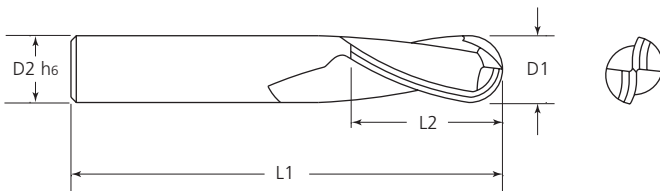
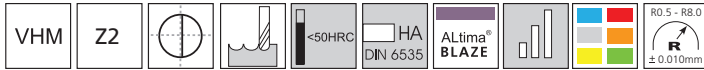


TuffCut® 3D Series 250

2 Flute Ball Nose End Mills



Features

- High performance geometry
- Radius tolerance $\pm 0.010\text{mm}$
- ALtima® Blaze coating
- Economical price level

Benefits

- Roughing and finishing applications
- Accurate finishing in 3D shapes
- Hardened steels $<50\text{HRC}$ - alloy steel - stainless steel - titanium
- Reduced tooling costs



Tool Number	D1	R	D2	L1	L2
250M01041B	1.0	0.5	4.0	50.0	2.0
250M015041B	1.5	0.75	4.0	50.0	3.0
250M02041B	2.0	1.0	4.0	50.0	4.0
250M03041B	3.0	1.5	4.0	50.0	6.0
250M04041B	4.0	2.0	4.0	50.0	6.0
250M04061B	4.0	2.0	6.0	50.0	6.0
250M05061B	5.0	2.5	6.0	50.0	7.5
250M06061B	6.0	3.0	6.0	50.0	9.0
250M06062B	6.0	3.0	6.0	75.0	9.0
250M06063B	6.0	3.0	6.0	100.0	12.0
250M08081B	8.0	4.0	8.0	63.0	12.0
250M08082B	8.0	4.0	8.0	75.0	12.0
250M08083B	8.0	4.0	8.0	100.0	16.0
250M10101B	10.0	5.0	10.0	75.0	15.0
250M10102B	10.0	5.0	10.0	100.0	20.0
250M12121B	12.0	6.0	12.0	75.0	18.0
250M12122B	12.0	6.0	12.0	100.0	24.0
250M16161B	16.0	8.0	16.0	75.0	24.0
250M16162B	16.0	8.0	16.0	100.0	32.0



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TuffCut® 3D Series 250

Recommended Speeds and Depths of Cut by Material Group

Workpiece Material Group	Material Type	Ap 			Roughing	Finishing	
		Ae 			0.05 - 0.1 x D	0.02 - 0.05 x D	
		Coolant			0.2 - 0.3 x D	0.02 - 0.05 x D	
		Max	Air	MMS	Vc-m/min		
Steels	P	Low Carbon Steels ≤180HB	○	●	●	250	280
		Med Carbon / Alloy Steels 180-350HB	○	●	●	200	220
		Pre-Hardened Steels 35-45HRC	○	●	●	180	200
Stainless Steels	M	Free Machining Stainless	●	○	○	160	180
		Austenitic Stainless	●	○	○	130	150
		Difficult Stainless	●	○	○	100	110
Special Alloys	S	High Temp Alloys	●	X	X	50	55
		Titanium Alloys	●	X	X	110	120
Cast Irons	K	Grey Cast Iron	○	●	X	220	250
		Ductile Cast Iron	○	●	X	180	200
Hardened Steels	H	Hardened Steels 45 - 50HRC	○	●	○	160	170
Non-Ferrous	N	Aluminium Alloys	●	X	○	300	500
		Brass / Bronze / Copper	●	X	○	250	400

