



Technical Service Memorandum

June 2001

Machining Ryton[®] PPS Compounds

Ryton[®] PPS compounds can be readily machined using conventional metal working tools. A high degree of precision can be obtained using moderate cutting speeds and fast feed rates. The rate of travel should be relatively fast because a slow feed rate results in excess abrasion by the tool and tends to give a poor surface appearance. Although fairly deep cuts of up to 0.125 inch (3.2 mm) can be made, finish cuts should take off no more than 0.005 inch (0.13 mm) of material. The glass and mineral fillers used in Ryton[®] PPS compounds can cause severe wear of machining tools, so carbide or diamond tipped tools should be used. If a coolant is desired, ethylene glycol (antifreeze) works well. It should be noted that machined surfaces are more prone to abrasion, crack formation, and fluid penetration than "resin rich" molded surfaces.

Turning Operations

Cutting Speed:	300 to 700 f.p.m. 90 to 210 m/min
Feed Rate:	0.002 to 0.005 in/rev 0.05 to 0.13 mm/rev
Turning Geometry	
Back Rake:	5° to 10°
Side Rake Front:	10°
Front Clearance:	5° to 10°
Side Clearance:	5° to 10°
Cut-Off Tool Geometry	
Back Clearance:	1° to 2°
Side Clearance:	1° to 3°
Front Clearance:	15° to 20°
End Cutting:	35°
Back Rake:	0° to 5°

The use of single point tooling is highly recommended, however, "form type" cutting tools can be used.

Tool Material

Conventional, premium grade, tungsten carbide tip tools. (For good finish, keep all tooling sharp.) For continuous machining of PPS filled with glass and/or minerals, diamond tip tools are highly recommended for durability. Use small radius at the front of the tool for better finish.

Milling Operations

Cutting Speed:	100 to 200 f.p.m. 30 to 60 m/min
Feed Rate:	0.005 to 0.015 in/rev 0.13 to 0.38 mm/rev
Chip Load:	0.003 to 0.005 in/tooth 0.08 to 0.13 mm/tooth
Cutter:	0.375 to 0.500 inch 9.5 to 12.7 mm
Tool Material	Multi-fluted C-2 tungsten carbide cutters, for best surface finish and lower cutter wear.

Drilling Operations

Drill Speed:	200 to 350 f.p.m. 60 to 100 m/min
Feed Rate:	0.003 to 0.005 in/rev 0.08 to 0.13 mm/rev

When drilling through holes, the feed should be reduced near the end to prevent the drill from pulling at the exit side, and to prevent chipping or breaking-out.

Tool Geometry

Rake Angle:	Positive 0° to 5°
Point Angle:	118°
Lip Relief Angle:	10° to 15°

Tool Material

Tungsten carbide inserts

Reaming

Reamer Speed:	200 to 300 f.p.m. 60 to 90 m/min
Feed Rate:	0.010 to 0.020 in/rev 0.25 to 0.51 mm/rev

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