

# 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	
	S	High temp. alloys	Fe based	Annealed		200	31
Cured					280	32	
Ni or Co based			Annealed		250	33	
			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 & Parting - Cutting Speeds

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

OPG-003 (07/2021)



DIN ISO 513	Material Group # VDI 3323	Cutting Speed (SFM)				
		TT7220	TT9080	TT4430	TT8020	K10
P	1	460-820	460-820	395-720	260-390	
	2	425-720	425-720	330-625	260-360	
	3	295-650	295-650	260-560	230-295	
	4	330-720	330-720	260-625	230-330	
	5	230-560	230-560	230-460	130-230	
	6	295-395	295-395	260-360	230-330	
	7	260-560	260-560	260-460	165-230	
	8	230-425	230-425	230-360	130-525	
	9	165-395	165-395	165-330	100-165	
	10	195-460	195-460	200-395	165-260	
	11	165-230	165-230	130-200	100-195	
M	12	230-560	230-560	200-495	260-395	
	13	195-490	195-490	200-395	195-295	
	14	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		130-230	100-200	80-170	115-165
	32		100-165	85-140	60-110	80-130
	33		100-130	85-100	60-110	65-100
	34		50-80	40-70	30-60	50-65
	35		50-100	40-90	30-70	50-65
	36		295-625	275-500	200-400	490-655
	37		100-195	85-175	60-120	165-260
H	38					
	39					
	40					
	41					