

# Andover Corporation



**Optical Filters and Coatings**

50 Years of Precision and Passion

# Why Andover?

## Industry-leading customer satisfaction

- Superior delivered quality with short lead times

## Exceptional coating expertise

- First-surface hard coat, assembled coatings, and hybrid solutions

## Vertically integrated for a seamless process

- For **every** step of the job including design, fabrication, and metrology

## No program too small or too large

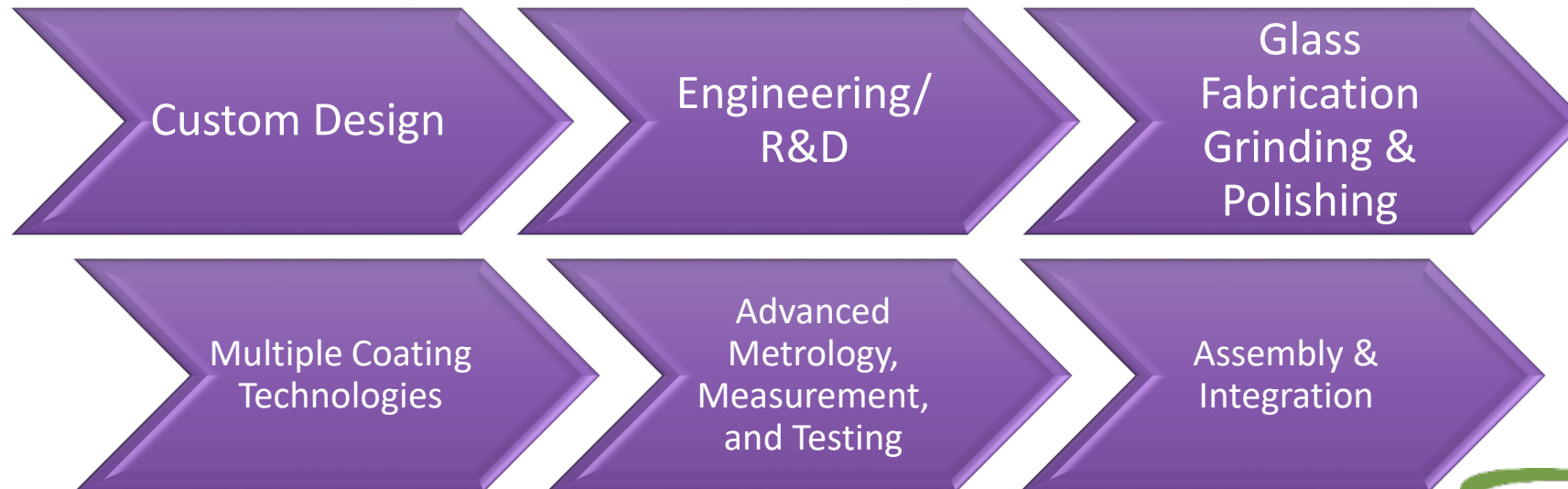
- A high-volume capacity with **no** minimum order quantities

## Custom craftsmanship to meet your needs

- We work with every customer to develop the best possible solution

# A Collaborative Approach To Customer Solutions

- Vertical integration
- From design to delivery, completely in-house
- We work **with** the customer throughout the process



# Grinding, Polishing, and Fabrication

## In-house finishing and fabrication processes

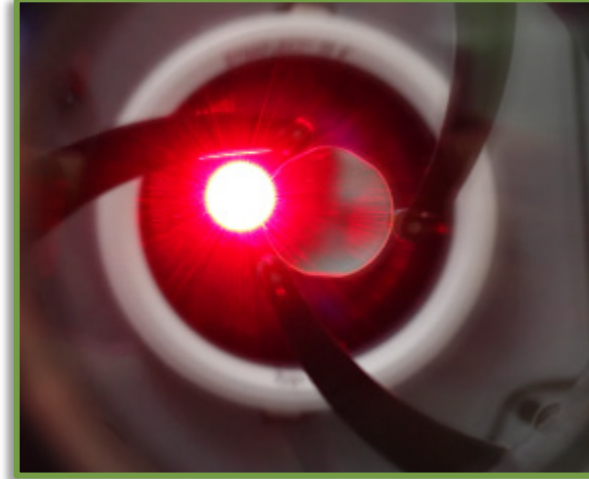
- Diamond surface grinders
- Myford cylindrical grinders
- Strasbaugh single-sided polishers
- Speedfam double-sided polishers
- Speedfam double-sided diamond lappers
- Dicing
- Robotic chamfering system
- Haas CNC fabrication centers
- Automated centering machines for high-precision beveling



