

Material Groups							Recommended Machining Conditions												
ISO	Material	Condition	Tensile Strength [ksi]	Hardness HB	Material Group No.	V _c SFM	SUMOCHAM												
							Feed vs. Drill Diameter												
							D= .157-.193	D= .197-.232	D= .236-.311	D= .315-.390	D= .394-.469	D= .472-.547	D= .551-.625	D= .630-.783	D= .787-1.020	D= 1.024-1.295			
IPR																			
P	Non-alloy steel and cast steel, free cutting steel	<0.25% C	Annealed	61	125	1	260-360-460												
		≥0.25% C	Annealed	94	190	2	260-340-430												
		<0.55% C	Quenched and tempered	123	250	3	260-330-390	.0015	.0027	.0035	.0047	.0059	.007	.0078	.009	.0102	.0118		
		≥0.55% C	Annealed	109	220	4	230-300-360	.0031	.0043	.0051	.0086	.0106	.0118	.0137	.0157	.0177	.0196		
			Quenched and tempered	145	300	5	160-230-300												
	Low alloy and cast steel (less than 5% of alloying elements)	Annealed	87	200	6	230-310-390	.0015	.0027	.0035	.0047	.0055	.0062	.007	.009	.0098	.0118			
		Quenched and tempered	135	275	7	230-300-360	.0023	.0039	.0047	.007	.0082	.0094	.0102	.0122	.0137	.0157			
			145	300	8	160-230-300	.0031	.0051	.0059	.0098	.011	.0125	.0137	.0157	.0177	.0196			
			174	350	9	130-180-230													
	High alloyed steel, cast steel and tool steel	Annealed	99	200	10	160-230-300	.0023	.0027	.0035	.0043	.0051	.0059	.007	.0078	.0086	.0098			
Quenched and tempered		160	325	11	130-200-260	.0027	.0035	.0043	.0055	.0066	.0078	.009	.0098	.0106	.0118				
Stainless steel and cast steel	Ferritic/martensitic	99	200	12	130-200-260	.0019	.0023	.0031	.0039	.0047	.0055	.0062	.0066	.007	.0078				
	Martensitic	119	240	13		.0023	.0027	.0035	.0047	.0059	.0066	.0078	.0086	.0094	.0106	.0118	.0137		
M	Stainless steel and cast steel	Austenitic, duplex	87	180	14	100-180-230	.0019	.0023	.0031	.0039	.0047	.0055	.0062	.0066	.007	.0078			
			.0023	.0027	.0035	.0047	.0059	.0066	.0078	.0086	.0094	.0106	.0118	.0137					
K	Gray cast iron (GG)	Ferritic / pearlitic	180	15	300-410-520														
		Pearlitic / martensitic	260	16	260-360-460														
	Nodular cast iron (GGG)	Ferritic	160	17	300-440-590	.0015	.0039	.0047	.0059	.0078	.0098	.0118	.0129	.0141	.0157				
		Pearlitic	250	18	260-360-460	.0023	.0051	.0059	.0086	.0106	.0125	.0145	.0165	.0181	.0196				
	Malleable cast iron	Ferritic	130	19	300-410-520	.0031	.0059	.007	.0118	.0137	.0157	.0177	.0196	.0216	.0236				
		Pearlitic	230	20	260-360-460														
N	Aluminum-wrought alloys	Not hardenable	60	21	300-510-720														
		Hardenable	100	22															
	Aluminum-cast alloys	≤12% Si	75	23															
		Hardenable	90	24		.0019	.0039	.0059	.0078	.0098	.0118	.0137	.0157	.0177	.0196				
	>12% Si	High temperature	130	25	260-390-520	.0047	.0066	.0086	.0106	.0125	.0145	.0165	.0196	.0224	.0263				
	Copper alloys	>1% Pb	Free cutting	110	26	300-510-720	.0078	.0098	.0118	.0137	.0157	.0177	.0196	.0236	.0275	.0295			
		Brass	90	27															
	Electrolytic copper	100	28																
Non-metallic	Duroplastics, fiber plastics	70 Shore D	29																
	Hard rubber	55 Shore D	30																
S	High temperature alloys	Fe based	Annealed	200	31	100-150-200													
			Hardened	280	32	70-110-160	.0011	.0015	.0019	.0023	.0031	.0039	.0043	.0047	.0055	.0062			
		Ni or Co based	Annealed	250	33		.0015	.0019	.0023	.0031	.0039	.0047	.0055	.0062	.007	.0078			
			Hardened	350	34		.0019	.0023	.0027	.0043	.0051	.0059	.0066	.0078	.0086	.0098			
	Titanium alloys	Cast	320	35															
		Pure	58	190	36	70-110-160	.0011	.0015	.0019	.0023	.0031	.0039	.0047	.0055	.0062	.007			
Alpha+Beta alloys, hardened	152	310	37	70-110-160	.0015	.0019	.0023	.0035	.0043	.0055	.0062	.007	.0078	.0086					
H	Hardened steel	Hardened	55 HRC	38	70-110-160														
			60 HRC	39															
	Chilled cast iron	cast	400	40		80-140-200			.0019	.0023	.0031	.0039	.0047	.0055	.0062	.007			
			55 HRC	41		70-110-160			.0023	.0035	.0043	.0055	.0062	.007	.0078	.0086			
Cast iron	hardened	55 HRC	41	70-110-160			.0027	.0047	.0059	.007	.0078	.0086	.0098	.0106					

- When using external coolant supply only, reduce cutting speed by 10%.
 - Use internal coolant supply when machining austenitic stainless steel.
 - When using more than 5XD drill ratio, reduce cutting parameters by 10%.
 - Recommended cutting data
 - Machining Stainless Steel is not recommended with QCP & HCP geometry
- For technical information regarding QCP/HCP see More Info.

As a starting value, the middle of the recommended machining range should be used. Then, according to the wear results, conditions can be changed to optimize performance. The data refers to IC908