

TuffCut® 3D

MFPB Series Recommended Cutting Data - Speeds - Inch

Recommended Speeds by Material Group					Finishing	Semi-Finishing	
Workpiece Material Group	Material Type	Ap			0.01-0.03 x D	0.05-0.1 x D	
		Ae			0.02-0.03 x D	0.05-0.1 x D	
		Coolant			Vc - SFM		
		Emulsion	Compressed Air	MQL			
Steels	P	Low Carbon	●	●	●	1480	1150
		Medium Carbon	●	●	●	1130	900
		Alloy Steels	●	●	●	1030	840
		Die / Tool Steels (≤ 45 HRC)	●	●	●	900	720
Stainless Steels	M	Free Machining	●	x	○	670	540
		Austenitic	●	x	○	520	430
		Difficult Stainless	●	x	○	410	330
		PH Stainless (≤ 45 HRC)	●	x	○	520	430
		Cobalt Chrome Alloys	●	x	○	410	330
		Duplex (22%)	●	x	○	250	200
		Super Duplex (25%)	●	x	○	250	200
Special Alloys	S	High Temp Alloys	●	x	x	180	150
		Titanium Alloys	●	x	x	380	340
Cast Irons	K	Gray Cast Iron	●	○	○	1620	1300
		Ductile Cast Iron	●	○	○	1050	920
		Malleable Iron	●	○	○	670	540
Hardened Steels	H	HRC 45-50	●	○	○	490	410
		HRC 50-55	●	○	○	330	310

● Preferred ○ Possible X Not Possible

MFPB Series Recommended Cutting Data - Feeds - Inch

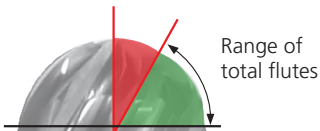
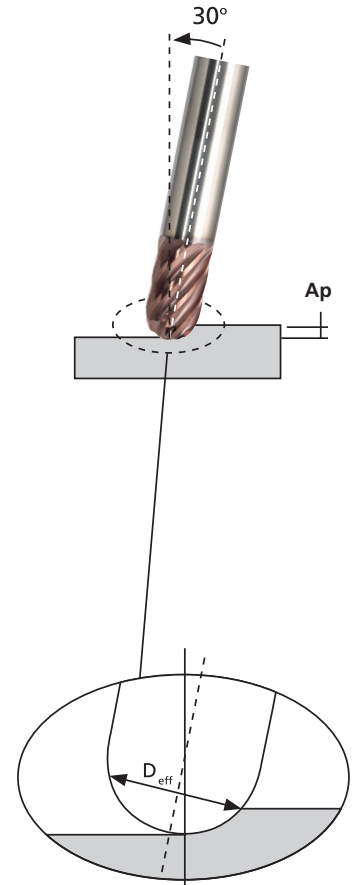
Recommended Feeds by Material Group		Tool Diameter (Inch)												
Workpiece Material Group	Material Type	1/4		5/16		3/8		1/2		5/8		3/4		
		Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	
		Fz - in/tooth												
Steels	P	Low Carbon	.0075	.0038	.0094	.0047	.0113	.0056	.0150	.0075	.0188	.0094	.0225	.0113
		Medium Carbon	.0075	.0038	.0094	.0047	.0113	.0056	.0150	.0075	.0188	.0094	.0225	.0113
		Alloy Steels	.0075	.0038	.0094	.0047	.0113	.0056	.0150	.0075	.0188	.0094	.0225	.0113
		Die / Tool Steels (≤ 45 HRC)	.0050	.0038	.0063	.0047	.0075	.0056	.0100	.0075	.0125	.0094	.0150	.0113
Stainless Steels	M	Free Machining	.0050	.0038	.0063	.0047	.0075	.0056	.0100	.0075	.0125	.0094	.0150	.0113
		Austenitic	.0050	.0038	.0063	.0047	.0075	.0056	.0100	.0075	.0125	.0094	.0150	.0113
		Difficult Stainless	.0050	.0038	.0063	.0047	.0075	.0056	.0100	.0075	.0125	.0094	.0150	.0113
		PH Stainless (≤ 45 HRC)	.0050	.0038	.0063	.0047	.0075	.0056	.0100	.0075	.0125	.0094	.0150	.0113
		Cobalt Chrome Alloys	.0045	.0030	.0056	.0038	.0068	.0045	.0090	.0060	.0113	.0075	.0135	.0090
		Duplex (22%)	.0045	.0030	.0056	.0038	.0068	.0045	.0090	.0060	.0113	.0075	.0135	.0090
		Super Duplex (25%)	.0043	.0028	.0053	.0034	.0064	.0041	.0085	.0055	.0106	.0069	.0128	.0083
Special Alloys	S	High Temp Alloys	.0038	.0025	.0047	.0031	.0056	.0038	.0075	.0050	.0094	.0063	.0113	.0075
		Titanium Alloys	.0038	.0025	.0047	.0031	.0056	.0038	.0075	.0050	.0094	.0063	.0113	.0075
Cast Irons	K	Gray Cast Iron	.0075	.0050	.0094	.0063	.0113	.0075	.0150	.0100	.0188	.0125	.0225	.0150
		Ductile Cast Iron	.0063	.0050	.0078	.0063	.0094	.0075	.0125	.0100	.0156	.0125	.0188	.0150
		Malleable Iron	.0050	.0038	.0063	.0047	.0075	.0056	.0100	.0075	.0125	.0094	.0150	.0113
Hardened Steels	H	HRC 45-50	.0038	.0035	.0047	.0044	.0056	.0053	.0075	.0070	.0094	.0088	.0113	.0105
		HRC 50-55	.0031	.0035	.0039	.0044	.0047	.0053	.0063	.0070	.0078	.0088	.0094	.0105

