

# OL SERIES 455-S

*Integrating Sphere Calibration Standard*

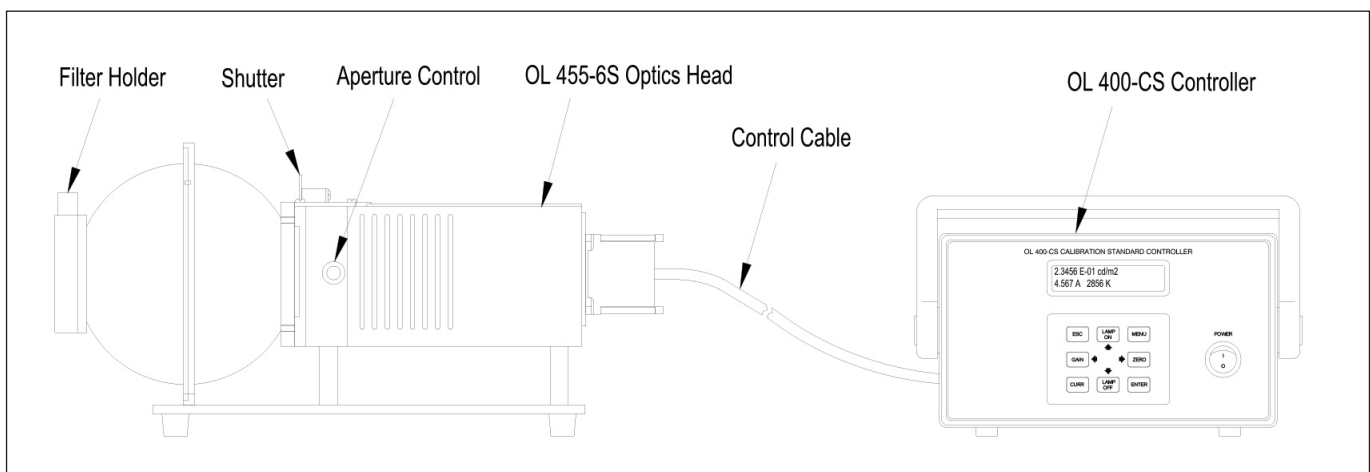
The [OL Series 455-S Integrating Sphere Calibration Standard](#) is designed for accurately calibrating microphotometers, image intensifiers, telephotometers, and imaging spectroradiometers for photometric, radiometric, and spectroradiometric response. It is a large area, uniform, diffusely radiating source with a near normal luminance that can be varied over many decades without changing the color temperature. The OL Series 455-S consists of an OL Series 455-S Optics Head and an OL 400-CS Controller. This enables remote location of either unit which facilitates alignment or positioning of the source with respect to the device to be calibrated. The OL Series 455-S Optics Head consists of a source module, precision variable aperture, integrating sphere, and temperature stabilized monitor detector.

The source module has a 150-watt tungsten quartz-halogen reflectorized lamp with a micrometer-controlled aperture between the lamp and the integrating sphere. This combination provides for continuous adjustment of the sphere luminance over a range of 106. The integrating sphere is coated with a highly reflective, diffuse coating and produces a near perfect luminance source.

A precision silicon detector-filter combination with an accurate photopic response is mounted in the sphere wall and monitors the sphere luminance. The detector is thermally stabilized at a constant temperature to reduce settling time and non-linearity as you increase or decrease the luminance output. The in-line

sphere ports design, with an intermediate (center) baffle, provides exceptional luminance levels while maintaining high uniformity in the near normal luminance across the radiating exit port's aperture. A shutter is located between the lamp and the entrance port of the integrating sphere allowing the luminance/radiance output to be switched between zero and any desired level without adjustment or lamp changes. An optional filter holder, mounted at the exit port, accommodates alignment targets, filters, etc. for specific user requirements. Spectral shaping filters can be utilized to simulate various sources such as illuminant A, B, C, D65, etc.

The OL Series 455-S is designed such that it can be configured with integrating spheres having diameters of 6, 8, 12, or 18 inches with exit (radiating) ports of 1.5, 2, 3, and 6 inches diameter respectively.



