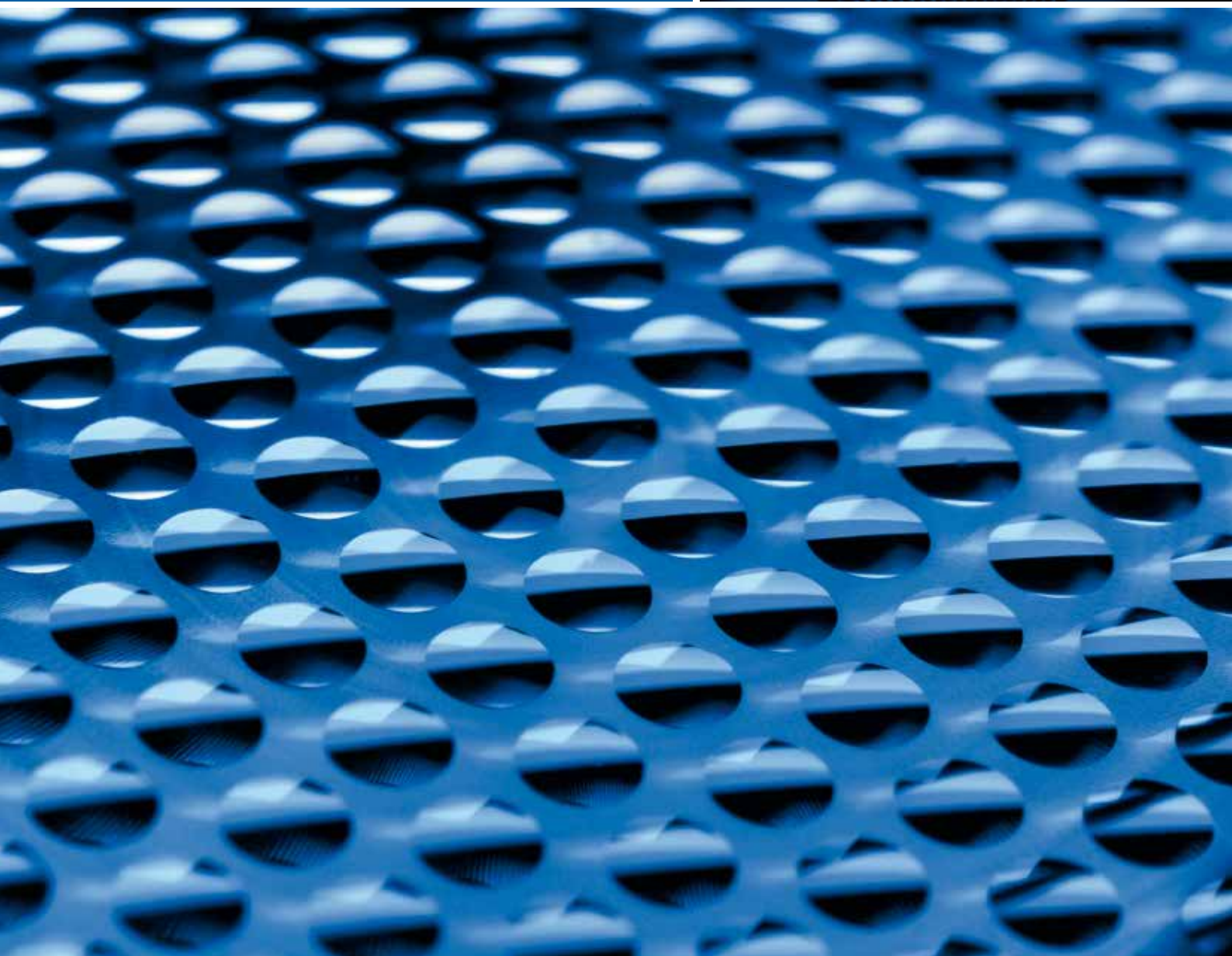
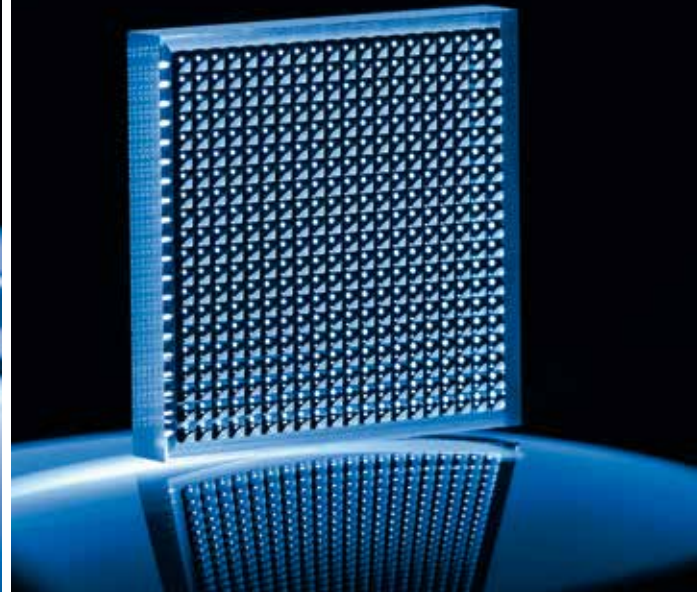
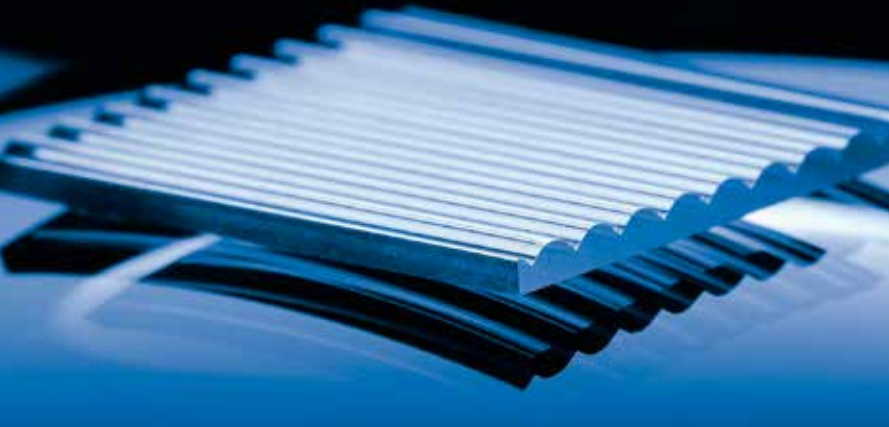


