

Applications of MRF

Case Study – Inducing Figure and Form

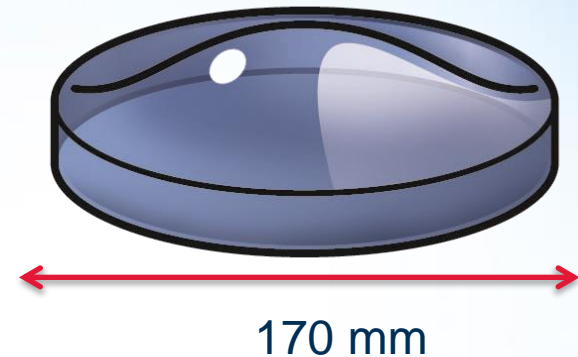
Presented By:

QED Technologies Applications and Engineering

Aspherizing with MRF

◆ The Asphere

- Size: 170 mm Φ
- Radius: ~400 mm CVX
- Aspheric Departure: ~16 μm
- Material: BK-7

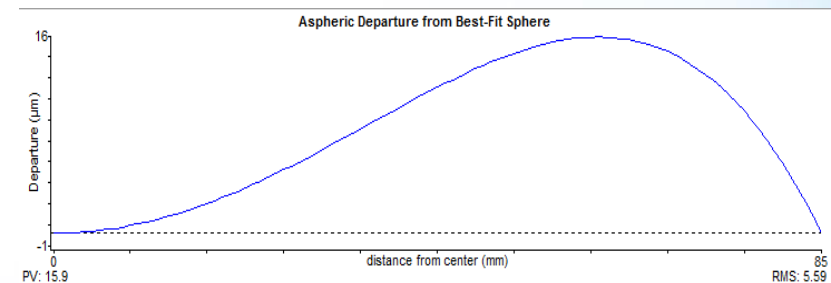


◆ The Goal

- **Induce aspheric shape**, starting from best-fit sphere

◆ The Configuration

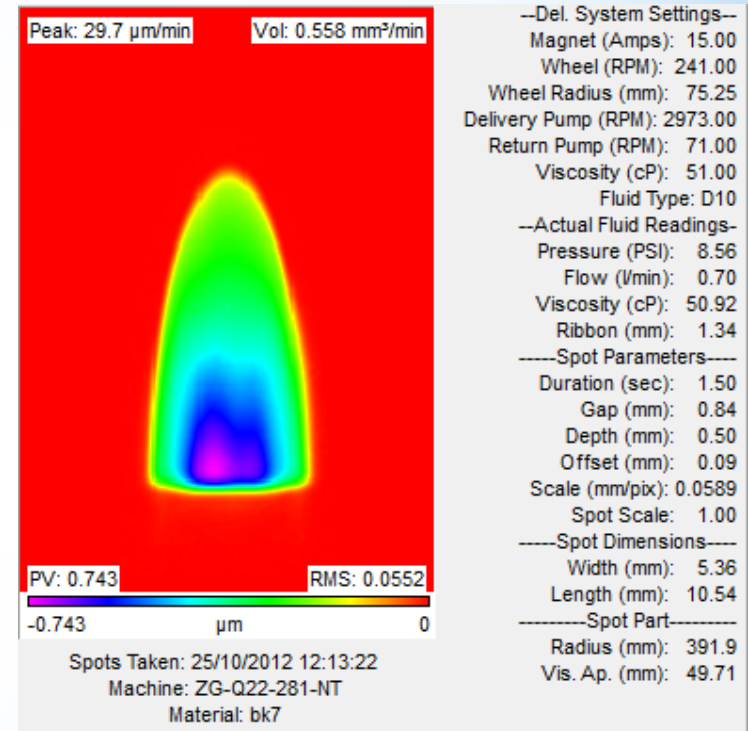
- Q22-X/Y
 - ◆ Rotational mode
- 150 mm wheel
 - ◆ Large spot for minimize cycle time
- D11 fluid
 - ◆ Maximum Removal Rate



- ◆ Q22-X/Y
 - Rotational Mode
- ◆ 150 mm Wheel
- ◆ D11 Fluid

Aspherizing with MRF

- ❖ MRF can generate high removal rates
 - ~ 30 $\mu\text{m}/\text{min}$ on this job!
 - > 0.5 mm^3/min VRR
 - This can make aspherizing practical
- ❖ No need to grind and pre-polish asphere
 - Do not need special equipment
 - Do not have MSF residuals often generated by this equipment
- ❖ Starting best-fit sphere is “easy” and “cheap”



Aspherizing with MRF

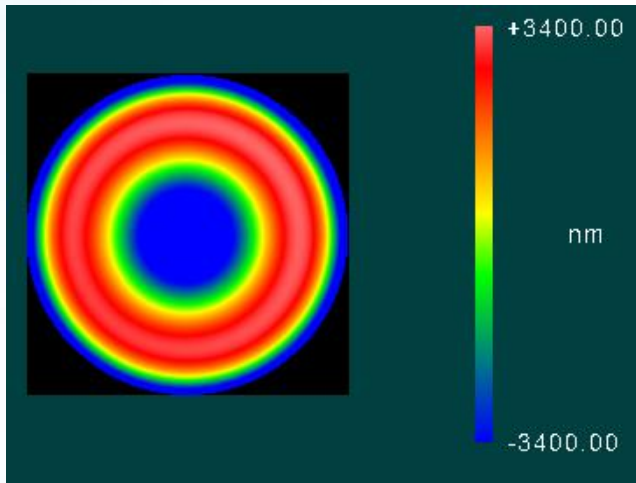
- ◆ D11 & large wheel provides ability to create precision asphere without aspheric grinding and pre-polishing equipment

- ◆ Q22-X/Y
- Rotational Mode
- ◆ 150 mm Wheel
- ◆ D11 Fluid

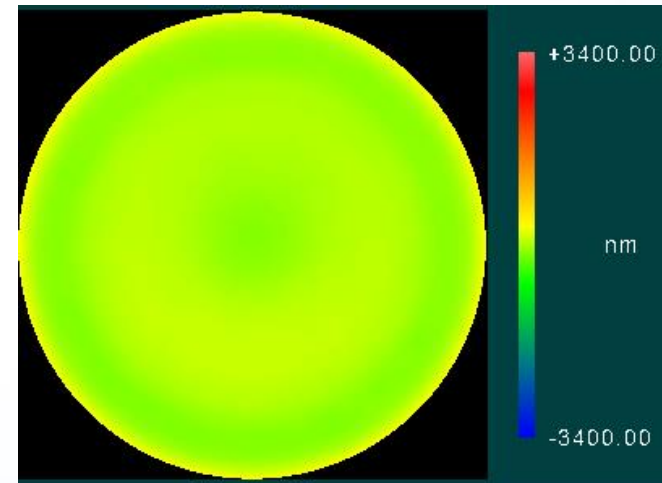
Desired Removal



Residual Error



PV: 10.5 μm



PV: 0.550 μm

- ◆ Residual error shown is after one aspherization run, and the part is now ready for figure correction