Accuflect™: Light-Reflecting Ceramic

Accuflect™ reflects 95% to 99% of incident light from 450 nm to 2500 nm. The reflectivity is essentially non-specular with nearly perfect LAMBERTIAN behavior across the entire spectrum.

Manufacturing Accuflect

Accuflect™ material is fabricated with high purity metal oxides free of transition metals and their compounds. Accuratus engineers working with many established laser physicists, laser engineers and materials scientists have developed a closely controlled manufacturing environment capable of producing Accuflect™ with consistent and repeatable material properties.

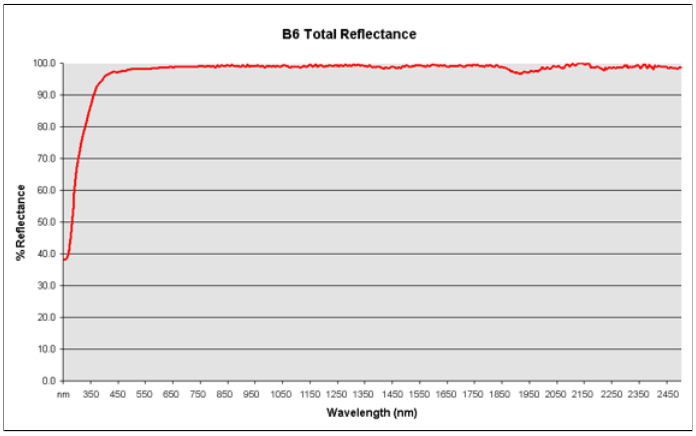
Types of Accuflect Ceramic

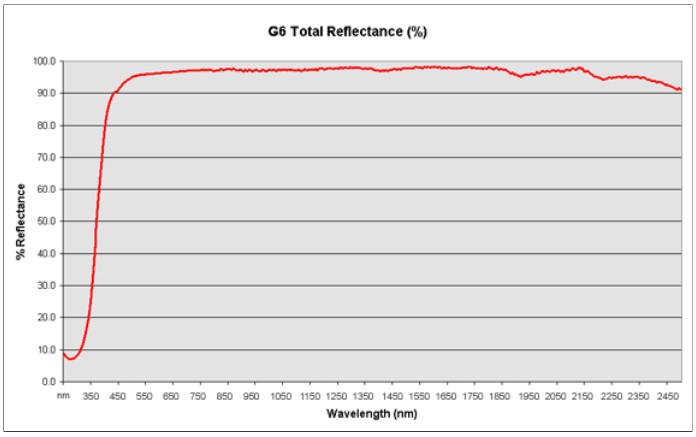
Accuflect™ is available in two product types. The B6 material has the virgin ceramic surface produced during manufacture. The G6 material has a specialty clear glaze applied to seal the surface porosity of the virgin material, allow easy cleaning and provide a non-contaminating surface where it is exposed to atmosphere or liquid environments.

Accuflect Optical Properties

The binary and ternary group metal oxides have a large band gap between their valence and conduction bands so they absorb little radiation between the ultraviolet and infrared. Thus, the broadband, high reflectance characteristic of Accuflect™ as shown in the total reflectance curves for virgin B6 and glazed G6 material.

Standard Products





Measurements Performed by Optical Data Associates Tucson, AZ

The fine microstructure with the related short mean path length and discontinuous refractive indices of the ceramic body combine to maximize diffuse light reflectance on reflectors as thin as three millimeters. The total reflectance can be broken into the diffuse component and the specular component. The Accuflect™ B6 exhibits virually no specular reflection.

