

Material			Material group	Hardness Brinell (HB)	Tensile Strength R_m [N/mm ²]	Example Material SAE, DIN	
P	Carbon steel	~ 0,2 % C	P1.1	125	430	1015 , CK15	
		~ 0,4% C annealed	P1.2	190	610	A515 , 19Mn6	
		~ 0,4% C quenched	P1.3	210	640	1335 , 36Mn5	
		~ 0,6% C annealed	P1.4	190	610	1055 , C55	
		~ 0,6% C quenched	P1.5	300	1000	1060 , CK60	
		Free cutting steel	P1.6	220	750	1213 , 9SMn28	
	Alloyed steel (<5%)	annealed	P2.1	180	590	52100 , 100Cr6	
		quenched	P2.2	280	960	3415 , 14NiCr10	
		quenched	P2.3	350	1250	4135 , 34CrMo4	
		quenched	P2.4	430	1450	5155 , 55Cr3	
	high alloyed steel (>5%)	annealed	P3.1	200	680	442 , X10CrAl18	
		hardened	P3.2	350	1200	D3 , X210Cr2	
	Cast steel	unalloyed	P4.1	180	590	A27 , GE200	
		alloyed	P4.2	220	750	10295 , GX40CrSi28	
	Sintered steel	soft	P5.1	220	570	P3082 , Sint-D39	
M	Stainless steel	martensitic ferritic	M1.1	200	680	17-4 PH , 455 , 465 , X16Cr13	
		austenitic	M1.2	300	1000	316Ti , X6CrNiMo- Ti17-12-2	
		austenitic ferritic	M1.3	230	780	316LN , X2CrNiMo- N17-13-3	

Cutting Data



			MG12	=	Coating Grade					
			55-395		Cutting speed Vc (SFM) - Suggested range					
			16-120		Cutting speed Vc (m/min) - Suggested range					
	MG12	TN3_	TI2_	TH3_ TF4_	AN2_ RC2_	EG3_ EG5_	IG3_	DD2_	SG3_	Coating Grades
Carbon steel	55-395 16-120	55-590 16-180	55-590 16-180	55-690 16-210	55-690 16-210	55-655 16-200	55-720 16-230		55-755 16-230	
	55-360 16-110	55-560 16-170	55-560 16-170	55-655 16-200	55-655 16-200	55-655 16-200	55-720 16-230		55-755 16-230	
	55-360 16-110	55-525 16-160	55-525 16-160	55-625 16-190	55-625 16-190	55-625 16-190	55-720 16-220		55-720 16-220	
	55-360 16-110	55-490 16-150	55-490 16-150	55-590 16-180	55-590 16-180	55-590 16-180	55-690 16-210		55-690 16-210	
	55-330 16-100	55-395 16-120	55-460 16-140	55-560 16-170	55-560 16-170	55-560 16-170	55-655 16-200		55-655 16-200	
	55-395 16-120	16-525 16-160	55-525 16-160	55-625 16-190	55-625 16-190	55-625 16-190	55-720 16-220		55-720 16-220	
Alloyed steel (<5%)	55-295 16-90	55-490 16-150	55-490 16-150	55-590 16-180	55-590 16-180	55-590 16-180	55-690 16-210		55-690 16-210	
	55-280 16-85	55-460 16-140	55-460 16-140	55-590 16-180	55-590 16-180	55-590 16-180	55-690 16-210		55-690 16-210	
	55-260 16-80	55-460 16-140	55-460 16-140	55-590 16-180	55-590 16-180	55-590 16-180	55-690 16-210		55-690 16-210	
	55-260 16-80	55-460 16-140	55-460 16-140	55-525 16-160	55-525 16-160	55-525 16-160	55-590 16-180		55-590 16-180	
High alloy steel (>5%)	55-295 16-90	55-295 16-90	55-295 16-90	55-460 16-140	55-460 16-140	55-395 16-120	55-460 16-140		55-460 16-140	
									55-460 16-140	
Cast steel	55-360 16-110	55-590 16-180	55-590 16-180	55-590 16-180	55-590 16-180	55-525 16-160	55-590 16-180		55-590 16-180	
	55-230 16-70	55-560 16-170		55-590 16-180	55-590 16-180	55-525 16-160	55-590 16-180		55-590 16-180	
Sintered steel										
Stainless steel		55-295 16 - 90		60-295 19 - 90	55-295 16 - 90	55-295 16 - 90	50-330 15 - 100		55-330 16 - 100	
		55-260 16 - 80		55-260 16 - 80	55-260 16 - 80	55-260 16 - 80	55-260 16 - 80		55-130 16 - 40	
		55-195 16-60		55-195 16-60	55-195 16-60	55-195 16-60	55-230 16-70		55-260 16-80	

