

## Custom/OEM Optics

### Overview of Capabilities

Custom optics from Laser Optics are widely used in laser systems, semiconductor inspection tools, and fiber optic telecommunication components. In addition, numerous defense systems and scientific instruments used at leading university, corporate, and national laboratories, rely on Laser Optics optical components.

Noteworthy characteristics that set Laser Optics apart from other optics companies are the wide range of expertise and capabilities in optical fabrication and thin-film coating, all housed under one roof, and the extensive emphasis on in-process metrology.

In addition, we have unique capabilities for manufacturing x-ray monochromators and toroids that are unsurpassed in performance.



### Optical Fabrication and Polishing

Laser Optics fabricates and polishes plano, spherical, elliptical, toroidal, and prismatic optics from a wide range of materials. These materials include optical glasses, fused silica, crystalline materials such as quartz, indium antimonide, zinc selenide, zinc sulfide, YLF, silicon and many metals.

Component sizes range from 0.2" up to 30.0" in diameter. Our technicians routinely hold figure tolerances of 1/20th wave or better; angular tolerances of < 1 arc second and surface quality of 10/5 or better.

- Fabrication and Polishing
- Materials
- Flats and Windows
- Etalons
- Wedges
- Prisms
- Lenses
- Reticules and Test Patterns
- Optical Assembly Capability



### **Optical Coatings**

Laser Optics has broad experience in the production of custom coatings, with special expertise in the design of multi-wavelength, wide angle and polarization specific coatings.

We have an extensive repertoire of sophisticated, time-proven optical coatings. These coatings include anti-reflective, reflective, polarizing and beamsplitter coatings for the ultraviolet, visible and near infrared. State-of-the-art modeling programs facilitate the optical thin-film design process.

The same careful procedures used for coating in-house manufactured components are available for customer furnished materials (CFM)

With coating chambers equipped for thermal evaporation, electron beam evaporation and ion-assisted deposition, we can choose the optimum process to meet application requirements at wavelengths that range from 0.20 microns to 16 microns.

- Optical Coatings
- High Power Laser Coatings
- AR Coatings
- Partial Reflectors
- High Reflection Dielectric Mirrors
- Dichroic Filters
- Beam Folding Mirrors
- Lower Power Laser Coatings
- High Reflection Enhanced Metallic Mirrors
- Polarizing Beamsplitter Coatings
- Filter Coatings (Short, Long, and Band Pass)
- Neutral Density Filters



### **Crystalline Optics**

We fabricate optical components from crystalline materials for specific applications that are enabled by the properties of the crystal. These properties can include optical transmission, power handling, lattice spacing, and polarization effects.

Polarization effects play a large role in optics, and Laser Optics has a proud heritage of providing high quality waveplates and polarization-altering components. Examples of our capabilities are covered under the headings below.

We encourage customers to contact us with their prints for optics specific to their application.

- Birefringent Optics
- Birefringent Beam Displacers
- Birefringent Wedges
- Quartz Rotators
- Quartz Waveplates
- Crystal Polarizers
- Crystal Depolarizers
- Birefringent Filters

### **Facility Overview**

In order to provide you with a better sense of the capabilities of Laser Optics, we have compiled a brief listing of features relating to the Laser Optics facility below.



- **High Volume Fabrication Facility**
- LAPMASTER LSP-6 Dual Sided Grinding and Polishing
- OPTOTECH SMP-500 Rough and Fine Grinding  
High Speed Removal Rate  
Dual Diamond Tool Rough and Fine Grinding in One Step
- OPTIPRO SX-100 CNC Generator  
Rapid Prototyping of Complex Geometries
- OPTOTECH SMC100 CNC Grinding Center  
Automated CNC Surface Grinding  
High Speed Spherical Surface Generation

- OPTOTECH SPK 100 CNC Polishing Center  
Automated CNC Surface Polishing  
High Speed Precision Polishing of Spherical Surfaces
- HAAS Mini Mill Core Drill  
CNC Core Drilling of Blanks for Increased Throughput
- CREST Ultrasonic Automated Cleaning Line
- Four STRASSBAUGH Cylindrical and Ellipsoidal Polishing Machines
- 72", 60", and 48" Continuous Polishing Machines (STRASSBAUGH and LAPMASTER) with Big Flats Capability

· ***Professional Manufacturing Staff***

· ***Robust Coating Facility***

- Three Large Box Coaters
- Eight Bell Jar Coaters
- Ion Assist Capability
- UV, Visible, Near-IR, and IR out to 10.6 microns

· ***Strong Thin Film Design Capability***

· ***Extensive Metrology***

- Mechanical Verification  
Calipers, Micrometers, Gauge Blocks and Gauge Pins  
HEIDENHAIN Drop-Dial Indicator  
MITUTOYA MU Checkers  
NIKON Autocollimators  
TRIOPTICS Computerized Autocollimator  
Radius Scale
- Surface Inspection  
18" ZYGO GPI-XP/D Interferometer  
12" ZYGO Mark-II Interferometers  
6" ZYGO Mark IV-XP Interferometer  
4" ZYGO GPI-XP/D Interferometer  
High Intensity Lights and Scrtach/Dig Standards
- Environmental Durability  
Salt / Fog Chamber  
Temperature / Humidity Chamber  
Calibrated Eraser Test  
Certified Adhesion Tape
- Spectral Characterization  
HITACHI U-4001 VIS-NIR Spectrophotometer  
PERKIN ELMER 1600 FTIR  
PERKIN ELMER Lambda 19  
Perkin Elmer 983 IR  
Various Laser Sources / Laser Detectors
- Crystal Certification



Double Crystal X-Ray Spectrometer

Back Reflection Laue  
Powder Diffraction  
Four Crystal BLAKE Monochromator  
X-ray Topography Capability  
Soliel-Babinet Compensators