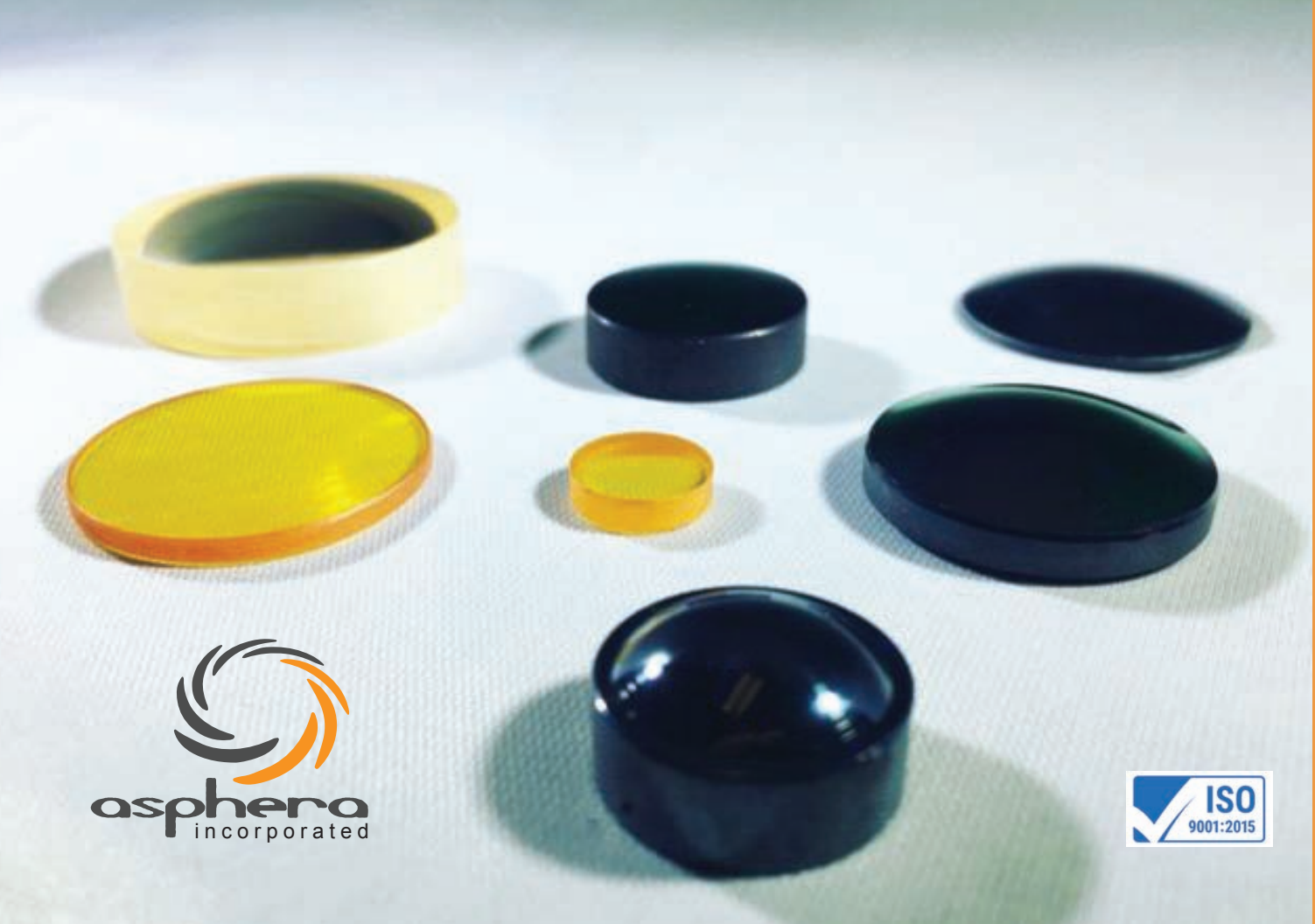


asphera incorporated

ISO 9001:2015

ASPHERES

About Us

www.asphera.com

ASPHERA INCORPORATED is dedicated to pioneering precision optics within the heart of innovation, strategically nestled in Santa Cruz, California with accessible proximity to Silicon Valley and San Francisco. As industry trailblazers, we channel our expertise in aspherical lens applications and manufacturing to fulfill our customers' aspirations.

Our mission is to satisfy our customer's financial needs through use of cutting-edge manufacturing methods, superior customer service and competitively priced optics.

VISION

Our mission is rooted in harnessing cutting-edge technology and unwavering dedication to exceptional customer service. By offering optics at competitive prices, we aim to provide not just optics, but solutions that empower our customers, enabling them to attain their envisioned objectives. At Asphera, we strive to shape the future of optics, enhancing lives and fostering progress, one lens at a time.