Material			Material group	Hardness Brinell (HB)	Tensile Strength R _m [N/mm²]	Example Material SAE, DIN	
K	Grey cast iron	low tensile strength	K1.1	180	250	A48 Class 35B, GG-25	
		high tensile strength	K1.2	250	350	A48 Class 60, GG-40	
	Spheroidal graphite cast iron	ferritic	K2.1	160	400	A536 60-40-18, GGG-40	
		perlitic	K2.2	260	700	A536 80-60-03, GGG-60	
	Malleable cast iron	ferritic	K3.1	200	400	A47 Grade 35018, GTW-45	
		perlitic	K3.2	260	700	A47 Grade 55004, GTS-55-04	
	Ausferritic spheroidal cast iron / ADI	quenched	K4.1	260	800		
		quenched	K4.2	350	1050		
		quenched	K4.3	450	1400		
	N	Al-alloys	not heat treatable	N1.1	30		5005, AlMg1
heat treatable			N1.2	100	340	6061, 7075, AlMgSi1	
Al-cast-alloy		< 6% Si	N2.1	80	300	AA 441, AlMgSi6	
		6-10% Si	N2.2	100	320	AA 356, AlSi7Mg	
		10-15 % Si	N2.3	130	450	AA 413, AlSi12	
Copper-alloys		pure copper	N3.1	100	340	C11000, Cu	
		brass	N3.2	90	310	C38500, CuZn40Pb	
		lead-free brass	N3.3	110	430	C28000, CuZn40	
		high strength	N3.4	300	1000	C67800, CuZ- n25Al5-Mn4Fe3	
Graphite			N4.1				

Cutting Data



			MG12	=	Coating Grade					
			55-395 16-120		Cutting speed Vc (SFM) - Suggested range					
			Cutting speed Vc (m/min) - Suggested range							
	MG12	TN3_	TI2_	TH3_ TF4_	AN2_ RC2_	EG3_ EG5_	IG3_	DD2_	SG3_	Coating Grades
Grey cast iron	55-295 16 - 90	55-490 16 - 150		55-525 16 - 160		55-525 16 - 160				
		55-395 16 - 120								
Spheroidal graphite cast iron	55-295 16 - 90	55-425 16 - 130								
		55-330 16-100		55-525 18 - 160		55-460 16 - 140				
Malleable cast iron		55-425 16 - 130		55-590 16 - 180		55-525 18 - 160				
Ausferritic spheroidal cast iron / ADI										
Al-alloys	55-720 16 - 220		55-720 16 - 220	55-720 16 - 220		55-720 16 - 220		55-1150 16 -350		
	55-720 16 - 220		55-720 16 - 220	55-720 16 - 220		55-720 16 - 220		55-1150 16 -350		
Al-cast-alloy	55-720 16 - 220		55-720 16 - 220	55-720 16 - 220		55-720 16 - 220		55-1150 16 -350		
								55-1150 16-350		
Copper- alloys	55-720 16 - 220							55-985 16 -300		
	55-720 16 - 220							55-985 16 -300		
	55-720 16 - 220							55-820 16 -250		
	55-590 16 - 180							55-655 16 -200		
Graphite										

Material			Material group	Hardness Brinell (HB)	Tensile Strength R _m [N/mm²]	Example Material SAE, DIN	
S	Heat resistant alloy	annealed	S1.1	200	670		
		hardened	S1.2	275	930		
	Heat resistant alloy	annealed	S2.1	250	840	Inconel 600	
		hardened	S2.2	350	1200	Inconel 713	
	Titanium	Titanium alloy α	S3.1	120	240	Grade 1-2 Ti, Ti99,7	
		Titanium alloy α- β	S3.2	360	1200	Grade 5 Ti, Ti6Al4V	
		Titanium alloy β	S3.3	410	1400	Ti-10-2-3, Ti-10V-2Fe-3Al	
H	Hardened steels	50-55 HRC	H1.1				
		55-60 HRC	H1.2				
		60-63 HRC	H1.3				
		> 63HRC	H1.4				
O	Thermoplastics		O1.1				
	Duro plaste		O1.2				
	Plastics - glass fiber reinforced	GFK	O1.3				
	Plastics - carbon fiber reinforced	CFK	O1.4				

Cutting Data



			MG12	=	Coating Grade					
			55-395		Cutting speed Vc (SFM) - Suggested range					
			16-120		Cutting speed Vc (m/min) - Suggested range					
	MG12	TN3_	TI2_	TH3_ TF4_	AN2_ RC2_	EG3_ EG5_	IG3_	DD2_	SG3_	Coating Grades
Heat resi- stant alloy	55-165						55-250		55-250	
	16-50						16-75		16 -75	
	55-165									
	16-50									
Heat resi- stant alloy	55-100						55-130		55-130	
	16-30						16 - 40		16 - 40	
	55-100						55-130		55-130	
	16-30						16 - 40		16 - 40	
Titanium	55-100						55-250		55-280	
	16-30						16 - 75		16-85	
	55-100						55-250		55-280	
	16-30						16 -75		16-85	
	55-100						55-250		55-280	
	16-30						16-75		16-85	
Hardened steels							55-165		55-200	
							16 - 50		16 - 60	
							55-165		55-200	
							16 - 50		16 - 60	
Thermo- plastics	55-490									
	16 - 150									
Duro plaste	55-490									
	16 - 150									
Plastics - glass fiber reinforced	55-490									
	16 - 150									
Plastics - carbon fiber reinforced	55-985									
	16 - 300									

