020	.0022	.0025	.0027	.0030	.0040	.0050	.0070
Malleable Iron	225-650	.0020	.0025	.0030	.0035	.0040	.0050	.0060	.0080
Low Carbon Steels (1020 & Under)	300-600	.0020	.0025	.0030	.0035	.0040	.0050	.0060	.0080
Medium Carbon Steels (1030-1060)	150-375	.0025	.0026	.0027	.0028	.0030	.0040	.0050	.0060
Alloy Steels Hardened to 35 Rc	130-345	.0020	.0021	.0022	.0023	.0025	.0027	.0030	.0040
Alloy Steels Hardened to 40-50 Rc	70-160	.0012	.0012	.0013	.0014	.0015	.0026	.0030	.0035
Die Steels Hardened to 51-60 Rc	--	--	--	--	--	--	--	--	--
Tool Steels	150-375	.0020	.0022	.0025	.0027	.0030	.0035	.0040	.0050
Mold Steels	300-525	.0020	.0022	.0025	.0027	.0030	.0035	.0040	.0050
Softer Stainless Steels	300-450	.0020	.0022	.0025	.0022	.0030	.0040	.0050	.0070
Harder Stainless Steels	150-300	.0015	.0016	.0017	.0018	.0020	.0030	.0040	.0060
Monel & High Nickel Steel	75-200	.0015	.0022	.0025	.0027	.0030	.0035	.0040	.0050
Softer Titanium	125-375	.0015	.0022	.0025	.0027	.0030	.0040	.0050	.0070
Harder Titanium	50-175	.0010	.0016	.0017	.0018	.0020	.0022	.0026	.0030
Nickel Based High Temp Alloys	50-125	.0014	.0014	.0015	.0016	.0017	.0018	.0020	.0023

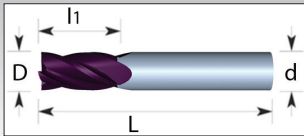
Note: These are guidelines only & the following points are important to consider:

- Higher Feed Per Tooth should be used to start for radial depths of cut less than 25% of the tool diameter.
- The above recommendations are for axial lengths of cut not to exceed 1.5 times the tool diameter for profiling and 1 times the diameter for full slotting.
- The above parameters are recommended starting points only. If the tool is working well, without vibrations or significant noise, increase the SFM and/or Feed Per Tooth in 5-10% increments.
- Optimum speeds & feeds will depend upon material, setup, machine conditions & tool deflection. Higher or lower parameters may be required to achieve optimum machining conditions.
- For Light Radial Depths of cut, make certain to increase the feed rate to compensate for Radial Chip Thinning Factor (RCTF). Consult a formula or app to calculate.
- For Plunging or Ramping the feed rate should be reduced by about 50%.
- Climb Milling is preferred to Conventional Milling.



P	●	Steel
M	⊖	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H		Hardened Steel
● BEST ⊖ OK ○ NOT OPTIMAL		

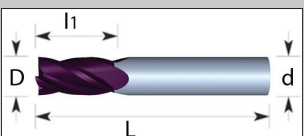
- Square & Corner Radius End
 - 4 & 5 Flute TiALN Coated
 - Variable Pitch, Reduces Chatter
 - Round & Weldon Shanks
 - Center Cutting
 - Fractional Sizes
- Extreme Production
 - Unique Polishing Process
 - Unique Honing Process
 - Plunging, Pocketing
 - Slotting, Ramping, Profiling
 - Ultra Premium Micrograin Carbide



