

OPTOLON 2™ : THE INTEGRATING SPHERE

Integrating spheres are used in many areas of light measurement. Some of these spheres are small, for example those generally used in irradiance measurements, and may be packed with a high reflectivity powder coating such as PTFE. For applications such as total flux measurements, spheres can be very large: typically 2 meters diameter or bigger. PTFE powder lacks the mechanical strength to reliably support its own weight at diameters greater than about 30 cm; so alternative, less reflective, materials are used to coat them. These alternative materials are sprayable, so that any size or shape may be coated, but have many disadvantages. Despite the problems with such coatings, they are widely used since there are no alternatives - until now. Optolon 2™ is a high reflectivity sprayable coating, based on barium sulfate that solves these problems and fully deserves the description of “the sphere coating of the future.”

OPTOLON 2™

- Strong
- Durable
- Washable
- Sandable
- Highly reflective
- Sprayable
- Moldable
- Insensitive to moisture
- The solution to many problems
- Available on a custom or OEM coating basis

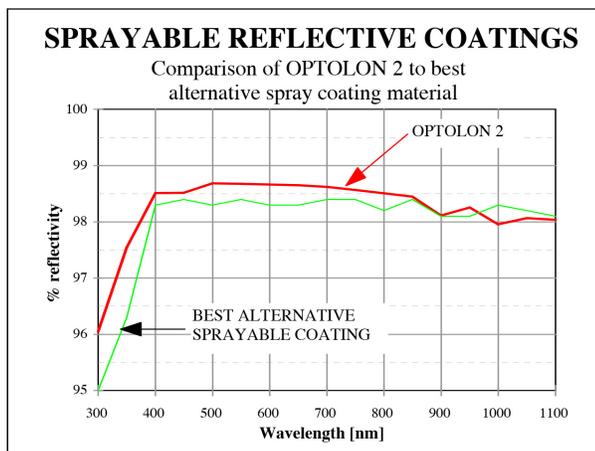


Figure 1 OPTOLON 2. A barium sulfate based high reflectivity visible coating.

Reflectivity

Optolon 2™ exhibits higher diffuse reflectivity than even the best sprayable coating previously available (see Figure 1).

Sphere Efficiency

The throughput of a sphere of any design varies non-linearly with the reflectivity of the coating. The formula shown is used to calculate relative sphere efficiency (α), where p is the reflectivity of the coating. This means that a sphere coated with Optolon 2™, with up to 98.6% reflectivity in the visible, is **15% more efficient** as the best alternative sprayable coating having a reflectivity of 98.4% ($\alpha = 70.4$ vs $\alpha = 61.5$).

Cleaning

One problem with untreated PTFE, and previously available sprayable coatings, is that they cannot be cleaned. Any dirt or marks remain until the sphere is recoated, decreasing the sphere's efficiency. Optolon 2™ is washable with water so the efficiency can remain high and recoating is a rare event rather than an annual interruption in work schedules.

Sensitivity to moisture

Water absorbs IR light, degrading the reflectivity of coatings and making their performance unpredictable. Other sprayable coatings use a binding material that absorbs water, making it necessary to “dry out” the sphere by regular exposure to intense light to maintain its performance during measurements. Optolon 2™ is hydrophobic (*rejects water*) so this tedious and time consuming “drying out” process is never needed.

Mechanical Properties

Optolon 2™ is made up of interlocked particles to give the rigidity necessary to support its own weight at any sphere diameter yet is easily sanded to give a new surface. Since the sanding action actually breaks the joints between particles rather than the particles themselves, the new surface always has the desired matte finish and the same optical properties as the old. Thus, surface scratches and nicks may be removed without recoating.

Temperature Limits

Temperatures below freezing have not been tested nor are they recommended. Maximum temperature is 150°C, though it is recommended staying below this point, otherwise the material will depolymerise and give off monomer. The paint and adhesives used in the assemblies have a maximum temperature limit of 85°C.

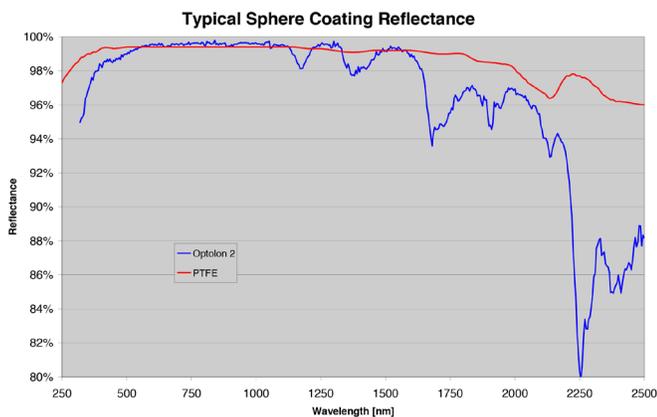
Applications

Optolon 2™ is well suited to many custom and OEM applications, including:

- Integrating Spheres
- Diffuse Reflectance Standards
- Diffuse Reflectance Targets
- Uniform Radiance Sources
- Lamp Cavities and Reflectors
- Diffusers
- High-efficiency Coatings for Lamp Fixtures and Baffles

Optronic Laboratories has over 30 years of experience in customizing our products to suit individual needs. Our experts are always available to discuss your specific applications.

Optolon 2™ is a trademark of Optronic Laboratories.



OPTRONIC[™]
LABORATORIES

Information Sheet: IS17 Jan 2019

As part of our policy of continuous product improvement, we reserve the right to change specifications at any time.