

# **Homogenizer / Diffuser**

Homogenizer/Diffuser diffractive optical elements (DOE) allow conversion of a single or multi-mode input beam into a welldefined output beam, characterized with a desired shape, and uniform intensity.

## FEATURES

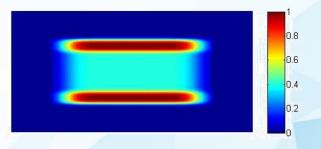
Uniform / Tailored intensity profile Any output shape or symmetry Works with single or multi-mode input beams Low centration requirement High-power threshold Wavelengths from UV to IR Optional AR/AR coating

### APPLICATIONS

Laser homogenizing/shaping Material Processing applications: perforation, ablation, derailing, marking, scribing and welding Medical/aesthetic laser skin treatment Beam shaping for Excimer lasers Hot spot reducer

The Homogenizer/Diffuser DOE is mainly beneficial with improved uniform exposure When sharp shaped edges are required, while keeping small divergence, and enabling high transmission efficiency.

The most common shapes are: round, square, rectangular, elliptical and hexagonal. However, almost any shape of image can be designed. Also possible, is a tailored intensity distribution of the image, so that different areas present higher/lower energy.



HOLO/OR can also design a Multi-level diffuser DOE to achieve higher efficiency.

### HIGH HOMOGENEITY SERIES (RH/HH/XH):

**HOLO/OR** developed a new class of homogenizers with enhanced performance referred to as the **"high homogeneity"** series. Its advantages are: higher homogeneity, lower zero order. Also, it corresponds well with input beams of lower M2.

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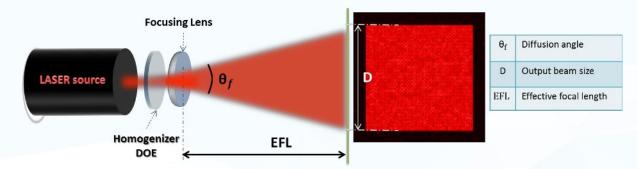


### DESIGN CONSIDERATIONS

**1.** Common homogenizer / diffuser elements are manufactured on a DOE window.

Since the homogenizer defines a certain diffusion angle, the customer is able control the image size on the image plane by choosing a focusing lens with a correct EFL.

Typical set up for homogenizer is presented below:



2. HOLO/OR has the capability to design an integrated solution:

combining the DOE window and a specific focusing lens into one single hybrid element. Here, the diffractive pattern will be etched on the Plano side of the focusing lens (planoconvex lens). The advantage of this solution includes less optical surfaces, compact dimension and low weight.

**3.** Additional improvement in the performance may be achieved by using a high M2 input beam.

## SPECIFICATION RANGE

Materials	Fused Silica, ZnSe
Wavelength range	193 nm to 10.6 um
Pattern angles@532nm	Few mRad to 160°
Doe design	2-level (binary) to 16-level
Diffraction efficiency	75%-98%
Element size	2mm to 100 mm
Coating (optional)	AR/AR coating
Custom design	Tailored shape and intensity distribution



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