Square & Corner Radius End - Fractional							
Cutter D	Shank d	LOC l1	Overall L	End Face	TiALN		
					4 Flute Round Shank	4 Flute Weldon Shank	5 Flute Round Shank
1/8	1/8	1/2	1-1/2	SQ	870006	--	--
		1/2	1-1/2	.010"R	870007	--	--
3/16	3/16	3/8	2	SQ	870181	--	--
		3/8	2	.015"R	870182	--	--
		5/8	2	SQ	870009	--	--
		5/8	2	.015"R	870010	--	--
		3/4	2-1/2	SQ	870085	--	--
		3/4	2-1/2	.015"R	870086	--	--
		1-1/8	3	SQ	870165	--	--
		1-1/8	3	.015"R	872531	--	--
		3/8	2	SQ	870183	--	--
		3/8	2	.015"R	870184	--	--
1/4	1/4	3/4	2-1/2	SQ	870012	870055	870015
		3/4	2-1/2	.020"R	870014	870057	870016
		1-1/8	3	SQ	870087	870110	872582
		1-1/8	3	.020"R	870088	870111	872583
		1-1/2	4	SQ	870166	--	872596
		1-1/2	4	.020"R	872532	--	872597
		3/8	2	SQ	870185	--	--
		3/8	2	.020"R	870186	--	--
5/16	5/16	13/16	2-1/2	SQ	870017	870058	870019
		13/16	2-1/2	.020"R	870018	870059	870020
		1-1/8	3	SQ	870089	870112	872584
		1-1/8	3	.020"R	870090	870113	872585
		1-5/8	4	SQ	870167	--	872598
		1-5/8	4	.020"R	872533	--	872599
		1/2	2	SQ	870187	--	--
3/8	3/8	1/2	2	.020"R	870188	--	--
		7/8	2-1/2	SQ	870021	870060	870025
		7/8	2-1/2	.020"R	870023	870062	870026
		7/8	2-1/2	.030"R	870024	870063	--
		1-1/8	3	SQ	870091	870114	872586
		1-1/8	3	.020"R	870092	870115	872587
		1-3/4	4	SQ	870168	--	872600
		1-3/4	4	.020"R	872534	--	872601
		1	2-3/4	SQ	870028	870064	--
		2	4	SQ	870093	870116	--
1/2	1/2	5/8	2-1/2	SQ	870189	870195	--
		5/8	2-1/2	.030"R	870190	870196	--
		1-1/4	3	SQ	870029	870065	870035
		1-1/4	3	.015"R	870030	870066	--
		1-1/4	3	.030"R	870031	870067	870036
		1-1/4	3	.060"R	870033	870069	--
		7/16	7/16	1	2-3/4	SQ	870028
		2	4	SQ	870093	870116	--
3/4	3/4	1	2-3/4	SQ	870028	870064	--
		2	4	SQ	870093	870116	--
		5/8	2-1/2	SQ	870189	870195	--
		5/8	2-1/2	.030"R	870190	870196	--
		1-1/4	3	SQ	870029	870065	870035
		1-1/4	3	.015"R	870030	870066	--
		1-1/4	3	.030"R	870031	870067	870036
		1-1/4	3	.060"R	870033	870069	--
		7/16	7/16	1	2-3/4	SQ	870028
		2	4	SQ	870093	870116	--
1	1	5/8	2-1/2	SQ	870189	870195	--
		5/8	2-1/2	.030"R	870190	870196	--
		1-1/4	3	SQ	870029	870065	870035
		1-1/4	3	.015"R	870030	870066	--
		1-1/4	3	.030"R	870031	870067	870036
		1-1/4	3	.060"R	870033	870069	--
		7/16	7/16	1	2-3/4	SQ	870028
		2	4	SQ	870093	870116	--
		5/8	2-1/2	SQ	870189	870195	--
		5/8	2-1/2	.030"R	870190	870196	--

P	●	Steel
M	⊖	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H		Hardened Steel
● BEST ⊖ OK ○ NOT OPTIMAL		

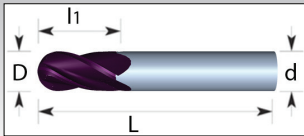
- Square & Corner Radius End
 - 4 & 5 Flute TiALN Coated
 - Variable Pitch, Reduces Chatter
 - Round & Weldon Shanks
 - Center Cutting
 - Fractional Sizes
- Extreme Production
 - Unique Polishing Process
 - Unique Honing Process
 - Plunging, Pocketing
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Square & Corner Radius End - Fractional							
Cutter D	Shank d	LOC l1	Overall L	End Face	TiALN		
					4 Flute Round Shank	4 Flute Weldon Shank	5 Flute Round Shank
1/2	1/2	2	4	SQ	870094	870117	872588
		2	4	.015"R	870095	870118	--
		2	4	.030"R	870096	870119	872589
		2	4	.060"R	870097	870120	--
		3	6	SQ	870169	--	872602
		3	6	.030"R	872535	--	872603
		3/4	3	SQ	870191	870197	--
		3/4	3	.030"R	870192	870198	--
		1-1/4	3-1/2	SQ	870037	870071	870041
		1-1/4	3-1/2	.030"R	870038	870072	870042
5/8	5/8	1-1/4	3-1/2	.060"R	870039	870073	--
		1-1/4	3-1/2	.125"R	870040	870074	--
		2-1/4	5	SQ	870098	870121	774018
		2-1/4	5	.030"R	870099	870122	774019
		2-1/4	5	.060"R	870100	870123	--
		2-1/4	5	.125"R	870101	870124	--
		3	6	SQ	870170	--	872604
		3	6	.030"R	872536	--	872605
		1	3	SQ	870193	870199	--
		1	3	.030"R	870194	870200	--
3/4	3/4	1-1/2	4	SQ	870043	870075	870047
		1-1/2	4	.030"R	870044	870077	870048
		1-1/2	4	.060"R	870045	870078	--
		1-1/2	4	.125"R	870046	870079	--
		2-1/4	5	SQ	870102	870125	872592
		2-1/4	5	.030"R	870103	870126	872593
		2-1/4	5	.060"R	870104	870127	--
		2-1/4	5	.125"R	870105	870128	--
		3	6	SQ	870171	--	872606
		3	6	.030"R	872537	--	872607
1	1	1-1/2	4	SQ	870000	870049	870004
		1-1/2	4	.030"R	870001	870050	870005
		1-1/2	4	.060"R	870002	870051	--
		1-1/2	4	.125"R	870003	870052	--
		2-1/4	5	SQ	870080	870106	872580
		2-1/4	5	.030"R	870081	870107	872581
		2-1/4	5	.060"R	870082	870108	--
		2-1/4	5	.125"R	870083	870109	--
		3	6	SQ	870164	--	872594
		3	6	.030"R	872530	--	872595

P	●	Steel
M	●	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	○	High Temp. Alloys
H	●	Hardened Steel
● BEST ● OK ○ NOT OPTIMAL		

