Contents

Tolerances for Solid Carbide End Mills

Cutting Diameter: 1/32" through 1/4" +.000 –.002
17/64" through 1" +.000 –.003

Shank Diameter: h6

General-Purpose End Mills

Features and Benefits of General-Purpose End Mills

- 10% cobalt submicron grain carbide substrate.
- 30° right-hand spiral, right-hand cut helix designed for maximum chip clearance.
- 2-, 3-, and 4-flute configurations available.
- Square end and ball nose end geometries available.
- Multiple lengths in select styles and sizes.
- TiCN-coated tools available in most styles.

Applications for General-Purpose End Mills

- Use in general milling applications in medium to low-carbon steels, cast iron, non-ferrous light metals, and plastics.
- Double-end end mills economically increase productivity.
- 2-flute end mills are generally used for plunging, slotting, and heavy peripheral cuts.
- 3-flute end mills provide a compromise between the chip clearance of a 2-flute tool and the rigidity and wear resistance of a 4-flute tool; especially useful for many slotting operations.
- 4-flute end mills are most commonly used in profiling and in harder materials; stiffer construction results in minimal deflection. They also provide good surface finishes and wear-resistant characteristics for excellent size control.

Cutting Data for General-Purpose Solid Carbide End Mills

Material	Hardness Brinell	Hardness HRc	Surface Feet per Minute		Chip Load per Tooth 1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
low and plain carbon, alloy and tool steels	<220 HB	<19	Low	270	.0004	.0006	.0010	.0015	.0020	.0025	.0030	.0035	.0040	.0045
			High	360										
plain carbon, alloy, and tool steels	225-286	20-30	Low	180	.0004	.0006	.0010	.0015	.0020	.0025	.0030	.0035	.0040	.0045
			High	270										
	294-371	31-40	Low	135	.0003	.0004	.0007	.0011	.0014	.0018	.0021	.0025	.0028	.0032
			High	180										
austenitic stainless steels 200 and 300 series	135-275	<28	Low	180	.0002	.0004	.0006	.0010	.0015	.0020	.0025	.0030	.0035	.0040
			High	315										
ductile and malleable cast iron	120-320	<35	Low	160	.0003	.0004	.0007	.0011	.0014	.0018	.0021	.0025	.0028	.0032
			High	270										
cast iron (gray)	120-220	<18	Low	315	.0008	.0012	.0020	.0030	.0040	.0050	.0060	.0070	.0080	.0090
			High	450										
	220-320	19-34	Low	225	.0005	.0007	.0012	.0018	.0024	.0030	.0036	.0042	.0048	.0055
			High	315										
low-silicon aluminum & other non-ferrous alloys	50-150	—	Low	720	.0006	.0010	.0016	.0024	.0032	.0040	.0048	.0560	.0064	.0072
			High	900										
cobalt-based high-temperature alloys	150-425	<45	Low	30	.0004	.0006	.0010	.0015	.0020	.0025	.0030	.0035	.0040	.0045
			High	45										
nickel-based high-temperature alloys	140-300	<32	Low	45	.0002	.0004	.0006	.0009	.0012	.0015	.0018	.0021	.0024	.0027
			High	90										
	300-475	32-50	Low	40	.0002	.0004	.0006	.0009	.0012	.0015	.0018	.0021	.0024	.0027
			High	70										

Higher values for surface speed should be used for radial depths of cut less than 25% of the diameter. Lower values for surface speed should be used for radial depths of cut greater than 25% of the diameter. The above recommendations are for axial lengths of cut not to exceed 1 times the cutter diameter for profiling and .5 times the diameter for slotting.

Recommended speeds above are for uncoated tools only and should be adjusted when using coated tools. Generally, speeds can be increased by the following factors:

- *TiCN-coated tools – 20-25% increase*
- *TiAlN-coated tools – 40-50% increase*

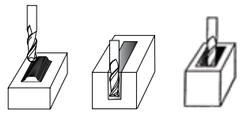
The above speeds are a recommended starting point only. If the tool is working well, without vibrations or significant noise, increase the SFM in 5-10% increments. Ultimate speeds will depend upon setup conditions. Higher or lower parameters may be required to achieve optimum conditions.

