Ocean Optics
A HALMA COMPANY
830 Douglas Ave.
Dunedin, FL 34698
+1 727-733-2447
www.OceanOptics.com

ISS-REF
Integrating Sphere
Installation and Operation Instructions

Description

The ISP-REF Integrating Sphere is an illuminated sampling optic that couples via optical fiber to Ocean Optics miniature fiber optic spectrometers to measure reflectance of solid objects or emission of spectral sources. The ISP-REF Integrating Sphere has a transfer optic assembly for restricting the fiber viewing angle, a 0.4" aperture sample port, and a built-in light source (tungsten halogen) with 12-volt DC adapter.

Application Tips

- The ISP-REF has two primary functions:
    1. To provide even surface illumination for reflectance measurements, such as determining the color of flat surfaces; and
    2. To collect light and funnel it to an optical fiber for emission experiments, such as measuring the spectral properties of an LED.
- The ISP-REF is small and compact. It's just 2.11" x 2.25" x 3.25" (LWH) and weighs less than 2 pounds, yet is durable enough for use outside the laboratory. All instrument electronics – including the lamp, which can be replaced by simply removing two screws – are mounted into the bottom section of the unit.
- The sphere is made from Spectralon®, a white diffusing material that provides a highly lambertian reflecting surface. A simple switch allows users to manipulate the sampling optic for the inclusion (I) or exclusion (E) of specular reflectance.
- The reflectivity value, obtained by calculating the difference between the inclusion and exclusion of specular reflection, is a direct measurement of the gloss of the surface.

Operation

Turning on Power

► ***Procedure***

1. Locate the on/off switch on the front of the ISP-REF.
    - The **1** is the ON position.
    - The **0** is the OFF position.
2. Turn the lamp on.

Setting the Shutter

1. Locate the shutter switch on the back of the integrating sphere.
    - The **I** (Includes) position means that the resulting reflection measurement includes both specular and diffuse reflections.
    - The **E** (Excludes) position means that the resulting reflection measurement excludes specular reflection (only obtains diffuse reflection measurements).
2. Move the switch to the mode necessary for your application.

Using the Optical Fiber Ports

The ISP-REF has SMA connectors for two optical fibers:

- **S** (Sample) is used to couple an optical fiber to the spectrometer to measure the reflection from a flat surface.
- **R** (Reference) offers two features not available with most other integrating spheres. One function of the R port is to couple an optical fiber to a second channel in the spectrometer. This channel can be used to monitor the Integrating Sphere's built-in tungsten halogen lamp, which provides even surface illumination.

  The other function of the R port is for the coupling of an optical fiber to collect light. This may be advantageous for applications involving the collection of a wide-angle beam of light, especially where the beam is much larger than the size of the entrance optics.

Specifications

Specification	Value
Dimensions (LxWxH):	54 x 57 x 83 mm (2.11" x 2.25" x 3.25”)
Weight:	864.7 g (1.9 lbs.)
Spectral range (built-in lamp):	~360-2500 nm
Sphere diameter:	38.1 mm
Sample port diameter:	10.32 mm
Sphere coating:	Spectralon doped with BaSO4
Spectralon reflectivity:	>98% (400-1500 nm) >95% (250-2000 nm)
Reflectance measurements:	Diffuse or specular and diffuse
Bulb life:	900 hours
Bulb color temperature:	3100 K
Replacement bulb:	Yes (ISP-REF-B)
Connector:	SMA 905
Operating temperature range	0 °C – 40 °C (32 °F – 104 °F)