- Ball Nose End
- 4 Flute TiAlN Coated
- Variable Pitch, Reduces Chatter
- Round & Weldon Shanks
- Center Cutting
- Fractional Sizes
- Extreme Production
- Unique Polishing Process
- Unique Honing Process
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Ball Nose - Fractional						
Cutter D	Shank d	LOC l1	Overall L	End Face	TiAlN	
					4 Flute Round Shank	4 Flute Weldon Shank
3/16	3/16	5/8	2	BN	870131	--
		3/4	2-1/2	BN	870148	--
		1-1/8	3	BN	870174	--
1/4	1/4	3/4	2-1/2	BN	870132	870140
		1-1/8	3	BN	870149	870157
		1-1/2	4	BN	870175	--
5/16	5/16	13/16	2-1/2	BN	870133	870141
		1-1/8	3	BN	870150	870158
		1-5/8	4	BN	870176	--
3/8	3/8	7/8	2-1/2	BN	870134	870142
		1-1/8	3	BN	870151	870159
		1-3/4	4	BN	870177	--
7/16	7/16	1	2-3/4	BN	870135	870143
		2	4	BN	870152	870160
		1	3	BN	870136	870144
1/2	1/2	2	4	BN	870153	870161
		3	6	BN	870178	--
		1-1/4	3-1/2	BN	870137	870145
5/8	5/8	2-1/4	5	BN	870154	870162
		3	6	BN	870179	--
		1-1/2	4	BN	870138	870146
3/4	3/4	2-1/4	5	BN	870155	870163
		3	6	BN	870180	--
		1-1/2	4	BN	870129	870139
1	1	2-1/4	5	BN	870147	870156
		3	6	BN	870172	--

A Complete Range Of Tools For High Efficiency Milling (HEM), Dynamic And Trochoidal Milling

- Square & Corner Radius End
- 5, 6 & 7 Flute ALL4 Coated
- Variable Pitch, Reduces Chatter
- Round Shanks
- Center Cutting, Fractional Sizes
- Trochoidal & Dynamic Milling

P	●	Steel
M	●	Stainless Steel
K	●	Cast Iron
N	○	Non-Ferrous
S	●	High Temp. Alloys
H	●	Hardened Steel
● BEST ● OK ○ NOT OPTIMAL		

- HEM (High Efficiency Milling)
- Chipbreakers Available
- Unique Honing Process
- Plunging, Pocketing
- Slotting, Ramping, Profiling
- Ultra Premium Micrograin Carbide

Finisher

Chipbreaker

Unique Honing Process

Chip Management Geometry

ALL4 Premium Coating

NEW!

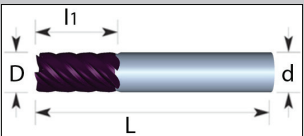
Ultra Premium Micrograin Carbide

Use On-Size Hydraulic Holders, Precision Collet Chucks, Milling chucks, or Shrink Fit Holders for best tool performance!