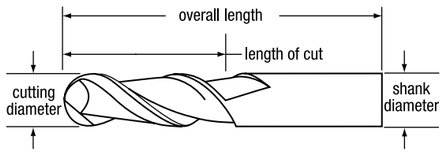
Single End General-Purpose

Series **MSE-2B**

Applications | STEEL | CAST IRON | HI-TEMP ALLOYS | NON-FERROUS MATERIALS

Features | SOLID CARBIDE | 2 FLUTE BALL CC | BRIGHT | TiCN | TiALN





cutting diameter fractional	cutting diameter decimal	cutting diameter metric	shank diameter	length of cut	overall length	no. of flutes	EDP number bright	EDP number TiCN	EDP number TiAlN
1/32	.0312	0.79	1/8	1/8	1 1/2	2	B52681	B01651	B69681
3/64	.0469	1.19	1/8	1/8	1 1/2	2	B52682	B01652	B69682
1/16	.0625	1.59	1/8	1/8	1 1/2	2	B52684	B01653	B69684
1/16	.0625	1.59	1/8	1/4	1 1/2	2	B52201	B01509	B69201
5/64	.0781	1.98	1/8	1/4	1 1/2	2	B52202	B01564	B69202
3/32	.0938	2.38	1/8	3/8	1 1/2	2	B52204	B01511	B69204
7/64	.1094	2.78	1/8	3/8	1 1/2	2	B52205	B01512	B69205
1/8	.1250	3.18	1/8	1/4	1 1/2	2	B52688	B01655	B69688
1/8	.1250	3.18	1/8	1/2	1 1/2	2	B52207	B01513	B69207
1/8	.1250	3.18	1/8	3/4	2 1/4	2	B51300	B01360	B68300
1/8	.1250	3.18	1/8	1	3	2	B51500	B01414	B68500
9/64	.1406	3.57	3/16	9/16	2	2	B52208	B01566	B69208
5/32	.1562	3.97	3/16	9/16	2	2	B52210	B01515	B69210
11/64	.1719	4.37	3/16	5/8	2	2	B52211	B01516	B69211
3/16	.1875	4.76	3/16	5/16	2	2	B52692	B01657	B69692
3/16	.1875	4.76	3/16	5/8	2	2	B52213	B01517	B00236
3/16	.1875	4.76	3/16	3/4	2 1/2	2	B51302	B01363	B68302
3/16	.1875	4.76	3/16	1 1/8	3	2	B51502	B01415	B68502
13/64	.2031	5.16	1/4	5/8	2 1/2	2	B52214	B01364	B69214
7/32	.2188	5.56	1/4	5/8	2 1/2	2	B52216	B01568	B69216
15/64	.2344	5.95	1/4	3/4	2 1/2	2	B52217	B01570	B69217
1/4	.2500	6.35	1/4	1/2	2	2	B52697	B01659	B69697
1/4	.2500	6.35	1/4	3/4	2 1/2	2	B52220	B01521	B69220
1/4	.2500	6.35	1/4	1 1/8	3	2	B51304	B01359	B68304
1/4	.2500	6.35	1/4	1 1/2	4	2	B51504	B01427	B68504
1/4	.2500	6.35	1/4	1 1/2	6	2	B51505	B01416	B68505
17/64	.2656	6.75	5/16	3/4	2 1/2	2	B52221	B01572	B69221
9/32	.2812	7.14	5/16	3/4	2 1/2	2	B52223	B01575	B69223
5/16	.3125	7.94	5/16	1/2	2	2	B52699	B01660	B69699
5/16	.3125	7.94	5/16	13/16	2 1/2	2	B52226	B01525	B00241
5/16	.3125	7.94	5/16	1 1/8	3	2	B51306	B01361	B68306
5/16	.3125	7.94	5/16	1 5/8	4	2	B51506	B01417	B68506

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Single End General-Purpose

CARBIDE END MILLS
CARBIDE DRILLS
CARBIDE THREAD MILLS
CARBIDE BURS
INDEX

Series **MSE-2B** (continued)

cutting diameter fractional	cutting diameter decimal	cutting diameter metric	shank diameter	length of cut	overall length	no. of flutes	EDP number bright	EDP number TiCN	EDP number TiAlN
3/8	.3750	9.53	3/8	5/8	2	2	B52701	B01661	B69701
3/8	.3750	9.53	3/8	1	2 1/2	2	B52232	B01529	B12014
3/8	.3750	9.53	3/8	1 1/8	3	2	B51308	B01362	B68308
3/8	.3750	9.53	3/8	1 3/4	4	2	B51508	B01418	B68508
3/8	.3750	9.53	3/8	1 1/2	6	2	B51509	B01419	B68509
7/16	.4375	11.11	7/16	5/8	2 1/2	2	B52703	B01662	B69703
7/16	.4375	11.11	7/16	7/8	2 1/2	2	B52238	B01584	B12015
7/16	.4375	11.11	7/16	2	4	2	B51310	B01365	B68310
7/16	.4375	11.11	7/16	3	6	2	B51510	B01420	B68510
1/2	.5000	12.70	1/2	5/8	2 1/2	2	B52706	B01663	B69706
1/2	.5000	12.70	1/2	1	3	2	B52245	B01537	B00244
1/2	.5000	12.70	1/2	2	4	2	B51312	B01367	B68312
1/2	.5000	12.70	1/2	3	6	2	B51512	B01422	B68512
1/2	.5000	12.70	1/2	1 1/2	6	2	B51511	B01366	B68511
9/16	.5625	14.29	9/16	1 1/4	3	2	B52247	B01617	B69247
5/8	.6250	15.88	5/8	3/4	3	2	B52708	B01664	B69708
5/8	.6250	15.88	5/8	1 1/4	3 1/2	2	B52249	B01539	B00246
5/8	.6250	15.88	5/8	2 1/4	5	2	B51314	B01368	B68314
5/8	.6250	15.88	5/8	3	6	2	B51514	B01423	B68514
3/4	.7500	19.05	3/4	1	3	2	B52711	B01665	B69711
3/4	.7500	19.05	3/4	1 1/2	4	2	B52251	B01540	B69251
3/4	.7500	19.05	3/4	2 1/4	5	2	B51316	B01369	B68316
3/4	.7500	19.05	3/4	3	6	2	B51516	B01424	B68516
7/8	.8750	22.23	7/8	1 1/2	4	2	B52253	B01595	B69253
7/8	.8750	22.23	7/8	2 1/4	5	2	B51318	B01370	B68318
7/8	.8750	22.23	7/8	3	6	2	B51518	B01425	B68518
1	1.0000	25.40	1	1 1/2	4	2	B52257	B01542	B00250
1	1.0000	25.40	1	2 1/4	5	2	B51320	B01371	B68320
1	1.0000	25.40	1	3	6	2	B51520	B01426	B68520