

# Aspheres

## Customised, efficient and high quality

Compared to spherical lenses, aspheres have significantly better imaging properties. This is due to the surface geometry deviating from the spherical shape. The resulting essential advantage is the ability to correct spherical aberrations.

Precision-molded aspheres are our speciality. We manufacture customised and standard aspheres with a diameter of up to 30 mm. Thanks to our innovative molding processes, we can also produce biconvex or meniscus lenses. In addition to the production of collimators, we also have experience in the production of special shapes of aspheres, such as segmented lenses or correction lenses. Thanks to our innovative processes, we can also produce biconvex or meniscus lenses.

## Technical specifications

|               | Diameter<br>ØD | Center<br>thickness | Edge<br>thickness | Clear<br>aperture | Numerical<br>aperture<br>NA | Focal<br>length<br>EFL | Back focal<br>length<br>BFL | Axial wave<br>front quality<br>RMS | λ                |
|---------------|----------------|---------------------|-------------------|-------------------|-----------------------------|------------------------|-----------------------------|------------------------------------|------------------|
|               | in mm          | in mm               | in mm             | in mm             | in mm                       | in mm                  | in mm                       | in waves                           | in nm            |
| <b>AC002</b>  | 2.54           | 0.8                 | 0.5               | 1.6               | 0.4                         | 2.0                    | 1.5                         | 0.04                               | 1,310 /<br>1,550 |
| <b>AC024</b>  | 3.00           | 1.84                | 0.96              | 2.70              | 0.47                        | 2.86                   | 1.71                        | 0.05                               | 1,507            |
| <b>AC040</b>  | 6.50           | 2.36                | 1.62              | 5.30              | 0.30                        | 8.87                   | 7.41                        | 0.05                               | 635              |
| <b>AC048</b>  | 1.90           | 0.8                 | 0.5               | 1.6               | 0.4                         | 2.0                    | 1.5                         | 0.04                               | 1,520            |
| <b>AC055</b>  | 7.20           | 2.20                | 1.46              | 6.00              | 0.27                        | 11.00                  | 9.54                        | 0.10                               | 635              |
| <b>AC055a</b> | 6.00           | 2.20                | 1.51              | 5.50              | 0.25                        | 11.00                  | 9.54                        | 0.10                               | 635              |
| <b>AC057</b>  | 6.37           | 4.00                | 3.28              | 5.10              | 0.32                        | 8.00                   | 5.51                        | 0.05                               | 780              |
| <b>AC059</b>  | 10.50          | 3.00                | 1.76              | 9.10              | 0.30                        | 15.00                  | 13.14                       | 0.10                               | 780              |
| <b>AC067</b>  | 4.50           | 2.15                | 1.83              | 3.60              | 0.19                        | 9.40                   | 8.07                        | 0.05                               | 715              |
| <b>AC090</b>  | 5.00           | 2.56                | 2.05              | 3.80              | 0.28                        | 6.50                   | 5.00                        | < 0.05                             | 650              |
| <b>AC130</b>  | 15.00          | 5.00                | –                 | 13.00             | 0.43                        | 15.20                  | 12.07                       | 0.1                                | 976              |
| <b>AC144</b>  | 8.00           | 2.663               | –                 | 7.200             | –                           | 11.32                  | 9.75                        | 0.08                               | 635              |

Molded aspherical lenses and optical components in glass for telecommunication and laser collimating. Customized solutions, stock items, hardcoatings as required.

Other sizes and tolerances available per request.

Technical data sheet

# Line Generator 5° 15° 30° 45° 60°

Variable microlens arrays

Acyinders or aspherical cylinders are lenses with a cylindrical surface whose cross-section deviates from the circular shape. In close dialogue with our customers, we develop and produce individual acylinder optics for a wide range of applications, from prototype status to series production. Most cylindrical or acylindrical lenses are customised solutions, specially developed and manufactured for the specific requirements and applications of our customers.

Line generators redistribute the incoming gaussian profile of the laser to a homogeneous line at the output. Our line generators provide very high repeatability compared to conventionally manufactured lenses (by grinding and polishing).

Technical specifications

|                  | Length,<br>parallel to cylindrical<br>axis |           | Center thickness |           | Centering | Free<br>aperture | Working<br>distance |
|------------------|--|-----------|------------------|-----------|-----------|------------------|---------------------|
|                  | in mm                                      |           | in mm            |           | in nm     | in mm            | in mm               |
|                  | from                                       | tolerance | from             | tolerance |           |                  |                     |
| <b>Acyinders</b> | 4.0  | ± 0.01    | 1.8              | ± 0.05    | ± 0.02    | 3,6 x 3,6        | ≥ 150               |

\* depending on pitch

More features

| Input beam diameter  | Maximum intensity deviation  | Range of wavelength   |
|--|--|---|
| <ul style="list-style-type: none"> <li>1.6 mm (1 / e<sup>2</sup>)</li> </ul> | <ul style="list-style-type: none"> <li>&lt; 30 % below the maximum value in 90 of the line length</li> </ul> | <ul style="list-style-type: none"> <li>400 – 800 nm</li> <li>Design wavelength 550</li> </ul> |

Precision glass molded aspherical cylinder lens for the generation of a laser line.  
AR-Coating possible, existing RoHS conformity. Angle (FWHM) in 5°, 15°, 30°, 45°, 60° on stock.

