

Silicon | Optical

Goal

Utilizing laser assisted machining to demonstrate improved surface finish and achieving a <math><0.5</math> fringe form accuracy.



OPTIMUS_{T+1}

Adaptable to all DT Machines

Part Details

Diameter: 90mm

Best fit concave radius: 55.5 mm

Crystal orientation: $\langle 111 \rangle$

Process Details

Machine: Nanoform 250 Ultra

Spindle speed: 4500 RPM

Feed rate: 9 mm/min

Feed per revolution: 2 $\mu\text{m}/\text{rev}$

Depth of cut: 10 μm

Coolant: Odorless Mineral Spirits

**4X typical feed per rev

Tool Details (Proprietary Design)

Radius: 0.5 mm

Sweep: 120°

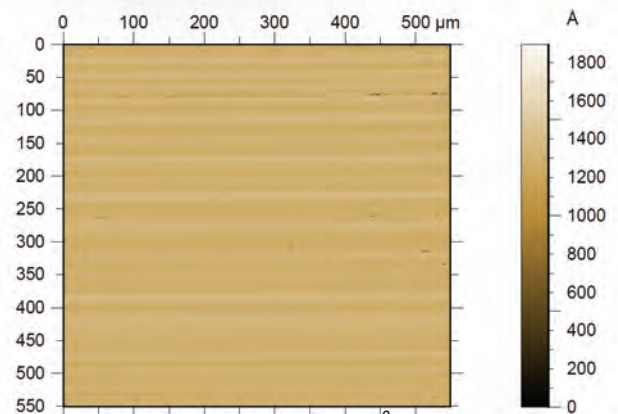
Sweep used: 40°

Rake angle: -35°



No visible defects under high intensity light

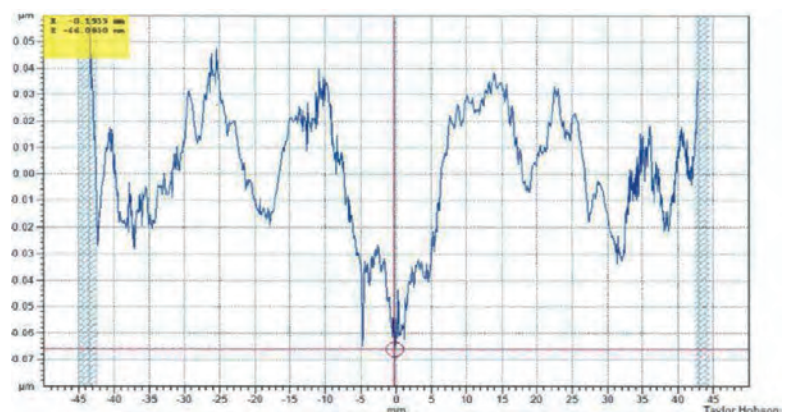
Metrology



Finish Parts 1-5: 20-40 Å

Finish Parts 6-10: 40-60 Å

Finish Parts 11-15: 45-65 Å



Form Accuracy <math><1/2</math> Fringe

Improves Surface

Extends Tool Life

µ-LAM

Improves Form

2-4X Faster