# Quality Control

## Inspection & Testing Equipment

- Mitutoyo optical comparator
- Near-infrared inclusion tester
- Janis cryostat tunable from 77°K to 500°K
- Custom-made tunable white light interferometer
- Zygo laser interferometers
- Environmental test chambers – humidity and temperature cycling
- Keyence Image Dimension Measuring system
- Optical alignment testing capabilities
- Custom testing & inspection processes



## Spectrophotometers

- **Cary 500, 5000 & 7000:UV-VIS-NIR**  
*Spectral Range 193nm – 33000nm*
- **PE 983G NIR-MWIR-LWIR**  
*Spectral Range 2000nm – 56000nm*
- **PE Frontier Optica, FTIR**  
*Spectral Range 15000nm – 25000nm*
- **Spex 1.26 meter for ultra-narrowband filters (VIS-NIR)**  
*Spectral Range 193nm – 1200nm, 0.0025 Resolution*



# Our Products and Services

Andover Corporation makes use of redundant production cells, with a strong focus on preventive maintenance and vertical integration to ensure top quality, short lead times, and the best optical engineering solution for every customer's specific needs.

## Products:

- Custom optics from 193nm – 15000nm
- Standard catalog offering from 193nm – 10600nm
- Custom bandpass filters from 240nm – 14000nm
- Optical accessory products

## Services:

- Design support for custom applications and R&D
- Coating services
- Substrate fabrication
- Dicing
- Precision beveling
- Optical assemblies



# Standard offering – Catalog items

- **Standard wavelengths:** 193nm – 10600nm
- **Sizes:** 12.5mm to 50mm
- **24/7 online ordering, no minimum quantities**

## Bandpass Filters

- Standard and custom
- First-surface UV filters
- High transmitting
- Hard-coated / Assembled



## Infrared Filters

- Bandpass filters
- Neutral-density filters
- Edge filters



## Heat Control Filters

- Ultraviolet cold mirrors
- Cold mirrors
- Hot mirrors
- IR-suppressing filters



## Neutral Density Filters

- Metallic UV-VIS-NIR
- Infrared ND filters
- ND filter sets
- Absorptive ND filters



## Dichroic Filters

- Color-control filters
- Beamsplitters



## Steep-Edge Longpass Filters

- Slope <1%
- Deep blocking



## Standard Edge Filters

- Long-wave pass
- Short-wave pass



# Coating Capabilities

We keep a large inventory of substrate materials, allowing for short lead times and no minimum order quantities.

## Our Capabilities

- Custom optical coatings  
193nm – 15000nm
- Standard optical filters  
193nm – 10600nm
- Custom bandpass filters  
240nm – 14000nm
- Optical accessory products
- Optical assemblies
- Advanced substrate fabrication
- Precision beveling
- Dicing
- Diamond milling, coring, and sawing