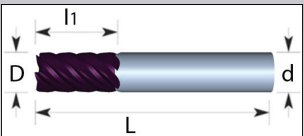
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- Square & Corner Radius End
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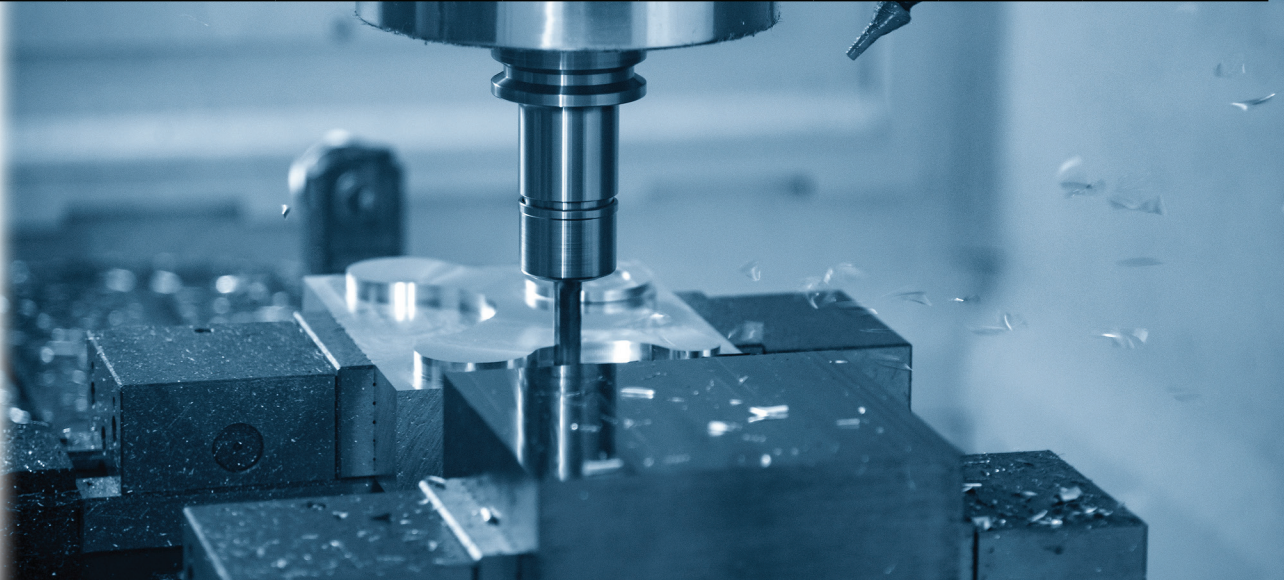
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N	○	Non-Ferrous
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H	●	Hardened Steel
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- Square & Corner Radius End
 - 5, 6 & 7 Flute ALL4 Coated
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HEM Square & Corner Radius End - Fractional									
Cutter	Shank	LOC	Overall	End	ALL4				
					5 Flute	5 Flute Chipbreaker	6 Flute	7 Flute	7 Flute Chipbreaker
1/4	1/4	3/4	2-1/2	SQ	872608	--	870203	--	--
		3/4	2-1/2	.015CR	872609	--	--	--	--
		3/4	2-1/2	.030CR	872610	--	870204	--	--
		1-1/8	3	SQ	872611	--	--	--	--
		1-1/8	3	.015CR	872612	--	--	--	--
		1-1/8	3	.030CR	872613	--	--	--	--
5/16	5/16	13/16	2-1/2	SQ	872614	--	--	--	--
		13/16	2-1/2	.015CR	872615	--	--	--	--
		13/16	2-1/2	.030CR	872616	--	--	--	--
		1-1/4	3	SQ	872617	--	--	--	--
		1-1/4	3	.015CR	872618	--	--	--	--
		1-1/4	3	.030CR	872619	--	--	--	--
		2-1/8	4	SQ	872620	--	--	--	--
		2-1/8	4	.015CR	872621	--	--	--	--
3/8	3/8	2-1/8	4	.030CR	872622	--	--	--	--
		1	2-1/2	SQ	872623	872638	870205	872632	872647
		1	2-1/2	.015CR	872624	872639	--	872633	872648
		1	2-1/2	.030CR	872625	872640	870206	872634	872649
		1-1/4	3	SQ	872626	872641	--	872635	872650
		1-1/4	3	.015CR	872627	872642	--	872636	872651
		1-1/4	3	.030CR	872628	872643	--	872637	872652
		2-1/8	4	SQ	872629	872644	--	--	--
		2-1/8	4	.015CR	872630	872645	--	--	--
		2-1/8	4	.030CR	872631	872646	--	--	--
1/2	1/2	1-1/4	3	SQ	872653	872685	870207	872669	872701
		1-1/4	3	.015CR	872654	872686	--	872670	872702
		1-1/4	3	.030CR	872655	872687	870208	872671	872703
		1-1/4	3	.060CR	872656	872688	--	872672	--
		2-1/8	4	SQ	872657	872689	--	872673	872704
		2-1/8	4	.015CR	872658	872690	--	872674	872705
		2-1/8	4	.030CR	872659	872691	--	872675	872706
		2-1/8	4	.060CR	872660	872692	--	872676	--
		2-5/8	5	SQ	872661	872693	--	872677	872707
		2-5/8	5	.015CR	872662	872694	--	872678	872708
		2-5/8	5	.030CR	872663	872695	--	872679	872709
		2-5/8	5	.060CR	872664	872696	--	872680	--
		3-1/4	6	SQ	872665	872697	--	872681	872710
		3-1/4	6	.015CR	872666	872698	--	872682	872711
		3-1/4	6	.030CR	872667	872699	--	872683	872712
		3-1/4	6	.060CR	872668	872700	--	872684	--

HEM Square & Corner Radius End - Fractional									
Cutter	Shank	LOC	Overall	End	ALL4				
					5 Flute	5 Flute Chipbreaker	6 Flute	7 Flute	7 Flute Chipbreaker
5/8	5/8	1-1/2	3-1/2	SQ	872713	872731	870209	872722	872740
		1-1/2	3-1/2	.030CR	872714	872732	870210	872723	872741
		1-1/2	3-1/2	.060CR	872715	872733	--	872724	--
		2-1/2	5	SQ	872716	872734	--	872725	872742
		2-1/2	5	.030CR	872717	872735	--	872726	872743
		2-1/2	5	.060CR	872718	872736	--	872727	--
		3-1/4	6	SQ	872719	872737	--	872728	872744
		3-1/4	6	.030CR	872720	872738	--	872729	872745
		3-1/4	6	.060CR	872721	872739	--	872730	--
3/4	3/4	1-1/2	4	SQ	872746	872764	870211	872755	872770
		1-1/2	4	.030CR	872747	872765	870212	872756	872771
		1-1/2	4	.060CR	872748	--	--	872757	--
		2-1/2	5	SQ	872749	872766	--	872758	872772
		2-1/2	5	.030CR	872750	872767	--	872759	872773
		2-1/2	5	.060CR	872751	--	--	872760	--
		3-1/4	6	SQ	872752	872768	--	872761	872774
		3-1/4	6	.030CR	872753	872769	--	872762	872775
		3-1/4	6	.060CR	872754	--	--	872763	--
1	1	1-1/2	4	SQ	872776	872794	870201	872785	872800
		1-1/2	4	.030CR	872777	872795	870202	872786	872801
		1-1/2	4	.060CR	872778	--	--	872787	--
		2-5/8	5	SQ	872779	872796	--	872788	872802
		2-5/8	5	.030CR	872780	872797	--	872789	872803
		2-5/8	5	.060CR	872781	--	--	872790	--
		3-1/4	6	SQ	872782	872798	--	872791	872804
		3-1/4	6	.030CR	872783	872799	--	872792	872805
		3-1/4	6	.060CR	872784	--	--	872793	--

