QUADRANT
ENGINEERING PLASTIC PRODUCTS

Technical Bulletin: **Semitron MDS 100 Machining Guidelines**

Semitron MDS 100 is an advanced engineered thermoplastic blend of PEEK and other high temperature polymers. This material is quite different from standard thermoplastic materials currently available today. As a result, this material also machines differently than other polymers. To achieve the best machined finish and help to ensure proper dimensional control for critical tolerance parts, use of the following guidelines should be considered.

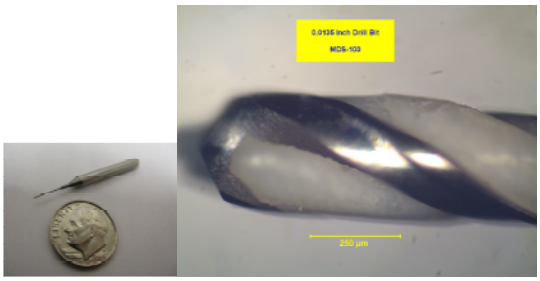
General Machining Guidelines:

	Tooling	**Speed**	**Feed Rate**	**Depth of Cut**	**Comments**
Sawing	Saw blade - minimum 8 to 10 teeth per inch	275 to 1,500 FPM			Using a blade with fewer teeth per inch will likely result in chipping of the material.
End Milling	Solid carbide uncoated end mill - 2 flute (0.25" diameter)	2,500 RPM	25 IPM or 0.0045 IPR	0.030" for finish work	
Face Milling	Face mill – for example: (3" dia. mill with 0° lead angle and 4 TPG - 322 uncoated carbide inserts)	4,500 RPM	20 IPM or 0.0044 IPR	0.020" to 0.030"	.020" depth of cut will give a slightly better RMS finish
Drilling	Solid carbide drills – uncoated For small diameter holes use circuit board drills 	> 1/32" dia. 2,500 RPM ≤ 1/32" dia. 7,500 RPM	10 IPM or 0.004 IPR 25 IPM or 0.003 IPR	**Critical:** depth of peck should be no more than ½ the diameter of the drill	**Tips for small diameter drilling:** For improved accuracy on hole locations, spot drill using a 90° tool. To avoid drill deflection (walk), use as short a flute length as possible. If burrs are a problem at the top of the holes, try finish milling the thickness after drilling. If "push through" is experienced at the bottom of the holes, the feed rate may be too fast or the material may not be properly supported underneath. If breakout at the holes is an issue, try removing a minimum .010" from each side prior to drilling.

Technical Note:

To eliminate burrs from small diameter drilling, it is critical to peck drill at a depth not to exceed ½ the diameter of your drill. A greater depth of peck will result in poor chip removal, **clogging of the flutes**, and excess heat generation.

Flooding the component with a water-based coolant during drilling and machining will also help with tolerance control.



Additional Hints for Tight Tolerance Parts:

- Incoming material should be allowed to stabilize in the environment in which it will be machined. Typically, we recommend 24 hours.
- Rough machine component to within 0.020" to 0.030" on all surfaces and leave the part sit for up to 48 hours to allow stress relief.
- Finish machine.
  - Correct feeds and speeds are critical.
  - Using a water-based coolant is highly recommended.
  - Carbide tools also required.

Quadrant has technical service representatives available to review the above procedures, and assist with any further recommendations. If you have any questions, please feel free to contact Quadrant at 1-800-366-0300.

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