

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)	Quenched and tempered	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,
				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, Discoloy, 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, PVD-Coated, Uncoated & Cermet Carbide - Cutting Speeds

OPG-007 (07/2021)



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

DIN ISO 513	Material Group # VDI 3323	Cutting Speed (SFM)											
		Coated Carbide-PVD									Uncoated	Cermet	
		TT5080	TT3010	TT3020	TT4410	TT4430	TT9080	TT9020	TT8080	TT8020	K10	PV3010	CT3000
P	1				560-1245	525-1215		490-1150		330-985		1150-2130	985-1870
	2				560-1115	525-1115		490-1050		330-885		885-1705	820-1640
	3				490-885	460-885		425-820		260-655		785-1575	720-1510
	4				560-885	525-885		460-855		295-690		855-1640	785-1540
	5				490-820	460-820		425-720		260-590		785-1510	720-1445
	6				490-885	460-885		425-820		260-655		785-1770	720-1705
	7				195-425	195-425		165-425		130-395		625-1080	560-985
	8				165-330	165-330		130-330		130-295		560-985	490-885
	9				100-330	100-330		100-330		100-295		460-885	425-820
	10				195-590	195-590		195-590		195-525		855-1330	820-1300
	11				130-260	130-260		130-260		130-260		460-670	425-635
M	12	525-1280			490-1245	395-885	395-950	395-950	350-900	330-820		655-985	590-885
	13	525-920			490-885	395-820	395-885	395-885	350-850	330-755		655-885	560-820
	14	330-820			295-785	295-720	295-785	295-720	280-750	260-655		560-855	490-785
K	15										350-575	755-1080	720-1050
	16										305-450	700-950	705-920
	17										305-430	560-870	525-835
	18										290-400	590-785	560-755
	19										350-450	475-720	440-655
	20										290-400	345-490	310-460
N	21										640-3200		
	22										640-3200		
	23										160-1280		
	24										120-1600		
	25										130-1120		
	26										160-1600		
	27										160-1600		
	28										95-960		
	29										95-960		
	30										160-480		
S	31	165-590	165-560	130-540	130-560	130-525	130-525		75-240	65-230	160-270		
	32	130-525	130-490	100-475	130-490	100-425	100-425		40-180	35-165	175-210		
	33	150-330	150-295	115-280	150-295	115-260	115-260		40-150	35-130	130-175		
	34	115-295	115-260	100-245	100-260	100-230	100-230		40-120	35-100	102-130		
	35	100-260	100-230	100-210	100-260	100-195	100-195		40-75	35-65	65-80		
	36	360-655	360-625	330-605	360-625	295-590	295-590		245-520	230-490	50-240		
	37	165-330	165-295	130-280	165-295	130-260	130-260		70-145	65-130	160-225		
H	38												
	39												
	40												
	41												