



ISO	VDI	Material Group	Sutton
P	A	Steel	N
M	R	Stainless Steel	VA
K	F	Cast Iron	GG
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al W
S	S	Titaniums & Super Alloys	Ti Ni
H	H	Hard Materials (≥ 45 HRC)	H

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to main index of this section.

Catalogue Code
Material
Surface Finish
Sutton Designation
Type of Cut: *Slotting*
Finishing
Universal
Roughing
Profiling
↑ $ap \times \phi$
↔ $ae \times \phi$

E456	E457	E458	E444	E310	E400
VHM			VHM		VHM-ULTRA
TiAIN			Brt		Cr/N
N			Al		Al
	•	•	•	•	•
	•	•	•	•	•
			•		•
				•	
					•
			1.0 1.5 1.5	1.0 1.5 1.5	1.5 2.0 2.0
			1.0 0.2 0.2	1.0 0.2 0.2	1.0 0.4 0.6

ISO	VDI ³³²³	Material	Condition	HB	N/mm ²	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #				
P	1	Steel - Non-alloy, cast & free cutting	~ 0.15 %C	A	125 440	180	16	180	15	180	16	-	-	-	-	-	-	-			
	2			A	190 640	180	16	180	15	180	16	-	-	-	-	-	-	-	-		
	3		QT	250 840	100	16	100	15	100	16	-	-	-	-	-	-	-	-	-		
	4		~ 0.75 %C	A	270 910	100	16	100	15	100	16	-	-	-	-	-	-	-	-	-	
	5			QT	300 1010	100	16	100	15	100	16	-	-	-	-	-	-	-	-	-	
	6	Steel - Low alloy & cast < 5% of alloying elements	A	180 610	180	16	180	15	180	16	-	-	-	-	-	-	-	-	-		
	7		QT	275 930	100	16	100	15	100	16	-	-	-	-	-	-	-	-	-		
	8		QT	300 1010	100	16	100	15	100	16	-	-	-	-	-	-	-	-	-		
	9		QT	350 1180	80	16	80	15	80	16	-	-	-	-	-	-	-	-	-		
	10	Steel - High alloy, cast & tool	A	200 680	100	16	100	15	100	16	-	-	-	-	-	-	-	-	-		
	11		HT	325 1100	80	16	80	15	80	16	-	-	-	-	-	-	-	-	-		
	12	Steel - Corrosion resistant & cast	Ferritic / Martensitic	A	200 680	90	16	90	15	90	16	-	-	-	-	-	-	-	-		
	13			QT	240 810	80	16	80	15	80	16	-	-	-	-	-	-	-	-		
M	14.1	Stainless Steel	Austenitic	AH	180 610	90	16	90	15	90	16	-	-	-	-	-	-	-			
	14.2		Duplex	250 840	90	16	90	15	90	16	-	-	-	-	-	-	-	-			
	14.3		Precipitation Hardening	250 840	80	16	80	15	80	16	-	-	-	-	-	-	-	-			
K	15	Cast Iron - Grey (GG)	Ferritic / Pearlitic	180 610	140	16	140	15	140	16	-	-	-	-	-	-	-	-			
	16			260 880	140	16	140	15	140	16	-	-	-	-	-	-	-	-			
	17	Cast Iron - Nodular (GGG)	Ferritic	160 570	140	16	140	15	140	16	-	-	-	-	-	-	-	-			
	18			Pearlitic	250 840	140	16	140	15	140	16	-	-	-	-	-	-	-			
	19			Pearlitic	130 460	100	16	100	15	100	16	-	-	-	-	-	-	-			
20	Cast Iron - Malleable	Pearlitic	230 780	100	16	100	15	100	16	-	-	-	-	-	-	-					
N	21	Aluminum & Magnesium - wrought alloy	Non Heat Treatable	60 210	-	-	-	-	-	220	3	11	16	220	8	14	18	200	8	13	17
	22		Heat Treatable	AH	100 360	-	-	-	-	220	3	11	16	220	8	14	18	200	8	13	17
	23	Aluminum & Magnesium - cast alloy ≤12% Si	Non Heat Treatable	75 270	-	-	-	-	220	3	11	16	220	8	14	18	200	8	13	17	
	24		Heat Treatable	AH	90 320	-	-	-	-	220	3	11	16	220	8	14	18	200	8	13	17
	25	Al & Mg - cast alloy >12% Si	Non Heat Treatable	130 460	-	-	-	-	220	3	11	16	220	8	14	18	200	8	13	17	
	26	Copper & Cu alloys (Brass/Bronze)	Free cutting, Pb > 1%	110 390	-	-	-	-	160	3	11	16	160	8	14	18	500	8	13	17	
	27		Brass (CuZn, CuSnZn)	90 320	-	-	-	-	160	3	11	16	160	8	14	18	500	8	13	17	
	28		Bronze (CuSn)	100 360	-	-	-	-	160	3	11	16	160	8	14	18	500	8	13	17	
	29	Non-metallic - Thermosetting & fiber-reinforced plastics			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	30	Non-metallic - Hard rubber, wood etc.			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
S	31	High temp. alloys	Fe based	A	200 680	50	16	50	15	50	16	-	-	-	-	-	-	-			
	32			AH	280 950	50	16	50	15	50	16	-	-	-	-	-	-	-			
	33			Ni / Co based	A	250 840	50	16	50	15	50	16	-	-	-	-	-	-	-		
	34				AH	350 1180	50	16	50	15	50	16	-	-	-	-	-	-	-		
	35				C	320 1080	50	16	50	15	50	16	-	-	-	-	-	-	-		
	36	Titanium & Ti alloys	CP Titanium	400 MPa	70	16	70	15	70	16	-	-	-	-	-	-	-	-			
	37.1		Alpha alloys	860 MPa	70	16	70	15	70	16	-	-	-	-	-	-	-	-			
	37.2		Alpha / Beta alloys	A	960 MPa	70	16	70	15	70	16	-	-	-	-	-	-	-			
	37.3			AH	1170 MPa	70	16	70	15	70	16	-	-	-	-	-	-	-			
	37.4		Beta alloys	A	830 MPa	70	16	70	15	70	16	-	-	-	-	-	-	-			
37.5	AH	1400 MPa	70	16	70	15	70	16	-	-	-	-	-	-	-	-					
H	38.1	Hardened steel		HT	45 HRC	80	16	80	15	80	16	-	-	-	-	-	-	-			
	38.2			HT	55 HRC	60	16	60	15	60	16	-	-	-	-	-	-	-			
	39.1			HT	58 HRC	-	-	-	-	-	-	-	-	-	-	-	-	-			
	39.2			HT	62 HRC	-	-	-	-	-	-	-	-	-	-	-	-	-			
	40	Cast Iron	Chilled	C	400 1350	60	16	60	15	60	16	-	-	-	-	-	-	-			
41	HT			55 HRC	-	-	-	-	-	-	-	-	-	-	-	-	-				