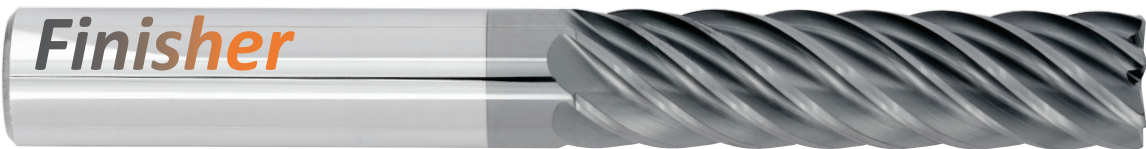


ULTRA HIGH PERFORMANCE HEM Speeds & Feeds

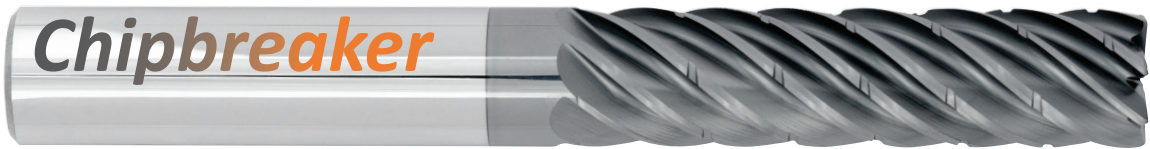
Material Classification		Speed	Feed Per Tooth By End Mill Diameter (IPT)							
		SFM	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
Softer Cast Iron	K	375-950	.0030	.0032	.0035	.0037	.0040	.0045	.0070	.0090
Harder Cast Iron		150-475	.0018	.0020	.0025	.0027	.0030	.0035	.0040	.0050
Ductile Iron		200-900	.0020	.0022	.0025	.0027	.0030	.0040	.0050	.0070
Malleable Iron		275-850	.0020	.0025	.0030	.0035	.0040	.0050	.0060	.0080
Low Carbon Steels (1020 & Under)	P	350-900	.0020	.0025	.0030	.0035	.0040	.0050	.0060	.0080
Medium Carbon Steels (1030-1060)		200-675	.0025	.0026	.0027	.0028	.0030	.0040	.0050	.0060
Alloy Steels Hardened to 35 Rc		190-545	.0020	.0021	.0022	.0023	.0025	.0027	.0030	.0040
Alloy Steels Hardened to 40-50 Rc		90-275	.0012	.0012	.0013	.0014	.0015	.0026	.0030	.0035
Die Steels Hardened to 51-60 Rc		--	--	--	--	--	--	--	--	--
Tool Steels		175-525	.0020	.0022	.0025	.0027	.0030	.0035	.0040	.0050
Mold Steels		300-725	.0020	.0022	.0025	.0027	.0030	.0035	.0040	.0050
Softer Stainless Steels	M	300-520	.0020	.0022	.0025	.0022	.0030	.0040	.0050	.0070
Harder Stainless Steels		150-475	.0015	.0016	.0017	.0018	.0020	.0030	.0040	.0060
Monel & High Nickel Steel	S	75-250	.0015	.0022	.0025	.0027	.0030	.0035	.0040	.0050
Softer Titanium		125-425	.0015	.0022	.0025	.0027	.0030	.0040	.0050	.0070
Harder Titanium		50-195	.0010	.0016	.0017	.0018	.0020	.0022	.0026	.0030
Nickel Based High Temp Alloys		50-175	.0014	.0014	.0015	.0016	.0017	.0018	.0020	.0023

Note: These are guidelines only & the following points are important to consider:

- High Efficiency Milling (HEM) utilizes high axial depths of cut with low radial depths of cut. Make certain to increase the programmed feed rate to compensate for Radial Chip Thinning Factor (RCTF). Consult a formula or app to calculate.
- The above parameters are recommended starting points only. If the tool is working well, without vibrations or significant noise, increase the SFM and/or Feed Per Tooth in 5-10% increments.
- Optimum speeds & feeds will depend upon material, setup, machine conditions & tool deflection. Higher or lower parameters may be required to achieve optimum machining conditions.
- For Plunging or Ramping the feed rate should be reduced by about 50%.
- Climb Milling is preferred to Conventional Milling.



- Finisher design provides the best surface finish
- Use when chip management isn't an issue such as periphery milling applications



- Chipbreaker design allows for chip size management
- With managed chip sizes, chip augers and conveyors are kept clean
- Chips are easily flushed or blown away from being re-cut & damaging the tool
- Excellent for slotting & pocketing applications



Premium Carbide Custom Order

End Face:

- ☐ Square
- ☐ Ball Nose
- ☐ Corner Radius Size: _____
- ☐ Chamfer Size: _____

Dimensions:

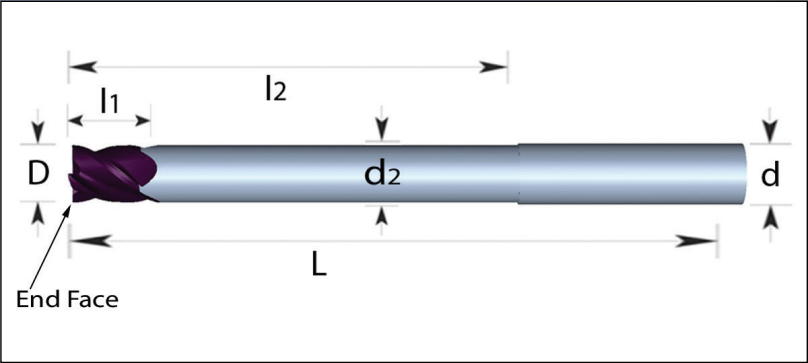
- L - Overall Length (OAL): _____
- d - Shank Diameter: _____
- l1 - Length of Cut (LOC): _____
- D - Tool Diameter: _____
- Number of Flutes: _____

