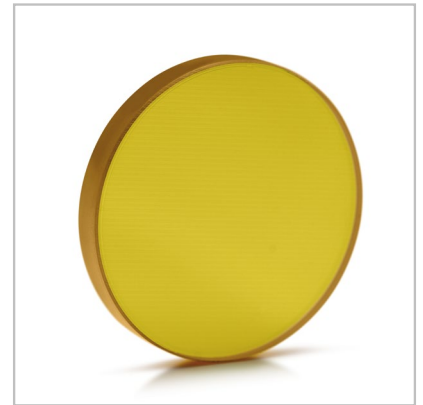


Materials for CO₂ Laser Optics

The long-lasting, close relationship we have developed with selected CO₂ optics suppliers has helped us guarantee certified high quality that you can trust. We not only offer standard optics for a number of industrial laser systems, but we are also your flexible partner for customized solutions at reasonable prices.

In the following pages, we will introduce our optical components for CO₂ lasers, which include:

- ZnSe lenses and windows
- Output couplers, beam splitters, and beam combiners
- F-Theta lenses



Note

Safety regulations regarding the handling of CO₂ laser optics are available upon request.

Materials for CO₂ Laser Optics

Only a few materials are suitable for application in CO₂ lasers due to the infrared wavelength of 9.3/10.6 μm . In addition to the transmission characteristics, the optical and thermal characteristics of the material have to be taken into account.

Zinc selenide (ZnSe) has become the standard materials for lenses and windows.

Components made of germanium and gallium arsenide are also available upon request.

Only high-quality substrates are used for the optics. The zinc selenide applied is "laser-grade material" that is perfectly suited for high-power applications.

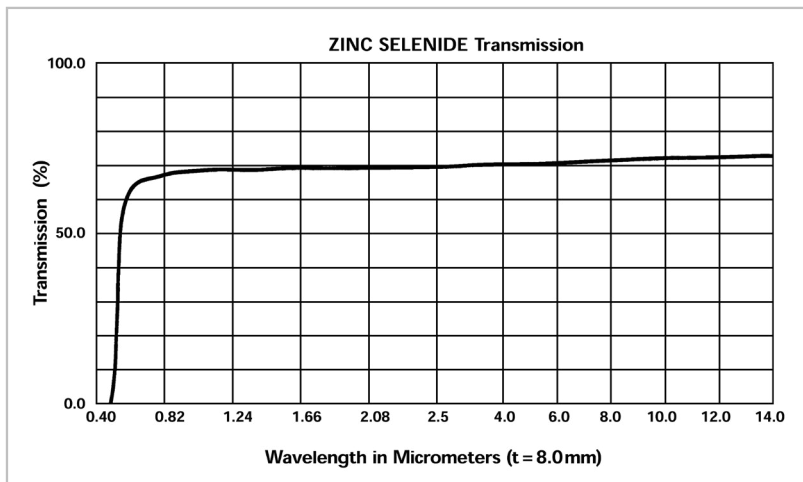
The transmission of uncoated material is approximately $T \approx 70\%$ for 10.6 μm . Coating both sides of the optic is recommended for applications in which only the least amount of loss possible is allowed. Coating both sides can increase the transmission to $T > 99.4\%$.

Low Absorption Coating

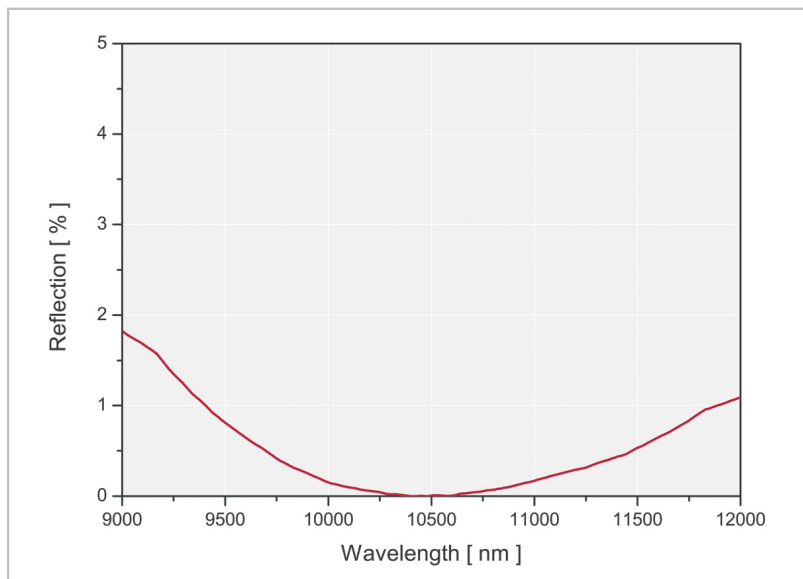
In addition to a standard antireflection coating of $R < 0.25\%$ and an absorption of approx. 0.25% , we also offer a special coating that has a reduced absorption.

At the same amount of residual reflection the absorption of the low absorption coating is less than 0.15% (typ. $< 0.12\%$)

This coating is recommended for use, in particular, in lasers that operate at more than 2.5 kW because it increases the life expectancy of the lens. Not only that but it reduces the effect of the thermal lens, which improves the performance of the laser during material processing.



Transmission curve of uncoated ZnSe over wavelengths for 8mm thickness



Reflection curve for AR coated ZnSe at $10.6\text{ }\mu\text{m}$ at 0° incidence (one side) – valid for standard and low absorption coating.