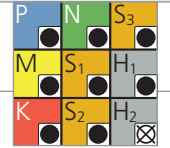


CrazyMill Cool Ball - Type A - Roughing

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ⊗ Not recommended

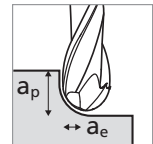


V_c [m/min] | [SFM]
f_z [mm] | [IPT]

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

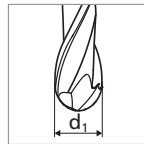
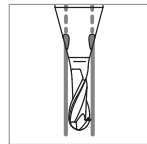
Materials group	Material	AISI/ASTM/UNS	Ød1		Ød1		Ød1		Ød1		Ød1		Ød1		Ød1			
			0.3–0.4 mm .012"–.016"		0.5–0.8 mm .020"–.031"		1.0–1.2 mm .039"–.047"		1.5–1.8 mm .059"–.071"		2.0–2.5 mm .079"–.098"		3.0 mm .118"		4.0–6.0 mm .157"–.236"		8.0 mm .315"	
			v _c	f _z	v _c	f _z	v _c	f _z	v _c	f _z	v _c	f _z	v _c	f _z	v _c	f _z	v _c	f _z
P	Unalloyed carbon steel Rm < 800 N/mm²	AISI 1010	60 197	0.005–0.007 .00020–.00028	100 328	0.010–0.014 .00039–.00055	140 459	0.015–0.017 .00059–.00067	200 656	0.024–0.026 .00094–.00102	220 722	0.034–0.036 .00134–.00142	240 787	0.048 .00189	280 919	0.050 .00197	280 919	0.050 .00197
		AISI 1015																
		AISI 1045																
		AISI 1020																
	Low alloyed steel Rm > 900 N/mm²	AISI 1215	60 197	0.004–0.006 .00016–.00024	100 328	0.009–0.012 .00035–.00047	140 459	0.014–0.016 .00055–.00063	200 656	0.022–0.024 .00087–.00094	220 722	0.032–0.034 .00126–.00134	240 787	0.046 .00181	280 919	0.048 .00189	280 919	0.048 .00189
		ASTM 3415 / AISI 3310																
		AISI 5115																
		AISI 52100																
	High alloyed tool steel Rm < 1200 N/mm²	AISI 4140	60 197	0.004–0.006 .00016–.00024	100 328	0.008–0.011 .00031–.00043	140 459	0.011–0.013 .00043–.00051	200 656	0.020–0.022 .00079–.00087	220 722	0.030–0.032 .00118–.00126	240 787	0.042 .00165	280 919	0.044 .00173	280 919	0.044 .00173
AISI D2																		
AISI D4/D6																		
AISI M2 / UNS T11302																		
M	Stainless steel ferritic	AISI T1 / UNS T12001	60 197	0.004–0.006 .00016–.00024	100 328	0.008–0.011 .00031–.00043	140 459	0.011–0.013 .00043–.00051	200 656	0.020–0.022 .00079–.00087	220 722	0.030–0.032 .00118–.00126	240 787	0.042 .00165	280 919	0.044 .00173	280 919	0.044 .00173
		AISI 430 / UNS S43000																
	Stainless steel martensitic	AISI 430F	60 197	0.005–0.007 .00020–.00028	100 328	0.010–0.014 .00039–.00055	140 459	0.016–0.018 .00063–.00071	200 656	0.024–0.026 .00094–.00102	220 722	0.034–0.036 .00134–.00142	240 787	0.046 .00181	280 919	0.048 .00189	280 919	0.048 .00189
		AISI 420C																
	Stainless steel martensitic – PH	AISI 440B	60 197	0.004–0.006 .00016–.00024	100 328	0.009–0.012 .00035–.00047	140 459	0.015–0.017 .00059–.00067	200 656	0.022–0.024 .00087–.00094	220 722	0.032–0.034 .00126–.00134	240 787	0.044 .00173	280 919	0.046 .00181	280 919	0.046 .00181
		AISI 630 / ASTM 17-4 PH																
	Stainless steel austenitic	ASTM 15-5 PH	60 197	0.004–0.006 .00016–.00024	100 328	0.009–0.012 .00035–.00047	140 459	0.015–0.017 .00059–.00067	200 656	0.022–0.024 .00087–.00094	220 722	0.032–0.034 .00126–.00134	240 787	0.044 .00173	280 919	0.046 .00181	280 919	0.046 .00181
		AISI 304																
		AISI 316L																
AISI 316LM																		
K	Cast iron	AISI 904L	60 197	0.004–0.006 .00016–.00024	100 328	0.008–0.011 .00031–.00043	140 459	0.012–0.014 .00047–.00055	200 656	0.016–0.018 .00063–.00071	220 722	0.030–0.032 .00118–.00126	240 787	0.042 .00165	280 919	0.044 .00173	280 919	0.044 .00173
		ASTM 30																
		ASTM 40B																
		ASTM 60-40-18																
		ASTM 80-60-03	60 197	0.003–0.005 .00012–.00020	100 328	0.006–0.009 .00024–.00035	120 394	0.011–0.022 .00043–.00087	140 459	0.024–0.026 .00094–.00102	160 525	0.028–0.036 .00110–.00142	180 591	0.042–0.048 .00165–.00189	200 656	0.052–0.057 .00205–.00224	200 656	0.052–0.057 .00205–.00224

