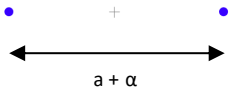
# DE 843 Diffractive Optical Element



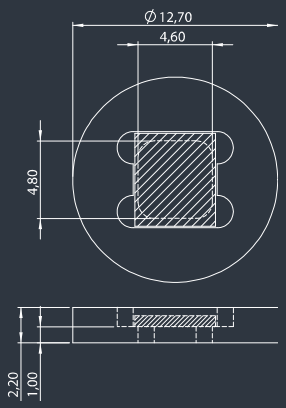

- **Element Number: DE 843**
- **Current Product Revision: A**
- Description: 1 : 2 Beam Splitter
- Substrate Material: Fused Silica
- AR coating on rear side of the substrate: R < 0.5% at recommended wavelength range
- Substrate Size: 5 mm x 5.75 mm
- Thickness: 0.725 mm
- Design Wavelength: 450 nm
- Recommended Wavelength Range: 420-490 nm *
- Typ. Diffraction Efficiency: 76% at design wavelength
- Minimum Recommended Beam Diameter: 0.1 mm

Within the recommended wavelength range, the zeroth order (Z0) has a significant lower power than the desired diffraction orders. Spot spacing and angular separation, and the ratio between zeroth order and desired orders will vary most with the wavelength.

Diffraction efficiencies given on this datasheet have been measured using elements of product revision A.

## MOUNTED VERSION

For testing or setups under laboratory conditions, we offer a version mounted in a black anodized 12.7 mm aluminum frame for use with standard laboratory holders. For other frame sizes (e.g. 8mm) please contact us at the given contact address.




*12.7 mm anodized aluminum lens adapter*

## COLLIMATED / CONVERGING LASER

The laser can be collimated for long-range use or converging for a fixed working distance. Please note that the size/thickness of each spot or line depends on the focusing of the laser.

# Diffraction angles & efficiencies

| Wavelength | Pattern Size @ 100 mm Distance | Pattern Angles |
|---|---|---|
| **λ [nm]** | **a [mm]** | **α [°]** |
| 375 | 51.6 | 29.0 |
| 405 | 56.1 | 31.3 |
| **450** | **62.9** | **34.9** |
| 488 | 68.8 | 38.0 |
| 520 | 73.9 | 40.6 |
| 532 | 75.9 | 41.5 |

**Table 1: Pattern size and pattern angle depending on the wavelength**

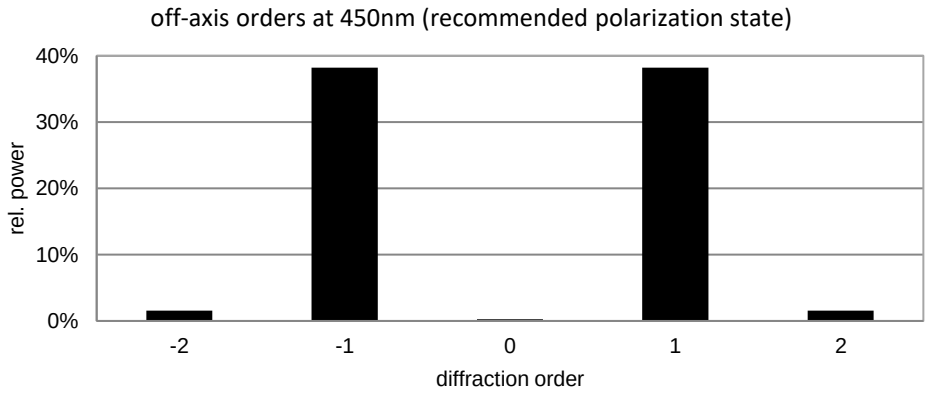
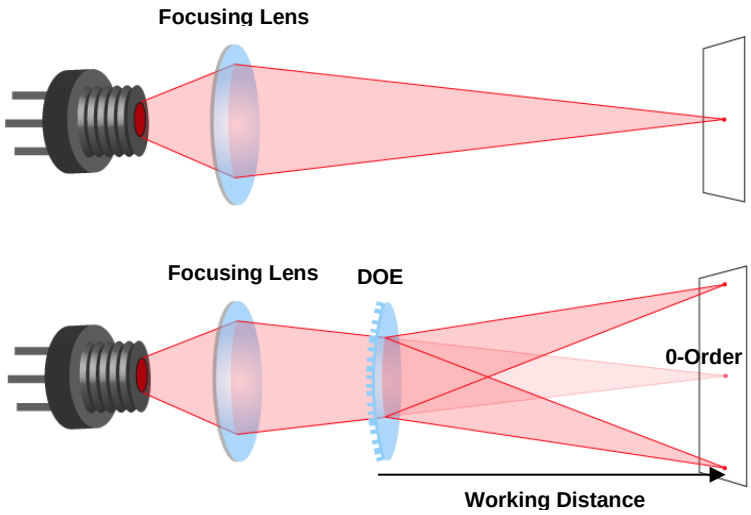



