

UltraLO-Coatings for CO₂ Laser Optics

ULO Optics is the leading European manufacturer of CO₂ laser optics, a position held for more than two decades. The optics manufactured by ULO Optics are often used in high power CO₂ laser systems and ULO's optics have always been designed for such environments. Apart from optimum design and manufacturing standards, the key to success of any optic relates to the coating performance.

ULO Optics is pleased to announce the launch of optics with very low absorption coatings. These exciting new products are known as **UltraLO** coated optics, and they compliment the well established range of available coatings, from anti-reflection (AR) to partial reflectors for use as beam splitter at specific incidence angles (typically 45 degrees), or for use in-cavity as rear mirrors or output couplers.

ULO Optics also offers state of the art maximum reflectance and phase retarder coatings for use on Copper and Silicon.

UltraLO AR

UltraLO optics are specifically fabricated for use in the growing family of CO₂ lasers with output powers in excess of 4kW.

- UltraLO absorption < 0.15%.
- Hygroscopic materials have been eliminated from the coating design enabling UltraLO lenses to maintain low absorption in storage and in high humidity environments.
- UltraLO lenses will handle the same high power as conventional lenses but with less optical distortion and a smaller focal length shift.
- The lower absorption of the UltraLO lenses can lead to longer lens lifetime.
- UltraLO lenses will transmit a red aiming beam.

Supermax R

The Supermax R coating is suitable for both Copper and Silicon. This coating is resistant to UV radiation. **Also available on Silicon Carbide.**

On Copper it can withstand high power and is often used in pulsed and continuous wave cavities.

- R_s > 99.9%
- R_p > 99.7%
- R_{av} > 99.8%
- phase shift < 2 degrees
- Ultra durable for easy cleaning

There is a Dual band version available on Si and Cu for visible beam alignment. Reflectance at the visible wavelength > 75%.



1 | UltraLO coated ZnSe lenses.



2 | Supermax R coated Si mirrors, also available on Copper and Silicon Carbide. Dual Band version available on Cu and Si for visible wavelengths.

Polarisation insensitive Beam Splitter

For use at 45 degrees in systems where incident polarisation can vary.

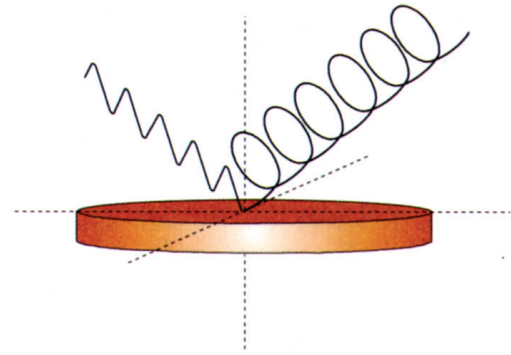
- Split ratio 50:50 +/- 1%

Phase Retarders on Copper and Silicon

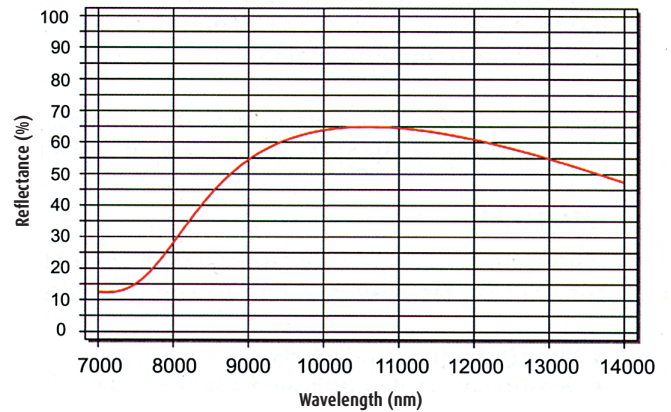
Used to convert a linearly polarised beam into a circularly polarised beam, so providing equal cut quality in all directions on the workpiece.

- 90 degree +/- 3degrees (< 1 degree possible on request).
- Typical reflectance > 98.5%
- Substrates up to 5" diameter can be coated.

- 3 | Cu and Si Phase Retarders are used to convert a linearly polarised beam into a circularly polarised beam.



- 4 | ZnSe AR/65%R Partial Reflector coating optimised for 10.6 µm



Partial Reflectors 0.75% to 99.9%

The standard reflectance values for use at normal incidence are: AR/ 1, 3.5, 5, 10, 17, 25, 36, 50, 60, 65, 70, 75, 80, 85, 90, 95, 97, 98, 99, 99.25, 99.5 and 99.6%. Others are available upon request.

A full range of polarisation specific Partial Reflectors are available for use at 45 degrees, including the standard AR/ 1, 3, 25, 33, 50, 99 and 99.5%.

Polarisation Forcing Mirrors

- $R_s > 99\%$: $R_p < 95\%$ at 10.6µm at 45 degrees

Dual-Band AR

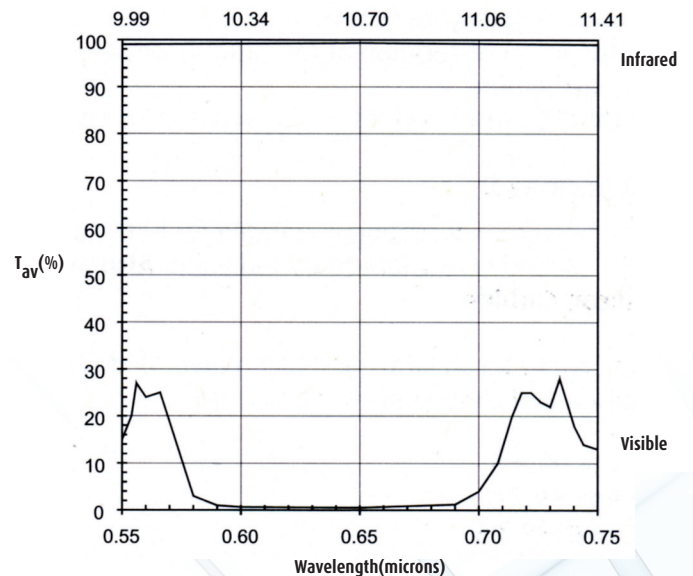
- T at 10.6µm > 99%
- T at 633nm > 95%

Beam Combiners

Used in systems where visual alignment is carried out by the introduction of a visible laser beam in to the path of the invisible CO₂ laser beam.

- R at 633 or 670nm > 99%, T at 10.6 µm > 99% at 45 degrees.

- 5 | Transmission curves of a standard beam combiner optimised in this case for 633nm. Beamcombiner coatings optimised for other wavelengths are also available.



Also available

- Thermal imaging coatings such as Diamond Like Carbon.
- Absorbing Thin Film Reflector coatings.

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