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LABORATORIES

OL SERIES 426-S

Low Light Level Integrating Sphere Calibration Standard

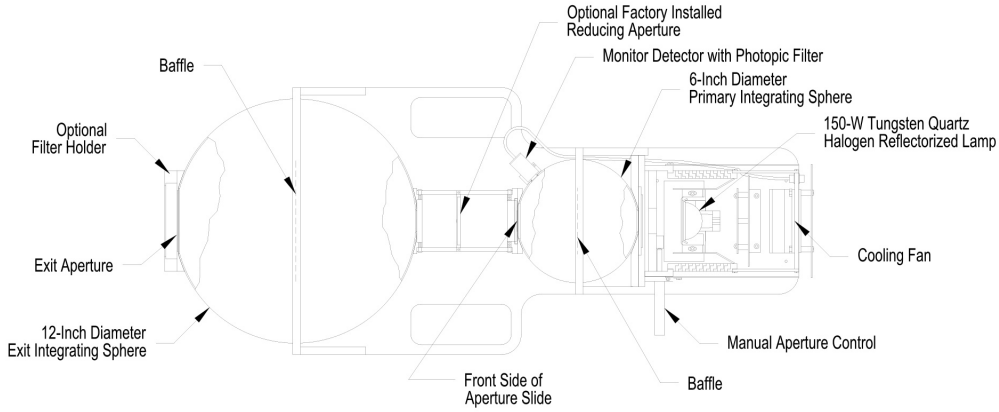
The OL Series 426-S Integrating Sphere Calibration Standard is designed for accurately calibrating very sensitive microphotometers, image intensifiers, telephotometers, and imaging spectroradiometers for photometric or spectroradiometric response at moderate to extremely low light levels. It serves as a highly accurate, large area, uniform, diffusely radiating source with a near normal luminance that can be varied over nearly six decades with essentially constant color temperature. The OL Series 426-S consists of an OL Series 426-S Optics Head and an OL 400-CS Controller. This enables remote location of either unit that facilitates alignment or positioning of the source with respect to the device to be calibrated.

In order to achieve very low radiance levels that can be tracked accurately with a monitor detector, the instrument is based on a dual integrating sphere design. The arrangement of these spheres are in series, with the exit port of the first (primary) sphere producing a uniform beam into the entrance port of the exit (secondary) sphere.

The instrument is based on the OL 455-6S Integrating Sphere Calibration Standard with a secondary sphere that varies in diameter depending on the radiating port size required. The primary sphere is 6 inches in diameter with a 1.5 inch exit port. A baffle tube connects the exit port of this sphere to the entrance port of the secondary sphere.

An optional factory installed aperture in the baffle tube determines how much light will be allowed into the secondary sphere. The size of the aperture in the baffle tube between the primary and secondary spheres determines the attenuation between the spheres, and essentially this can range over many decades, depending on the size of the aperture installed. This aperture is not used to determine the true radiance of secondary sphere radiating port, but merely to scale it by the desired amount. The actual radiance of the secondary sphere radiating port is calibrated via measurements.

Optional user interchangeable aperture slides at the exit port of the intermediate sphere can be supplied with a calibration for each aperture. This provides a very broad range of luminance/radiance levels that can be selected by insertion of the aperture slides. The photopic monitor detector on the primary sphere tracks the radiance in the primary sphere and the OL 400-CS Controller display is scaled to indicate the radiance at the exit port of the secondary/exit sphere. When optional aperture slides for the exit port of the intermediate sphere are supplied, unique calibration factors are supplied for each aperture.



OL 426-12S Integrating Sphere Calibration Standard (Top View)

