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amazing range of aspheric capabilities!

Aspheres



single point diamond turning (SPDT)

Asphera's newest technology is single point diamond turning (SPDT) offering the highest precision for manufacturing complex aspherical shapes. SPDT is mostly known for fabricating micro-optics with features down to 1 micron in size. SPDT replaces the standard lathe with a diamond tip bit to achieve surface roughness of only a few nanometers.

ADVANTAGES: • offers the highest lens shape accuracy without any high tooling costs - only tooling required is the diamond bit

DISADVANTAGES: • high reject rate • long lead times
• not suitable for mass production



cnc polished glass aspheres

CNC polishing is the most efficient method of asphere fabrication. It relies on the traditional optics technique of polishing one lens at a time on a computer-controlled platform that adjusts the shape



materials

Germanium, Silicon, Calcium Fluoride, Zinc Selenide, Zinc Sulfide, Multi-spectral Zinc Sulfide, Chalcogenide Glass (Gallium Arsenide)

diameter

5-300 mm

surface accuracy

PV=0.07 μ m

surface roughness

0.9 nm

glass material

Schott, Ohara, CDGM...

uv fused silica material

Hereaus, Corning

on a spindle, spinning the lens at a high speed to reach the desired surface profile. Our 5 axis machine is 3-5 times faster than traditional CNC polished aspheres. This technique is chosen for its high-precision, reliability and capabilities with wide ranges of size and materials. For volume cost and speed, it is best for diameters between 30 and 50 mm. When diameters below 10 mm are needed, it is best to consider this method's limitations of cost efficiency and volume processing.

ADVANTAGES: • better surface quality • complex shapes
• large diameter capabilities • wide selection of materials

DISADVANTAGES: • volume capabilities • cost efficiency
• small diameter capabilities

diameter
4-750 mm

thickness
2-80 mm

dimension tolerance
+0/-0.01 mm

scratch-dig
10-5

irregularity (p-v)
1 fringe-0.3 μ m

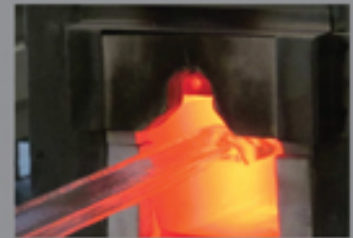


precision moulded aspheres

The ideal asphere is a ground prototype design that is machined and then transferred to a mould for production. Precision Glass Moulding (PGM) is fabricating a mould from a thermally and physically durable material created with an optical quality surface profile that accounts for shrinkage as the glass cools. PGM is the best choice for high volume production runs with little compromise in quality compared to SPDT and polishing. The mould can be made with multiple cavities to produce many lenses quickly and inexpensively. However, PGM is not often the choice of many designers because material selections are limited to glasses with low transformation temperature of <math><550^{\circ}\text{C}</math>. Another aspect of PGM is that the index of refraction drops by around 0.002 - 0.005 of its original value and must be taken into consideration.

ADVANTAGES: • better RMS surface figure than CNC machined aspheres • quick and inexpensive • small diameters down to 1 mm

DISADVANTAGES: • limited choice of materials • size limitations for large diameters • best achievable surface quality is 40/20



materials

Glasses with Ti contents <math><1\%</math>
Fused Silica: Corning C0550

diameter
Diameters: 1-90 mm

diameter tolerance
 ± 0.015 mm

surface quality
40/20

focal length tolerance
 $\pm 1\%$

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