

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		

Gold Flex - Cutting Speeds

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

OPG-001 (07/2021)



DIN ISO 513	Material Group # VDI 3323	Cutting Speed (SFM)		
		TT9080	TT4430	CT3000
P	1	360-655	395-720	525-920
	2	330-590	330-625	495-820
	3	230-525	260-560	360-750
	4	260-590	260-625	395-790
	5	195-460	230-460	295-650
	6	260-590	260-360	360-525
	7	230-460	260-460	330-650
	8	195-360	230-360	295-650
	9	130-460	165-330	260-525
	10	165-360	200-395	260-330
	11	130-330	130-200	230-330
M	12	195-460	200-495	330-650
	13	395-590	200-395	295-590
	14	230-460	260-490	395-650
K	15	395-590		
	16	230-460		
	17	230-425		
	18	195-375		
	19	195-230		
	20	260-560		
N	21	330-1200	330-1200	
	22	260-720	260-720	
	23	655-1310	655-1310	
	24	655-920	655-920	
	25	655-920	655-920	
	26	260-835	260-835	
	27	260-835	260-835	
	28	260-835	260-835	
	29	260-820	260-820	
	30	260-820	260-820	
S	31	100-195	100-200	
	32	80-130	85-140	
	33	80-115	85-100	
	34	50-80	40-70	
	35	50-100	40-90	
	36	230-490	275-500	
	37	80-165	85-175	
H	38	145-195	145-195	
	39	100-160	100-160	
	40	125-195	125-195	
	41	145-195	145-195	