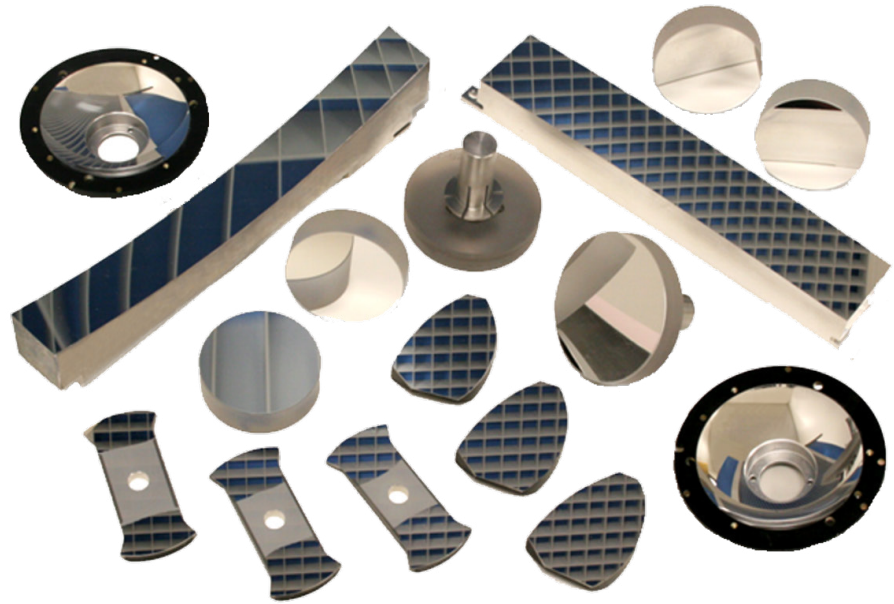


# Replicated Optics

## Cost-Effective Solutions for Optical Systems



### YOUR SINGLE SOURCE FOR CUSTOM REPLICATED OPTICS

#### Holographix' Replicated Product Offerings:

- Metal Mirrors
- Glass Mirrors
- Glass and Plastic Lenses
- Aspheric Optics
- Parabolic Mirrors
- Optical Assemblies



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## CAPABILITIES & RESOURCES

### Replicated Optics

Replicated mirrors and lenses can directly replace conventional optics to provide lower-cost optical system solutions that are more compact and lighter compared to systems using conventional optics. Holographix produces high quality optical surfaces onto low-cost metal, glass, ceramic, or plastic blanks using our proprietary replication technology.

### Our customers achieve cost savings by:

- The use of lower-cost substrates
- Integrating low-cost mounting and alignment features into the blank
- Reducing assembly steps necessary to integrate the optic into the system

### Examples include:

#### REPLICATED METAL MIRRORS

- Readily machinable materials (Al, Be, etc.) used for substrates
- Pre-machined alignment tabs, mounts and other design features
- Direct assembly into the final system
- Matching CTE for reduced distortion over temperature
- Lower machining cost vs. polished glass
- Reduced weight vs. glass optics
- Simplified system design by eliminating glass substrate and placing the mirror surface directly onto the metal mount

#### REPLICATED ASPHERICS

- Low-cost spherical blanks can be used
- Work effectively in both transmission and reflection
- Higher repeatability part-to-part compared to polishing
- Aspherics can be used in place of multi-element lens assemblies

### Company Experience

Over the past 25 years, Holographix has earned a reputation for providing our customers with outstanding development and manufacturing services for custom surface relief

patterns. Custom binary and blazed gratings, micro-lens arrays, and diffractive waveguides are our main focus. With a companywide emphasis on quality, Holographix maintains a rigorous Quality Assurance program designed to ISO9001-2015 standards.

### Replication Facilities

Production of replicated components requires a significant investment in capital equipment. Our 15,000 square foot facility in Marlborough, MA is equipped with:

- ADE and Zygo 4 phase-shift interferometers (Qty 4)
- ADT 7100 Dicing System
- AFM Workshop TT- Atomic Force Microscope (AFM)
- Amray 3600 Scanning Electron Microscope (SEM)
- Cary 500 UV-Vis-NIR Spectrophotometer
- Custom fully automated UV curing stations
- Denton DESK II sputtering systems (Qty 2)
- Denton Infinity 22 thin-film box coater
- Keyence VK-X260K Violet Laser Confocal Microscope
- March Plasma AP-1000 plasma treatment system
- Mitutoyo Vision Systems (Qty 2)

### Production Capabilities

Holographix specializes in the manufacture of custom replicated components in production quantities. The inherent speed of our cold-forming replication process allows us to offer economical volume pricing without the associated high tooling costs.

Please contact us via phone, e-mail, or fax with any inquiries you may have regarding our services. We will be happy to assist you!

For a more comprehensive overview of Holographix and our technology, please visit our website: [holographix.com](http://holographix.com).

STANDARD REPLICA PROPERTIES	
Wavelength Range	190 nm to 15 um
Flatness/Curvature	<A/10 P-V
Scratch/Dig	to 20-10
Temperature Range	-50 C to 200 C
Humidity Range	0 to 95% continuous
Chemical Resistance	most common solvents
Damage Threshold	>1 MW/cm <sup>2</sup>