Shank:

- ☐ Round
- ☐ Weldon Flat

Coating:

- ☐ Uncoated
- ☐ TiALN (Titanium Aluminum Nitride)
- ☐ ZrN (Zirconium Nitride)
- ☐ DLC (Diamond Like Carbon)



Neck Relief:

Optional

- ☐ No
- ☐ Yes
- d2 - Neck Relief Diameter: _____
- l2 - Length below Shank (LBS): _____

Tapered:

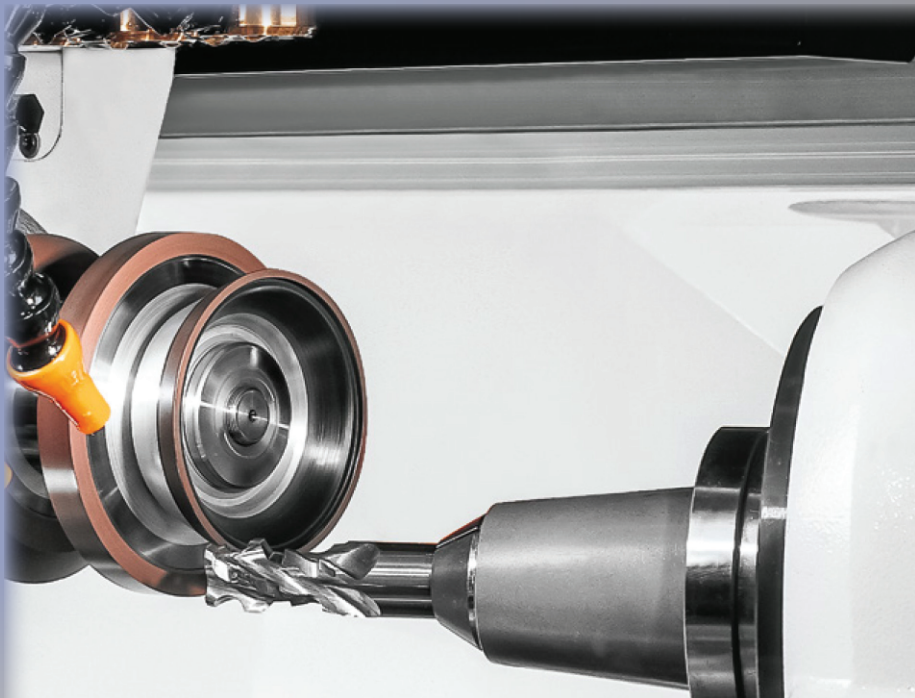
- ☐ No
- ☐ Yes
- Taper Angle Per Side: _____
- D - Tip Diameter: _____

Special Minimum Order Quantities

Tool Diameter Range	Minimum Order Qty.
Under 3/16" (4mm)	Not Available
3/16"-1/4" (4mm-6mm)	20
5/16"-3/8" (7mm-10mm)	15
7/16"-1/2" (11mm-12mm)	10
9/16"-3/4" (13mm-20mm)	5
7/8"-1" (25mm)	3

Series:

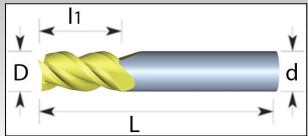
- ☐ GENERAL PURPOSE
- ☐ HIGH PERFORMANCE
- ☐ ULTRA HIGH PERFORMANCE
- ☐ ALUMINUM



P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High Temp. Alloys
H	Hardened Steel

● BEST

- Square & Corner Radius End
- 3 Flute Uncoated & ZrN
- Variable Pitch, Reduces Chatter
- Round Shanks, Center Cutting
- With or Without Chipbreakers
- Fractional Sizes
- 36 Degree Helix
- Unique Polishing Process
- Unique Honing Process
- Plunging, Pocketing
- Slotting, Ramping, Profiling
- Ultra Premium Micrograin Carbide