| OL 455-OH OPTICS HEAD SPECIFICATIONS   |   |
|--|---|
| <b>Luminance Uncertainty at Set Point</b> (@ 2856 K, k=2)<br><i>(Refer to the report of calibration for luminance set point)</i> | ± 0.5% <i>(Relative to NIST)</i><br>± 2.0% <i>(2300 K to 3000 K)</i><br>± 2.0% to ± 3.5 % <i>(2000 K to 2300 K)</i>   |
| <b>Spectral Radiance Uncertainty</b> (@ 550 nm, k=2)   | ± 2% <i>(Relative to NIST)</i>  |
| <b>Correlated Color Temperature Range</b>  | 2000 K to 3000 K  |
| <b>Correlated Color Temperature Uncertainty</b> (k=2)  | ± 25 K  |
| <b>Luminance Stability</b> (@ 2856 K)  | Short Term: ± 0.5%<br><i>(After 15 Minutes Warm-up)</i><br>Long Term: ± 2%<br><i>(100 Hours of Use or 1 Year)</i>   |
| <b>Radiance Stability</b>  | ± 0.5%<br><i>(After 15 Minutes Warm-up)</i><br>± 4% @ 350 nm<br><i>(100 Hours of Use or 1 Year)</i><br>± 2% @ 550 nm<br><i>(100 Hours of Use or 1 Year)</i><br>± 3% @ 1000 nm<br><i>(100 Hours of Use or 1 Year)</i>  |
| <b>Sphere Coating</b> <i>(Reflectance)</i>   | >99% <i>(350 nm to 1100 nm)</i>   |
| <b>Sphere Luminance Monitor</b> <i>(Built-In)</i>  | High Accuracy Silicon Detector with Filtered CIE Photopic Response<br><i>(Temperature Stabilized)</i>   |
| <b>Variable Aperture</b>   | Manually Operated<br>Micrometer-controlled  |
| <b>Shutter</b>   | Manually Operated <i>(Open/Close)</i>   |
| <b>Size</b>  | <b>OL 455-6S:</b> 16" L x 11" W x 8" H<br><i>(40.6 cm x 28 cm x 20.3 cm)</i><br><b>OL 455-8S:</b> 18" L x 12" W x 11" H<br><i>(45.7 cm x 30.5 cm x 28 cm)</i><br><b>OL 455-12S:</b> 20" L x 14" W x 13" H<br><i>(50.8 cm x 35.6 cm x 33 cm)</i><br><b>OL 455-18S:</b> 28" L x 20" W x 20" H<br><i>(71 cm x 50.8 cm x 50.8 cm)</i> |
| <b>Weight</b>  | <b>OL 455-6S:</b> 16 lbs. <i>(7.3 kg)</i><br><b>OL 455-8S:</b> 19 lbs. <i>(8.6 kg)</i><br><b>OL 455-12S:</b> 33 lbs. <i>(15 kg)</i><br><b>OL 455-18S:</b> 48 lbs. <i>(22 kg)</i>  |

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

| CALIBRATION OPTIONS   |  |
|---|--|
| <b>OL 455-XS</b>  | Luminance,<br>Correlated Color Temperature   |
| <b>OL 455-XS-1</b>  | Luminance, Correlated Color<br>Temperature, <sup>1</sup> / <sub>1</sub> Spectral Radiance<br><i>(350 to 1100 nm)</i> |
| <b>OL 455-XS-2</b>  | Luminance, Correlated Color<br>Temperature, <sup>1</sup> / <sub>1</sub> Spectral Radiance<br><i>(350 to 2500 nm)</i> |
| <b>OL 455-XS-U</b>  | Uncalibrated   |
| *Note: "X" designates the diameter of the integrating sphere.<br><sup>1</sup> / <sub>1</sub> Spectral radiance measured at a color temperature of ~3000K<br>unless otherwise specified. |  |

**OPTRONIC™**  
LABORATORIES

Data Sheet: B108 Dec 2018

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

**LUMINANCE LEVELS (NOMINAL) SPECIFICATIONS**

| MODEL NUMBER      | SPHERE DIAMETER | EXIT PORT DIAMETER | UNIFORMITY | MAXIMUM LUMINANCE |           |
|-------------------|-----------------|--------------------|------------|-------------------|-----------|
|                   |                 |                    |            | @ 2856 K          | @ 3000 K  |
| <b>OL 455-6S</b>  | 6" (15.24 cm)   | 1.5" (3.81 cm)     | ±1.0%      | 12,000 fL         | 20,000 fL |
| <b>OL 455-8S</b>  | 8" (20.32 cm)   | 2" (5.08 cm)       | ±1.0%      | 9,000 fL          | 13,000 fL |
| <b>OL 455-12S</b> | 12" (30.48 cm)  | 3" (7.52 cm)       | ±1.0%      | 4,000 fL          | 6,400 fL  |
| <b>OL 455-18S</b> | 18" (45.72 cm)  | 6" (15.24 cm)      | ±2.0%      | 700 fL            | 1100 fL   |



**Data Sheet: B108 Dec 2018**

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