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New Graded Reflectivity Laser Mirrors Enable Beam Profile Shaping

A new series of graded reflectivity mirrors from REO, a leading manufacturer of high volume precision optical solutions, enables precise spatial shaping of both the intensity and phase characteristics of laser beams. In graded reflectivity mirrors, the reflectivity and/or phase effects of the coating vary radially across the surface of the optic. REO can produce these mirrors with virtually any arbitrary variation, including non-rotationally symmetric patterns, as well as with complex designs in which the reflectivity increases and decreases repeatedly across the component.

The most common application for graded reflectivity mirrors is as cavity optics in unstable resonator lasers. In this case, the use of a second order Gaussian or super-Gaussian (Gaussianⁿ) reflectivity profile allows both maximum power extraction from the resonator, as well as a smooth far field output beam profile. A Gaussian profile mirror can also be used to achieve laser output with a uniform irradiance distribution, which is often required in illumination, materials processing and surgical applications. And the ability to shape the phase of a laser's emergent wavefront can aid in achieving better focusing characteristics, and improve coupling efficiency into optical fibers.

REO offers these graded reflectivity mirrors on a wide range of substrate materials, including fused silica, various optical glasses, ZnSe, ZnS and Si, for operation over the 266 nm to 5 μ m spectral range. These mirrors are available with diameters from 0.25 inches (6 mm) to 5 inches (127 mm). Reflectivity pattern variations can be achieved down to a scale of approximately 1 mm. The use of ion beam sputtering (IBS) coating technology makes these optics suitable for intracavity laser use, and provides a unique combination of high damage threshold, spectral stability, environmental stability and mechanical durability that makes them compatible with other harsh and demanding environments.

About REO

REO produces high precision thin film coatings, optics and opto-mechanical assemblies for the ultraviolet, visible and infrared. Located in Boulder, CO, the company primarily services medium to high volume OEMs including manufacturers of defense and aerospace systems, laser systems, semiconductor tools, medical systems, life sciences instrumentation and telecom equipment. REO is a privately held company. For more information, contact Mark Damery, Vice President and General Manager of Worldwide Sales, at +1-720-562-3213, e-mail MarkD@reoinc.com, www.reoinc.com, or Susan Anway, Vice President of Finance and Chief Financial Officer at +1-720-562-3206, e-mail SueA@reoinc.com.