

Recommended Cutting Conditions

(mm)

Workpiece Material	Mild Steels ($\leq 180\text{HB}$), JIS SS400, S10C, etc				Carbon Steels, Alloy Steels (180—250HB) JIS S45C, SCM440 etc			
	Cutting Speed vc (m/min)	Revolution n (min^{-1})	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)	Cutting Speed vc (m/min)	Revolution n (min^{-1})	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)
3.0	65	6800	0.090 (0.07—0.11)	610	60	6300	0.090 (0.07—0.11)	565
4.0	70	5500	0.115 (0.09—0.14)	630	65	5100	0.115 (0.09—0.14)	585
5.0	70	4400	0.145 (0.11—0.18)	635	65	4100	0.145 (0.11—0.18)	590
6.0	80	4200	0.175 (0.14—0.21)	735	75	3900	0.175 (0.14—0.21)	680
7.0	80	3600	0.205 (0.16—0.25)	735	75	3400	0.205 (0.16—0.25)	695
8.0	85	3300	0.230 (0.18—0.28)	755	80	3100	0.230 (0.18—0.28)	710
10.0	90	2800	0.265 (0.21—0.32)	740	85	2700	0.265 (0.21—0.32)	715
12.0	95	2500	0.280 (0.22—0.34)	700	90	2300	0.280 (0.22—0.34)	640
14.0	95	2100	0.290 (0.23—0.35)	605	90	2000	0.290 (0.23—0.35)	580

Workpiece Material	Carbon Steels, Alloy Steels (280—350HB) JIS SNCM439 etc				Austenitic Stainless Steel ($\leq 200\text{HB}$) Ferritic, Precipitation Hardening Stainless Steels ($>200\text{HB}$) with water-insoluble coolant JIS SUS431, SUS420J2 etc			
	Cutting Speed vc (m/min)	Revolution n (min^{-1})	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)	Cutting Speed vc (m/min)	Revolution n (min^{-1})	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)
3.0	55	5800	0.075 (0.06—0.09)	435	40	4200	0.070 (0.04—0.10)	290
4.0	60	4700	0.105 (0.08—0.13)	490	40	3100	0.075 (0.05—0.10)	230
5.0	60	3800	0.130 (0.10—0.16)	490	40	2500	0.100 (0.05—0.15)	250
6.0	70	3700	0.155 (0.12—0.19)	570	40	2100	0.105 (0.06—0.15)	220
7.0	70	3100	0.180 (0.14—0.22)	555	40	1800	0.120 (0.06—0.18)	215
8.0	75	2900	0.205 (0.16—0.25)	590	40	1500	0.130 (0.06—0.20)	195
10.0	80	2500	0.240 (0.20—0.28)	600	40	1200	0.140 (0.08—0.20)	165
12.0	85	2200	0.250 (0.20—0.30)	550	40	1000	0.175 (0.10—0.25)	175
14.0	85	1900	0.250 (0.20—0.30)	475	40	900	0.175 (0.10—0.25)	155

Workpiece Material	Gray Cast Iron ($\leq 350\text{MPa}$) JIS FC300 etc				Ductile Cast Iron ($\leq 450\text{MPa}$) JIS FCD450 etc			
	Cutting Speed vc (m/min)	Revolution n (min^{-1})	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)	Cutting Speed vc (m/min)	Revolution n (min^{-1})	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)
3.0	60	6300	0.105 (0.06—0.15)	660	55	5800	0.085 (0.05—0.12)	490
4.0	65	5100	0.130 (0.08—0.18)	660	60	4700	0.120 (0.07—0.17)	560
5.0	65	4100	0.150 (0.10—0.20)	615	60	3800	0.140 (0.08—0.20)	530
6.0	75	3900	0.175 (0.12—0.23)	680	70	3700	0.150 (0.10—0.20)	555
7.0	75	3400	0.175 (0.12—0.23)	595	70	3100	0.175 (0.12—0.23)	540
8.0	80	3100	0.210 (0.17—0.25)	650	75	2900	0.200 (0.15—0.25)	580
10.0	85	2700	0.230 (0.18—0.28)	620	80	2500	0.230 (0.18—0.28)	575
12.0	90	2300	0.250 (0.20—0.30)	575	85	2200	0.250 (0.20—0.30)	550
14.0	90	2000	0.250 (0.20—0.30)	500	85	1900	0.250 (0.20—0.30)	475

Note 1) The above cutting conditions is with the water soluble coolant is used. For stainless steels, water-insoluble coolant is recommended.

Note 2) When using a water-insoluble coolant, reduce the cutting speed by 20% to ensure adequate lubrication.

Note 3) Check the condition of chips and perform step machining if necessary. * Reference of step length: 0.2 to 1.0 DC

Note 4) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.

Note 5) Machining depths exceeding flute length (LU) are not recommended.

Note 6) Clamp the drill so that the drill runout is within 0.03mm.

Note 7) Do not clamp the flute part of the drill.