**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 aspheres on an aspheric nickel plated steel mold for automotive headlamps

**FTS Details:**
- Peak acceleration: 200 m/sec²
- 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
High speed lens array for automotive lighting mold

Metrology:

ISO 4287
Amplitude parameters - Roughness profile

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ra</td>
<td>1.73842 nm</td>
<td>Gaussian filter, 0.68 mm</td>
</tr>
<tr>
<td>Rz</td>
<td>10.2100 nm</td>
<td>Gaussian filter, 0.68 mm</td>
</tr>
<tr>
<td>Rq</td>
<td>2.15453 nm</td>
<td>Gaussian filter, 0.68 mm</td>
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