

Material Group

STEP 1 - Identify workpiece Material Group



DIN ISO 513	Material	Condition	Tensile Strength (Kpsi)	Hardness HB	Material Group # VDI 3323	Trade Names	
P	Non-alloy steel, cast steel, free cutting steel	<0.25%C Annealed	61	125	1	1010, 1015, 1018, 1020, 1023, 1102, 1108, 1109, 1213, 12L13, 1215	
		>=0.25%C Annealed	94	190	2	1025, 1030, 1035, 1040, 1045, 1050, 1140, 1141, 1330	
		<0.55%C Quenched and tempered	123	250	3	1025, 1030, 1035, 1040, 1045, 1050, 1140, 1141, 1330	
		>=0.55%C Annealed	109	220	4	1055, 1060, 1070, 1080, 1151, W112	
	Low alloy steel and cast steel (Less than 5% of alloying elements)	Quenched and tempered	145	300	5	1055, 1060, 1151	
		Annealed	87	200	6	3135, 3435, 3440, 4130, 4140, 4150, 4320, 4340, 5015, 5060, 5120, 5132, 5140, 5160, 6150, 8620, 8640, 9254, 9255, 9262, L1, L2, L3, O1, O2, S1, P2, P3, P5, P20, W1, W2, W5, 51100, 52100,	
		Quenched and tempered	135	275	7		
			145	300	8		
			174	350	9		
	High alloy steel, cast steel and tool steel	Annealed	99	200	10	A2, A3, A4, A,6 A7, A10, D2, D3, D4, D5, D7, H11, H12, H13, H14, H17, H22, H23, S7, M1, M2, M3, M4, M6, M7, M10, M30, M42, T1, T2, T4, T5,	
Quenched and tempered		160	325	11			
M	Stainless steel and cast steel	Ferritic/martensitic	99	200	12	203, 303, 303Plus X, 303Pb, 409, 430, 430F, 440, 444	
		Martensitic	119	240	13	410, 420, 431, 440A, 416	
		Austenitic	87	180	14	304, 310, 316, 316L, 317, Nitronic 40, Carpenter 20, 13-8, 15-5, 17-4	
K	Gray cast iron (GG)	Ferritic		180	15	ASTM A48 Classes 20, 25, SAEJ431c grades G1800, G2000, G2500	
		Pearlitic		260	16	ASTM A48 Classes 30, 35, 40, 45, 50, SAEJ431c grades G3000, G3500	
	Cast iron nodular (GGG)	Ferritic		160	17	60-40-18, 65-45-12	
		Pearlitic		250	18	80-55-06, 100-70-03, 120-90-02	
	Malleable cast iron	Ferritic		130	19	22010, 325110	
		Pearlitic		230	20	40010, 50005, 70003, 90001	
N	Aluminum - Wrought alloy	Not cureable		60	21	1000, 2011, 2014, 2124, 2024, 6061, 7075	
		Cured		100	22		
	Aluminum - cast, alloyed	<=12% Si Not cureable		75	23	319, 383, 356, 413, 535, A280, A380, A413	
		Cured		90	24		
		>12% Si High temp		130	25		
	Copper alloys	>1% Pb Free cutting		110	26	C23000, C36000, C83600, C93200, C93600	
		Brass		90	27	C18200, C27200, C27700, C86500, Red Brass	
		Electrolitic copper		100	28	B-148-52, C63000, C81500, C90700, C90800	
	Non-metallic	Duroplastics, fiber plastics			29		
		Hard rubber			30		
S	High temp. alloys	Fe based	Annealed		200	A286, Incoloy 800, Incoloy 801, Incoloy 802, N-155, W-545	
			Cured		280		32
		Ni or Co based	Annealed		250	33	Astroloy, Hastelloy, C-272, IN-100, Inconel 625, Inconel 718, Inconel 750, Numonic, Rene, Udimet, Waspaoly, Haynes, Stellite, AR213, MP35N
			Cured		350	34	
			Cast		320	35	
	Titanium, Ti alloys		Rm 58		36	Grade 1, Grade 2, Grade 2H, Grade 3	
		Alpha+beta alloys cured	Rm 152		37	Grade 5, Ti6AL4V, Ti6-4	
H	Hardened steel	Hardened		55 HRC	38	Hardox 400, Hardox 500, W1, W210	
		Hardened		60 HRC	39	HSS, 90 MnV8	
	Chilled cast iron	Cast		400	40	Ni-Hard 1, Ni-Hard 2, Ni-Hard 4, A532, GX300	
	Cast iron nodular	Hardened		55 HRC	41		

