

# 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	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			

# ISO-Turning, Non-Ferrous - Cutting Speeds

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

OPG-004 (07/2021)



DIN ISO 513	Material Group # VDI 3323	Cutting Speed (SFM)		
		Uncoated-Carbide	PCD	
		K10	TD810	KP300
P	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
M	12			
	13			
	14			
K	15			
	16			
	17			
	18			
	19			
	20			
N	21	640-3200	820-8200	820-8200
	22	640-3200	820-8200	820-8200
	23	160-1280	1640-4920	1310-4590
	24	120-1600	305-3150	305-2950
	25	130-1120	985-3280	655-2625
	26	160-1600	205-2065	205-2065
	27	160-1600	205-2065	205-2065
	28	95-960	100-1230	100-1230
	29	95-960	330-3280	330-3280
	30	160-480	330-1640	330-1640
S	31	160-270		
	32	175-210		
	33	130-175		
	34	102-130		
	35	65-80		
	36	50-240		
	37	160-225		
H	38			
	39			
	40			
	41			