Other sizes and tolerances available per request.

Technical data sheet

# Glass molded acylindrical lenses

Highest precision - from development to series production

GD Optics has developed its own glass molding process especially for the production of small aspherical cylindrical lenses. The process is very economical for lenses in a size range from 0.5 mm to 5 mm in medium to high quantities.

Technical specifications

|                   | Length / width<br>f / w<br><br>in mm |           | Center thickness<br>MD<br><br>in mm |           | Effective focal length<br>EFL<br>in mm | Back focal length<br>BFL<br>in mm | Radius of curvature<br>ROC<br>in mm | Numerical aperture<br>NA<br>in mm | Form accuracy<br>Peak to valley<br>in nm |
|-------------------|--------------------------------------|-----------|-------------------------------------|-----------|--|-----------------------------------|-------------------------------------|-----------------------------------|--|
|                   | from                                 | tolerance | from                                | tolerance |  |                                   |                                     |                                   |  |
| <b>Acylanders</b> | 0.5 to 30                            | ± 0.02    | 1 to 6,5                            | ± 0.01    | ≥ 0.3                                  | ≥ 0.05                            | ≥ 0.2                               | 0.8*                              | < 250**                                  |

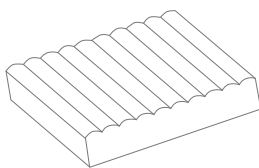
\* depending on EFL    \*\* Peak to valley

More features

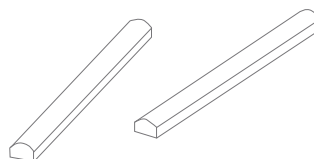
| Material   | Type  | Applications  |
|--|---|---|
| <ul style="list-style-type: none"> <li>• Optical glasses</li> <li>• High index possible</li> </ul> | <ul style="list-style-type: none"> <li>• Plano-convex, convex-convex</li> <li>• Perpendicular and parallel axes</li> <li>• Array</li> </ul> | <ul style="list-style-type: none"> <li>• Fast axis collimation</li> <li>• Slow axis collimation</li> <li>• Beam circularization and collimation</li> <li>• Line generation, homogenization</li> </ul> |

Molded aspherical lenses and optical components in glass for telecommunication and laser collimating. Customized solutions, stock items, hardcoatings as required.

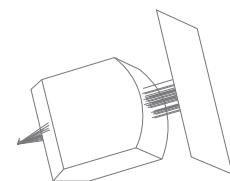
Other sizes and tolerances available per request.



01 Cylinder lens array



02 Fast axis collimators



03 Crossed Cylinder lenses

## Technical data sheet

# Double-sided glass microlens arrays

## Variable microlens arrays

Microlens arrays for very different applications offer great potential for future developments by enabling components to be further reduced in size, lowering production costs and increasing the performance of the end product.

As a series manufacturer, we supply variable microlens arrays and acylinder lens arrays, with a size of up to 50 x 50 mm<sup>2</sup>. A wide variety of spherical lenses with a broad parameter field of lens radius, lens height and lens pitch can be combined in an array. Thanks to our special processes and our own toolmaking, the dead zones are very small and the proportion of used surface is very large.

## Technical specifications

|               | Array diameter / aperture |           | Center thickness |           | Lenslet diameter |           | Fill factor | Surface roughness | Offset front to back |
|---------------|---------------------------|-----------|------------------|-----------|------------------|-----------|-------------|-------------------|----------------------|
|               | in mm                     |           | in mm            |           | in mm            |           | in %        | in mm             | in mm                |
|               | from                      | tolerance | from             | tolerance | from             | tolerance |             |                   |                      |
| <b>Arrays</b> | 25                        | ± 0.01    | 0.5 to 6.5       | ± 0.005   | 0.1 to 3         | ± 0.01    | 99          | < 5               | ± 10                 |

\* depending on pitch

## More features

| Lenslet aperture typ                 | Radius of curvature                                      | Offset front to back       |
|--------------------------------------|--|----------------------------|
| • Circular / rectangular / hexagonal | • From 0.18 nm up to 30 nm<br>• Equal or more than ± 2 % | • Equal or more than 10 µm |

Double-sided glass microlens arrays.

Other sizes and tolerances available per request.