

# Applications of MRF

## Case Study – Improving Roughness – Smooth and Correct Optical Mold

**Presented By:**

QED Technologies Applications and Engineering

# Smooth & Correct Optical Mold

## Optical Mold

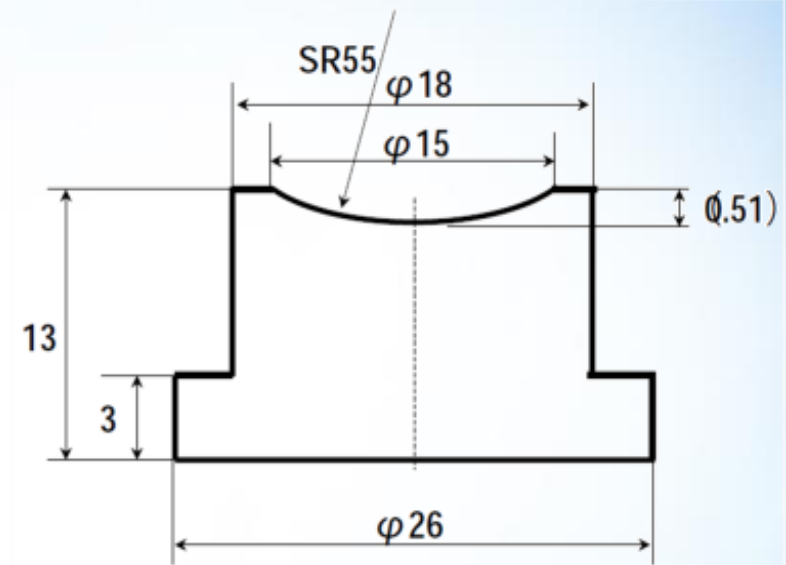
- Size: 18 mm  $\Phi$
- Shape: -55 mm CCV sphere
- Material: J02 Tungsten Carbide (WC)

## The Goal

- Smooth MSF & micro-roughness and correct figure

## The Configuration

- Q-flex 100
  - ◆ Rotational mode
- 20 mm wheel
  - ◆ Small spot for steep concave
- D10 fluid
  - ◆ Optimal Fluid for WC



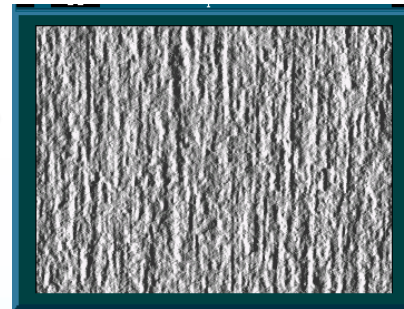
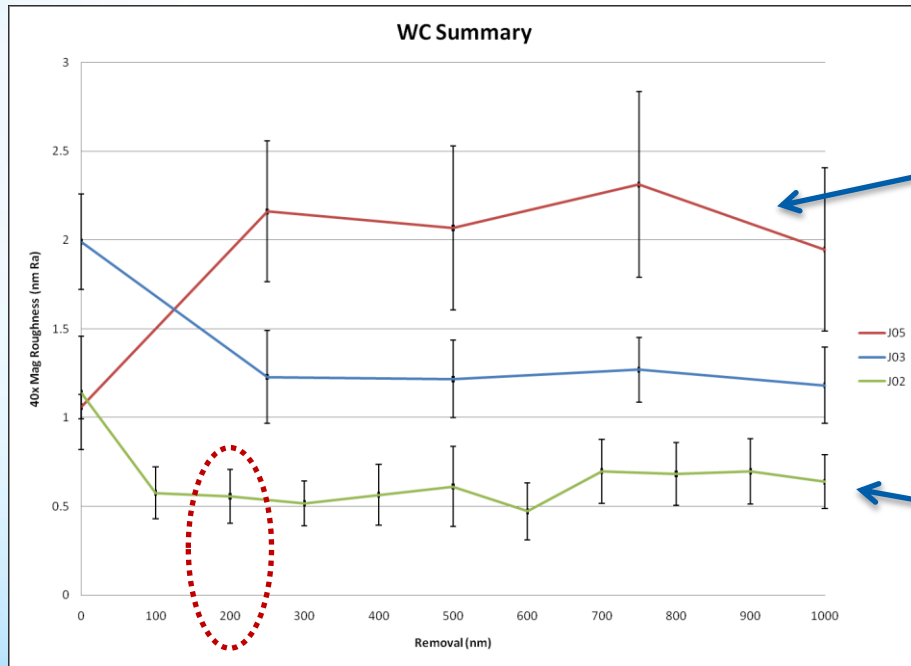
- ◆ Q-flex 100
  - Rotational Mode
- ◆ 20 mm Wheel
- ◆ D10 Fluid