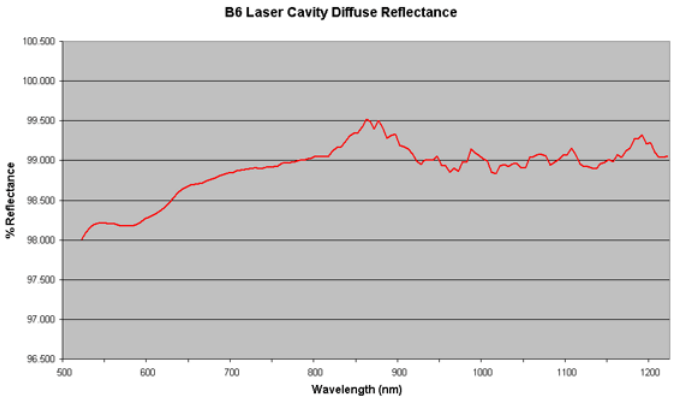
Accuflect™

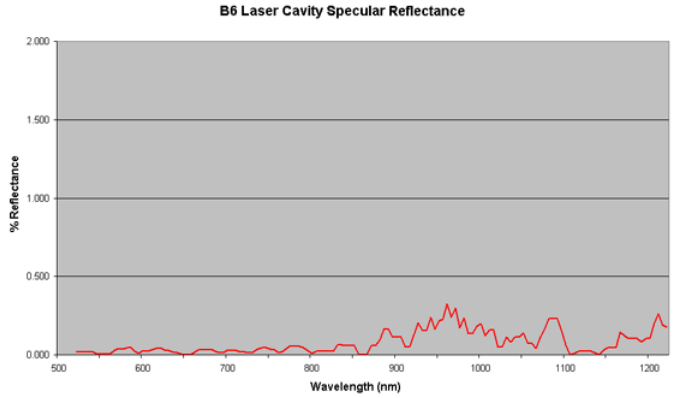
>Laser Reflectors

>Infrared Reflectors

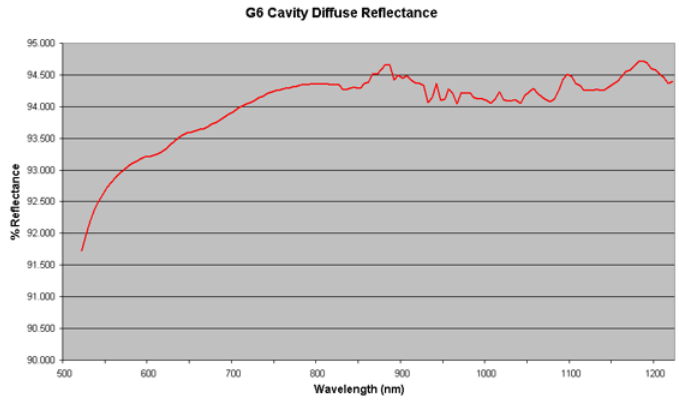
Macor

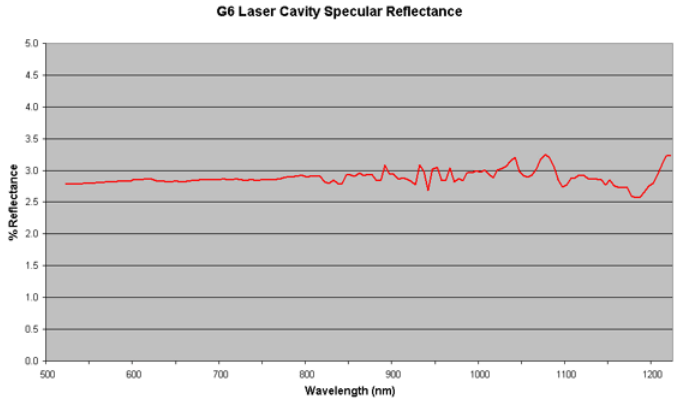
Ceramic Rod & Tube



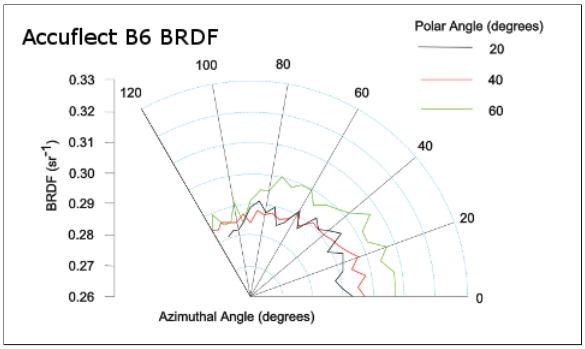


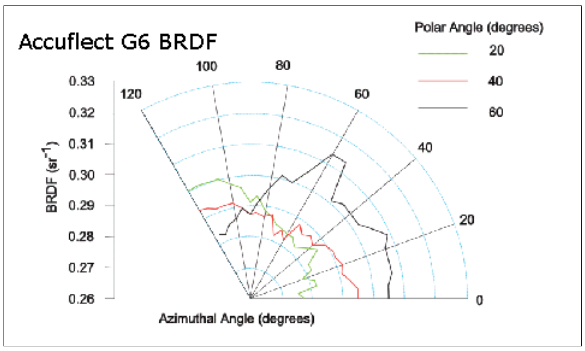
The glazed surface on Accuflect™ G6 exhibits some specular reflection. These measurements are performed by trapping the light falling along the specular ray relative to the incident ray and taking the difference in flux between the total reflectance and the total less the specular component of reflection. Note that these curves are developed with an air interface. If the Accuflect™ G6 is immersed in a medium other than air, with a corresponding higher refractive index, the specularity will be reduced.





Another way to express the "diffuseness" of a surface is to measure the Bidirectional Reflectance Distribution Function or BRDF. The BRDF curves give you an idea of the "diffuseness" of the Accuflect™ materials. An ideal Lambertian reflector would have a uniform reflectance of Π^{-1} steradians. A more in depth discussion of the reflectance characteristics of the material is available by downloading "The Reflectance Characteristics of Accuflect™ Light Reflecting Ceramic".





Physical properties of Accuflect are listed in the Materials section.

Available Accuflect Sizes

Optimal optical performance requires proprietary fabrication and firing processes developed by Accuratus. For your design purposes, the initial material forms are pressed as rods and blocks. For large orders, the material can be pressed to near net shape.

	Rods *diameter x length*	**Blocks** *height x width x length*
millimeters	up to 100mm x 450mm	up to 75mm x 75mm x 450mm
inches	up to 4" x 18"	up to 3" x 3" x 18"

Accuratus' fabrication team can shape the material to your final geometry.

Accuflect Applications

Accuflect is used in a number of applications. The Case Studies section identifies several applications where the highly diffuse, highly efficient reflection properties are used to good advantage. Applications include:

- 1. Optically pumped laser cavity reflectors
- 2. Intense Pulsed Light therapy reflectors
- 3. Reflectors in high temperature luminaires

- 4. Solar cell manufacturing
- 5. Thermophotovoltaics

The Bottom Line

If you need a reflector material capable of being formed in complex geometries, usable up to 1000°C, capable of maintaining reflectance and integrity in extreme environments then consider **Accuflect™: The Light Reflecting Ceramic** for your application.

See also: Custom Products and Services > Laser Ceramics
See also: Case Studies > Laser Reflectors

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