ISO 9001:2015

- diamond turning
- cnc polishing
- molding
- complex coatings

CALL US: (831) 431-6801

SEND RFQ: sales@asphera.com

TECH SUPPORT: tech@asphera.com

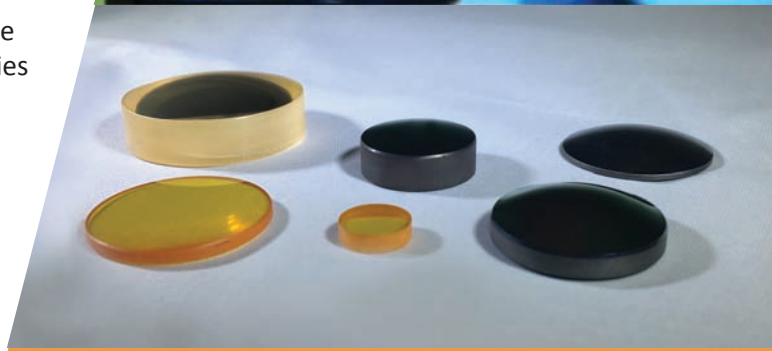
PRODUCTION: production@asphera.com

- Proven track record with customers since 2013.
- Proficient in all methods of aspheric manufacturing: Single Point Diamond Turning, CNC Machining and Molding.
- A portfolio of complex aspheres delivered with quick lead times.
- Your partner from concept through production.

Asphera Incorporated
629 Center Street
Santa Cruz, CA 95060 USA
(831) 431-6801 • info@asphera.com

Diamond Turning

SINGLE POINT DIAMOND TURNING (SPDT) offers the highest precision for manufacturing complex aspherical shapes (toroidal, paraboloids, ellipsoids, fresnel, diffractives...). SPDT is mostly known for fabricating micro-optics with radius down to 1.5um in size. SPDT replaces the standard lathe with a diamond tip bit to achieve surface roughness of only a few nanometers. This method of turning is most widely used during the prototype stage for R&D testing before production. Common industries using SPDT technology are: defense and aerospace, laser companies, medical devices, and research universities.

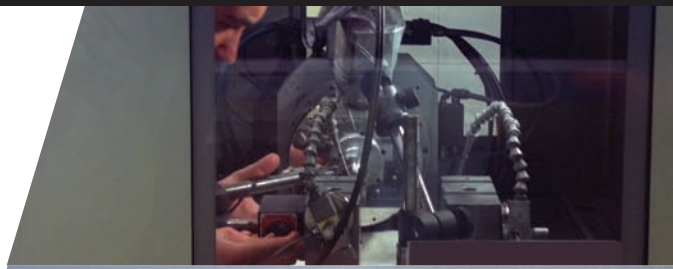


ADVANTAGES: • offers the highest lens shape accuracy without any high tooling costs
• method for a wide variety of IR materials

DISADVANTAGES: • high scrap rate • longer lead times
• not suitable for mass production

TOLERANCES:
DIAMETERS: 2 - 360 mm
SURFACE ROUGHNESS: 3 nm Ra
SURFACE FORM: 0.25 - 0.6 um

CNC Polishing



CNC POLISHING is the highest precision 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 on a spindle, spinning the lens at a high speed to reach the desired surface profile. 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 20 and 40 mm. When diameters below 8 mm are needed, this method has limitations of cost efficiency and volume processing.

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

DISADVANTAGES: • limited production runs (<3k pcs)
• cost efficiency • limitations on small diameters

TOLERANCES:
DIAMETERS: 8 - 300 mm
PEAK TO VALLEY: 0.1um
SURFACE IRREGULARITY: λ/10
SCRATCH & DIG: 10-5 (Select Glasses)

