

# High Performance Thin Film Optical Coatings

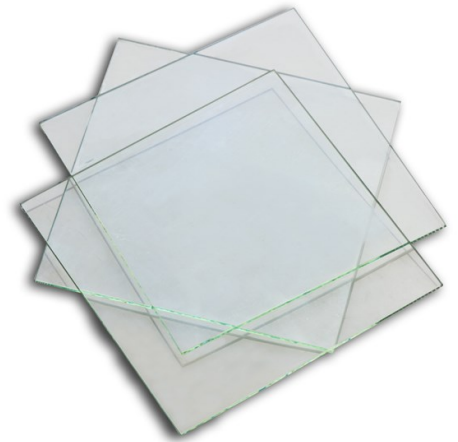
## Technical Reference Document

09/13

### Coatings Capabilities

#### Anti-Reflective (AR)

These coatings are all dielectric single or multi-layers and are designed for low reflectance and high transmittance in the UV, visible, and near IR spectral bands.



#### Features

- High transmittance
- Low reflectance
- Operating temperature of  $\geq 300^{\circ}\text{C}$  (typical)
- Durable and easy-to-clean

#### Specifications: (standard)

##### Substrates

- Soda lime float glass
- Polished and drawn technical glass materials such as BK7 fused silica and Eagle XG
- Borofloat<sup>®</sup> Borosilicate
- IR materials such as silicon, zinc selenide, and germanium
- Water white float glass
- Crystalline materials such as CaF<sub>2</sub> and crystal quartz

**Thicknesses** - range from 0.1mm to over 25.4mm and thicker

**Reflectance** - as low as 0.05% depending upon wavelengths covered

**Transmittance** - typically very high. Contact us for specific values for each substrate material

AR coatings from ZC&R meet the requirements of MIL-C-675C, MIL-C-14806A, and MIL-C-48497A. AR Coatings are often crucial components in optical systems with multiple lenses or other optics where the maximum possible light energy is needed. AR coatings help to produce brighter images while reducing the intensity of ghost images which may otherwise be produced in optical systems having multiple reflecting surfaces.

Custom and standard AR coatings commonly deposited by ZC&R are generally separated into two groups. The first group is made up of AR coatings that target one or more broad wavelength bands. Our BARC coatings are examples of this group.

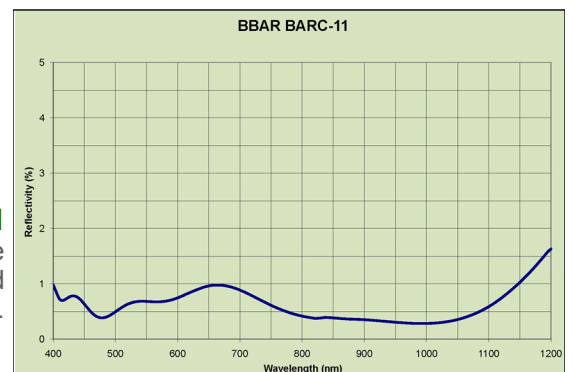


#### BBAR BARC-5 High Efficiency Coating

This high efficiency broadband anti-reflective coating reflects less than 0.5% average from 425-675nm. Higher performance specifications are also available. Standard & custom coatings are available for refractive indices of 1.46-1.90.

#### BBAR BARC-11

This broadband coating provides a low level of reflectance across a wide spectrum from 400-1100nm, reflecting less than 1.0% average. Standard and custom coatings are available for refractive indices of 1.46 to 1.90.

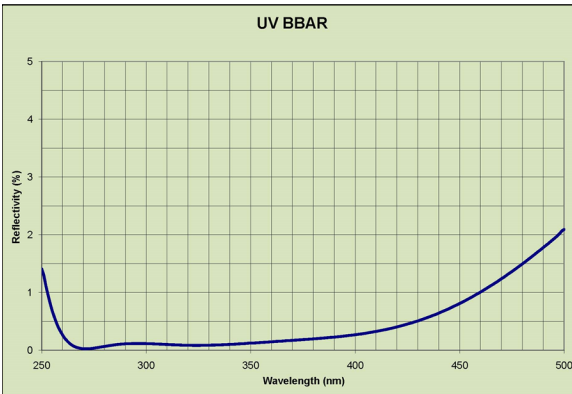


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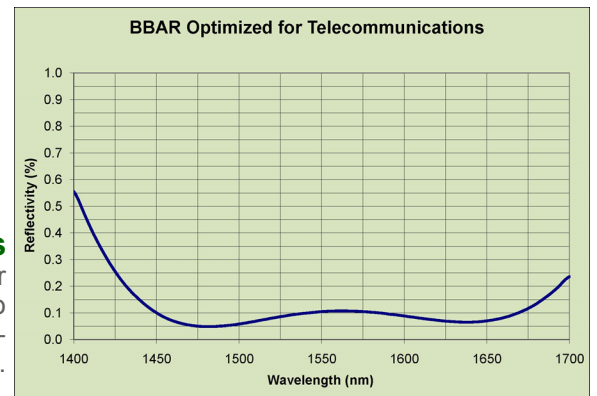
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### Anti-Reflective (AR) - continued