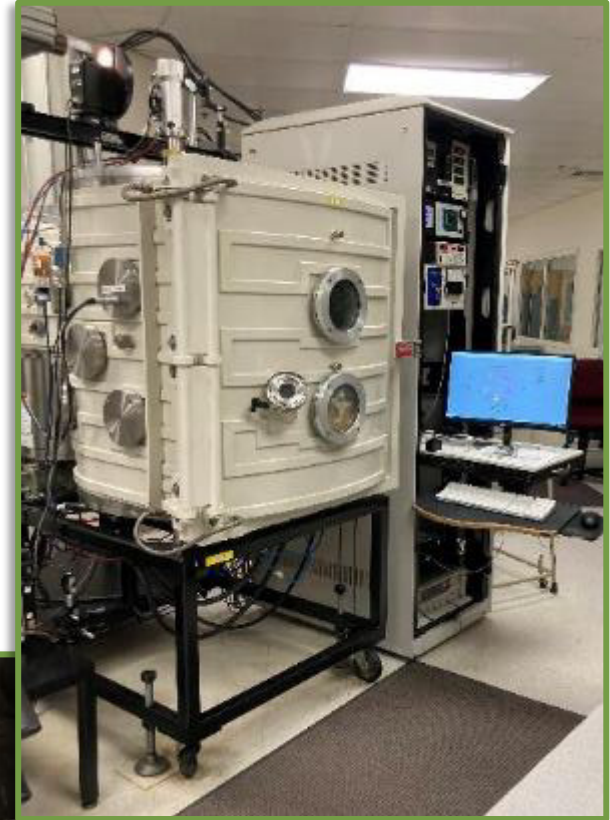
## Substrate Materials

- BK-7; H2; G-18
- Fused silica; UV & IR grade
- Filter glass
- Chalcogenide glass
- Sapphire
- Germanium
- Zinc Sulfide
- Zinc Selenide
- Silicon, CZ and FZ grade
- Calcium Fluoride
- Barium Fluoride
- Magnesium Fluoride



# Quality and Consistency

- We inspect 100% of our products
- Our return rate is less than 0.2%.
- No minimum order requirement.
- Focus on continuous improvement
- Redundant chambers for 0 downtime



# Magnetron Sputtering

**Wavelengths:** UV-Mid IR 300nm to 5000nm

**Sizes:** 2mm to 200mm

## Used for:

- Windows
- Lenses
- Mirrors
- Beamsplitters
- AR and BBAR coatings
- Prisms
- Laser optics
- Bandpass filters
- Long- and short-pass filters
- Dichroic filters
- Multiband ARs



## Technology Benefits:

- Environmentally stable
- Extremely durable
- No W/L shift over time
- Consistent production results
- Low water-content coatings
- Good for complex requirements

# E-Beam with Ion-assist

**Wavelengths:** UV-Mid IR 240nm to 2500nm

**Sizes:** 2mm to 355mm

## Used for:

- Windows
- Lenses
- Mirrors
- Beamsplitters
- AR coatings
- Prisms
- Long- and short-pass filters
- Dichroic filters
- Image-quality (IQ) filters
- Neutral-density filters: UV, VIS, NIR, IR
- Laser coatings



## Technology Benefits:

- Durable & environmentally stable
- Large usable coated area for large optics
- Stress-free coatings for low surface distortion
- Parts coated to size for low per-unit cost
- Improved UV transmission
- High laser damage threshold

# Resistance Evaporation

**Wavelengths:** UV-Near IR 193nm to 2400nm

**Sizes:** 5mm to 250mm

## Used for:

- Image-quality filters
- Bandpass filters
- Wideband filters
- Ultra-narrowband filters
- UV filters



## Technology Benefits:

- Lower cost
- Short lead times
- Variety of coating types available
- Ultra-narrowband selections <0.1nm in the VIS
- Parts coated to size
- Low distortion for imaging applications