Roughing



- $a_p = 0.5 \times d_1$
($\varnothing d_1 \leq 0.5 \text{ mm} | .020''$)
- $a_p = 1 \times d_1$
($\varnothing d_1 > 0.5 \text{ mm} | .020''$)
- $a_e = 0.3 \times d_1$

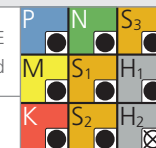
Machining angle = 0°



CrazyMill Cool Ball - Type A - Roughing

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ⊗ Not recommended

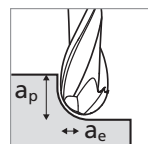


MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

v_c [m/min] | [SFM]
 f_z [mm] | [IPT]

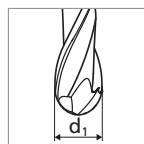
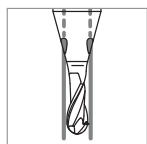
Materials group	Material	AISI/ASTM/UNS	Ød1 0.3–0.4 mm .012"–.016"		Ød1 0.5–0.8 mm .020"–.031"		Ød1 1.0–1.2 mm .039"–.047"		Ød1 1.5–1.8 mm .059"–.071"		Ød1 2.0–2.5 mm .079"–.098"		Ød1 3.0 mm .118"		Ød1 4.0–6.0 mm .157"–.236"		Ød1 8.0 mm .315"	
			v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
N	Aluminium alloy wrought	ASTM 6351	60 197	0.006–0.008 .00024–.00031	100 328	0.012–0.016 .00047–.00063	140 459	0.018–0.020 .00071–.00079	200 656	0.026–0.028 .00102–.00110	220 722	0.036–0.040 .00142–.00157	240 787	0.058 .00228	280 919	0.060 .00236	280 919	0.060 .00236
		ASTM 7075																
	Aluminium alloy cast	ASTM A380	60 197	0.006–0.008 .00024–.00031	100 328	0.012–0.016 .00047–.00063	140 459	0.018–0.020 .00071–.00079	200 656	0.026–0.028 .00102–.00110	220 722	0.036–0.040 .00142–.00157	240 787	0.058 .00228	280 919	0.060 .00236	280 919	0.060 .00236
		UNS A03590																
	Copper	UNS C10100	60 197	0.006–0.008 .00024–.00031	100 328	0.014–0.018 .00055–.00071	140 459	0.020–0.022 .00079–.00087	200 656	0.026–0.028 .00102–.00110	220 722	0.036–0.040 .00142–.00157	240 787	0.058 .00228	280 919	0.060 .00236	280 919	0.060 .00236
		UNS C11000																
	Brass lead free	UNS C27400	60 197	0.006–0.008 .00024–.00031	100 328	0.014–0.018 .00055–.00071	140 459	0.020–0.022 .00079–.00087	200 656	0.026–0.028 .00102–.00110	220 722	0.036–0.040 .00142–.00157	240 787	0.058 .00228	280 919	0.060 .00236	280 919	0.060 .00236
UNS C28000																		
Brass, Bronze Rm < 400 N/mm²	UNS C38500	60 197	0.006–0.008 .00024–.00031	100 328	0.014–0.018 .00055–.00071	140 459	0.020–0.022 .00079–.00087	200 656	0.026–0.028 .00102–.00110	220 722	0.036–0.040 .00142–.00157	240 787	0.058 .00228	280 919	0.060 .00236	280 919	0.060 .00236	
