

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
		Quenched and tempered	145	300	5	1055, 1060, 1151
	Low alloy steel and cast steel (Less than 5% of alloying elements)	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	31	A286, Discaloy, Incoloy 800, Incoloy 801, Incoloy 802, N-155, W-545
				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
				350	34	
				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 & Parting - Cutting Speeds

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

OPG-003-1 (07/2026)



DIN ISO 513	Material Group # VDI 3323	Cutting Speed (SFM)					
		TT3020	TT7220	TT9080	TT4430	TT8020	K10
P	1	495-885	460-820	460-820	395-720	260-390	
	2	460-780	425-720	425-720	330-625	260-360	
	3	320-700	295-650	295-650	260-560	230-295	
	4	355-780	330-720	330-720	260-625	230-330	
	5	250-605	230-560	230-560	230-460	130-230	
	6	320-425	295-395	295-395	260-360	230-330	
	7	280-605	260-560	260-560	260-460	165-230	
	8	250-460	230-425	230-425	230-360	130-525	
	9	180-425	165-395	165-395	165-330	100-165	
	10	210-495	195-460	195-460	200-395	165-260	
	11	180-250	165-230	165-230	130-200	100-195	
M	12	250-605	230-560	230-560	200-495	260-395	
	13	210-530	195-490	195-490	200-395	195-295	
	14	320-635	295-590	295-590	260-490	195-295	
K	15		330-755	330-755			195-260
	16		295-590	295-590			165-230
	17		625-985	625-985			230-330
	18		395-720	395-720			230-295
	19		295-820	295-820			195-260
	20		330-690	330-690			145-245
N	21						490-3500
	22						490-3500
	23						490-3500
	24						490-3500
	25						490-2620
	26						
	27						490-2620
	28						400-1200
	29						
	30						
S	31	140-250		130-230	100-200	80-170	115-165
	32	110-180		100-165	85-140	60-110	80-130
	33	110-140		100-130	85-100	60-110	65-100
	34	55-85		50-80	40-70	30-60	50-65
	35	55-110		50-100	40-90	30-70	50-65
	36	320-675		295-625	275-500	200-400	490-655
	37	110-210		100-195	85-175	60-120	165-260
H	38						
	39						
	40						
	41						