# Smooth & Correct Optical Mold



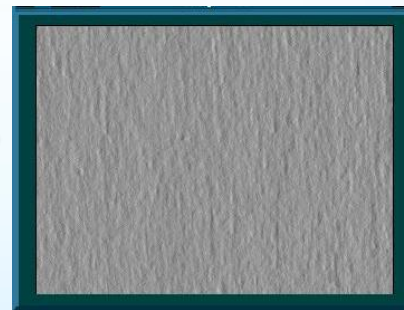
**~110 min**

~200nm Removed



**J05**

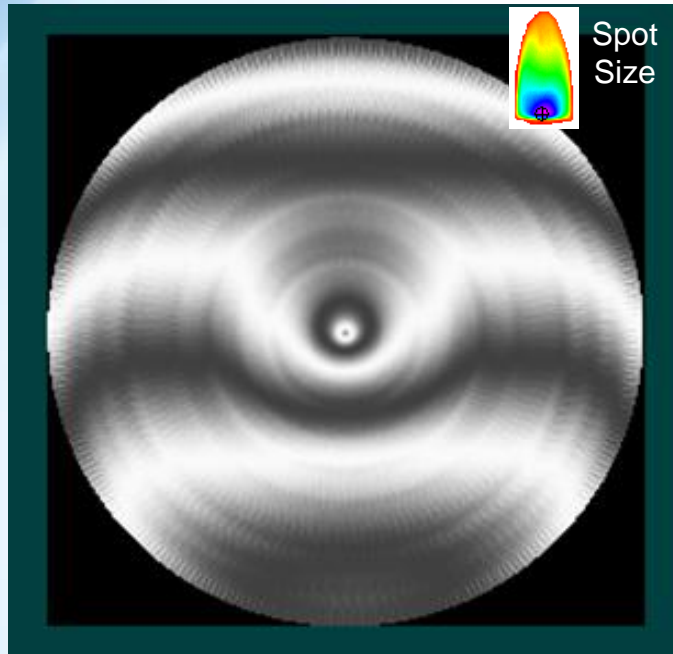
*mold provided by Fuji Die Co., Ltd*



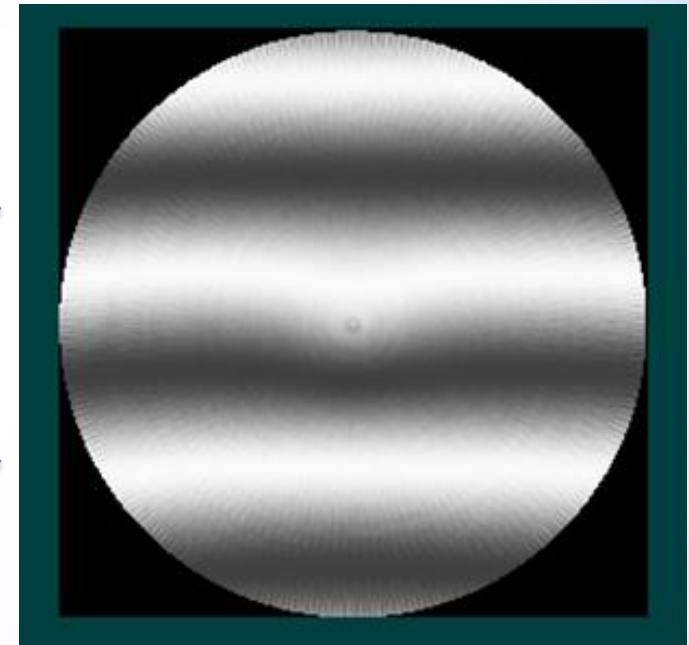
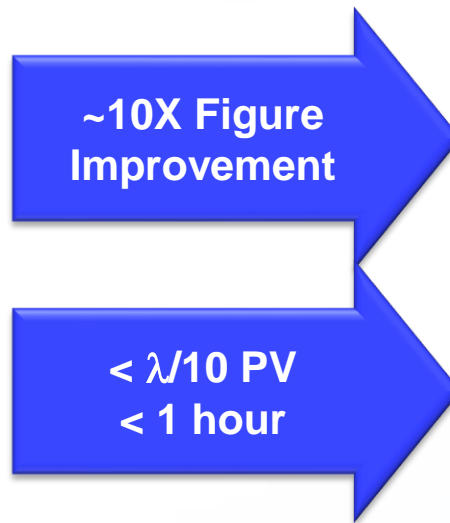
**J02**

# Figure Correction WC Optical Mold

*\*Note: excellent correction of rings (~1mm)*



**PV ~  $0.86\lambda$  (~540nm)**  
**rms ~  $\lambda/13$  (~50 nm)**



**PV ~  $\lambda/12$  (~54 nm)**  
**rms ~  $\lambda/111$  (~6 nm)**