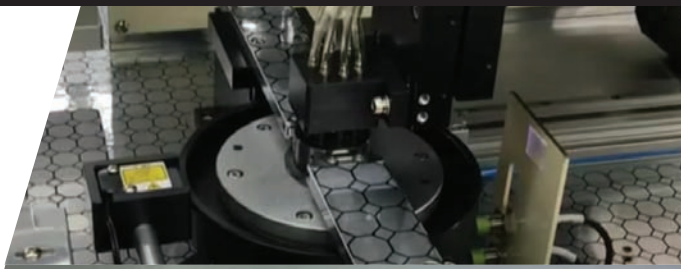
Compression Molding

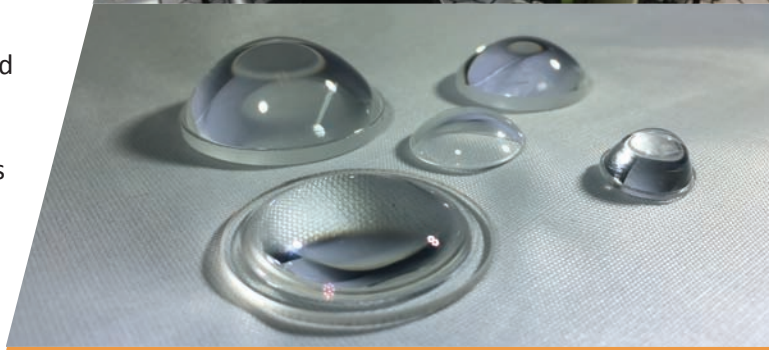
COMPRESSION MOLDING is fabricating a mold from a thermally and physically durable material created with an optical quality surface profile that accounts for shrinkage as the glass cools. The combination of high-precision and high-volume processing is an effective alternative manufacturing method for high-quality, low-cost optical components.

Compression Molding is effective for high volume micro and diffractive optical component fabrication, but is limited to glasses with a low transformation temperature of <550˚C. The index of refraction drops by around 0.002 – 0.005 of its original value and must be taken into consideration during production.

ADVANTAGES: • better RMS surface figure than CNC machined aspheres • quick and inexpensive • small aspheric diameters down to 0.8 mm

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





TOLERANCES:
DIAMETERS: 0.8 - 50 mm
SURFACE ROUGHNESS: > 2 nm Ra
SURFACE IRREGULARITY: > 80 nm PV (about 15 nm RMS)
SURFACE QUALITY: 40/20

Optical Coatings

OUR OPTICAL COATINGS WITH THIN FILM DEPOSITION TECHNIQUES for all methods of aspheric production offer several coating options completed within 7- 10 days at an affordable option. Our complete metrology lab will insure your coatings will effectively meet the desired wavelengths and reflection for your application.

Our innovative E-Beam and extensive experience with Plasma Ion Assist Deposition allow us to meet high-accuracy, flexibility, short lead times, and reliable consistency while maintaining optimal pricing.

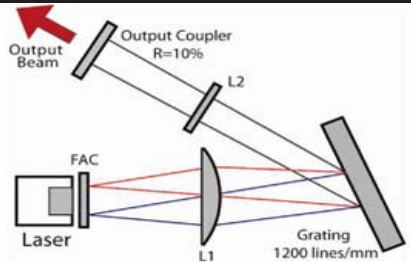
COATING OPTIONS WITH ASPHERA:

- Single Layer MgF2 Anti-Reflective
- Multi-Layer Anti-Reflective
- Multi-Layer Broadband Anti-Reflective
- Dual Wavelength Band Anti-Reflective
- Dielectric High-Reflective
- Metallic High-Reflective

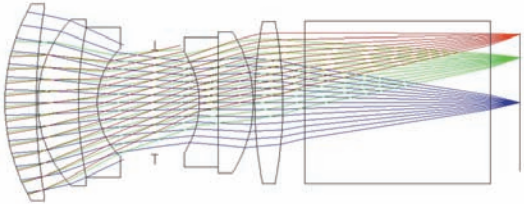
- **COATING OPTIONS FOR EVERY ASPHERIC SUBSTRATE**
- **EXPEDITED 3-DAY LEAD TIMES**
- **HIGH-REFLECTANCE COATINGS >97%**
- **MICRO-OPTIC COATING <2MM DIAMETER**

Lens Design

$$Z = \frac{cr^2}{1+\sqrt{1-(1+K)c^2r^2}} + A_4r^4 + A_6r^6 + A_8r^8 + A_{10}r^{10} \ldots$$



ABOVE IS THE STANDARD ASPHERIC LENS DESIGN FORMULA. This combined with SAG data will define the accurate data needed for manufacturing aspheres. Often customers will have the desired diameters and focal lengths for their systems, but need assistance bringing their concept to design.



Our lens designers can assist you every step of the way from concept to prototyping to production. We will work with you through the concept development modeling and simulations to incorporate your unique specifications into a complete optical design.

Our experience includes (but not limited to):

- micro-aspheric molded lens for projection
- laser collimating applications
- detection and scanning devices
- medical imaging (endoscopes and ophthalmoscopes)

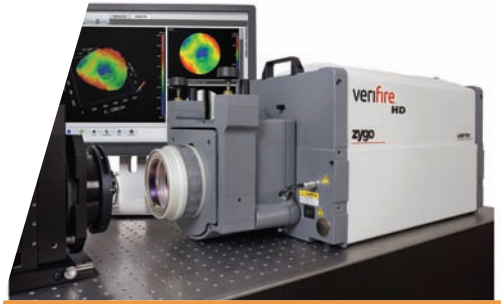
- **COMPETITIVE LENS DESIGN RATE PER HOUR**
- **WIDE RANGE OF PROTYPE TO CONSUMER APPLICATIONS**
- **DESIGNS BUILT FOR ACCELERATED MANUFACTURING**

