TOOLING

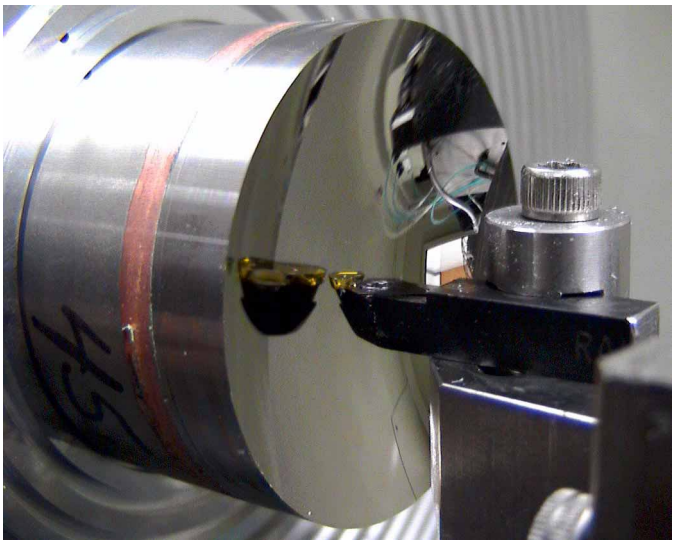
Fresnel Technologies announces the expansion of its optical surface generation capabilities

Three significant new diamond machines have been added to the company's collection of optical surface generating equipment: two two-axis ultraprecision lathes and a four-axis ultraprecision freeform surface generating machine, all fitted with on-machine measuring and compensation devices. The largest diameter that can be turned on our new machines is approximately 24" (600mm), or almost 28" (710mm) with special fixturing. One of the two-axis lathes is fitted with a fast tool servo for the generation of non-rotationally symmetric surfaces, such as phase plates and anamorphic lenses. These machines complement the existing Fresnel lens generating machine, a machine for cutting large linear structures, and a machine for cutting arrays of conventional aspheres, as well as Fresnel Technologies' famed capabilities in making parqueted arrays of lenses. Two of the world's leaders in the field of ultraprecision machining, Donald Combs and Dr. John Mader, have recently joined our technical staff.

Fresnel Technologies also operates a world-class all-CNC facility for the machining of hardened stainless steel for the nonoptical portions of molds for optics. Our conventional machining capabilities include high-speed hard milling; form, wire, and small-hole EDM; surface grinding; and super-precision turning, including C-axis capability.

Fresnel Technologies can mold your optical products, by injection molding or compression molding as appropriate. We mold in acrylic, polycarbonate, cyclic olefins, and our proprietary line of POLY IR® infrared-transmitting materials. We offer molding services for low-volume to high-volume applications–from a few pieces to millions. Fresnel Technologies' compression molding capabilities are unsurpassed anywhere in the world. We operate 32 computer-controlled compression molding presses, as well as sufficient high-accuracy house-designed machinery for the necessary secondary operations. Five first-rate injection molding machines complete our molding facilities.

Molds and molded products can be verified by profiling or by measurement of optical properties. Fresnel Technologies has emphasized test equipment and techniques to characterize the fast aspheres and unusual diffusing surfaces others find difficult to handle.



Diamond machining of an optical surface on an electroless nickel mold insert. Surface finish of this insert was measured to be 1.9nm R_a, and form error was measured to be 44nm peak-to-valley, excluding an approximately 100nm error in the center due to tool setup.

Fresnel Technologies maintains both optical and mechanical design capabilities. Optical design software ranges from Zemax, CODE V, and LightTools to proprietary in-house programs. Our mechanical design facilities include CAD/CAM software capable of interchanging surface and solids data with most commonly used CAD systems. All design facilities are seamlessly networked with our various diamond- and conventional machining facilities.

We offer prototyping services as well as machining and molding of production parts. Please contact Donald M. Combs (dcombs@fresneltech.com) or Nelson E. Claytor, Ph.D. (nclaytor@fresneltech.com) to discuss your requirements.