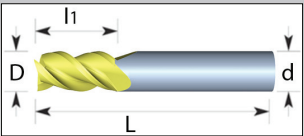


Square & Corner Radius - 3 Flute Medium/Roughing									
Cutter D	Shank d	LOC l1	Overall L	End Face	Uncoated		ZrN		
					3 Flute	Chipbreaker	3 Flute	Chipbreaker	
1/4	1/4	3/4	2-1/2	SQ	872213	--	872264	--	
		3/4	2-1/2	.015CR	872214	--	872265	--	
		3/4	2-1/2	.030CR	872216	--	--	--	
		3/4	2-1/2	.060CR	872217	--	--	--	
5/16	5/16	13/16	2-1/2	SQ	872219	--	872268	--	
		13/16	2-1/2	.030CR	872220	--	872269	--	
		13/16	2-1/2	.060CR	872221	--	--	--	
3/8	3/8	1	2-1/2	SQ	872222	--	872270	--	
		1	2-1/2	.030CR	872223	872225	872271	872272	
		1	2-1/2	.060CR	872224	--	--	--	
		1-1/8	3	SQ	872226	--	872273	--	
		1-1/8	3	.030CR	872227	872228	872274	872275	
1/2	1/2	1-1/4	3	SQ	872229	--	872276	--	
		1-1/4	3	.030CR	872230	872234	872277	872278	
		1-1/4	3	.060CR	872231	--	--	--	
		1-1/4	3	.090CR	872232	--	--	--	
		1-1/4	3	.120CR	872233	--	--	--	
		2	4	SQ	872235	--	872279	--	
		2	4	.030CR	872236	872237	872280	872281	
5/8	5/8	1-1/4	3-1/2	SQ	872238	--	872282	--	
		1-1/4	3-1/2	.030CR	872239	872243	872283	872284	
		1-1/4	3-1/2	.060CR	872240	--	--	--	
		1-1/4	3-1/2	.090CR	872241	--	--	--	
		1-1/4	3-1/2	.120CR	872242	--	--	--	
		2-1/4	5	SQ	872244	--	872285	--	
		2-1/4	5	.030CR	872245	872246	872286	872287	
3/4	3/4	1-5/8	4	SQ	872247	--	872288	--	
		1-5/8	4	.030CR	872248	872252	872289	872290	
		1-5/8	4	.060CR	872249	--	--	--	
		1-5/8	4	.090CR	872250	--	--	--	
		1-5/8	4	.120CR	872251	--	--	--	
		2-1/4	5	SQ	872253	--	872291	--	
		2-1/4	5	.030CR	872254	872255	872292	872293	
1	1	1-1/2	4	SQ	872256	--	872294	--	
		1-1/2	4	.030CR	872257	872260	872295	872296	
		1-1/2	4	.060CR	872258	--	--	--	
		1-1/2	4	.120CR	872259	--	--	--	
		2-1/4	5	SQ	872261	--	872297	--	
		2-1/4	5	.030CR	872262	872263	872298	872299	

P	Steel
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● BEST

- Square & Corner Radius End
- 2 & 3 Flute Uncoated, ZrN & DLC
- Variable Pitch, Reduces Chatter
- Round Shanks
- Center Cutting
- Fractional Sizes
- 45 Degree Helix
- Unique Polishing Process
- Unique Honing Process
- Plunging, Pocketing
- Slotting, Ramping, Profiling
- Ultra Premium Micrograin Carbide



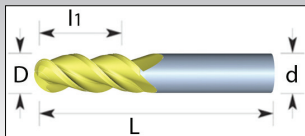
Square & Corner Radius - 2 & 3 Flute Medium/Finishing											
Cutter D	Shank d	LOC l1	Overall L	End Face	Uncoated		ZrN		DLC		
					2 Flute	3 Flute	2 Flute	3 Flute	2 Flute	3 Flute	
1/8	1/8	1/2	1-1/2	SQ	872071	872072	--	--	--	--	
3/16	3/16	5/8	2	SQ	872073	872075	871957	871959	872187	872188	
		3/4	2-1/2	SQ	872105	872106	871989	871990	--	--	
		1-1/8	3	SQ	872153	872154	872037	872038	--	--	
1/4	1/4	3/4	2-1/2	SQ	872076	872078	871960	871962	872189	872191	
		3/4	2-1/2	.020"R	872077	872079	871961	871963	872190	872192	
		1-1/8	3	SQ	872107	872108	871991	871992	--	--	
		1-1/2	4	SQ	872155	872156	872039	872040	--	--	
5/16	5/16	13/16	2-1/2	SQ	872081	872083	871965	871967	872193	872195	
		13/16	2-1/2	.020"R	872082	872085	871966	871969	872194	872196	
		1-1/8	3	SQ	872109	872110	871993	871994	--	--	
		1-5/8	4	SQ	872157	872158	872041	872042	--	--	
		1	2-1/2	SQ	872087	872089	871971	871973	872197	872199	
3/8	3/8	1	2-1/2	.020"R	872088	872090	871972	871974	872198	872200	
		1-1/8	3	SQ	872111	872112	871995	871996	--	--	
		1-3/4	4	SQ	872159	872160	872043	872044	--	--	
1/2	1/2	1-1/4	3	SQ	872091	872093	871975	871977	872201	872203	
		1-1/4	3	.030"R	872092	872094	871976	871978	872202	872204	
		2	4	SQ	872113	872114	871997	871998	--	--	
		3	6	SQ	872161	872162	872045	872046	--	--	
5/8	5/8	1-1/4	3-1/2	SQ	872095	872097	871979	871981	872205	872207	
		1-1/4	3-1/2	.030"R	872096	872098	871980	871982	872206	872208	
		2-1/4	5	SQ	872115	872116	871999	872000	--	--	
		3	6	SQ	872163	872164	872047	872048	--	--	
3/4	3/4	1-1/2	4	SQ	872099	872101	871983	871985	872209	872211	
		1-1/2	4	.030"R	872100	872102	871984	871986	872210	872212	
		2-1/4	5	SQ	872117	872118	872001	872002	--	--	
		3	6	SQ	872165	872166	872049	872050	--	--	
1	1	1-1/2	4	SQ	872067	872069	871953	871955	872183	872185	
		1-1/2	4	.030"R	872068	872070	871954	871956	872184	872186	
		2-1/4	5	SQ	872103	872104	871987	871988	--	--	
		3	6	SQ	872151	872152	872035	872036	--	--	



