

Dual-Band Infrared Anti-Reflection Coatings

Anti-Reflection (AR) Coatings Provide High Transmission in the MWIR and LWIR



DESCRIPTION

Current and next-generation infrared (IR) imaging systems require simultaneous performance at the MWIR (mid-wave, typically 3-5 μ m) and LWIR (long-wave, typically 8-12 μ m or 7.5-13.5 μ m) spectral bands. Dual-band atmospheric transmission performance is challenged to equal or outperform the classic single wavelength band designs. As IR imaging instruments utilize many transmissive elements in the optical path, maximizing per-element throughput is critical to achieve high-levels of system performance.

Reynard's Dual-Band IR anti-reflection (AR) coatings achieve measured peak transmission values of over 99.5% in both bands.

Depending on specific system requirements, high-performance dual-band AR coatings can be applied to a variety of IR materials, in large or small sizes, and on plano or curved surfaces.

Our coatings are deposited using hard materials in a proprietary deposition process verified to result in excellent environmental durability and spectral performance.

Reynard can customize any filter to meet the performance needs of your system. All manufacturing is done in-house for improved quality, ease of communication and innovative customization.

KEY SYSTEM BENEFITS

REDUCED OVERALL SYSTEM WEIGHT

A dual-band optical system requires fewer optical elements compared to multiple, single-band systems.

MORE SIGNALS AT THE DETECTOR

With every optical surface, transmission through the system is reduced. High efficiency AR designs ensure more signal reaches the sensor.

BETTER PERFORMANCE

Advanced coating performance to enhance IR systems.

HIGH-DURABILITY

Meets demanding IR system requirements with minimal layers that are stable & durable.

ENVIRONMENTAL

Able to withstand MIL-SPEC environmental testing including humidity, temperature, abrasion (moderate), and adhesion.

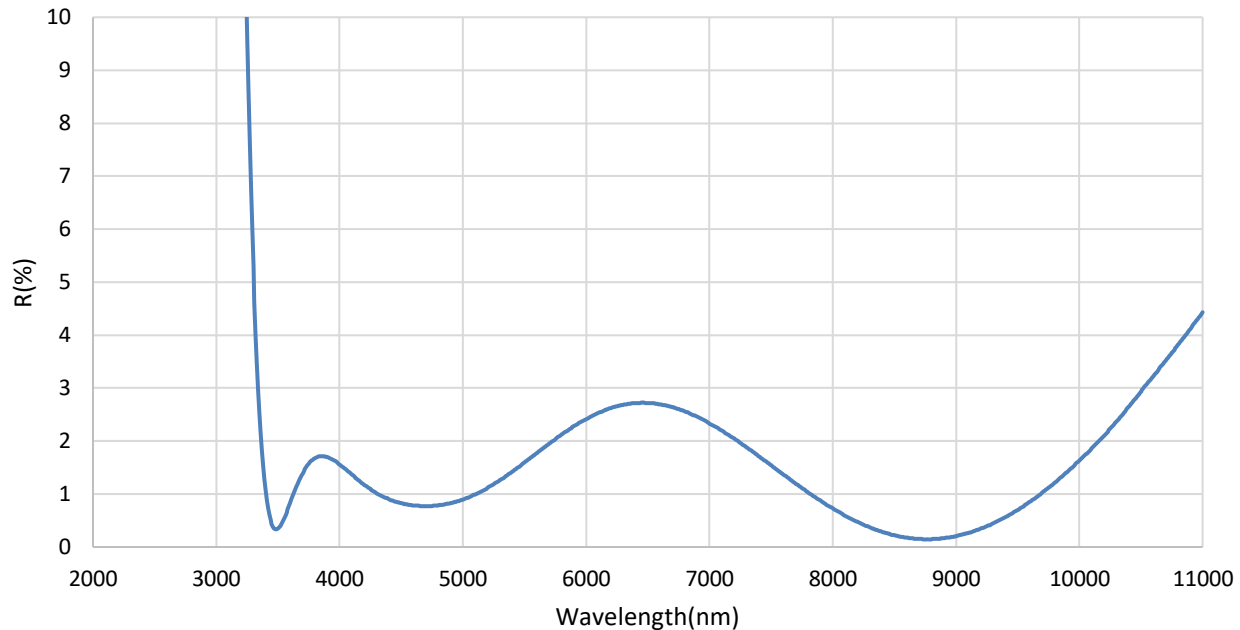
BETTER IMAGING

Ensures clear and accurate images under most lighting conditions without using costly filter switching mechanisms.

SMALLER FOOTPRINT

With fewer optical elements in the optical path, the system can be designed into a smaller enclosure, reducing weight, and providing space for additional system functionality.

Theoretical Reflection of Dual Band AR Coating at 80K



SPECIFICATIONS

Property	Value
Material	Ge, InAs, ZnS, ZnSe, and others
Size	Custom, upon request
Surface	Plano, Convex, Concave Polished edges/chamfers available
Surface Quality	Per MIL-C-48497A/48616(MIL-PRF-13830B) Standard: D-C (40-20) Limit: B-A (10-5)
Wavelength Band	3.0µm to 5.0µm 8.0µm to 12.0µm
Spectral Performance	<u>0° AOI, f/4.3, 80K</u> $T_{avg} > 97.0\%$ $T_{max} > 99.5\%$
Environmental	MIL-C-48497A 3.4.1.1 – Adhesion 3.4.1.2 – Humidity 3.4.1.3 – Abrasion (moderate) 3.4.2.1 – Temperature Cryogenic cycling to 80K
Damage Threshold	Fluence $> 1\text{J}/\text{cm}^2$

KEY FEATURES

- Custom tuned to specific wavelength band requirements.
- Deposition on a variety of IR materials.
- Substrate configurations include aspherical, spherical, and flats of custom sizes.
- Environmentally durable.
- Prototype to production volumes.
- Build-to-print manufacturing.
- Custom applications are welcome.

APPLICATIONS

- Current and 3rd Gen FLIR Instruments
- Night imaging
- Imaging through smoke and fog
- Target detection and identification
- Weather imaging