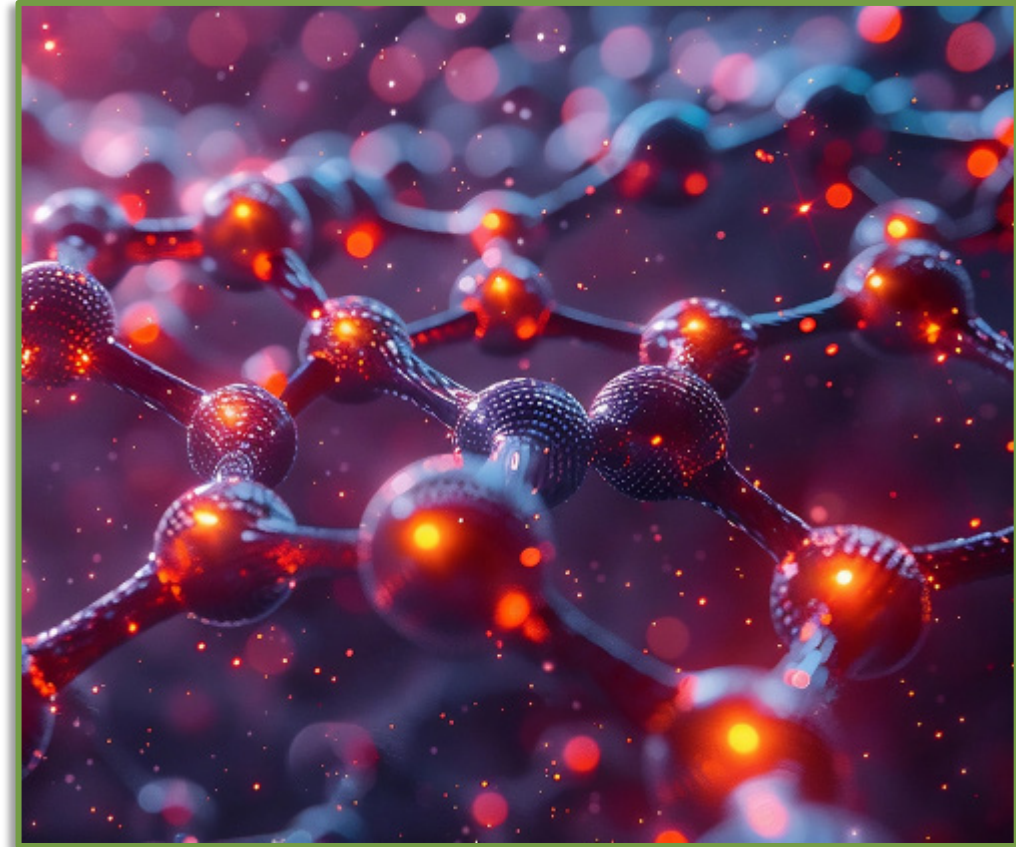
# Coating Capacity

Filter Type	Technology	Wavelength Application Range (nm)	Planetary Layout (diameter)	Filter Construction	Durability
<b>Hardcoat Bandpass</b>	Magnetron Sputtering with Advanced Pumping and Monitoring	105-1650	1-10"	First Surface	Severe abrasion
<b>Visible Bandpass</b>	Thermal/Resistance Evaporation	390-850	1-10"	Laminated	Moderate to severe abrasion
<b>Hard Coat Edge / Bandpass / Beamsplitters / Antireflective Coatings</b>	Magnetron Sputtering	325-5000	5-10", 6-8"	First Surface	Severe abrasion
<b>Far Infrared Bandpass</b>	EB Gun and Resistance (ion assisted preclean)	2050-12000	1-10"	First Surface	Moderate abrasion / Cleanability and solubility
<b>Far Infrared Edge / Antireflective Coatings</b>	EB Gun and Resistance (ion assisted preclean)	1650-20000	5-10", 8-9"	First Surface	Moderate abrasion / Cleanability and solubility
<b>Visible Edge / Beamsplitters / Antireflective Coatings/ Dichroic</b>	EB Gun with Ion Assist Deposition	390-2100	5-12", 4-14", 8-9"	First Surface	Severe abrasion
<b>Neutral Density Filters</b>	EB gun (ion assisted preclean) Hard coat	250-14000	4-10"	First Surface	Moderate to severe abrasion
<b>Near Infrared Bandpass</b>	Thermal/Resistance Evaporation	400-2400	1-10"	Laminated	Moderate to severe abrasion
<b>Ultraviolet Bandpass / Aluminum Mirrors</b>	Thermal/Resistance Evaporation	190-390	1-10"	Laminated	Moderate to severe abrasion



