Speeds and Feeds

1) Select your material in the ISO colored chart with respect to material description.
2) Start with a middle/average value for cutting speed, V_c (ft/min) and feed, f_n (in/rev). Adjust the cutting speed and/or feed based on your cutting conditions.

ISO	VDI 3323	Material	Compostion Structure Heat Treatment	Condition	HB	SFM		Drill Diameter											
							METRIC	3.0	-	4.0	-	5.0	6.0	-	-	8.0	-	10.0
							FRACTIONAL	-	1/8	-	3/16	-	-	1/4	5/16	-	3/8	-
							DECIMAL	.1181	.1250	.1575	.1875	.1969	.2362	.2500	.3125	.3150	.3750	.3937
N	21	Aluminum-wrought alloy	Not Curable		60	658	RPM	21220		15920		12730		10610		7960		6370
							FEED	.0047 - .0071		.0055 - .0087		.0059 - .0091		.0067 - .0098		.0083 - .011		.0094 - .0118
N	22		Curable	Hardened	100	527	RPM	16980		12730		10190		8490		6370		5090
							FEED	.0047 - .0071		.0055 - .0087		.0059 - .0091		.0067 - .0098		.0083 - .011		.0094 - .0118
N	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable		75	494	RPM	15920		11940		9550		7960		5970		4770
							FEED	.0059 - .0083		.0067 - .0098		.0075 - .0106		.0083 - .011		.0094 - .0122		.0114 - .0177
N	24		≤ 12% Si, Curable	Hardened	90	461	RPM	14850		11140		8910		7430		5570		4460
							FEED	.0059 - .0083		.0067 - .0098		.0075 - .0106		.0083 - .011		.0094 - .0122		.0114 - .0177

ISO	VDI 3323	Material	Compostion Structure Heat Treatment	Condition	HB	SFM		Drill Diameter									
							METRIC	12.0	-	14.0	-	-	16.0	18.0	-	20.0
							FRACTIONAL	-	1/2	-	9/16	5/8	-	-	3/4	-
							DECIMAL	.4724	.5000	.5512	.5625	.6250	.6299	.7087	.7500	.7874
N	21	Aluminum-wrought alloy	Not Curable		60	658	RPM	5310	5030	4550		3980		3540	3350	3180
							FEED	.0094 - .0118	.0094 - .0118	.0098 - .0138		.0098 - .0138		.011 - .015	.011 - .015	.0118 - .0157
N	22		Curable	Hardened	100	527	RPM	4240	4030	3640		3180		2830	2680	2550
							FEED	.0094 - .0118	.0094 - .0118	.0098 - .0138		.0098 - .0138		.011 - .015	.011 - .015	.0118 - .0157
N	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable		75	494	RPM	3980	3770	3410		2980		2650	2520	2390
							FEED	.013 - .0217	.013 - .0217	.0138 - .0236		.0138 - .0236		.0154 - .0287	.0154 - .0287	.0154 - .0335
N	24		≤ 12% Si, Curable	Hardened	90	461	RPM	3710	3520	3180		2790		2480	2350	2230
							FEED	.013 - .0217	.013 - .0217	.0138 - .0236		.0138 - .0236		.0154 - .0287	.0154 - .0287	.0154 - .0335

Speeds and Feeds

Penetration Rate (in/min)

$$v_f = f_n \cdot n$$

Feed Per Revolution (in/rev)

$$f_n = \frac{v_f}{n}$$

Cutting Speed (ft/min)

$$v_c = \frac{\pi \cdot D_{tool} \cdot n}{12}$$

Spindle Speed (rev/min)

$$n = \frac{v_c \cdot 12}{\pi \cdot D_{tool}}$$

Material Removal Rate (in³/min)

$$MRR = D_{tool} \cdot f_n \cdot v_c \cdot 3$$

Inch

Symbol	Definition	Unit
V_f	Penetration rate	in/min
f_n	Feed per revolution	in/rev
V_c	Cutting speed	ft/min (SFM)
n	Spindle speed	rev/min (RPM)
D_{tool}	Tool cutting diameter	in
MRR	Material removal rate	(in³/min)

TESTED. PROVEN.