Condition: A (Annealed), AH (Age Hardened), C (Cast), HT (Hardened & Tempered), QT (Quenched & Tempered)

Bold = Optimal | Regular = Effective

Notes on Milling

- Above values are guidelines for the size and type of cut nominated.
- For long series tools, reduce speed by 40% and feed by 20%.

Ø	Feed Table (f _z) (mm/tooth)																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.013	0.014	0.016	0.018	0.020	0.022	0.024	0.026	0.030
3	0.002	0.003	0.004	0.005	0.006	0.008	0.009	0.010	0.012	0.014	0.016	0.018	0.020	0.023	0.025	0.028	0.032	0.034	0.038	0.042
4	0.004	0.005	0.006	0.007	0.009	0.010	0.012	0.014	0.016	0.018	0.021	0.023	0.026	0.030	0.032	0.036	0.040	0.044	0.045	0.050
5	0.005	0.006	0.008	0.009	0.011	0.013	0.015	0.017	0.020	0.023	0.025	0.030	0.032	0.036	0.040	0.044	0.050	0.055	0.060	0.065
6	0.006	0.008	0.009	0.011	0.013	0.016	0.018	0.021	0.024	0.028	0.030	0.034	0.038	0.042	0.045	0.050	0.055	0.060	0.070	0.075
8	0.010	0.012	0.014	0.017	0.019	0.022	0.025	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.065	0.075	0.080	0.085	0.095
10	0.013	0.015	0.018	0.021	0.024	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.070	0.075	0.085	0.090	0.100	0.11	0.12
12	0.016	0.019	0.022	0.026	0.030	0.034	0.038	0.044	0.050	0.055	0.060	0.065	0.075	0.080	0.090	0.100	0.11	0.12	0.13	0.14
16	0.020	0.024	0.028	0.034	0.038	0.044	0.050	0.055	0.060	0.070	0.080	0.085	0.095	0.11	0.12	0.13	0.14	0.16	0.17	0.18
20	0.022	0.028	0.032	0.038	0.044	0.050	0.060	0.065	0.075	0.085	0.095	0.11	0.12	0.13	0.15	0.16	0.18	0.19	0.21	0.23
25	0.025	0.032	0.038	0.045	0.055	0.060	0.070	0.080	0.090	0.10	0.12	0.13	0.15	0.16	0.18	0.20	0.22	0.24	0.26	0.29