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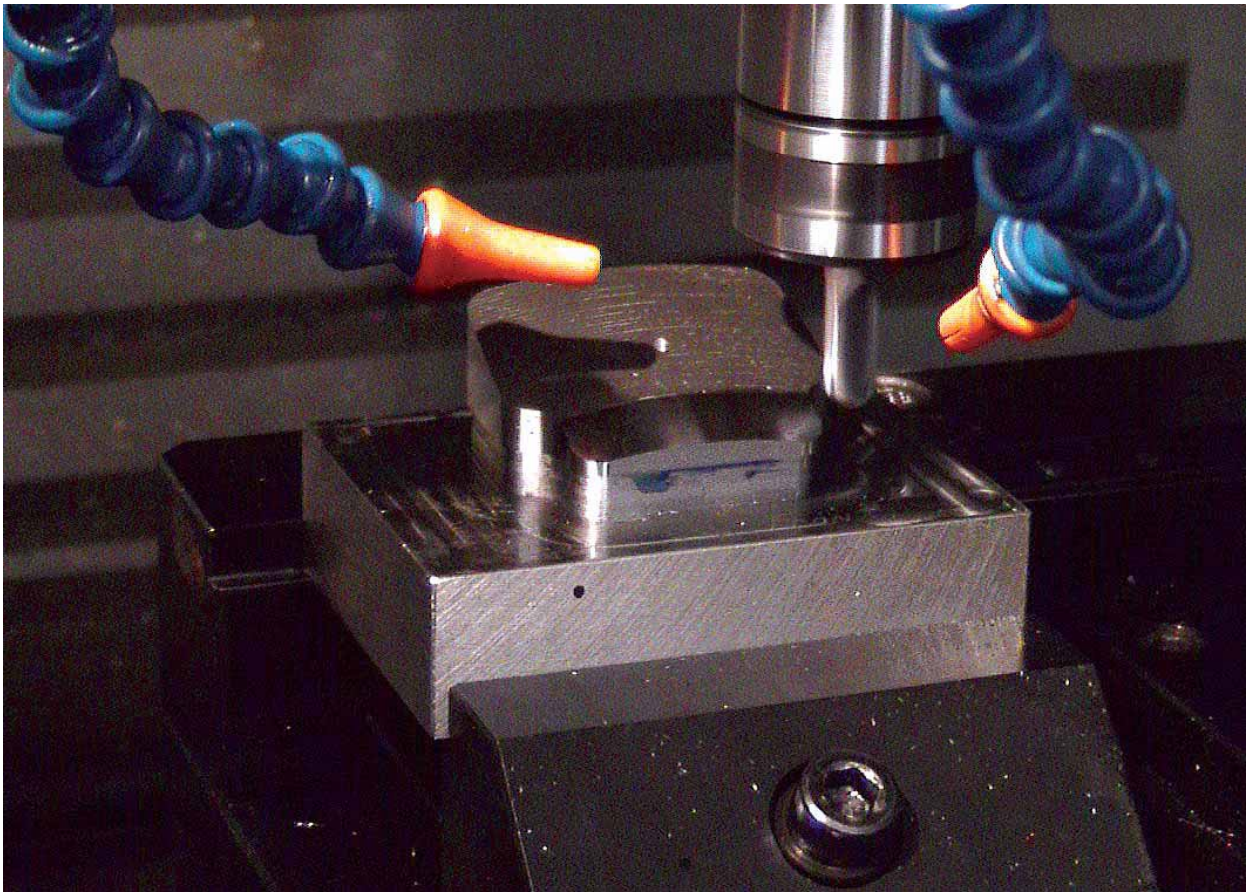
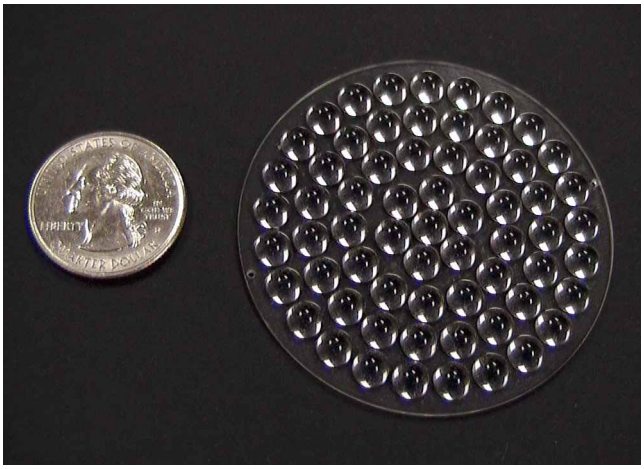


High speed milling of a hardened stainless steel mold insert



Molded array of 64 conventional aspheres, made from a directly diamond machined mold. Part of a system used to couple 64 LEDs into one light pipe.

A parqueted array (CM 0.77 GI V3) of our patented LODIFF® lenses; arrays of this type are very effective when used in passive infrared motion detection.

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