

Description

A circular grating (a.k.a flat axicon) is a space-variant retarder that transforms a Gaussian beam into a Bessel-Gauss beam.

This product stands out for its high damage threshold compared with alternative devices. It has a laser irradiation resistance similar to that for uncoated fused silica substrates.

The structure of the element is unique due to the formation of birefringent nanogratings inside a bulk of fused silica glass, sensitive to the incident polarization.

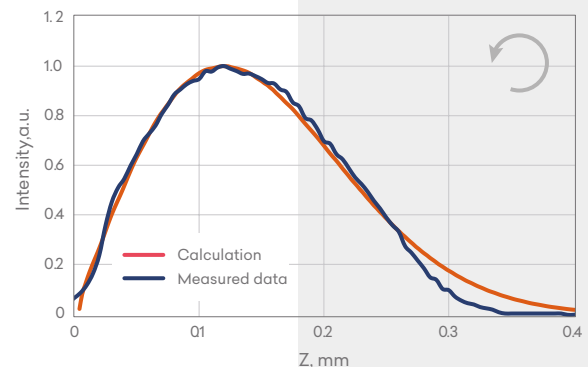
A circular grating can generate both positive and negative Bessel-Gauss zones, with LHCP and RHCP polarizations respectively. Also, positive and negative zones simultaneously with linear polarization. The working regime depends only on incident polarization.



Fast axis distribution across the element (measured with HINDS MicroImager)

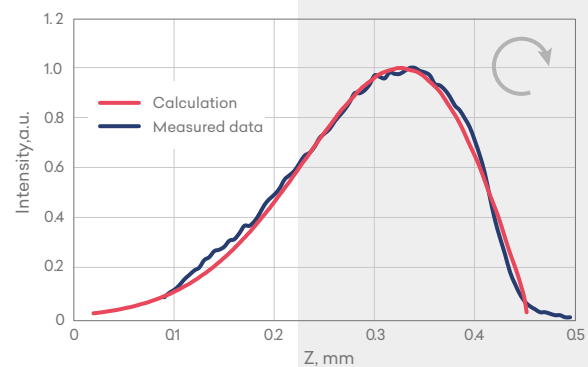
Technical features

- Materials: UVFS, IRFS
- Wavelength range: 330nm to 2000 nm
- Min apex angle: 176-179.9° @1030 nm
- Diffraction efficiency: up to 95%
- Element size: up to 15 mm
- Coating (optional): AR/AR coating
- Uncertainty of cone tip diameter ~20 μm
- LIDT | High damage threshold:
63 J/cm² @1064 nm, 10ns;
2 J/cm² @1030 nm, 212fs
- Transmission (no AR coating):
85% @343 nm,
92% @515 nm, 94% @1030 nm



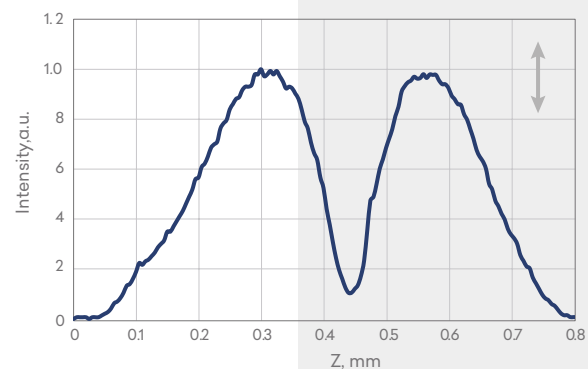
Positive Bessel-Gauss zone

Incident light polarization > left-hand circular – emulating convex axicon.



Negative Bessel-Gauss zone

Incident light polarization > right-hand circular – emulating concave axicon.



Positive & Negative Bessel-Gauss zones

Incident light polarization > linear – emulating both axicons simultaneously.

Applications

- Micromachining
- Ultra-high aspect ratio micro holes drilling
- High 90% efficiency Bragg gratings
- Cutting of transparent materials