

Homogenizer / Diffuser

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

FEATURES

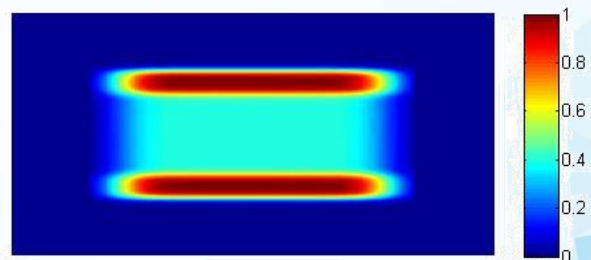
- Uniform / Tailored intensity profile
- Any output shape or symmetry
- Works with single or multi-mode input beams
- Low centration requirement
- High-power threshold
- Wavelengths from UV to IR
- Optional AR/AR coating

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):

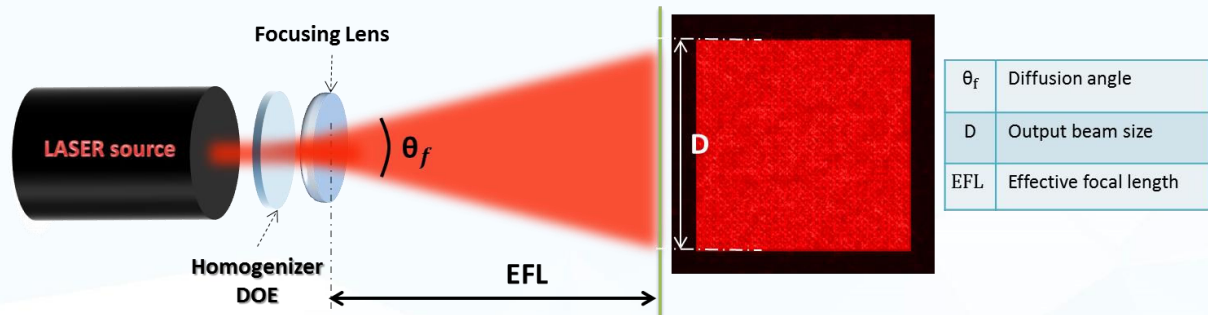
HOLO/OR developed a new class of homogenizers with enhanced performance referred to as the “**high homogeneity**” series. Its advantages are: higher homogeneity, lower zero order. Also, it corresponds well with input beams of lower M2.

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 (plano-convex 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

