

# Graded Reflectivity Mirrors



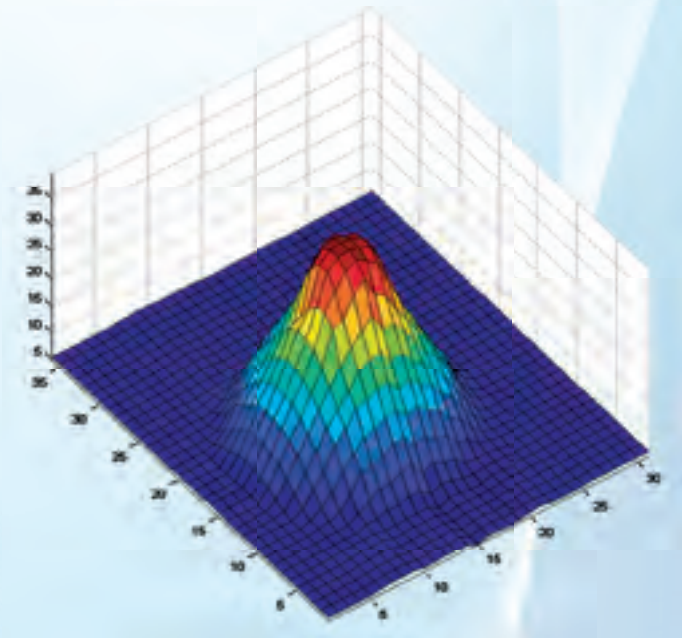
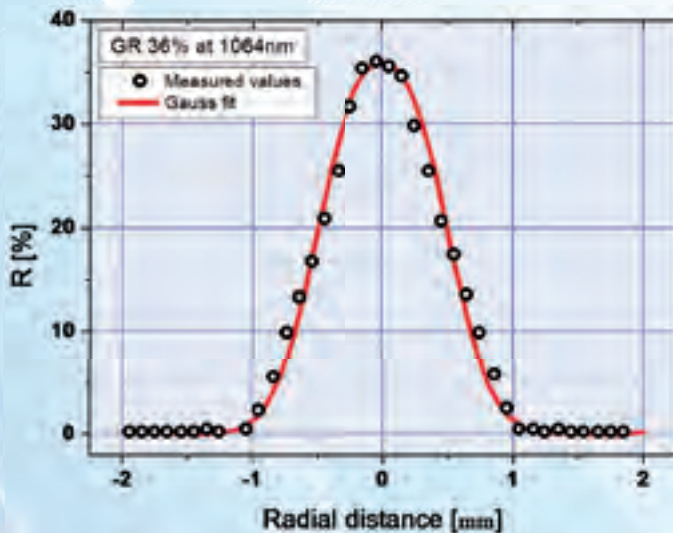
The graded reflectivity mirror (**GRM**) (also known as variable reflectivity mirror, or Gaussian or Super-Gaussian mirror) has a reflectivity which varies gradually as a function of the position on the mirror's surface.

GRM provides a better modal discrimination in an unstable resonator, i.e. it favors the oscillation of the fundamental mode against that of higher order modes. It also improves the optical quality of the output beam especially at low magnifications. The tapered reflectivity profile also leads to a decrease of the ripples in the field profile and thus reduces the risk of optical damage when used with high intensity lasers.

Typically, the reflectivity of the mirror is greatest at the centre and goes down towards the edge of mirror. Crytur offers GRM with circularly symmetric profiles.

The GRM profile is described by  $R(r) = R_0 \exp(-2(r/w_0)^n)$ , where  $R_0$  is the central reflectivity value,  $r$  is the distance from the mirror's centre,  $w_0$  is the radius of reflecting area at  $R_0/e^2$  and  $n$  designates the order of (Super-)Gaussian profile.

## An example of GRM ( $R_0 = 36\%$ , $n = 3$ , $w_0 = 0.9$ mm at 1064 nm) made by Crytur



## Substrate specification

Material: BK7 glass, fused silica

Size: standard  $\varnothing 25.4 \times 9.5$  mm,  $\varnothing 12.7 \times 6.35$  mm

Other materials, sizes, wedged and spherical substrates with various radii of curvature are available upon request.

## Specifications of Crytur GRM coating:

Working wavelength	1064 nm (other wavelengths from 250 nm to 2500 nm upon request)
$w_0$	typically 0.5 to 5 mm
Central reflectivity $R_0$	from interval 5 % to 80 % (+/- 1 % to +/- 5% depending on the reflectivity level)
Residual reflectivity	<1/20 of the central reflectivity or <0.5%
Second side	appropriate AR-coating
Damage threshold	15 J/cm <sup>2</sup> at 1.06 $\mu$ m, 10 ns