

Operating Guidelines

ISO	Materials		Condition	Tensile Strength (N/mm ²)	HB Hardness	Vc Cutting Speed SFM	Feed vs. Drill Diameter (inches/rev)					
	Mtl Group No.	Type					Inch (mm) 2.125-2.188 (53.9-55.5)	Inch (mm) 2.250-2.563 (57.1-65.1)	Inch (mm) 2.625-2.813 (66.7-71.5)	Inch (mm) 2.875-3.125 (73.0-79.4)		
P	1	Non-alloy steel, cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	590-825	.002-.005	.002-.005	.002-.005	.002-.005	
	2		>= 0.25 %C	Annealed	650	190	530-825	.002-.006	.002-.006	.002-.006	.002-.006	
	3		< 0.55 %C	Quenched and Tempered	850	250	460-790	.003-.006	.003-.006	.003-.007	.003-.007	
	4		>= 0.55 %C	Annealed	750	220	460-790	.003-.006	.003-.006	.003-.007	.003-.007	
	5		> 0.55 %C	Quenched and Tempered	1000	300	460-790	.003-.006	.003-.006	.003-.007	.003-.007	
	6	Low alloy steel and cast steel (less than 5% of alloying elements)	Annealed		600	200	460-790	.003-.007	.003-.007	.003-.007	.003-.007	
	7		Quenched and Tempered		930	275	330-590	.003-.007	.003-.007	.003-.007	.003-.007	
	8		Quenched and Tempered		1000	300	330-590	.003-.007	.003-.007	.003-.007	.003-.007	
	9		Quenched and Tempered		1200	350	330-590	.003-.007	.003-.007	.003-.007	.003-.007	
	10	High alloy steel, cast steel, and tool steel	Annealed		680	200	460-660	.003-.007	.003-.007	.003-.007	.003-.007	
	11		Quenched and Tempered		1100	325	330-530	.003-.006	.003-.006	.003-.006	.003-.006	
M	12	Stainless steel & Cast iron	Ferritic/Martensitic		680	200	560-790	.002-.005	.003-.006	.003-.006	.003-.006	
	13		Martensitic		820	240	560-790	.002-.005	.003-.006	.003-.006	.003-.006	
	14		Austenitic		600	180	560-790	.002-.005	.003-.006	.003-.006	.003-.006	
K	15	Grey cast iron (GG)	Ferritic			160	590-825	.005-.008	.005-.008	.005-.009	.005-.009	
	16		Pearlitic			250	590-825	.005-.008	.005-.008	.005-.009	.005-.009	
	17	Cast iron nodular (GGG)	Ferritic			180	590-825	.005-.008	.005-.008	.005-.009	.005-.009	
	18		Pearlitic			260	590-825	.005-.008	.005-.008	.005-.009	.005-.009	
	19	Malleable cast iron	Ferritic			130	390-730	.004-.007	.004-.007	.005-.008	.005-.008	
	20		Pearlitic			230	390-730	.004-.007	.004-.007	.005-.008	.005-.008	
N	21	Aluminum - Wrought alloy	Not cureable			60	660-1155	.002-.007	.002-.007	.002-.007	.002-.007	
	22		Cured			100	660-1155	.002-.007	.002-.007	.002-.007	.002-.007	
	23	Aluminum-cast, alloyed	<=12 %Si	Not cureable			75	660-1155	.002-.007	.002-.007	.002-.007	
	24		Cured			90	660-1155	.002-.007	.002-.007	.002-.007	.002-.007	
	25	>12% Si	High temp			130	660-1155	.002-.007	.002-.007	.002-.007	.002-.007	
	26	Copper alloys	>1% Pb		Free cutting			110	495-825	.004-.007	.004-.007	.004-.007
	27		Brass			90	495-825	.004-.007	.004-.007	.004-.007	.004-.007	
	28		Electrolitic copper			100	495-825	.004-.007	.004-.007	.004-.007	.004-.007	
	29	Non-metallic	Duroplastics, fiber plastics				495-825	.004-.007	.004-.007	.004-.007	.004-.007	
	30		Hard rubber				495-825	.004-.007	.004-.007	.004-.007	.004-.007	
S	31	High temp alloys	Fe based	Annealed			200	100-200	.002-.004	.002-.004	.002-.004	.002-.004
	32			Cured			280	100-200	.002-.004	.002-.004	.002-.004	.002-.004
	33		Ni or Co based	Annealed			250	100-200	.002-.004	.002-.004	.002-.004	.002-.004
	34			Cured			350	100-200	.002-.004	.002-.004	.002-.004	.002-.004
	35			Cast			320	100-200	.002-.004	.002-.004	.002-.004	.002-.004
	36	Titanium, Ti alloys			Rm 400		165-265	.002-.004	.002-.004	.002-.004	.002-.004	
	37		Alpha+Beta alloys cured		Rm 1050		165-265	.002-.004	.002-.004	.002-.004	.002-.004	
H	38	Hardened Steel	Hardened			55 HRC	100-200	.002-.004	.002-.004	.002-.004	.002-.004	
	39		Hardened			60 HRC	100-200	.002-.004	.002-.004	.002-.004	.002-.004	
	40	Chilled cast iron	Cast			400	100-200	.002-.004	.002-.004	.002-.004	.002-.004	
	41	Cast iron nodular	Hardened			55 HRC	100-200	.002-.004	.002-.004	.002-.004	.002-.004	

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. Additionally, DOC and WOC may need to be revised to optimize the tools performance.