## MICROLENS ARRAYS

Perfection for High-End-Applications



# Microlens Arrays

## Perfection for High-End-Applications

### GENERAL DESCRIPTION

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Microlens Arrays with superior form accuracy are used for applications, where reliability and highest efficiency are crucial criteria. They range from beam transformation for fiber coupling over the homogenization of laser light up to the efficient combination of laser stacks of identical wavelength. The lateral dimensions of the arrays range from some millimeters in the micro-scale up to 30 millimeters for the macro-scale. The dimension of the array structures are typically in the sub-millimeter-range. With its unique production technique, INGENERIC is able to keep the form accuracy of the arrays within the submicron range.

### ADVANTAGES

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- monolithic array
- highest transmission due to minimized transition zones
- highest level of precision and uniformity
- reliable and stable quality
- manufacturing process highly economical at large quantities
- high flexibility with respect to geometry

### QUALITY

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We operate a strict quality control policy. For diagnosing the relevant product characteristics and thus ensuring the specified quality, INGENERIC has a considerable equipment of measurement devices available. Beyond that, certain products can further be tested in the application which they will encounter at your site.

In conjunction with our sophisticated manufacturing technology, this guarantees the production of optics with unsurpassed collimation and homogenization characteristics.



## SPHERICAL AND ASPHERICAL MICROLENS ARRAYS

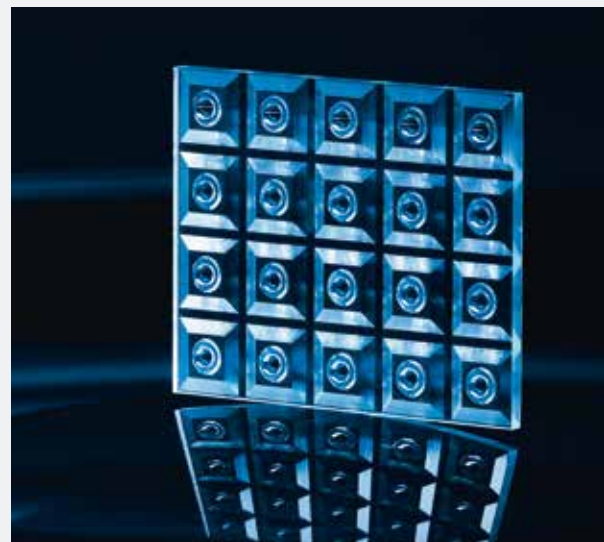
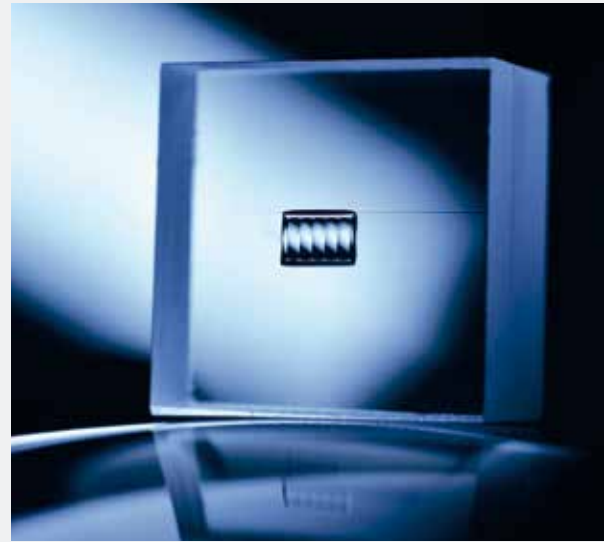
Major applications for lens arrays with spherical or aspherical curvature are imaging and illumination as well as the effective collimation of laser light. Lens apertures from 0.2 mm up to 3.0 mm are possible. High filling factors and minimum dead zones allow unique beam shaping results.