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

TuffCut® 3D

MFPB Series Recommended Cutting Data - Inch

Tool Ø (in)	Effective Diameter at 30°						
	Axial Depth of Cut (Ap) - inch						
	.008	.016	.024	.031	.039	.059	.079
1/4	.193	.215	.229	.237	.243	-	-
5/16	.234	.260	.276	.287	.296	.309	-
3/8	.273	.303	.322	.335	.347	.365	.373
1/2	.351	.386	.411	.428	.443	.470	.487
5/8	.426	.467	.497	.517	.535	.570	.593
3/4	.500	.547	.580	.603	.624	.666	.695



Range of total flutes

Tool Ø (in)	Tilt Angle	No. of Flutes
1/4	33°	6
5/16	25°	8
3/8	22°	8
1/2	24°	8
5/8	25°	8
3/4	25°	10

Tool Ø (in)	Effective Teeth		
	Tilt Angle		
	20°	25°	33°
1/4	2	4	6
5/16	2	8	8
3/8	2	8	8
1/2	6	8	8
5/8	6	8	8
3/4	6	10	10

Red Area:

Does not have complete effective number of flutes to center of tool.

Green Area:



Programming at the listed tilt angle will utilize the full effective number of flutes.

End Mills - Technical Information Series MFPB

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

TuffCut® 3D

MFPB Series Recommended Cutting Data - Speeds - Metric

Recommended Speeds by Material Group					Finishing	Semi-Finishing	
Workpiece Material Group	Material Type	Ap			0.01-0.03 x D	0.05-0.1 x D	
		Ae			0.02-0.03 x D	0.05-0.1 x D	
		Coolant			Vc - M/Min		
Emulsion	Compressed Air	MQL					
Steels	P	Low Carbon	●	●	●	450	350
		Medium Carbon	●	●	●	345	275
		Alloy Steels	●	●	●	315	255
		Die / Tool Steels (≤ 45 HRC)	●	●	●	275	220
Stainless Steels	M	Free Machining	●	x	○	205	165
		Austenitic	●	x	○	160	130
		Difficult Stainless	●	x	○	125	100
		PH Stainless (≤ 45 HRC)	●	x	○	160	130
		Cobalt Chrome Alloys	●	x	○	125	100
		Duplex (22%)	●	x	○	75	60
		Super Duplex (25%)	●	x	○	75	60
Special Alloys	S	High Temp Alloys	●	x	x	55	45
		Titanium Alloys	●	x	x	115	105
Cast Irons	K	Gray Cast Iron	●	○	○	495	395
		Ductile Cast Iron	●	○	○	320	280
		Malleable Iron	●	○	○	205	165
Hardened Steels	H	HRC 45-50	●	○	○	150	125
		HRC 50-55	●	○	○	100	95

