

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, 1213, 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)	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, A6 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		160	15	ASTM A48 Classes 20, 25, SAEJ431c grades G1800, G2000, G2500
		Pearlitic		250	16	ASTM A48 Classes 30, 35, 40, 45, 50, SAEJ431c grades G3000, G3500
	Cast iron nodular (GGG)	Ferritic		180	17	60-40-18, 65-45-12
		Pearlitic		260	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	31	A286, Discaloy, Incoloy 800, Incoloy 801, Incoloy 802, N-155, W-545
				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
				350	34	
				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	

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



Member IMC Group
Ingersoll
Cutting Tools

[illegible]

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



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DIN ISO 513	Material Group # VDI 3323	Cutting Speed (SFM)												
		Coated Carbide-PVD										Uncoated		Cermet
		TT2010	TT5080	TT3010	TT3020	TT4410	TT4430	TT9080	TT9020	TT8080	TT8020	K10	PV3010	CT3000
P	1					560-1245	525-1215		490-1150	360-1015	330-985		1150-2130	985-1870
	2					560-1115	525-1115		490-1050	360-920	330-885		885-1705	820-1640
	3					490-885	460-885		425-820	295-690	260-655		785-1575	720-1510
	4					560-885	525-885		460-855	330-720	295-690		855-1640	785-1540
	5					490-820	460-820		425-755	295-625	260-590		785-1510	720-1445
	6					490-885	460-885		425-820	295-690	260-655		785-1770	720-1705
	7					195-425	195-425		165-425	130-395	130-395		625-1080	560-985
	8					165-330	165-330		130-330	130-295	130-295		560-985	490-885
	9					100-330	100-330		100-330	100-295	100-295		460-885	425-820
	10					195-590	195-590		195-590	195-525	195-525		855-1330	820-1295
	11					130-260	130-260		130-260	130-260	130-260		460-670	425-640
M	12		525-1280			490-1245	395-885	395-950	395-885	360-855	330-820		655-985	590-885
	13		525-920			490-885	395-820	395-885	395-820	360-785	330-755		655-885	560-820
	14		330-820			295-785	295-720	295-785	295-720	260-655	260-655		560-855	490-785
K	15											360-590	755-1080	720-1050
	16											310-460	705-950	670-920
	17											310-445	475-720	445-655
	18											295-410	345-490	310-460
	19											360-460	560-870	525-835
	20											295-410	590-785	560-755
N	21											655-3280		
	22											655-3280		
	23											165-1310		
	24											165-1640		
	25											130-1150		
	26											165-1640		
	27											165-1640		
	28											100-960		
	29											165-985		
	30											165-490		
S	31		165-590	165-560	130-540	130-560	130-525	130-525		100-260	65-230	180-280		
	32		130-525	130-490	100-475	130-490	100-425	100-425		65-195	35-165	130-215		
	33		150-330	150-295	115-280	150-295	115-260	115-260		65-165	35-130	105-180		
	34		115-295	115-260	100-245	100-260	100-230	100-230		65-130	35-100	70-130		
	35		100-260	100-230	100-210	100-260	100-195	100-195		65-100	35-65	50-85		
	36		360-655	360-625	330-605	360-625	295-590	295-590		260-525	230-490	165-245		
	37		165-330	165-295	130-280	165-295	130-260	130-260		100-165	65-130	150-230		
H	38	260-650												
	39	160-325												
	40													
	41													