Most spherical and aspherical microlens arrays are customized solutions, especially designed and manufactured for the individual needs of our customers. We manage to manufacture microlens arrays with the following typical characteristics:

|                            |  |
|----------------------------|--|
| Material:                  | optical glass (high refractive index material) |
| Max. array size:           | app. 40.0 x 40.0 mm                            |
| EFL:                       | 0.25 ... 5.0 mm                                |
| Lens diameter:             | 0.2 ... 3.0 mm                                 |
| Lens aperture:             | round, rectangular                             |
| Arrangement:               | linear, hexagonal                              |
| QTY of lenslets per array: | 5 ... 500                                      |
| Pitch:                     | 0.2 ... 4.0 mm                                 |
| Pitch accuracy:            | < 1 $\mu\text{m}$ across 25 mm                 |
| Form accuracy:             | < 250 nm                                       |
| EFL tolerance:             | < 1% *   |
| Application:               | e.g. collimation of VCSEL arrays               |
| Dead zones:                | < 10 $\mu\text{m}$                             |
| CT accuracy:               | < 20 $\mu\text{m}$                             |

\*) High relative radius tolerance (< 0.2%).

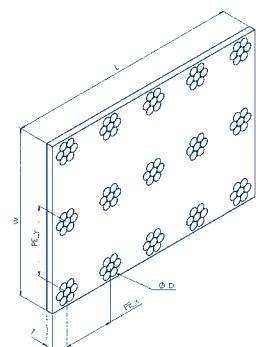
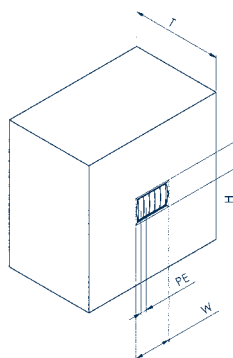
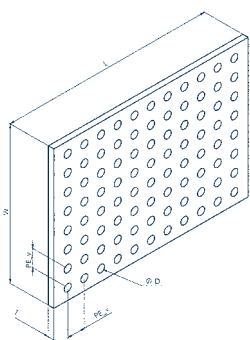
For deviating requirements, please contact our specialists.



## EXAMPLE PRODUCTS

| Lens Type           | Size [mm]   | QTY of lenslets | Aperture | Arrangement | EFL [mm] | PE [mm]     | D [mrad] | Material |
|---------------------|-------------|-----------------|----------|-------------|----------|-------------|----------|----------|
| MLA-ASPH-PL-CX-0.72 | 15.0 x 12.0 | 20              | round    | linear      | 0.72     | 3.2         | 1.3      | K-VC89   |
| MLA-ASPH-PL-CX-2.28 | 8.0 x 6.0   | 9               | round    | linear      | 2.28     | 1.1 ... 1.3 | 1.0      | L-BSL7   |

## Example Arrangements



## MICROLENS ARRAYS

### CYLINDRICAL MICROLENS ARRAYS

Cylindrical Microlens arrays are used for the transformation of high power diode laser beams. The INGENERIC XP-micro-cylindrical arrays stand out due to an aberration free image and an optimum light efficiency. Assuring facts for these features are the extremely high pitch-repeatability and the minimized dead-zones between the lens elements. Due to the high form accuracy the arrays show an extremely stable focus position.

|                                   |                                     |
|-----------------------------------|-------------------------------------|
| Material:                         | optical glass (high index material) |
| Max. array size                   | 40.0 x 40.0 mm                      |
| EFL:                              | 1.0 ... 35.0 mm                     |
| Pitch:                            | 0.2 ... 5.0 mm                      |
| Pitch accuracy:                   | < 2 µm across 25 mm                 |
| Form accuracy:                    | < 100 nm                            |
| EFL-tolerance:                    | < 1%                                |
| Transition zone between lenslets: | < 10 µm                             |
| Application                       | i. e. Homogenizing < 2kW            |

### EXAMPLE PRODUCTS

| Lens Type              | L [mm] | W [mm] | CT [mm] | EFL [mm] | PE [mm] | Material |
|------------------------|--------|--------|---------|----------|---------|----------|
| Homogenizer Array-18.5 | 35.0   | 28.0   | 2.0     | 18.5     | 1.3     | K-VC89   |
| Homogenizer Array-19.4 | 30.0   | 26.0   | 2.0     | 19.4     | 0.8     | K-VC89   |