Grooving & Turning - Cutting Speeds

OPG-002-2 (20250721)



STEP 2 - Locate Cutting Speed by Application, Insert Grade & Material Group

DIN ISO 513	Material Group # VDI 3323	Groove-turn, profiling, undercutting											Material Group # VDI 3323	Internal grooving, face grooving							
		TD1020	TB2015	CT3000	TT7505	TT5100	TT6080	TT3010	TT9080	TT4430	TT7220 TT8020	K10		TT7505	TT6080	TT3010	TT5100	TT9080	TT4430	TT7220 TT8020	K10
P	1			330-690		360-720			330-655	295-590	260-490		1				360-525	330-490	330-425	260-360	
	2			330-655		360-655			330-590	295-525	330-490		2				230-360	195-330	195-295	165-260	
	3			260-590		295-590			260-525	260-460	230-425		3								
	4			260-590		295-590			260-525	260-460	230-395		4				230-395	195-360	195-330	165-295	
	5			230-460		260-490			230-425	230-360	195-330		5								
	6			330-590		360-590			330-525	295-460	260-395		6				230-395	195-360	195-330	130-230	
	7			295-590		295-590			260-525	260-490	230-425		7				260-395	230-360	230-330	130-195	
	8			260-560		295-560			260-490	260-425	230-360		8								
	9			260-490		295-490			260-425	260-395	195-330		9				230-330	195-295	195-260	100-165	
	10			295-425		330-490			295-425	260-395	260-300		10				230-330	195-295	195-260	100-165	
	11			165-260		195-295			165-260	165-230	130-195		11				195-295	165-260	165-230	100-130	
M	12			260-560		295-625			260-560	260-490	230-425		12				195-460	165-425	165-360	130-260	
	13			260-490		295-560			260-490	260-425	230-360		13								
	14			260-560		295-625			260-560	260-490	230-425		14				165-460	130-425	130-360	100-260	
K	15				490-885		360-820					230-330	15	295-460	230-395					130-195	
	16				395-560		295-460					165-295	16	260-395	195-330					130-195	
	17				490-820		395-755					230-330	17	295-425	230-360					130-195	
	18				395-655		295-590					195-295	18	260-360	195-295					100-165	
	19				395-655		295-590					195-395	19	260-425	195-360					65-130	
	20				330-590		260-490					165-260	20	195-330	165-295					65-130	
N	21	490-8200										985-2620	21							330-985	
	22	490-8200										755-1020	22							330-985	
	23	490-8200										920-2720	23							330-985	
	24	490-8200										655-1670	24							330-985	
	25	1080-2625										425-985	25							260-655	
	26												26								
	27	1080-2625										395-655	27							260-490	
	28	625-1310										295-490	28							195-330	
	29												29								
	30												30								
S	31					130-195		130-195	100-165	100-130	65-100	100-130	31			100-165	100-165	65-130	65-100	50-80	
	32					80-150		100-165	65-130	65-100	50-65	65-130	32			80-130	65-130	50-100	50-80	35-50	
	33					80-115		100-130	65-100	50-80	50-65	65-100	33			80-115	65-100	50-65	50-65	35-50	
	34					65-80		80-115	50-65	50-65	50-65	50-65	34			65-100	65-100	50-65	50-65	35-50	
	35					65-80		80-115	50-65	50-65	50-65	50-65	35			65-100	65-100	50-65	50-65	35-50	
	36					490-625		460-590	425-560	330-490	260-330	330-425	36			330-425	330-425	295-395	260-330	195-260	
	37					165-260		130-260	130-230	130-195	50-100	65-165	37			100-195	100-195	65-165	65-130	50-100	
H	38		295-360		100-165		80-150				65-130	38	50-80							50-65	
	39		260-330		100-165		80-115				65-100	39	50-80							50-65	
	40		590-655		100-165		80-150				65-165	40	50-80							50-80	
	41		295-360		100-165		80-150				65-130	41	50-80							50-80	