#### UV BBAR

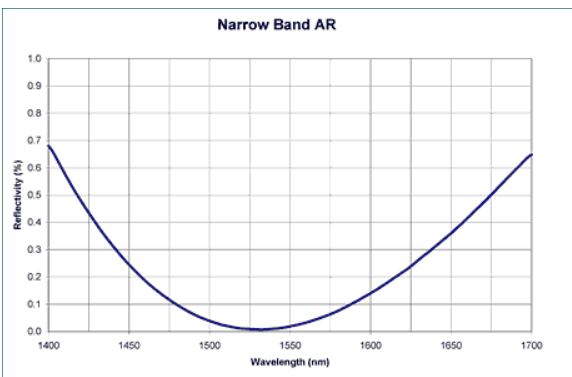
This broadband AR coating is particularly designed for the ultra-violet region. It provides a low level of reflectance less than 0.5% average from 275-425nm. Standard & custom coatings are available for refractive indices of 1.46-1.90.



#### BBAR Optimized for Telecommunications

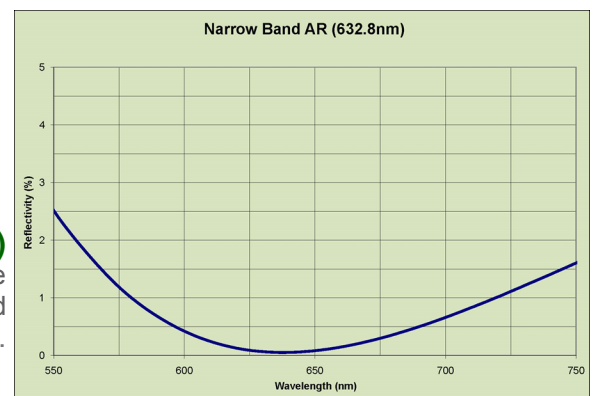
This broadband AR coating is particularly designed for telecommunication applications. It provides a low level of reflectance to less than 0.25% average from 1450-1650nm. Standard & custom coatings are available for refractive indices of 1.46-1.90.

The second group of AR coatings, V-coating target one or more narrow wavelength bands. V-coats are used to target a single wavelength such as 632.8nm or 532nm, or a single very narrow band of wavelengths.



#### Narrow Band AR (nominally centered @ 1550nm)

This narrow band AR is an excellent coating for targeting a single wavelength or very narrow band of wavelengths at or near 1550nm. Standard < 0.25% and high performance < 0.05% reflectivity specifications are available.



#### Narrow Band AR (nominally centered @ 632.8nm)

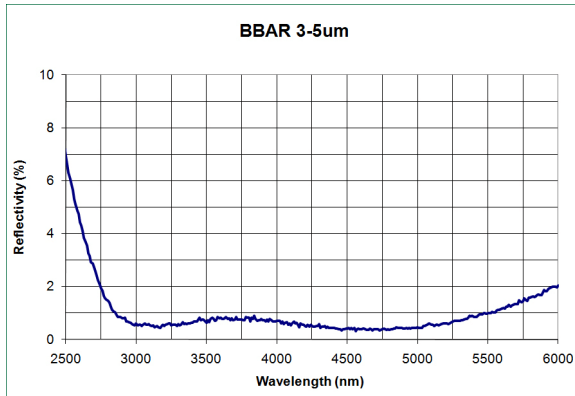
This narrow band AR is an excellent coating for targeting a single wavelength or very narrow band of wavelengths. Standard < 0.25% and high performance < 0.05% reflectivity specifications are available.

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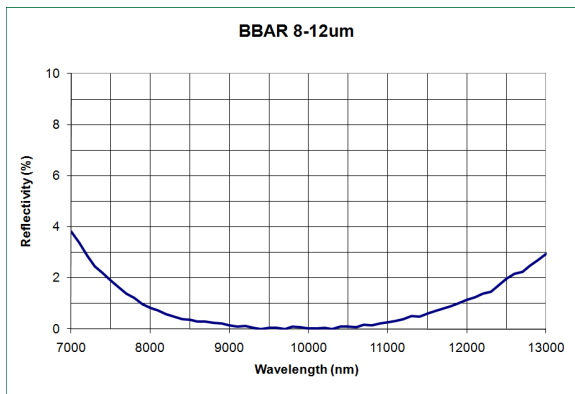
09/13

### Anti-Reflective (AR) *continued*



#### IR-BBAR 3-5 Microns

This AR coating provides a low level of reflectance for the mid-infrared spectrum (3000nm to 5000nm). Band averaged reflectance is less than 1.0% at normal incidence.



#### IR-BBAR 8-12 Microns

This AR coating provides a low level of reflectance for the far-infrared spectrum (8um to 12um). Band averaged reflectance is less than 1.0% at normal incidence.

**Custom AR Coatings** - Often, our customers need a custom AR coating that is tailored to meet their specific requirements. The ZC&R Coatings for Optics division of Abrisa Technologies has developed thousands of AR coatings to fulfill such needs. If you have a custom AR requirement just let us know, and we will be happy to submit a design curve for your review.