● Preferred ○ Possible X Not Possible

Recommended Feed per Tooth by Material Group

Workpiece Material Group	Material Type	Tool Diameter & Radius												
		1		1.5		2		3		4		5		
		0.5		0.75		1		1.5		2		2.5		
		Rough	Finish	Rough	Finish	Rough	Finish	Rough	Finish	Rough	Finish	Rough	Finish	
Fz - mm/tooth														
Steels	P	Low Carbon Steels ≤180HB	0.020	0.015	0.030	0.023	0.040	0.030	0.060	0.045	0.080	0.060	0.100	0.075
		Med Carbon / Alloy Steels 180-350HB	0.020	0.015	0.030	0.023	0.040	0.030	0.060	0.045	0.080	0.060	0.100	0.075
		Pre-Hardened Steels 35-45HRC	0.018	0.015	0.027	0.023	0.036	0.030	0.054	0.045	0.072	0.060	0.090	0.075
Stainless Steels	M	Free Machining Stainless	0.018	0.015	0.027	0.023	0.036	0.030	0.054	0.045	0.072	0.060	0.090	0.075
		Austenitic Stainless	0.015	0.015	0.023	0.023	0.030	0.030	0.045	0.045	0.060	0.060	0.075	0.075
		Difficult Stainless	0.015	0.015	0.023	0.023	0.030	0.030	0.045	0.045	0.060	0.060	0.075	0.075
Special Alloys	S	High Temp Alloys	0.008	0.010	0.012	0.015	0.016	0.020	0.024	0.030	0.032	0.040	0.040	0.050
		Titanium Alloys	0.012	0.010	0.018	0.015	0.024	0.020	0.036	0.030	0.048	0.040	0.060	0.050
Cast Irons	K	Grey Cast Iron	0.020	0.015	0.030	0.023	0.040	0.030	0.060	0.045	0.080	0.060	0.100	0.075
		Ductile Cast Iron	0.018	0.015	0.027	0.023	0.036	0.030	0.054	0.045	0.072	0.060	0.090	0.075
Hardened Steels	H	Hardened Steels 45 - 50HRC	0.013	0.013	0.020	0.019	0.026	0.025	0.039	0.038	0.052	0.050	0.065	0.063
Non-Ferrous	N	Aluminium Alloys	0.025	0.015	0.038	0.023	0.050	0.030	0.075	0.045	0.100	0.060	0.125	0.075
		Brass / Bronze / Copper	0.020	0.015	0.030	0.023	0.040	0.030	0.060	0.045	0.080	0.060	0.100	0.075

Workpiece Material Group	Material Type	Tool Diameter & Radius										
		6		8		10		12		16		
		3		4		5		6		8		
		Rough	Finish	Rough	Finish	Rough	Finish	Rough	Finish	Rough	Finish	
Fz - mm/tooth												
Steels	P	Low Carbon Steels ≤180HB	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240
		Med Carbon / Alloy Steels 180-350HB	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240
		Pre-Hardened Steels 35-45HRC	0.108	0.090	0.144	0.120	0.180	0.150	0.216	0.180	0.288	0.240
Stainless Steels	M	Free Machining Stainless	0.108	0.090	0.144	0.120	0.180	0.150	0.216	0.180	0.288	0.240
		Austenitic Stainless	0.090	0.090	0.120	0.120	0.150	0.150	0.180	0.180	0.240	0.240
		Difficult Stainless	0.090	0.090	0.120	0.120	0.150	0.150	0.180	0.180	0.240	0.240
Special Alloys	S	High Temp Alloys	0.048	0.060	0.064	0.080	0.080	0.100	0.096	0.120	0.128	0.160
		Titanium Alloys	0.072	0.060	0.096	0.080	0.120	0.100	0.144	0.120	0.192	0.160
Cast Irons	K	Grey Cast Iron	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240
		Ductile Cast Iron	0.108	0.090	0.144	0.120	0.180	0.150	0.216	0.180	0.288	0.240
Hardened Steels	H	Hardened Steels 45 - 50HRC	0.078	0.075	0.104	0.100	0.130	0.125	0.156	0.150	0.208	0.200
Non-Ferrous	N	Aluminium Alloys	0.150	0.090	0.200	0.120	0.250	0.150	0.300	0.180	0.400	0.240
		Brass / Bronze / Copper	0.120	0.090	0.160	0.120	0.200	0.150	0.240	0.180	0.320	0.240

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