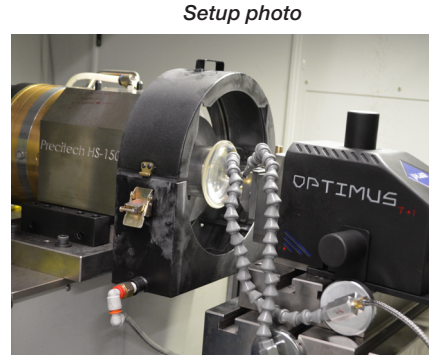


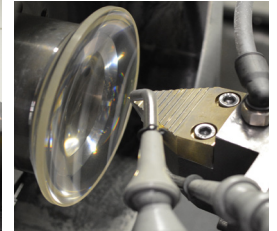


Nanoform® X*

* Also applicable to Freeform® TL or Nanoform® 700 ultra



Setup photo



Goal:

Utilizing laser assisted machining, demonstrate improved surface finish and cosmetic appearance by reducing visual haze and pullouts on ZnS.

Process:

Using a Nanoform® X, MicroLAM Optimus T+1 laser assisted machining device, and HS150 Spindle to diamond turn a ZnS asphere using XZ (2 axis) machining.

Part Details:

- Material:** Zinc Sulfide (ZnS)
- Diameter:** 88 mm
- Best fit concave radius:** 132 mm

Tool Details (proprietary MicroLAM diamond tool):

- Radius:** 0.5 mm
- Sweep:** 120°
- Sweep used:** 20°
- Rake angle:** -35°

Process Details:

- Spindle speed:** 5000 rpm
- Feed rate:** 5 mm/min
- Feed per revolution:** 1 µm/rev**
- Coolant:** Odorless Mineral Spirits (OMS)
- ** 2X typical feed per rev

Results (Metrology on reverse side):

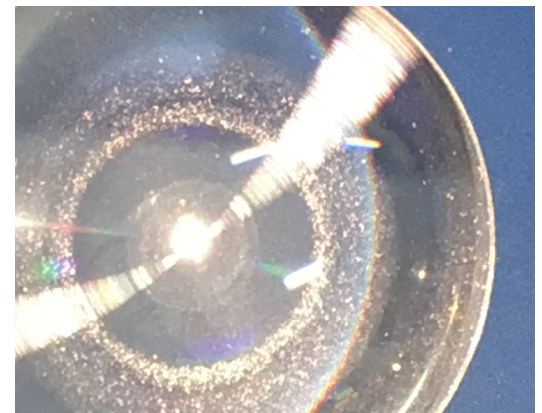
Without laser:

- **Surface finish:** 3.5 nm Ra
- **Cosmetics:** Visible color, haze, and pullouts under high intensity light
- **Form accuracy:** 0.30 µm PV

With laser:

- **Surface finish:** 1.0 nm Ra
- **Cosmetics:** No visible color, haze, and pullouts under high intensity light
- **Form accuracy:** 0.17 µm PV

Part photos under high intensity light



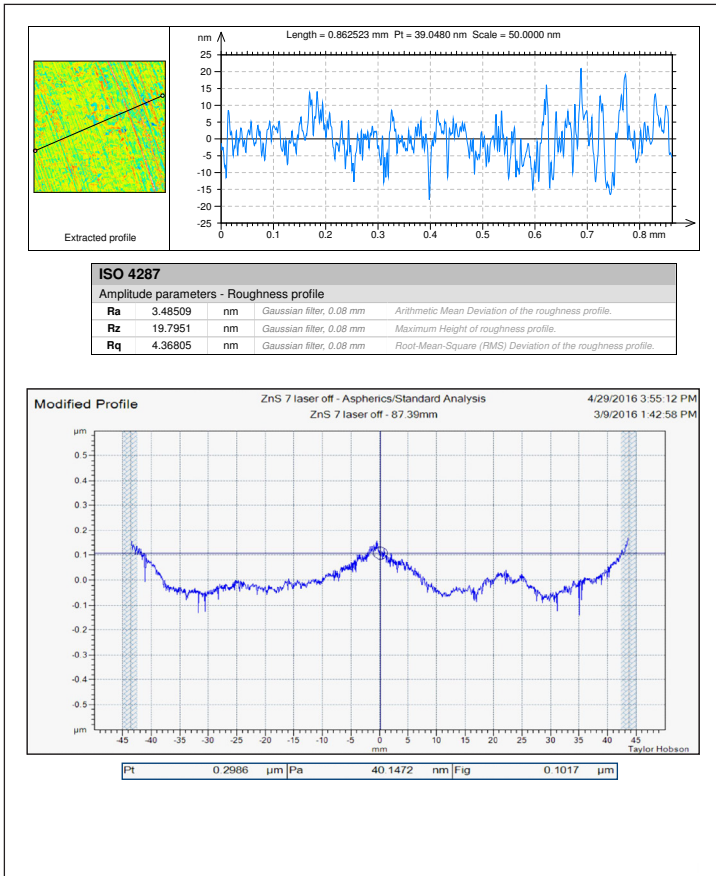
Without laser



With laser

Metrology:

Without laser



With laser