OL 426-OH OPTICS HEAD SPECIFICATIONS	
Luminance Uncertainty *(k=2)*	± 2.0% *(2300 K to 2950 K (± 50 K))* ± 2.0% to ± 3.5% *(2000 K to 2300 K)*
Spectral Radiance Uncertainty *(@ 550 nm, k=2)*	± 2% *(Relative to NIST)*
Correlated Color Temperature Range	2000 K to 2950 K *(± 50 K)*
Correlated Color Temperature Uncertainty *(k=2)*	Less than ± 25 K
Luminance Stability *(@ 2856 K)*	Short Term: ± 0.5% *(After 15 Minutes Warm-up)* Long Term: ± 2% *(100 Hours of Use or 1 Year)*
Radiance Stability	± 0.5% *(After 15 Minutes Warm-up)* ± 4% @ 350 nm *(100 Hours of Use or 1 Year)* ± 2% @ 550 nm *(100 Hours of Use or 1 Year)* ± 3% @ 1000 nm *(100 Hours of Use or 1 Year)*
Sphere Coating *(Reflectance)*	>99% *(350 nm to 1100 nm)*
Sphere Luminance Monitor *(Built-In)*	High Accuracy Silicon Detector with Filtered CIE Photopic Response *(Temperature Stabilized)*
Variable Aperture	Manually Operated Micrometer-controlled
Shutter	Manually Operated *(Open/Close)*
Size	**OL 426-6S:** 23.74" x 10.33" x 8.38" *(65.38 cm x 26.24 cm x 21.29 cm)* **OL 426-8S:** 27.70" x 10.39" x 9.25" *(70.36 cm x 26.37 cm x 23.50 cm)* **OL 426-12S:** 32.00" x 13.25" x 14.00" *(81.28 cm x 33.66 cm x 35.56 cm)* **OL 426-18S:** 39.23" x 21.27" x 20.25" *(97.10 cm x 54.02 cm x 51.44 cm)*
Weight	**OL 426-6S:** 24 lbs. *(10.89 kg)* **OL 426-8S:**30 lbs. *(13.60 kg)* **OL 426-12S:** 35.5 lbs. *(16.10 kg)* **OL 426-18S:**42 lbs. *(19.05 kg)*

OL 400-CS CONTROLLER SPECIFICATIONS	
CURRENT SOURCE	
Range	0.001 A to 6.600 A
Resolution	0.001 A
Accuracy	0.02 % of Full-Scale
Stability	10 ppm After Warm-up
Line Voltage Sensitivity	< 2 ppm / V
Temperature Sensitivity	< 25 ppm / °C
PHOTOMETER	
Ranges	$2E^{-10}$ to $2E^{-3}$ A
Resolution	4 ½ Digits (0.0001 E^{x} A)
Accuracy	E^{-3} to E^{-7} Ranges...0.05 % + 1 Digit E^{-8} to E^{-9} Ranges...0.10 % + 1 Digit E^{-10} Range...0.50 % + 2 Digits
Range Selector	Auto, Manual or Software Selectable
Response Time	0.1 to 10.0 Seconds
PHYSICAL	
Size	13.25" D x 9.38" W x 5.38" H *(33.65 cm x 23.83 cm x 13.67 cm)*
Weight	17.5 lb. *(7.9 kg)*
Power Input	100/115/230 VAC, 3.2/3.2/2 A, 50/60 Hz
Operating Temperature Range	15°C to 35°C
Operating Humidity Range	10 % to 85 % *(Non-condensing)* ± 2 % @ 550 nm, 100 hours of use or 1 year ± 3 % @ 1100 nm, 100 hours of use or 1 year

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LUMINANCE LEVELS *(NOMINAL)* SPECIFICATIONS					
MODEL NUMBER	EXIT SPHERE DIAMETER	EXIT PORT DIAMETER	UNIFORMITY	MAXIMUM LUMINANCE	
				@ 2856 K	@ 3000 K
OL 426-6S	6" *(15.24 cm)*	1.5" *(3.81 cm)*	±1.0%	40 fL	70 fL
OL 426-8S	8" *(20.32 cm)*	2" *(5.08 cm)*	±1.0%	29 fL	40 fL
OL 426-12S	12" *(30.48 cm)*	3" *(7.52 cm)*	±1.0%	14 fL	23 fL
OL 426-18S	18" *(45.72 cm)*	6" *(15.24 cm)*	±2.0%	4 fL	7 fL
**Other configurations available upon request.*					

CALIBRATION OPTIONS	
OL 426-XS	Luminance, Correlated Color Temperature
OL 426-XS-1	Luminance, Correlated Color Temperature, [1]/Spectral Radiance *(350 to 1100 nm)*
OL 426-XS-U	Uncalibrated

**Note: "X" designates the diameter of the integrating sphere.*

[1]/Spectral radiance measured at a color temperature of ~3000K unless otherwise specified.

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