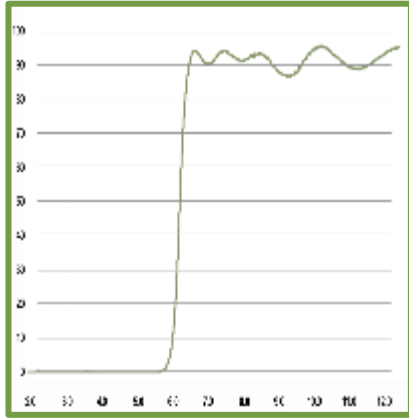
# Diamond-Like Carbon Coatings

- Premium AR coatings on a variety of IR substrates
  - Germanium
  - Silicon
  - Custom options
- Unmatched durability and superior optical performance
- Survives sand, salt fog, humidity, and extreme abrasion tests
- Optimized for 2-14 $\mu$ m applications
- Extreme Environmental Resistance  
Withstands temperatures from -192°C to +500°C



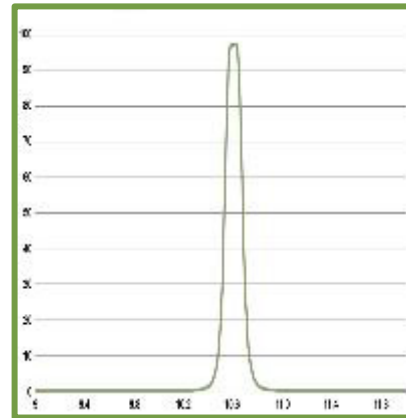


# Infrared Filters and Coatings



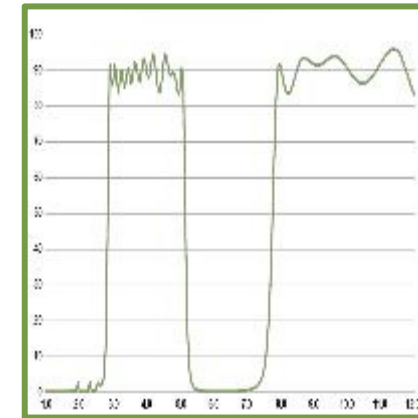
## Custom IR Edge Filters:

- 2-14μm range
- Custom product available
- Dichroic edge filters
- Used for beamsplitters



## Narrowband Filters

- 2-14μm range
- Bandwidths as low as 1% of center wavelength



## Dual-Band IR Coating

- Transmits 3-5μm and 8-12μm
- Used for combination targeting and thermal imaging applications
- Other wavelengths available

## Far Infrared Coating (Narrow to Broadband Filters)

- IR substrates; ZnSe, CaF<sub>2</sub>, Si, Ge, Sapphire, water free quartz, ZnS and more
- Custom designed by our Optical Engineers for durability, cost, performance
- FIR coatings can be deposited on Domes, Gratings, Prisms

# Neutral Density Filters

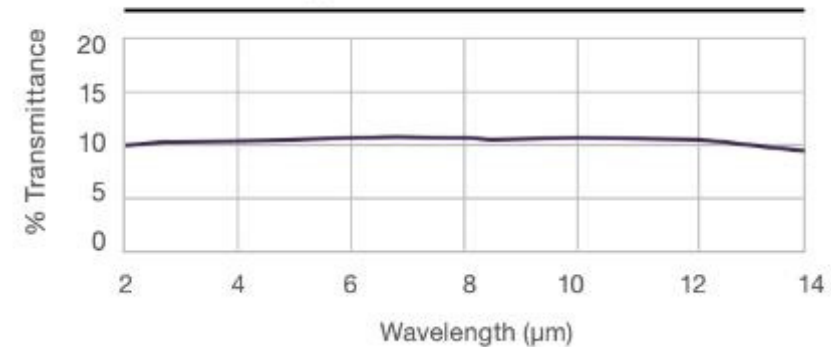
## Neutral Density Filters

UV to NIR (250nm-2000nm)  
Far IR (2000nm-14000nm)

Andover's coatings are durable and free of pinholes with optical densities ranging from 0.3 OD to 5.0 OD. Infrared Neutral Density Filters are available with a back-surface anti-reflection coating as an additional option. The AR coating lowers the reflection of the uncoated surface, thereby greatly reducing the intensity of the interfering beams, and effectively disabling the etalon effect.



