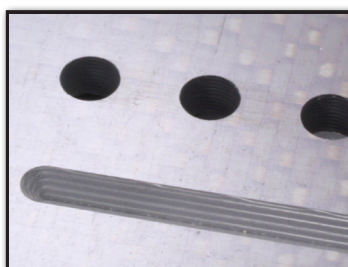


* Chamfering *

Type	Rc Hardness	SFM (Vc)		CHIPLOAD PER FLUTE (Fz)				
		154M, 154MA 152M, 152MA	1600 152D, 152DA	2.0 - 3.0	3.0 - 6.0	6.0 - 10.0	10.0 - 14.0	14.0 - 20.0
COBALT BASE ALLOYS								
Powdered Metal, Stellite, Hs-21, Haynes 25/188, X-4, L-605	< 35	50 - 70	45 - 60	.008 - .020	.010 - .025	.020 - .050	.025 - .075	.050 - .100
	> 35	35 - 50	30 - 45	.003 - .010	.005 - .015	.010 - .035	.025 - .050	.025 - .075
NICKEL BASE ALLOYS								
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	35 - 50	30 - 45	.006 - .020	.010 - .025	.020 - .050	.025 - .075	.050 - .100
	> 35	20 - 35	15 - 25	.003 - .010	.005 - .015	.010 - .035	.025 - .050	.025 - .075
TITANIUM ALLOYS								
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si 5553 / Beta Titanium	< 35	60 - 90	35 - 75	.008 - .025	.015 - .035	.025 - .065	.035 - .100	.075 - .125
	> 35	50 - 65	45 - 60	.006 - .020	.010 - .025	.020 - .050	.025 - .075	.050 - .100
STAINLESS STEELS								
13/8, 15/5, 17-4, pH Types	< 35	45 - 75	30 - 45	.006 - .020	.010 - .025	.020 - .050	.025 - .075	.050 - .100
	> 35	35 - 50	25 - 45	.003 - .010	.005 - .015	.010 - .035	.025 - .050	.025 - .075
Inox, 200 Series, 300 Series	< 35	60 - 80	40 - 55	.008 - .020	.010 - .025	.020 - .050	.025 - .075	.050 - .100
	> 35	45 - 60	30 - 45	.003 - .010	.005 - .015	.010 - .035	.025 - .050	.025 - .075
304L, 316L, Nitronic 50, Inox	< 35	25 - 40	25 - 35	.006 - .015	.010 - .020	.020 - .035	.025 - .050	.035 - .075
	> 35	20 - 35	15 - 25	.003 - .010	.005 - .015	.010 - .025	.025 - .035	.025 - .050
400 Series	< 35	45 - 70	30 - 45	.006 - .020	.010 - .025	.020 - .050	.025 - .075	.050 - .100
	> 35	35 - 50	25 - 40	.003 - .010	.005 - .015	.010 - .035	.025 - .050	.025 - .075
HIGH STRENGTH TOOL STEELS								
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	45 - 60	35 - 50	.006 - .020	.010 - .025	.020 - .050	.025 - .075	.050 - .100
	30 - 38	30 - 45	25 - 35	.003 - .010	.005 - .015	.010 - .035	.025 - .050	.025 - .075
	> 38	15 - 30	10 - 25	.002 - .006	.003 - .008	.005 - .020	.015 - .040	.020 - .065
TOOL STEELS								
200, 250, 300, 8620, A36, 12L14, 1018, 1020	< 35	55 - 75	45 - 60	.008 - .025	.015 - .035	.025 - .065	.035 - .100	.075 - .125
	> 35	35 - 55	30 - 45	.006 - .020	.010 - .025	.020 - .050	.025 - .075	.050 - .100
CAST MATERIAL								
Steel, Iron		75 - 105	50 - 75	.010 - .035	.025 - .050	.035 - .100	.050 - .150	.075 - .250
Aluminum		75 - 105	75 - 105	.010 - .035	.025 - .050	.035 - .100	.050 - .150	.075 - .250
ALUMINUM								
Aircraft Grade (6061, 7075)		90 - 150	90 - 150	.010 - .035	.025 - .050	.035 - .100	.050 - .150	.075 - .250
COPPER								
Copper Alloys		75 - 115	60 - 90	.008 - .025	.020 - .040	.025 - .065	.040 - .090	.050 - .200
BRASS, BRONZE								
Brass, Aluminum/Bronze, Low Silicon Bronze		75 - 115	60 - 90	.008 - .025	.020 - .040	.025 - .065	.040 - .090	.050 - .200
COMPOSITE MATERIAL								
Glass Epoxy, Fiberglass, Plastics		60 - 120	60 - 120	.010 - .035	.025 - .050	.035 - .100	.050 - .150	.075 - .250
Graphite, G10, Carbon Fiber		90 - 150	75 - 135	.010 - .035	.025 - .050	.035 - .100	.050 - .150	.075 - .250



NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

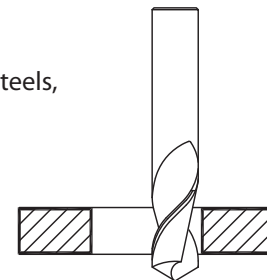
* Through Hole *

Type	Rc Hardness	SFM (Vc)		CHIPLOAD PER FLUTE (Fz)			
		152M, 152MA 154M, 154MA	152D, 152DA	3.0 - 6.0	6.0 - 10.0	10.0 - 14.0	14.0 - 20.0
TITANIUM ALLOYS							
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		-	35 - 75	.015 - .035	.025 - .065	.035 - .100	.075 - .125
STAINLESS STEELS							
13/8, 15/5, 17-4, pH Types	< 35	-	30 - 45	.010 - .025	.020 - .050	.025 - .075	.050 - .100
	> 35	-	25 - 45	.005 - .015	.010 - .035	.025 - .050	.025 - .075
HIGH STRENGTH TOOL STEELS							
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	-	35 - 50	.010 - .025	.020 - .050	.025 - .075	.050 - .100
	30 - 38	-	25 - 35	.005 - .015	.010 - .035	.025 - .050	.025 - .075
MEDIUM ALLOY TOOL STEELS							
200, 250, 300, 8620	< 35	-	45 - 60	.015 - .035	.025 - .065	.035 - .100	.075 - .125
	> 35	-	30 - 45	.010 - .025	.020 - .050	.025 - .075	.050 - .100
CARBON STEELS							
A36, 12L14, 1000's, 1100's, 1300's	< 35	55 - 75	45 - 60	.015 - .035	.025 - .065	.035 - .100	.075 - .125
	> 35	-	30 - 45	.010 - .025	.020 - .050	.025 - .075	.050 - .100
CAST MATERIAL							
Steel		-	50 - 75	.025 - .050	.035 - .075	.050 - .100	.075 - .150
Ductile Iron		-	60 - 90	.025 - .050	.035 - .075	.050 - .100	.075 - .150
Gray Iron		-	50 - 75	.025 - .050	.035 - .075	.050 - .100	.075 - .150
Aluminum		75 - 105	75 - 105	.025 - .050	.035 - .075	.050 - .100	.075 - .150
ALUMINUM							
Aircraft Grade (6061, 7075)		90 - 150	90 - 150	.025 - .050	.035 - .075	.050 - .100	.075 - .150
MAGNESIUM							
		90 - 135	75 - 105	.020 - .040	.025 - .065	.040 - .090	.050 - .125
COPPER							
Copper Alloys		75 - 115	60 - 90	.020 - .040	.025 - .065	.040 - .090	.050 - .125
BRASS, BRONZE							
Brass, Aluminum/Bronze, Low Silicon Bronze		75 - 115	60 - 90	.020 - .040	.025 - .065	.040 - .090	.050 - .125
COMPOSITE MATERIAL							
Glass Epoxy, Fiberglass, Plastics		60 - 120	60 - 120	.025 - .050	.035 - .075	.050 - .100	.075 - .150
Graphite, G10, Carbon Fiber		90 - 150	75 - 135	.025 - .050	.035 - .075	.050 - .100	.075 - .150

DRILL MILL USES:

Through Hole - mostly for composites, plastics, softer steels, copper, aluminum and similar metals.

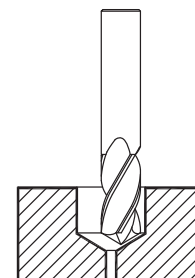
Drilling through, then side milling



NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

* Solids *

Type	Rc Hardness	SFM (Vc)	CHIPLOAD PER FLUTE (Fz)			
		152M, 152MA 154M, 154MA	3.0 - 6.0	6.0 - 10.0	10.0 - 14.0	14.0 - 20.0
STAINLESS STEELS						
13/8, 15/5, 17-4, pH Types	< 35	45 - 75	.006 - .020	.010 - .025	.020 - .050	.025 - .075
400 Series	< 35	45 - 75	.006 - .020	.010 - .025	.020 - .050	.025 - .075
HIGH STRENGTH TOOL STEELS						
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30 30 - 38	45 - 60 30 - 45	.006 - .020 .003 - .010	.010 - .025 .005 - .015	.020 - .050 .010 - .035	.025 - .075 .025 - .050
MEDIUM ALLOY TOOL STEELS						
200, 250, 300	< 35	55 - 75	.008 - .025	.015 - .035	.025 - .065	.035 - .100
CARBON STEELS						
A36, 1000's, 1100's, 1300's	< 35	55 - 75	.008 - .025	.015 - .035	.025 - .065	.035 - .100
CAST MATERIAL						
Steel		75 - 105	.010 - .035	.025 - .050	.035 - .075	.050 - .100
Aluminum		75 - 105	.010 - .035	.020 - .050	.035 - .075	.050 - .100
ALUMINUM						
Aircraft Grade (6061, 7075)		90 - 150	.010 - .035	.025 - .050	.035 - .075	.050 - .100
MAGNESIUM						
		90 - 135	.008 - .025	.020 - .040	.025 - .065	.040 - .090
COPPER						
Copper Alloys		75 - 115	.008 - .025	.020 - .040	.025 - .065	.040 - .090
BRASS, BRONZE						
Brass, Aluminum/Bronze, Low Silicon Bronze		75 - 115	.008 - .025	.020 - .040	.025 - .065	.040 - .090
COMPOSITE MATERIAL						
Glass Epoxy, Fiberglass, Plastics		60 - 120	.010 - .035	.025 - .050	.035 - .075	.050 - .100
Graphite, G10, Carbon Fiber		90 - 150	.010 - .035	.025 - .050	.035 - .075	.050 - .100



Milling pre-drilled through hole to size

NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.