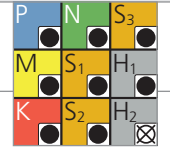


# CrazyMill Cool Ball - Type B - Roughing

RECOMMENDATION FOR USE

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

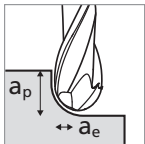


## MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

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

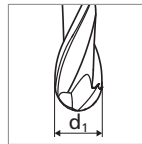
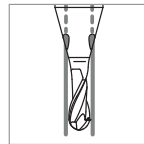
Materials group	Material	AISI/ASTM/UNS	Ød1		Ød1		Ød1		Ød1		Ød1		Ød1		Ød1		Ød1	
			0.3–0.4 mm   .012"–.016"	0.5–0.8 mm   .020"–.031"	1.0–1.2 mm   .039"–.047"	1.5–1.8 mm   .059"–.071"	2.0–2.5 mm   .079"–.098"	3.0 mm   .118"	4.0–6.0 mm   .157"–.236"	8.0 mm   .315"	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$
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	0.046 .00181	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	0.044 .00173	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	0.040 .00157	280   919	0.042 .00165	280   919	0.042 .00165
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	0.040 .00157	280   919	0.042 .00165	280   919	0.042 .00165
		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	0.044 .00173	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	0.040 .00157	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	0.040–0.047 .00157–.00185	200   656	0.050–0.054 .00197–.00213	200   656	0.050–0.054 .00197–.00213

### Roughing



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

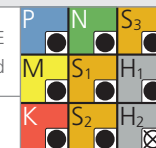
Machining angle = 0°



# CrazyMill Cool Ball - Type B - Roughing

RECOMMENDATION FOR USE

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

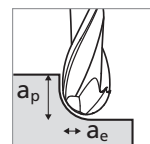


## MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

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

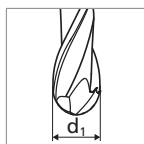
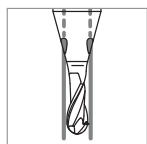
Materials group	Material	AISI/ASTM/UNS	Ød1 0.3–0.4 mm   .012"–.016"		Ød1 0.5–0.8 mm   .020"–.031"		Ød1 1.0–1.2 mm   .039"–.047"		Ød1 1.5–1.8 mm   .059"–.071"		Ød1 2.0–2.5 mm   .079"–.098"		Ød1 3.0 mm   .118"		Ød1 4.0–6.0 mm   .157"–.236"		Ød1 8.0 mm   .315"	
			$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$
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 <sub>1</sub>	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 <sub>2</sub>	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	0.040 .00157	170   558	0.044 .00173	170   558	0.044 .00173
		ASTM B348 / F68																
S <sub>3</sub>	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	0.040 .00157	170   558	0.044 .00173	170   558	0.044 .00173
		ASTM F1295																
H <sub>1</sub>	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 <sub>2</sub>	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	0.033 .00130	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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