Determining Optimum Feed Rates and Speeds for Freud Premier Bits

Step 1: Determine the appropriate chip load* for your application:

Tool Diameter	MDF/ Particle Board	Hardwood	Softwood	Soft Plastic	Hard Plastic	Plywood
1/8"	.004"-.007"	.002"-.004"	.003"-.005"	.003"-.005"	.002"-.004"	.003"-.005"
1/4"	.012"-.015"	.005"-.007"	.006"-.008"	.006"-.009"	.005"-.008"	.006".009"
3/8"	.017"-.019"	.013"-.015"	.015"-.017"	.009"-.011"	.008"-.010"	.015"-.018"
1/2"	.020"-.025"	.017"-.019"	.019"-.021"	.011"-.014"	.010"-.013"	.018"-.021"

**This chart is a recommended starting point and does not warranty against tool breakage.*

Note 1: This information is for a starting point only. Actual feed and speeds will very depending on each application and machining limitations.

Note 2: Chip loads shown above are based on cutting depth equal to the bit diameter. For deeper cuts, modify the chip load as follows:
Cut Depth 2X Tool Diameter: reduce chip load by 25%
Cut Depth 3X Tool Diameter: reduce chip load by 50%

Step 2: Calculate the Feed and Speed to match the selected chip load:

Use the following formulas to determine the feed and speed to match the chip load for your application. Use the appropriate formula to find the desired variable.

Chip Load = Feed Rate* / (RPM x number cutting edges)
Feed Rate* = RPM x number cutting edges x chip load
RPM = Feed Rate* / (number of cutting edges x chip load)
**Note: Feed Rate measured in inches per minute. 1" = 25.4mm*

Example 1: Chip Load = 684 inches per minute/ (18000 RPM x 2 flutes)
Chip Load = .019"

Example 2: Feed Rate = 18000 RPM x 2 flutes x .019"
Feed Rate = 684 inches per minute

Step 3: Test the calculated feed and speed:

To achieve the best tool life and part quality these steps should be taken. Start using the recommended chip load and increase feed rate until part quality is unacceptable. Then decrease feed rate until desired part finish is reached. Next decrease RPM's until part finish detiorates. After this happens increase RPM's until finish is acceptable. This will achieve the largest chipload possible therefore increasing the life of tool and preventing excessive heat.