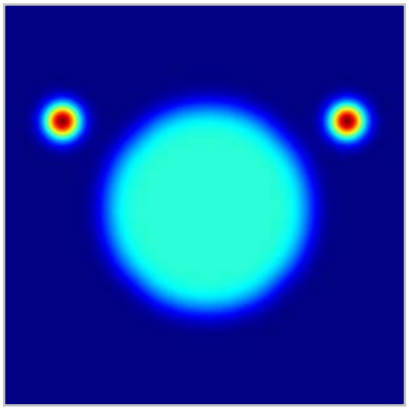
HOLO/OR

LASER COMPONENTS

Special Diffractive Element for Brazing Applications



In laser brazing applications, two metal sheets are joined by a laser melted solder wire. The join quality has been proven to improve when the metal surfaces are cleaned and pre-heated before the brazing wire is melted. Typical applications are found in the automotive industry.

For this purpose, Holo/Or has developed a special Homogenizer element that creates two small leading beams for cleaning/preheating and one large uniform beam that equally distributes the energy over the brazing wire to achieve better melting and cleaner edges.

We prepared special solution for brazing applications based on single binary diffractive element DOE.

This element splits incident beam to 3 beams: main beam in center and large in diameter and two small stripping beams with small diameter in front of main beam.

This diffractive solution has few obvious advantages:

- High efficiency (~90 %)
- High power (Fused Silica)
- Single element
- Simple installation to existing solutions
- No need special mechanics
- Simple customization

Solution parameters:

Mechanical Parameters of the DOE	Value
Element diameter	25.4 mm
Clear aperture	23.6 mm
Material	Fused Silica
Type	Lens

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Special Diffractive Element for Brazing Applications

Optical System Parameters	Value
Wavelength	1070 nm
Incident beam size	14 mm
M^2	10
Main EFL	200 mm
EFL of refractive lens	
Main beam size	600 µm
Stripping beam size	200 µm
Relation between main and stripping beams	8
Grating period	713 µm
Stripping beam from center period	1070 µm

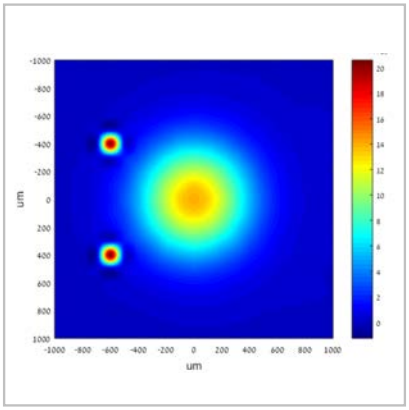
Simulation Results

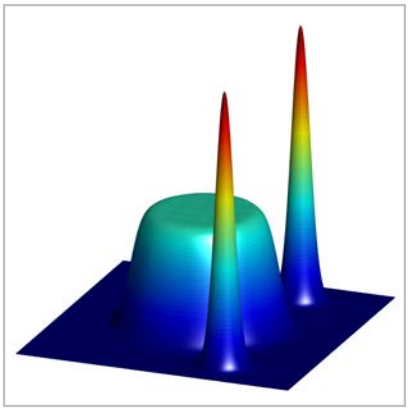
Simulation properties:

Simulation Parameters	Value
Wavelength	1070 nm
Incident beam	14 mm
M^2	10
Beam profile	Gaussian
EFL	200 mm
Propagation method	Physical optics
Simulation resolution	100um

Output properties:

- Efficiency: 90 %
- Main beam ~ 600 um (shape identical to incident beam, size and intensity ratio can be customized)
- Stripping beam size ~200 um (equal to diffraction limited spot size of incident beam)





Intensity distribution of generated by special DOE

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