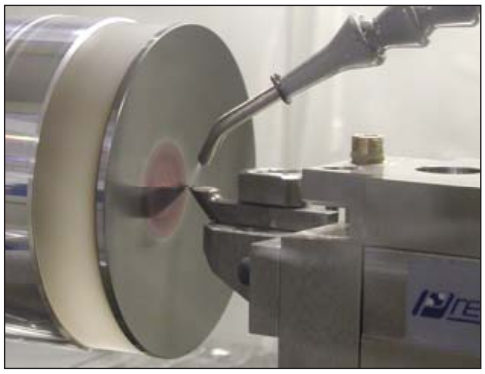
precitech

Global Manufacturer of Innovative Ultra Precision Machining Solutions

High Speed Germanium Machining

INNOVATIVE **APP**NOTE

Nanoform® X



Goal:

Demonstrate the capability to reduce part cutting time for Infrared (IR) Germanium lenses without sacrificing form accuracy or surface finish.

Process:

Using a Nanoform® X with Hydroround oil hydrostatic B axis and HS150 work holding spindle to machine Germanium at 3 times* typical part cutting times.

B Axis Specifications:

- **Bearing type:** Oil Hydrostatic
- **Radial stiffness:** 225 N/µm (1,280,000 lbs/in)
- **Axial stiffness:** 600 N/µm (3,428,000 lbs/in)
- **Moment stiffness:** 3.4 N-n/µrad (30 lbs-in/µrad)

Part Details:

Material: Germanium
Diameter: 100 mm
Concave Radius: 163 mm

Process Details:

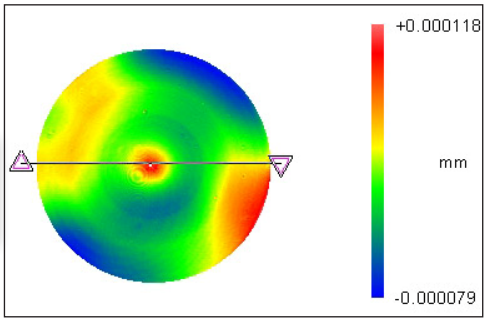
Tool: Limited sweep, large radius, negative rake diamond tool
Tool set: Off the center of B utilizing Virtual Center Technology (VCT)
Spindle speed: 5000 rpm
Feed rate: 15 mm/min
Feed per revolution: 3 µm/rev
Coolant: Odorless Mineral Spirits (OMS)

Results*:

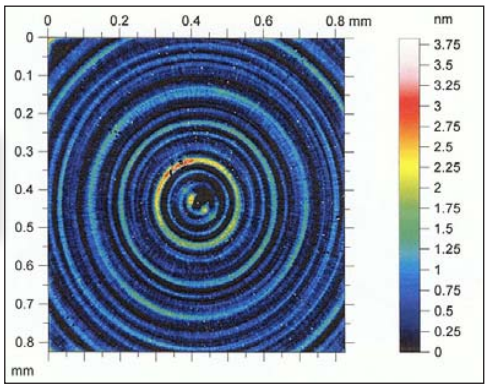
- **Form accuracy:** .197 µm PV
- **Surface finish:** .4845 nm Ra

* speed can be increased up to 7 times typical processing time and still yield form and finish results below typical IR specifications

Form Accuracy
0.197 µm PV



Surface Finish
0.3674 nm Sa
0.4845 nm Ra



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