Material Group

STEP 1 - Identify workpiece Material Group

Member IMC Group Ingersoll Cutting Tools

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)		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, 02, 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,
			Quenched and tempered	160	325	11	S7, M1, M2, M3, M4, M6, M7, M10, M30, M42, T1, T2, T4, T5,
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, Nitrionic 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	336, 390, 4032,
	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
			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

Member IMC Group Ingersoll Cutting Tools

DIN ISO 513	Material Group # VDI 3323	Cutting Speed (SFM)		
		Uncoated-Carbide	PCD	
		K10	TD1010 (aka TD810)	TD1020 (aka 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	985-8200	985-7545
	22	640-3200	985-8200	985-7545
	23	160-1280	655-4920	655-4590
	24	120-1600	655-4920	655-4590
	25	130-1120	260-3280	260-2950
	26	160-1600	195-1970	198-1805
	27	160-1600	195-1970	198-1805
	28	95-960	100-1310	100-1245
	29	95-960	330-3280	330-2950
	30	160-480	330-1640	330-1805
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			