

## High Power Masks – Precision aperture for high power laser

### Introduction

HOLO/OR has developed a series of projection masks to answer the demand of using such masks with very high powered laser sources in the UV-VIS spectrum. These masks have two different forms: the dielectric mask has a reflective coating that blocks unwanted light, and the transmissive mask uses a diffractive pattern that diffuses this unwanted light at large angles.

Typical Parameters:

<b>Outer Diameter:</b>	5 - 100 mm
<b>Aperture Shape</b>	Round, square, multi-aperture, other
<b>Aperture Size</b>	10 um - 60 mm
<b>Wavelength spectrum</b>	193 - 11000 nm, each element designed for single wavelength
<b>Transfer Region</b>	Small; sharp edges
<b>SNR</b>	~500
<b>Shape size</b>	>5 um

### Dielectric Reflective Mask

Dielectric masks are Fused Silica substrates patterned by very thin (~1um) reflective coating. The coated part reflects the incoming beam while the uncoated part transmits the beam.

Typical Applications:

- Micro patterns projection for high power systems
- UV lithography

Schematic sketch of the optical system:

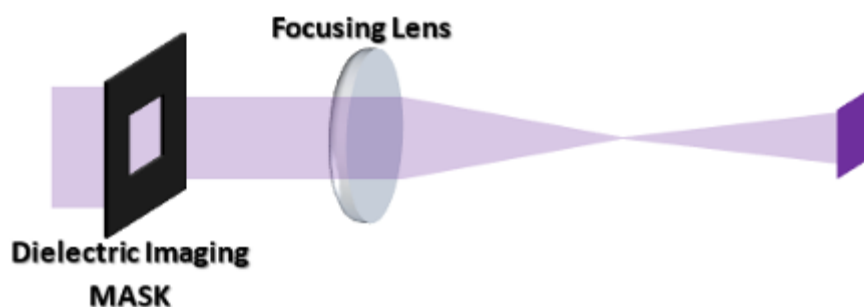


Fig 1. Typical Set Up

HOLO/OR can design and manufacture a custom dielectric mask to match the customer's needs.

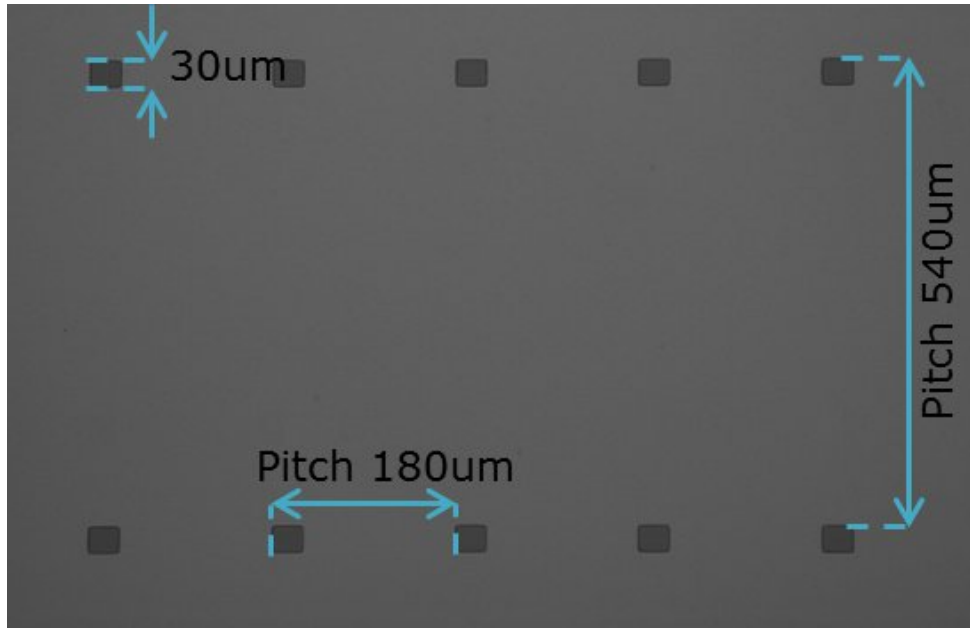


Fig 2.Real measurement of custom Dielectric Mask taken with microscope magnification

Features of Dielectric Mask:

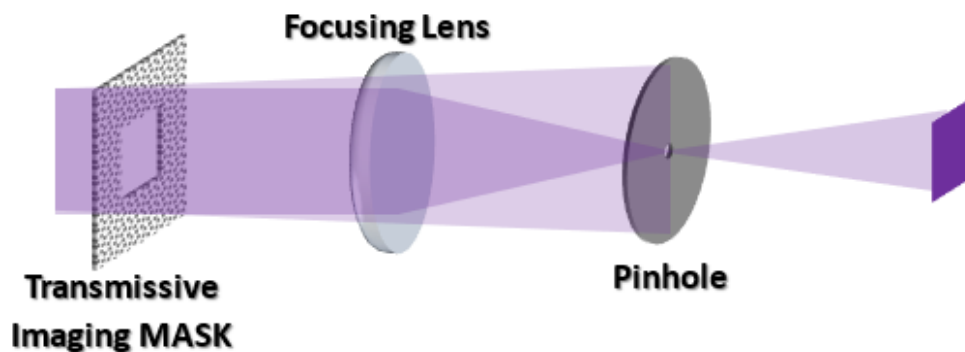
- High damage threshold
- Low absorption
- High reflection (>99%) in reflective part
- High transmission (>95%) in transparent part
- Very thin dielectric reflective layer (~1 um)

### Transmissive Imaging Mask

Principle of operation:

The Transmissive Mask transmits all incident illumination without any blocking. The pattern to be imaged is a clear mask area that transfers the light without interruption, while the surrounding areas transfer light through a specially designed diffractive pattern which diffuses light in large angles. Placed close to the focal plane of a focusing lens, a pinhole blocks most of the diffused light, so that a high-contrast intensity shape is achieved at the image plane.

Schematic sketch of the optical system:



Features of Transmissive mask:

- No danger of reflected light causing damage to optical system
- ~100% transmission
- Higher laser damage threshold than for reflective mask
- Affordable price, similar to that of other diffractive elements

Transmissive Mask element Measured Intensity



Standard products

Part Number	Diameter (mm)	Aperture Size (um)	Aperture Shape
DM-017	85	50075	Square
DM-010	25.4	5680	Round
DM-004	25.4	1750	Square
DM-009	25.4	6200	Round
DM-019	25.4	300	Square
DM-007	25.4	10838	Round
DM-006	25.4	7000	Square
DM-005	25.4	3500	Square
DM-008	20	8428	Round
DM-016	11	5400	Round
DM-015	11	3000	Round
DM-014	11	4214.9	Round
DM-013	11	2408	Round
DM-012	11	3612	Round
DM-011	11	4817	Round
DM-003	11	165	Square
DM-002	11	65	Square