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)		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, 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, 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, CVD-Coated Carbide - Cutting Speeds

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

OPG-007 (07/2021)

Member IMC Group Ingersoll Cutting Tools

DIN ISO 513	Material Group # VDI 3323	Cutting Speed (SFM)												
		Coated Carbide-CVD												
		TT3005	TT7005	TT7015	TT7025	TT8105	TT8115	TT8125	TT8135	TT9215	TT9225	TT9235	TT5100	TT7100
P	1					1015-1900	920-1740	755-1575	625-1310				655-1475	560-1245
	2					885-1740	755-1575	655-1380	560-1180				560-1280	490-1115
	3					755-1605	655-1445	525-1245	425-1050				425-1150	360-985
	4					655-500	720-1475	625-1310	460-1115				525-1215	460-1050
	5					690-1540	590-1380	490-1150	395-985				395-1050	330-920
	6					455-1805	655-1310	560-1310	425-920				460-1215	360-855
	7					590-1080	490-920	460-820	260-560				360-720	195-490
	8					525-985	425-820	395-755	230-490				295-655	165-395
	9					490-920	395-755	360-655	195-460				260-560	130-395
	10					690-1380	625-1245	460-920	330-720				360-820	260-655
	11					330-655	295-590	230-425	150-330				130-330	130-295
M	12									525-820	395-655	360-560		
	13									490-755	360-920	330-490		
	14									425-720	330-560	295-490		
K	15		985-1805	950-1475	920-1310									
	16		985-1410	820-1180	655-1050									
	17		525-1310	490-1150	460-985									
	18		460-1150	425-985	395-920									
	19		655-1510	820-1280	755-1150									
	20		590-1150	655-1050	590-985									
N	21													
	22													
	23													
	24													
	25													
	26													
	27													
	28													
	29													
	30													
S	31	195-650								130-260	100-230	100-195		
	32	165-590								100-230	65-195	65-165		
	33	180-390								115-230	80-195	65-165		
	34	150-360								100-230	65-195	65-165		
	35	130-330								100-230	65-195	65-165		
	36	390-720												
	37	195-390												
H	38													
	39													
	40													
	41													

ISO Turning, PVD-Coated, Uncoated & Cermet Carbide - Cutting Speeds

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

OPG-007 (07/2021)

Member IMC Group Ingersoll Cutting Tools

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												