**Typical 1.0 ND Filter**



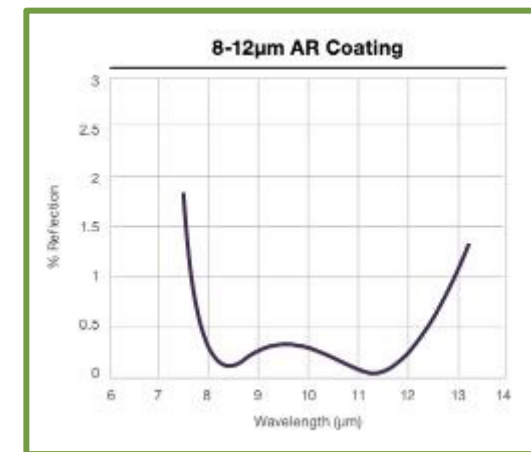
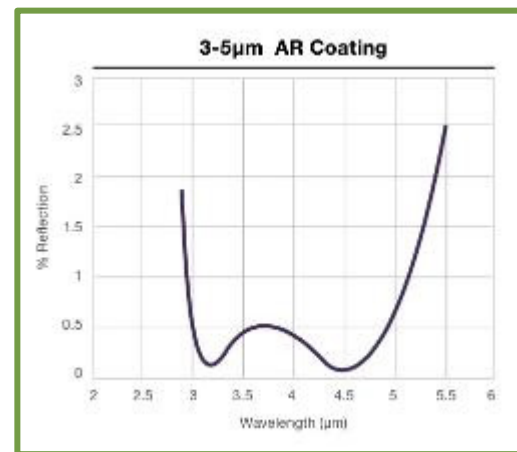
# Anti-Reflective Coatings

## Anti Reflective Coatings

Andover produces a non-radioactive dielectric multilayer coating designed to reduce the reflection of Germanium substrates in the infrared.

With an AR coating, reflection is reduced from 36% per surface to less than 1% per surface. Constructed of hard, durable first-surface dielectric optical coatings on optical-quality germanium substrates, these filters will withstand cleaning and handling associated with any high-quality optical component.