**Figure 1**

*within the recommended wavelength range and polarization state the zeroth order is usually ≤2%

# Setup




Laser diodes are the most common light source to be used with diffractive optical elements, but other laser light sources may also be used.

The DOEs are best used with collimated or convergent laser sources. The microstructure surface should be oriented towards the laser.

The 0-order spot is equivalent in size and shape to the original beam, but its power is attenuated.

# Zero order diffraction intensity

The intensity of the zeroth order of this 1d dot line is polarization dependent. At the recommended polarization state, the minimum of the zeroth order can be found at the design wavelength.

At the recommended polarization state the electric field component is:

- Parallel to the grid lines of the microstructure and the longer substrate side
- Perpendicular to the generated (dot) line

At the orthogonal polarization state the electric field component is:

- Perpendicular to the grid lines of the microstructure
- Parallel to the generated (dot) line and the shorter substrate side

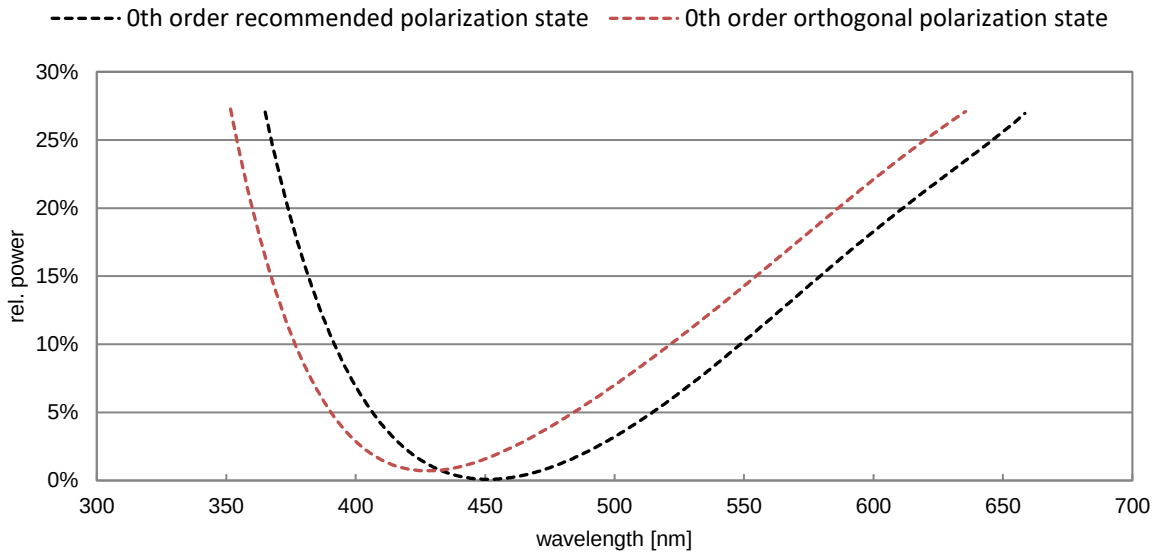



**Figure 2: Zero order curve as a function of wavelength, example curve, the curves may differ slightly for different DOEs of the same type**

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