Spectralon® Reflectance Material Care and Handling Guidelines

To maintain the unique optical and reflectance properties of Spectralon reflectance material, the following cleaning and handling procedures must be followed.

General Care

Spectralon is an optical standard and should be handled in much the same way as other optical standards.

Although the material is very durable, care should be taken to prevent contaminants such as finger oils from contacting the material's surface. Always wear clean gloves when handling Spectralon.

Cleaning Instructions

If the material is lightly soiled, it may be air brushed with a jet of clean dry air or nitrogen. DO NOT use Freon.

For heavier soil, the material can be cleaned by sanding under running water[1] with a 220 - 240 grit waterproof emery cloth until the surface is totally hydrophobic (water beads and runs off immediately).

Blow dry with clean air or nitrogen or allow material to air dry.

If the material requires high resistance to deep UV radiation, prepare the piece as above, and then perform either of the following two treatments:

1. Flush Spectralon piece with >18 MΩ.com distilled, deionized water for 24 hours.
2. Vacuum bake the Spectralon piece at 75°C for a 12 hour period at a vacuum of 1 Torr or less, then purge the vacuum oven with clean dry air or nitrogen.

[1]Low reflectance Spectralon (<10% reflectance) should be dry sanded.

Information on coolant requirements for laser chamber applications is located on the reverse side of this instruction sheet.

For further information on care and handling of Spectralon Reflectance Material, please contact the Labsphere Technical Sales Department

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Coolant requirements for Laser-grade Spectralon Material

Spectralon laser cavities and reflectors are sensitive to contaminants in the cooling water that runs through the cavities. Contaminants may include plasticizers from tubing, metal ions from the water supply, degraded ion exchange resin, or epoxy components. These impurities tend to collect in the porous structure of the material and cause photolytic degradation. This photolytic degradation leads to a reduction in efficiency and output from the cavity. When the cavity is disassembled it will show some basic symptoms of degradation. These may include:

a) yellowing of the surface of the reflector
b) red or other colored posts or streaks on the reflectors, generally along the seams
c) black spots, pits or streaks on the reflector

To prevent coolant-related degradation, we recommend the following standards for your cooling system:

1. Tubing should be stainless steel [2], polypropylene or Tygon.
   (Tygon should be rinsed in hot water to remove plasticizers [3].)
2. Double distilled or deionized water would be used in all cooling systems.
3. Reflectors should be kept away from all non-polar substances. These include machine oil, finger grease, etc.
4. Flow rate of the coolant system should be high enough to maintain an operating temperature as low as possible, preferably below 40°C.
5. The coolant system should include particle filters and a deionizing column. (Labsphere recommends using a Mace Model 932 filter.) Note that most deionizing columns have a maximum operating temperature of approximately 40°C. Use of the columns above this temperature cause them to decompose and introduce contaminants that may cause photolytic degradation.

[2] High temperature water systems without proper deionization may cause degradation of the stainless steel. Traces of iron and chromium from this reaction may cause discoloration of the cavity.

[3] Plasticizers (generally in the form of dibutyl or diethyl phthalate) will be leached from Tygon tubing at most temperatures in a flow system. Increasing the temperature increases the rate of the leaching process. These plasticizers readily absorb ultraviolet light and are a likely cause of yellowing in degraded cavities using Tygon in the coolant stream.