● Preferred ○ Possible X Not Possible

MFPB Series Recommended Cutting Data - Feeds - Metric

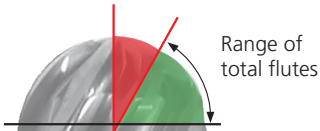
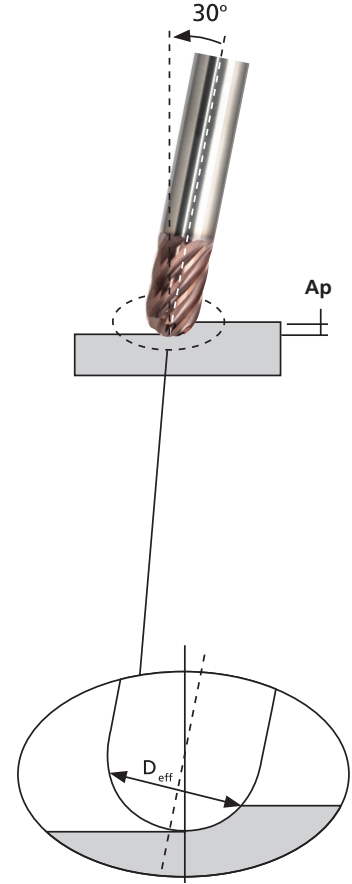
Recommended Feeds by Material Group		Tool Diameter (mm)												
Workpiece Material Group	Material Type	6		8		10		12		16		20		
		Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	
		Fz - mm/tooth												
Steels	P	Low Carbon	0.180	0.090	0.240	0.120	0.300	0.150	0.360	0.180	0.480	0.240	0.600	0.300
		Medium Carbon	0.180	0.090	0.240	0.120	0.300	0.150	0.360	0.180	0.480	0.240	0.600	0.300
		Alloy Steels	0.180	0.090	0.240	0.120	0.300	0.150	0.360	0.180	0.480	0.240	0.600	0.300
		Die / Tool Steels (≤ 45 HRC)	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240	0.400	0.300
Stainless Steels	M	Free Machining	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240	0.400	0.300
		Austenitic	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240	0.400	0.300
		Difficult Stainless	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240	0.400	0.300
		PH Stainless (≤ 45 HRC)	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240	0.400	0.300
		Cobalt Chrome Alloys	0.108	0.072	0.144	0.096	0.180	0.120	0.216	0.144	0.288	0.192	0.360	0.240
		Duplex (22%)	0.108	0.072	0.144	0.096	0.180	0.120	0.216	0.144	0.288	0.192	0.360	0.240
		Super Duplex (25%)	0.102	0.066	0.136	0.088	0.170	0.110	0.204	0.132	0.272	0.176	0.340	0.220
Special Alloys	S	High Temp Alloys	0.090	0.060	0.120	0.080	0.150	0.100	0.180	0.120	0.240	0.160	0.300	0.200
		Titanium Alloys	0.090	0.060	0.120	0.080	0.150	0.100	0.180	0.120	0.240	0.160	0.300	0.200
Cast Irons	K	Gray Cast Iron	0.180	0.120	0.240	0.160	0.300	0.200	0.360	0.240	0.480	0.320	0.600	0.400
		Ductile Cast Iron	0.150	0.120	0.200	0.160	0.250	0.200	0.300	0.240	0.400	0.320	0.500	0.400
		Malleable Iron	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240	0.400	0.300
Hardened Steels	H	HRC 45-50	0.090	0.084	0.120	0.112	0.150	0.140	0.180	0.168	0.240	0.224	0.300	0.280
		HRC 50-55	0.075	0.084	0.100	0.112	0.125	0.140	0.150	0.168	0.200	0.224	0.250	0.280

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TuffCut® 3D

MFPB Series Recommended Cutting Data - Metric

Tool Ø (mm)	Effective Diameter at 30°						
	Axial Depth of Cut (Ap) - mm						
	0.2	0.4	0.6	0.8	1	1.5	2
6	4.67	5.19	5.52	5.73	5.87	-	-
8	5.96	6.62	7.05	7.36	7.58	7.91	-
10	7.22	7.99	8.51	8.90	9.20	9.68	9.93
12	8.46	9.33	9.93	10.38	10.74	11.37	11.75
16	10.88	11.93	12.66	13.24	13.71	14.58	15.17
20	13.25	14.45	15.31	15.99	16.55	17.62	18.39



Tool Ø (mm)	Tilt Angle	No. of Flutes
6	33°	6
8	25°	8
10	22°	8
12	24°	8
16	25°	8
20	25°	10

Tool Ø (mm)	Effective Teeth		
	Tilt Angle		
	20°	25°	33°
6	2	4	6
8	2	8	8
10	2	8	8
12	6	8	8
16	6	8	8
20	6	10	10

Red Area:

Does not have complete effective number of flutes to center of tool.

Green Area:

Programming at the listed tilt angle will utilize the full effective number of flutes.

End Mills - Technical Information Series MFPB

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.