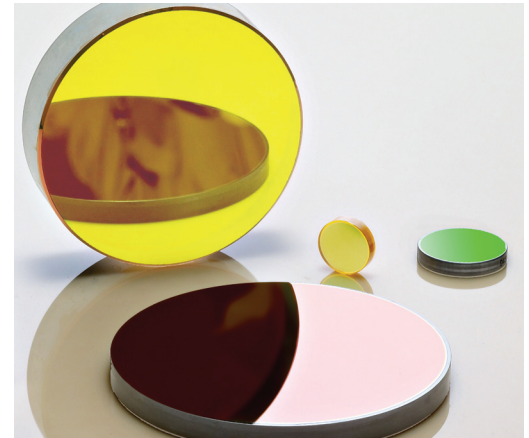


Superpolished Mirrors for Laser Applications

These superpolished mirrors offer substantially lower loss than previously available from any supplier, enabling them to service the most demanding laser-based applications. Specifically, microroughness on these mirrors is below 0.5 Å, allowing them to achieve a scattering loss of under 5 ppm and a finesse of 200,000 when incorporated into optical cavities. In contrast, most commercially available superpolished mirrors only reach 100 ppm of loss and a finesse in the 30,000 range. Ion beam sputtered coatings (IBS) are employed to take full advantage of these ultra-smooth surfaces and deliver reflectivities of over 99.998% at any wavelength in the 450 nm to 2 μm range.

REO superpolished mirrors can be produced on a number of different substrate materials, including BK7, fused silica, Zerodur, ULE, sapphire and silicon. They are supplied with diameters in 0.25 inch to 4.0 inch (6 mm to 101 mm) range, with a flatness of $\lambda/20$ (at 633 nm), 10-5 surface quality over an 80% clear aperture, with zero defects (0-0) achievable over controlled sub-apertures. Furthermore, it is possible to use standard, solvent based cleaning methods and still maintain these exceptional loss specifications. Mirrors with plano, concave and convex surface shapes are all available. REO utilizes a suite of advanced metrology instrumentation to maintain and verify these performance specifications, including phase shifting interference microscopy, cavity ringdown measurements and photothermal common path interferometers.

These superpolished mirrors are useful in any laser or laser-based system which demands extremely high reflectivity or very low loss. Typical applications are as cavity mirrors in low gain gas and solid state lasers, such as HeNe's and HeCd's, and in systems which employ nonlinear processes. Other important uses are in ring laser gyroscopes (RLG), instruments based on cavity ringdown spectroscopy and frequency reference standards.



Typical Specifications

Substrate Material	BK7, fused silica, Zerodur, ULE, sapphire, silicon
Design wavelength range	450 nm to 2 μm
Reflectivity	>99.998%
Surface flatness (@ 633 nm)	$\lambda/20$
Surface quality	10-5 or better over 80% clear aperture 0-0 over controlled sub-apertures
Loss	≤ 5 ppm
Cavity Finesse	> 200,000
Size range	0.25" to 4"
Temperature range	-196 °C to 400 °C
Humidity range	0 to 100%