

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		

I-Notch - Cutting Speeds

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

OPG-010 (04/2022)



DIN ISO 513	Material Group # VDI 3323	Cutting Speed (SFM)		
		TT9030	TT5030	TT9010
P	1	400-800	250-450	200-600
	2	400-800	250-450	200-600
	3	450-800	250-450	200-600
	4	450-800	250-450	200-600
	5	450-800	250-450	200-600
	6	400-800	250-400	200-500
	7	400-800	250-400	200-500
	8	400-800	250-400	200-500
	9	400-800	250-400	200-500
	10	400-750	250-400	200-450
	11	400-750	250-400	200-450
M	12	350-700	250-450	200-500
	13	350-700	250-450	200-500
	14		250-700	
K	15		300-700	
	16		300-600	
	17	300-700	200-450	200-500
	18	300-700	200-450	200-500
	19	300-700	200-450	200-500
	20	300-700	200-450	200-500
N	21		600-2500	
	22		600-2500	
	23			
	24			
	25			
	26		400-1000	
	27		400-1000	
	28		400-1000	
	29		400-1500	
	30		400-1500	
S	31		100-250	
	32		100-200	
	33		100-250	
	34		100-200	
	35		100-200	
	36		100-300	
	37		100-300	
H	38		80-150	
	39		50-125	
	40			
	41			