

## Operating Guidelines - 20xD

Materials				Condition	Tensile Strength (N/mm2)	HB Hardness	Vc Cutting Speed SFM	IPR Cutting Diameter (in/rev)				
ISO	Mtl Group No.	Type						3.0-5.9 mm (.118-.235")	6.0-8.9 mm (.236-.353")	9.0-11.9 mm (.354-.471")	12.0-16.0 mm (.472+")	
P	1	Non alloy steel and cast steel free cutting steel	< 0.25 %C	Annealed	420	125	360	.0058 - .0094	.0094 - .0120	.0120 - .0130	.0130	
	2		>= 0.25 %C	Annealed	650	190						
	3		< 0.55 %C	Quenched and Tempered	850	250						
	4		>= 0.55 %C	Annealed	750	220						
	5		> 0.55 %C	Quenched and Tempered	1000	300						
	6	Low alloy steel and cast steel (less than 5% of alloying elements)			Annealed	600	200	245	.0058 - .0094	.0094 - .0120	0.012 - .0130	.0130
	7				Quenched and Tempered	930	275					
	8					1000	300					
	9					1200	350					
	10	High alloyed steel, cast steel, and tool steel			Annealed	680	200	220	.0043 - .0069	.0069 - .0088	.0088 - .0094	.0094 - .0102
	11				Quenched and Tempered	1100	325					
M	12	Stainless steel (410, 416, 420, 440)		Ferritic/ Martensitic	680	200	220	.0043 - .0069	.0069 - .088	.0088 - .0094	.0094 - .0102	
	13	Stainless steel (15-5, 17-4)		Martensitic	820	240						
	14	Stainless steel (302, 303, 304)		Austenitic	600	180	220	.0023 - .0047	.0047 - .0070	.0070 - .0094	.0094 - .0122	
		Stainless steel (310, 316, 321)					165	.0018 - .0035	.0035 - .0053	.0053 - .0070	.0070 - .0093	
	14	Stainless steel (323, 329, F55, 2205)		Austenitic/ Ferritic	820	240	120	.0010 - .0024	.0024 - .0029	.0029 - .0033	.0033 - .0036	
S	36	Titanium Ti alloys Ti1100, Ti6AL4V				Rm 400	120	.0010 - .0023	.0023 - .0028	.0028 - .0032	.0032 - .0037	
	37				Alpha + Beta alloys cured	Rm1050						

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases.