

# 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		

# Grooving & Turning - Cutting Speeds

OPG-002-1 (20240203)



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

DIN ISO 513	Material Group # VDI 3323	Groove-turn, profiling, undercutting										Material Group # VDI 3323	Internal grooving, face grooving						
		TD1020 (aka KP300)	TB2015	CT3000	TT7505	TT5100	TT6080	TT9080 TT7220	TT4430	TT8020	K10		TT7505	TT6080	TT5100	TT9080 TT7220	TT4430	TT8020	K10
P	1			330-690		360-655		330-655	295-525	330-590		1		360-525	330-490	330-425	260-360		
	2			330-655		295-590		330-590	260-460	330-460		2		230-360	195-330	195-295	195-295		
	3			260-590		295-590		80-525	260-460	260-425		3							
	4			260-590		260-490		80-525	230-360	260-425		4		230-395	195-360	195-330	165-295		
	5			230-460		360-590		230-425	295-460	230-395		5							
	6			330-590		295-590		330-525	260-490	330-490		6		230-395	195-360	195-330	130-230		
	7			295-590		295-560		260-525	260-425	260-490		7		260-395	230-360	230-330	130-195		
	8			260-560		295-490		260-490	260-395	260-425		8							
	9			260-490		330-490		260-425	295-395	260-395		9		230-330	195-295	195-260	100-165		
	10			295-425		195-295		295-425	165-230	295-360		10		230-330	195-295	195-260	100-165		
	11			165-260		295-625		165-260	260-490	150-230		11		195-295	165-260	165-230	100-130		
M	12			260-560		295-560		260-560	260-560	260-560		12		195-460	165-425	195-360	130-260		
	13			260-490		295-625		260-490	260-490	260-490		13							
	14			260-560				260-560	260-560	260-560		14		165-460	130-425	130-360	100-260		
K	15				490-885		360-820				230-330	15	295-460	230-395				130-195	
	16				395-560		295-460				165-295	16	165-295	195-330				130-195	
	17				490-820		395-755				230-330	17	230-330	230-360				130-195	
	18				395-655		295-590				195-295	18	260-360	195-295				100-165	
	19				395-655		295-590				195-395	19	260-425	195-360				65-130	
	20				330-590		260-490				165-260	20	195-330	165-295				65-130	
N	21	490-8200									985-2620	21						330-985	
	22	490-8200									755-1020	22						330-985	
	23	490-8200									920-2720	23						330-985	
	24	490-8200									655-1670	24						330-985	
	25	1080-2625									425-985	25						260-655	
	26											26							
	27	1080-2625									395-655	27						260-490	
	28	625-1310									295-490	28						260-330	
	29											29							
	30											30							
S	31							100-165		65-100	100-130	31					65-100		
	32							65-130		50-65	65-130	32					50-65		
	33							65-100		50-65	65-100	33				50-65	50-65		
	34							50-65		50-65	50-65	34				50-65	50-65		
	35							50-65		50-65	50-65	35				50-65	50-65		
	36							425-560		260-330	330-425	36				295-395	195-260		
	37										65-165	37				65-165	50-100		
H	38		295-360		100-165						65-130	38	50-80					50-65	
	39		260-330		100-165						65-100	39	50-80					50-65	
	40		590-656		100-165						65-165	40	50-80					50-80	
	41		295-360		100-165						65-130	41	50-80					50-80	