Boring Steel		Depth of Cut, ap (in) Depth of Cut, ap (mm)					
		.020 in 0.5 mm	.040 in 1 mm	.060 in 1.5 mm	.080 in 2 mm	.100 in 2.5 mm	.120 in 3 mm
		Feed Rate, f [in/rev] Feed Rate f [mm/rev]					
R/L105.B0.30.20.045.1	1.5*D	.001-.002 0.03-0.05	.001-.0012 0.02-0.03				
R/L105.B0.30.20.075.1	2.5*D	.001-.002 0.03-0.05	.001-.0012 0.02-0.03				
R/L105.B0.40.20.060.1	1.5*D	.0015-.0025 0.04-0.06	.0015-.0025 0.04-0.06				
R/L105.B0.40.20.100.1	2.5*D	.0015-.0025 0.04-0.06	.0015-.0025 0.04-0.06				
R/L105.B0.50.20.075.1	1.5*D	.002-.003 0.05-0.08	.001-.003 0.05-0.08	.0015-.003 0.04-0.07	.0015-.003 0.04-0.07		
R/L105.B0.50.20.125.1	2.5*D	.002-.003 0.05-0.08	.002-.003 0.05-0.08	.0015-.003 0.04-0.07	.0015-.003 0.04-0.07		
R/L105.B0.60.20.090.1	1.5*D	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.002-.003 0.05-0.08	
R/L105.B0.60.20.150.1	2.5*D	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.002-.003 0.05-0.08	
R/L105.B0.70.20.105.1	1.5*D	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.003-.0032 0.07-0.8	.002-.003 0.05-0.07
R/L105.B0.70.20.175.1	2.5*D	.003-.004 0.08-0.1	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.003-.004 0.07-0.1	.003-.0032 0.07-0.08	.002-.003 0.05-0.07

For stainless materials: start with minimum values

Drilling Steel		Feed rate f [in/rev]	Feed rate f [mm/rev]
R/L105.B0.30.20.045.2	1.5*D	.0004-.0008	0.01-0.02
R/L105.B0.30.20.075.2	2.5*D	.0004-.0008	0.01-0.02
R/L105.B0.40.20.060.2	1.5*D	.0004-.0008	0.01-0.02
R/L105.B0.40.20.100.2	2.5*D	.0004-.0008	0.01-0.02
R/L105.B0.50.20.075.2	1.5*D	.0008-.0016	0.02-0.04
R/L105.B0.50.20.125.2	2.5*D	.0008-.0016	0.02-0.04
R/L105.B0.60.20.090.2	1.5*D	.0012-.0020	0.03-0.05
R/L105.B0.60.20.150.2	2.5*D	.0012-.0020	0.03-0.05
R/L105.B0.70.20.105.2	1.5*D	.0012-.0020	0.03-0.05
R/L105.B0.70.20.175.2	2.5*D	.0012-.0020	0.03-0.05

For drilling: the universal geometry (product number ending in .2) is recommended

	Steel (N/mm ² Tensile strength)					Stainless steel	Grey cast iron	Alu
	400-500	500-700	700-850	850-1150	> 1150	303	Class 30	6061
V_{max} SFM	525	460	395	295	230	295	330	985
V_{max} m/min	160	140	120	90	70	90	100	300

Pitch		Number of passes							
mm	Gg/'" tpi	Steel (N/mm ² Tensile strength)					Stainless steel	Grey cast iron	Alu
		400-500	500-700	700-850	850-1150	> 1150	303	Class 30	6061
0.8	32	10	10	12	12	14	14	12	10
1.0	24	13	13	15	15	18	18	15	13
1.25	20-19	16	16	19	19	22	22	19	16
1.5	16	20	20	23	23	27	27	23	20
1.75	14	23	23	27	27	31	31	27	23
2.0	12-11	27	27	30	30	36	36	30	27
2.5	10	33	33	38	38	45	45	38	33
3.0-3.5	8	40	40	46	46	54	54	46	40

Table values are approximate, exact values will be process-dependent.

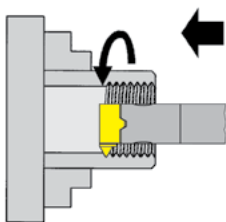
Important:

- The first pass should start with a smaller infeed to avoid chipping the cutting edge
- Finishing passes (with no depth of cut) are not shown in this table

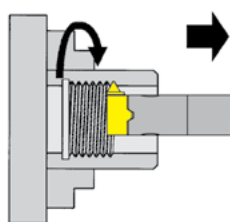
Internal Threading Feed Direction

Right hand thread

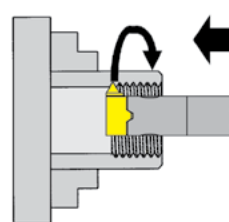
Left hand thread



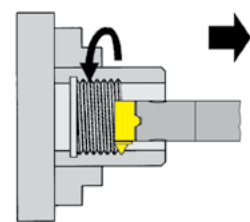
Insert right hand



Insert left hand



Insert left hand



Insert right hand