P	Steel
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● BEST

- Ball Nose End
- 2 & 3 Flute Uncoated & ZrN
- Variable Pitch, Reduces Chatter
- Round Shanks
- Center Cutting
- Fractional Sizes
- Extreme Production
- Unique Polishing Process
- Unique Honing Process
- Plunging, Pocketing
- Slotting, Ramping, Profiling
- Ultra Premium Micrograin Carbide



Ball Nose - Fractional

Cutter D	Shank d	LOC L1	Overall L	End Face	Uncoated		ZrN	
					2 Flute	3 Flute	2 Flute	3 Flute
3/16	3/16	5/8	2	BN	872121	872122	872005	872006
		3/4	2-1/2	BN	872137	872138	872021	872022
		1-1/8	3	BN	872169	872170	872053	872054
1/4	1/4	3/4	2-1/2	BN	872123	872124	872007	872008
		1-1/8	3	BN	872139	872140	872023	872024
		1-1/2	4	BN	872171	872172	872055	872056
5/16	5/16	13/16	2-1/2	BN	872125	872126	872009	872010
		1-1/8	3	BN	872141	872142	872025	872026
		1-5/8	4	BN	872173	872174	872057	872058
3/8	3/8	1	2-1/2	BN	872127	872128	872011	872012
		1-1/8	3	BN	872143	872144	872027	872028
		1-3/4	4	BN	872175	872176	872059	872060
1/2	1/2	1-1/4	3	BN	872129	872130	872013	872014
		2	4	BN	872145	872146	872029	872030
		3	6	BN	872177	872178	872061	872062
5/8	5/8	1-1/4	3-1/2	BN	872131	872132	872015	872016
		2-1/4	5	BN	872147	872148	872031	872032
		3	6	BN	872179	872180	872063	872064
3/4	3/4	1-1/2	4	BN	872133	872134	872017	872018
		2-1/4	5	BN	872149	872150	872033	872034
		3	6	BN	872181	872182	872065	872066
1	1	1-1/2	4	BN	872119	872120	872003	872004
		2-1/4	5	BN	872135	872136	872019	872020
		3	6	BN	872167	872168	872051	872052



ALUMINUM

Speeds & Feeds

Material Classification	Speed SFM	Feed Per Tooth By End Mill Diameter (IPT)							
		1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"
Aluminum Alloys & Aluminum	900-1800	.0030	.0035	.0040	.0045	.0050	.0060	.0070	.0090
Copper Alloys & Copper	525-1275	.0030	.0035	.0035	.0040	.0040	.0045	.0050	.0070
Bronze & Brass	375-600	.0030	.0035	.0035	.0040	.0040	.0045	.0050	.0060
Graphite	500-1200	.0040	.0045	.0045	.0045	.0045	.0050	.0060	.0080
Plastics	600-1650	.0040	.0045	.0050	.0060	.0070	.0090	.0110	.0160
Softer Cast Iron	--	--	--	--	--	--	--	--	--
Harder Cast Iron	--	--	--	--	--	--	--	--	--
Ductile Iron	--	--	--	--	--	--	--	--	--
Malleable Iron	--	--	--	--	--	--	--	--	--
Low Carbon Steels (1020 & Under)	--	--	--	--	--	--	--	--	--
Medium Carbon Steels (1030-1060)	--	--	--	--	--	--	--	--	--
Alloy Steels Hardened to 35 Rc	--	--	--	--	--	--	--	--	--
Alloy Steels Hardened to 50 Rc	--	--	--	--	--	--	--	--	--
Die Steels Hardened to 60 Rc	--	--	--	--	--	--	--	--	--
Tool Steels	--	--	--	--	--	--	--	--	--
Mold Steels	--	--	--	--	--	--	--	--	--
Softer Stainless Steels	--	--	--	--	--	--	--	--	--
Harder Stainless Steels	--	--	--	--	--	--	--	--	--
Monel & High Nickel Steel	--	--	--	--	--	--	--	--	--
Softer Titanium	--	--	--	--	--	--	--	--	--
Harder Titanium	--	--	--	--	--	--	--	--	--
Nickel Based High Temp Alloys	--	--	--	--	--	--	--	--	--

Note: These are guidelines only & the following points are important to consider:

- Higher Feed Per Tooth should be used to start for radial depths of cut less than 25% of the tool diameter.
- The above recommendations are for axial lengths of cut not to exceed 1.5 times the tool diameter for profiling and 1 times the diameter for full slotting.
- The above parameters are recommended starting points only. If the tool is working well, without vibrations or significant noise, increase the SFM and/or Feed Per Tooth in 5-10% increments.
- Optimum speeds & feeds will depend upon material, setup, machine conditions & tool deflection. Higher or lower parameters may be required to achieve optimum machining conditions.
- For Light Radial Depths of cut, make certain to increase the feed rate to compensate for Radial Chip Thinning Factor (RCTF). Consult a formula or app to calculate.
- For Plunging or Ramping the feed rate should be reduced by about 50%.
- Climb Milling is preferred to Conventional Milling.



MAJAC MILLS PREMIUM CARBIDE



MAJAC

M I L L S

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