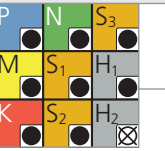


# CrazyMill Cool Ball - Type B - Roughing

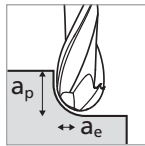
$v_c$  [m/min] | [SFM]  
 $f_z$  [mm] | [IPT]

RECOMMENDATION FOR USE  
● Excellent | ● Good | ○ Acceptable | ⊗ Not recommended



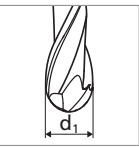
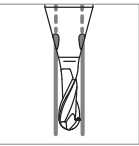
## MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

### Roughing



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

Machining angle = 0°



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	$\varnothing d_1$ 0.3-0.4 mm   .012"-.016"		$\varnothing d_1$ 0.5-0.8 mm   .020"-.031"		$\varnothing d_1$ 1.0-1.2 mm   .039"-.047"		$\varnothing d_1$ 1.5-1.8 mm   .059"-.071"		$\varnothing d_1$ 2.0-2.5 mm   .079"-.098"		$\varnothing d_1$ 3.0 mm   .118"		$\varnothing d_1$ 4.0-6.0 mm   .157"-.236"		$\varnothing d_1$ 8.0 mm   .315"									
					$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$	$v_c$	$f_z$						
P	Unalloyed carbon steel Rm < 800 N/mm <sup>2</sup>	1.0301	C10	AISI 1010																								
		1.0401	C15	AISI 1015																								
		1.1191	C45E/CK45	AISI 1045		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
		1.0044	S275JR	AISI 1020																								
		1.0715	11SMn30	AISI 1215																								
	Low alloyed steel Rm > 900 N/mm <sup>2</sup>	1.5752	15NiCr13	ASTM 3415 / AISI 3310																								
		1.7131	16MnCr5	AISI 5115																								
		1.3505	100Cr6	AISI 52100		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
		1.7225	42CrMo4	AISI 4140																								
		1.2842	90MnCrV8	AISI O2																								
	High alloyed tool steel Rm < 1200 N/mm <sup>2</sup>	1.2379	X153CrMoV12	AISI D2																								
		1.2436	X210CrW12	AISI D4/D6																								
1.3343		H56-5-2C	AISI M2 / UNS T11302		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	
1.3355		H518-0-1	AISI T1 / UNS T12001																									
M		Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000																							
	1.4105		X6CrMoS17	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
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C																								
		1.4112	X90CrMoV18	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
	Stainless steel martensitic - PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH																								
		1.4545	X5CrNiCuNb 15-5	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
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304																								
		1.4435	X2CrNiMo 18-14-3	AISI 316L																								
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		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
	K	Cast iron	0.6020	GG20	ASTM 30																							
0.6030			GG30	ASTM 40B																								
0.7040			GGG40	ASTM 60-40-18		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
0.7060			GGG60	ASTM 80-60-03																								
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351																								
		3.4365	AlZnMgCu1.5	ASTM 7075		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
	Aluminium alloy cast	3.2163	GD-AISI9Cu3	ASTM A380																								
		3.2381	GD-AISI10Mg	UNS A03590		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
	Copper	2.004	Cu-OF / CW008A	UNS C10100																								
		2.0065	Cu-ETP / CW004A	UNS C11000		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
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400																								
		2.036	CuZn40 CW509L	UNS C28000		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
	Brass, Bronze Rm < 400 N/mm <sup>2</sup>	2.0401	CuZn39Pb3 / CW614N	UNS C38500																								
		2.102	CuSn6	UNS C51900		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
	Bronze Rm < 600 N/mm <sup>2</sup>	2.0966	CuAl10Ni5Fe4	UNS C63000																								
		2.096	CuAl9Mn2	UNS C63200		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
S <sub>1</sub>	Super alloys	2.4856		Inconel 625																								
		2.4668		Inconel 718																								
		2.4617	NiMo28	Hastelloy B-2		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 .00063-.00067		150 492	0.015 .00059		170 558	0.020 .00079		170 558	0.020 .00079
		2.4665	NiCr22Fe18Mo	Hastelloy X																								
S <sub>2</sub>	Titanium pure	3.7035	Gr.2	ASTM B348 / F67																								
		3.7065	Gr.4	ASTM B348 / F68		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
S <sub>2</sub>	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136																								
		9.9367	TiAl6Nb7	ASTM F1295		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	0.030-0.030 .00110-.00118		150 492	0.040 .00157		170 558	0.044 .00173		170 558	0.044 .00173