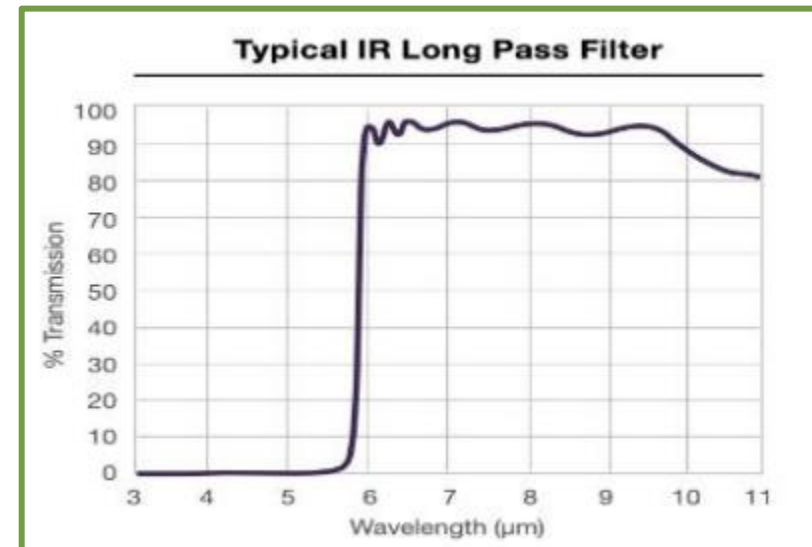
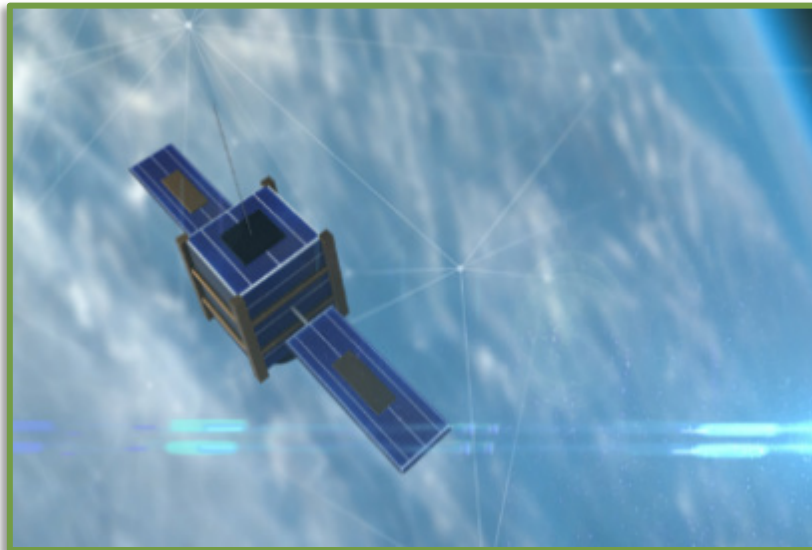
Meets MIL-C-48497. We offer these filters in two standard sizes: 25 mm and 50 mm dia. Custom sizes and shapes available.



# Filters and coatings for any environment

Andover Corporation is experienced in designing and manufacturing optics for a variety of environments, criteria, and applications. For example, our **space-qualified filters** are engineered to withstand the extreme temperatures, radiation levels, and mechanical stresses of space.

We employ rigorous testing and quality control processes to ensure each filter meets the stringent requirements of aerospace missions, supporting applications from satellite imaging to deep-space exploration.



# Accessories

- Manual and motorized filter wheels
- Temperature controllers
- Quick-change filter mounts
- Threaded filter rings
- Epolite FH-5313 epoxy

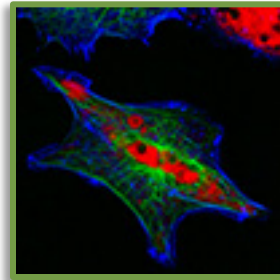




# Serving Demanding Markets and Applications

## Markets Served:

- Defense & Aerospace
- Environmental
- Science & Industry
- Instrumentation
- Astronomy
- Semiconductor
- Imaging
- Biotechnology
- Medical Devices
- Telecommunications
- Universities & National Labs
- Resellers & Representatives



## Applications:

- Surveillance & Targeting
- Night Vision Systems
- Environmental Monitoring
- Oil/Water/Gas Analysis
- Agricultural Imaging
- Fluorescence Studies
- Spectroscopy
- Thermal Imaging
- Astronomy



# Quality Assurance

Andover Corporation operates using a Quality Management System certified to several standards.

- **ISO 9001:2015** Registration
- **AS 9100:2016** Registration
- Fully compliant with **DFARS 7012**
- **FedRAMP Moderate** file sharing service for secure sharing of **CUI** and **ITAR** materials
- Received high praise during **NIST 800-171** gap analysis



# Additional Information

**Cage Code:** 0J798

**DUNS no:** 09-427-6854

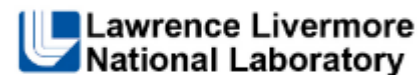
**EIN:** 04-2607555

**SIC Codes:** 3827 Optical Instruments & Lenses

**NAICS code:** 333314 Optical Instrument & Lens Manufacturing

**Exostar** Approved Supplier

# Trusted Partners



# Thank you!



**Shaping the Spectrum  
With Precision and Passion**

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