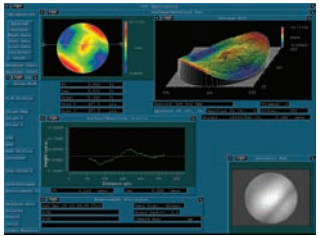
Metrology & Inspection

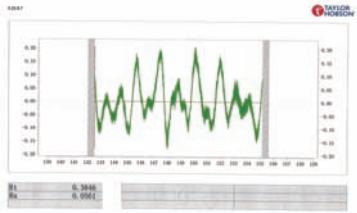
WE APPROACH ASPHERIC METROLOGY WITH A COMBINATION OF ACCURACY AND FLEXIBILITY. Measuring aspheres can be a challenging process, but with the use of the Taylor Hobson Profilometer and Zygo VeriFire Asphere Interferometer, in addition to partnering with local Mahr offices as needed, we have flexibility in getting every aspect of your specification verified.

INSPECTION REPORTS CONFIRM MEASUREMENTS FOR:

- surface accuracy
- surface roughness (P-V)
- slope error
- *diameter, radius, center thickness, etc.*

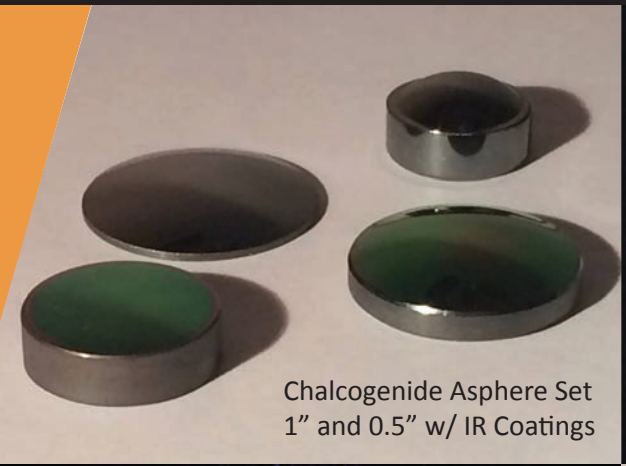






- **ISO9001: 2015 CERTIFIED PRODUCTION**
- **SGS TESTING AND CERTIFICATION**
- **100% LOT TEST REPORTS ON REQUEST**

Awesome Accomplishments



Chalcogenide Asphere Set
1” and 0.5” w/ IR Coatings

BK7 Acylindical Asphere
BBAR Coated

Sumita Glass Conic Lens

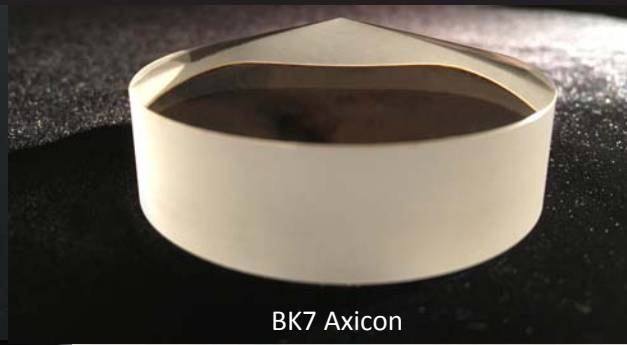
ZnSe Aspheric Lens
IR Telescope - 1” - AR Coated

65mm BK7 Collimating Asphere

Awesome Accomplishments

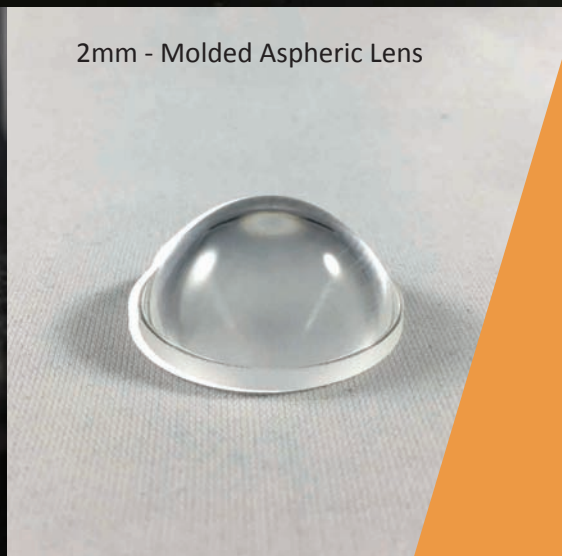

Asphere & Window Assembly


Ohara Glass Parabolic Mirror


BK7 Axicon


BK7 9” Asphere - AR Coated


100mm - CaF2 Asphere


2mm - Molded Aspheric Lens

ASPHERES

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