



**Dr. Gröbel**  
UV-Elektronik GmbH

*we apply photonics.*

# Integrating Spheres



*Fig. 1: Small integrating spheres*

Integrating spheres distribute incoming light by diffuse reflection uniformly on their inner surface. They are used in different measuring applications for the integration of radiation and as a source of uniform diffuse radiation.

The function of the sphere is based on its highly diffuse reflecting inner surface and the spherical shape. Besides the selection of the proper coating material for the measuring wavelength, the portion of port areas in the total sphere surface is important for its function. Port areas generally should not exceed 5% of the surface. Much smaller port areas may be acceptable depending of the requirements of the application. Please ask us for a proper sphere design for your application. We use barium sulphate, special PTFE (Teflon) and gold as diffuse reflectors. Barium sulphate is best suited for coating very large spheres for the UV/VIS range. PTFE is advantageous for smaller and mid-sized spheres for the visible and UV range. Gold is preferably used in the NIR and IR spectral ranges.

Our standard integrating spheres are equipped with 2 ports, an internal baffle and a support. We offer a wide range of accessories such as light traps, stabilized light sources, light guides and spheres with integrated illumination. For radiometric measurements with the spheres, we recommend the radiometer RM-12 with the respective sensors.

## Applications

- Measurement of Luminance and radiance of lamps and other light sources
- Laser power measurement
- Measurement of lamps, LED, OLED, displays and light guides
- Detector calibration
- Measurement of diffuse reflection and transmission
- Uniform light source



*Fig. 2: Installation of a 2.5 m integrating sphere at the Physikalisch-Technische Bundesanstalt PTB*

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**Technical Data**

Inner diameter: 25 to 2500 mm  
 Coating: BaSO<sub>4</sub>  
 PTFE  
 Gold  
 Wavelengths: BaSO<sub>4</sub> 200-2500 nm  
 PTFE 200-2500 nm  
 Gold 0.7 - 20 µm  
 Ports: 2 (standard)  
 Baffles: 1 (standard)  
 Options: Internal illumination  
 Additional ports  
 Accessoires: Light traps  
 Light sources  
 Light guides  
 Radiometer RM 12



Fig. 3: 175 mm integrating spheres with 20 µm diffuse gold plating for the infrared spectral range

**Part numbers**

**BaSO<sub>4</sub>:**  
(Inside coated metal hollow cavity)

Diameter / mm	Part numbers
25	850101
50	850102
75	850103
100	850104
150	850106
200	850108
300	850112
1000	850140
1500	850160
2500	850200
4000	850260

**PTFE:**  
(PTFE cylinder with hollow cavity in Al housing, from 1000 mm inside coated metal hollow cavity)

Diameter / mm	Part numbers
25	850301
50	850302
75	850303
100	850304
150	850306
175	850307
200	850308
250	850310
300	850312
1000	850340
2500	850400
4000	850460

**Gold:**  
(Inside coated metal hollow cavity)

Diameter / mm	Part numbers
25	850501
50	850502
75	850503
100	850504
150	850506
175	850507
200	850508
300	850512

Other sizes are available on request.