	UNS C51900																	
Bronze Rm < 600 N/mm²	UNS C63000	60 197	0.006–0.008 .00024–.00031	100 328	0.012–0.016 .00047–.00063	140 459	0.018–0.020 .00071–.00079	200 656	0.026–0.028 .00102–.00110	220 722	0.036–0.040 .00142–.00157	240 787	0.058 .00228	280 919	0.060 .00236	280 919	0.060 .00236	
	UNS C63200																	
S ₁	Super alloys	Inconel 625	60 197	0.003–0.004 .00012–.00016	100 328	0.004–0.006 .00016–.00024	120 394	0.007–0.008 .00028–.00031	130 427	0.009–0.010 .00035–.00039	140 459	0.010–0.012 .000639–.00047	150 492	0.015 .00059	170 558	0.020 .00079	170 558	0.020 .00079
		Inconel 718																
		Hastelloy B-2																
		Hastelloy X																
S ₂	Titanium pure	ASTM B348 / F67	60 197	0.004–0.006 .00016–.00024	100 328	0.008–0.011 .00031–.00043	120 394	0.016–0.018 .00063–.00071	130 427	0.020–0.022 .00079–.00087	140 459	0.028–0.030 .00110–.00118	150 492	0.042 .00165	170 558	0.044 .00173	170 558	0.044 .00173
		ASTM B348 / F68																
S ₃	Titanium alloys	ASTM B348 / F136	60 197	0.004–0.006 .00016–.00024	100 328	0.008–0.011 .00031–.00043	120 394	0.016–0.018 .00063–.00071	130 427	0.020–0.022 .00079–.00087	140 459	0.028–0.030 .00110–.00118	150 492	0.042 .00165	170 558	0.044 .00173	170 558	0.044 .00173
		ASTM F1295																
H ₁	Hardened steel < 55 HRC	Haynes 25	60 197	0.003–0.004 .00012–.00016	100 328	0.004–0.006 .00016–.00024	140 459	0.007–0.008 .00028–.00031	180 591	0.009–0.010 .00035–.00039	200 656	0.010–0.012 .000639–.00047	220 722	0.015 .00059	240 787	0.020 .00079	240 787	0.020 .00079
		ASTM F1537																
H ₂	Hardened steel ≥ 55 HRC	AISI O1	60 197	0.004–0.006 .00016–.00024	80 262	0.007–0.009 .00028–.00035	100 328	0.010–0.012 .000639–.00047	140 459	0.014–0.018 .00055–.00071	180 591	0.020–0.026 .00079–.00102	200 656	0.035 .00138	240 787	0.040 .00157	240 787	0.040 .00157
		AISI D2																

Roughing



- $a_p = 0.5 \times d_1$
($\varnothing d_1 \leq 0.5 \text{ mm} | .020''$)
- $a_p = 1 \times d_1$
($\varnothing d_1 > 0.5 \text{ mm} | .020''$)
- $a_e = 0.3 \times d_1$

Machining angle = 0°



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