Global Manufacturer of Innovative Ultra Precision Machining Solutions

High speed lens array for automotive headlamp mold

INNOVATIVE APPNOTE

Nanoform® X
(with FTS®500)

Freeform® L
(with FTS®500)

* also applicable to Nanoform® 700, Nanoform® L 1000

Goal:

Demonstrate high speed machining of a lens array on nickel plated steel

Process:

Use a Nanoform® X (Freeform L, Nanoform 700, or Nanoform L 1000) and Fast Tool Servo (FTS500) to machine an array of concave asheres on an aspheric nickel plated steel mold for automotive headlamps

FTS Details:

Peak acceleration: 200 m/sec^2
Travel: 500 µm
Typical form: < 0.3 µm PV
Typical finish: < 5 nm Ra

Part Details:

Material: NiP
Size: 65 x 55 mm
Shape: Concave asphere

Tool Details:

Radius: 0.505 mm
Rake angle: 0°

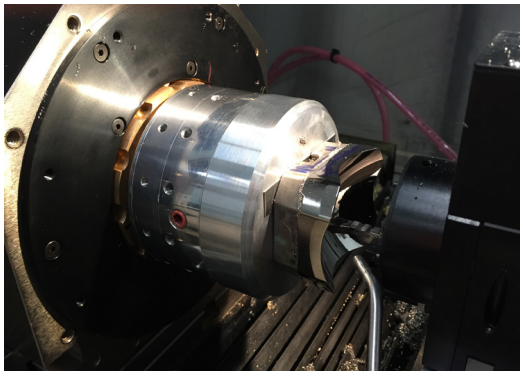
Process Details:

Spindle speed: 500 mm/min (constant surface speed)
Feed per revolution: 4 µm/rev
Coolant: OMS

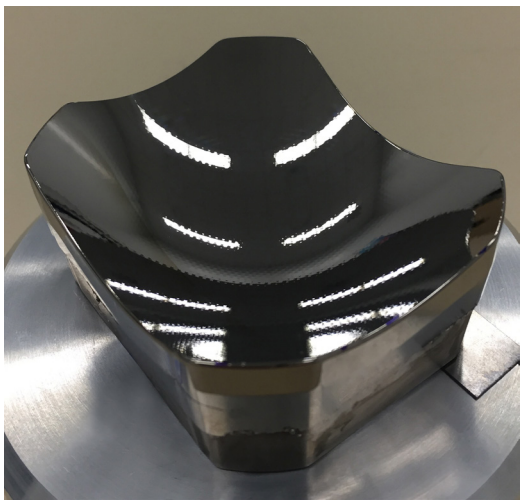
Results (Metrology on reverse side):

Machining Time: 3 hrs.
Surface finish: 1.74 nm Ra (0.08 mm gaussian filter)
2.15 nm Rq (0.08 mm gaussian filter)
Cosmetics: Good
Form accuracy: < 1 µm PV

Setup photo



Part photo



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ULTRA PRECISION TECHNOLOGIES

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High speed lens array for automotive lighting mold

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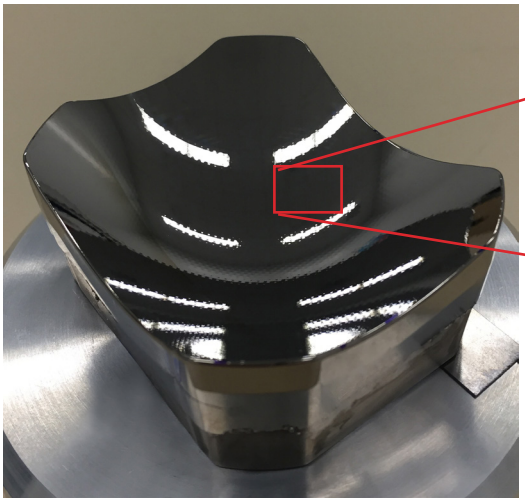
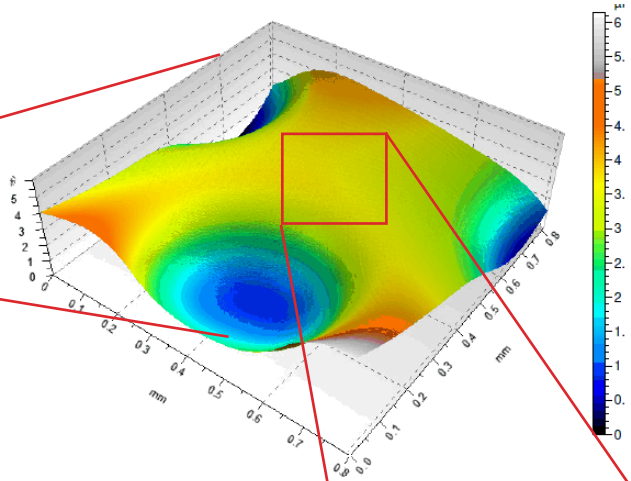
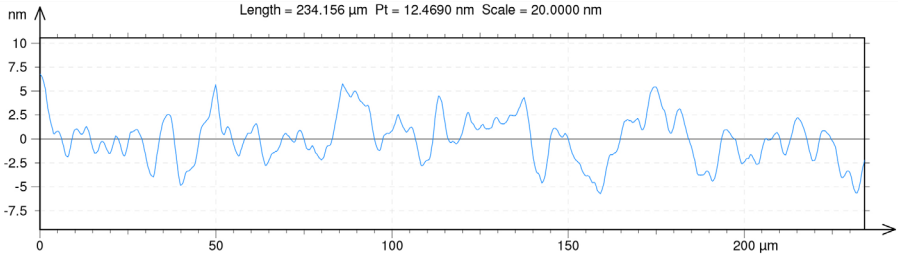
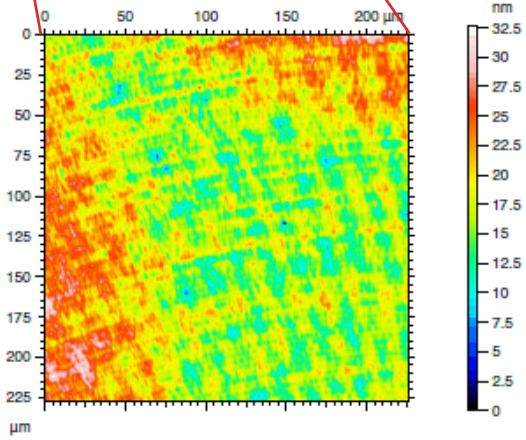
Metrology:









ISO 4287				
Amplitude parameters - Roughness profile				
Ra	1.73842	nm	*Gaussian filter, 0.08 mm*	*Arithmetic Mean Deviation of the roughness profile.*
Rz	10.2100	nm	*Gaussian filter, 0.08 mm*	*Maximum Height of roughness profile.*
Rq	2.15453	nm	*Gaussian filter, 0.08 mm*	*Root-Mean-Square (RMS) Deviation of the roughness profile.*

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