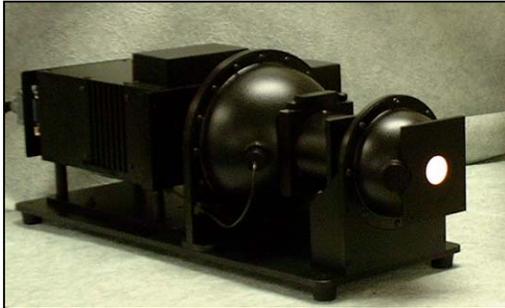




OPTRONIC LABORATORIES, INC.

Light Measurement Specialists Since 1970

OL Series 426 Low-Light-Level Integrating Sphere Calibration Standard



OL 426-OH Optics Head



OL 450-C Controller

GENERAL

The OL Series 426 Low-Light-Level Calibration Standard is designed for accurately calibrating very sensitive microphotometers, image intensifiers, telephotometers, and imaging spectroradiometers for photometric, radiometric, 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 6 decades with essentially constant color temperature.

The OL Series 426 consists of an Optics Head and a separate electronic display console/power supply (OL 450-C 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 source module/optics head is designed such that it can be configured with integrating spheres having diameters of 4, 6, 8, 12 and 18 inches with exit (radiating) ports of 1, 1½, 2, 3 and 6 inches, respectively.

OPTICS HEAD

The OL 426 is based on a dual integrating sphere design, with the arrangement of these spheres in series. The exit port of the first sphere, or primary sphere, produces a uniform beam into the entrance port of the secondary sphere. A baffle tube connects the exit port of the primary sphere to the entrance port of the secondary sphere, and an aperture in the baffle tube determines how much light is allowed into the secondary sphere, thus the maximum luminance at the radiating port can range over several decades depending on the size of the aperture installed. The aperture is not used to determine the true luminance at the exit port of the secondary sphere but merely scale it by the desired amount. A precision silicon detector-filter combination with an accurate photopic response mounted in the wall of the primary sphere tracks the luminance in the primary sphere at higher levels for accuracy purposes, and the luminance display is scaled to indicate the actual luminance at the exit port of the secondary sphere. The actual luminance of the exit port is calibrated via measurements, and then the monitor detector gain is scaled appropriately.

The Optics Head utilizes a 150-W tungsten-halogen, reflectorized lamp with a micrometer-controlled variable aperture between the lamp and the entrance port of the primary integrating sphere. This combination provides for continuous adjustment of the sphere luminance over a range of more than 10^6 , which is tracked and displayed by the OL 450-C Controller.

The in-line sphere port concept with an intermediate spider baffle provides exceptional uniformity in the near normal luminance across the radiating port.

A shutter is located between the lamp and the entrance port of the primary sphere. The location of the shutter ensures that stray light from room lights are properly measured (and hence associated errors eliminated). In addition, the luminance/radiance output can 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, de-coupling diffusers etc. for specific user requirements. Spectral shaping filters can be utilized to simulate various sources such as illuminates A, B, C, D65, etc. In addition to luminance and color temperature, the OL Series 426 can be obtained with calibrations for spectral radiance over the 350 to 1100 nm wavelength range.

CONTROLLER

The control chassis contains the lamp power supply and the photometer amplifier. The power supply is a highly regulated DC constant current design optimized for source stability and accuracy. The lamp current is displayed on a 4-digit meter and can be adjusted via a precision current control from zero to full power rating. An automatic ramp function is used to control the lamp turn-on current rise-time, which eliminates electrical shocking of the lamp due to high initial current surges. This feature preserves the lamp calibration for the useable life of the lamp. Also, to further protect the lamp, a trip circuit automatically cuts off power to the lamp when the current exceeds a preset safety limit. The display console has a "luminance monitor" switch for selecting direct readout in luminance units of footLamberts or candelas/m². A built-in elapsed time meter enables the user to keep track of the number of hours the lamp has been in operation.

OL SERIES 426 SPECIFICATIONS

OL 426-OH OPTICS HEAD

Luminance Uncertainty (@ 2856K, 90% max. luminance).....	±2% relative to NIST
Color Temperature Range	2000 to 3000 K
Color Temperature Uncertainty	±25 K
Source Stability @ 2856 K	
Short Term.....	±0.5%
Long Term	±2% 100 hours/1 year
Spectral Radiance Uncertainty @ 550 nm.....	±2% relative to NIST
Sphere Coating (reflectance)	>99% (350 to 1100 nm)
Variable Aperture	Micrometer Controlled
Shutter.....	Open/Closed

OL 450-C CONTROLLER

Luminance Display (4½ digits)	fL or cd/m ²
Luminance Display Ranges.....	0.002, 0.02, 0.2, 2, 20, 200
Lamp Current	
Display	4 digits
Range	0 to 6.500 amperes DC
Power Cycle	60 second ramp function
Accuracy.....	±0.05% @ 6.500 amperes
Regulation	±0.01% for 10% line variation
Temperature Regulation.....	±0.025%/10° C
Lamp Timer	0 to 9999.99 hours
Operating Temperature Range	15° to 35° C
Operating Humidity Range	10% to 85% (non-condensing)
Power (user selectable)	115 or 230 VAC ±10%, 50/60 Hz
Size	15.5" x 11.5" x 6"
Weight	19.5 lbs.

LUMINANCE LEVELS (nominal)

Model Number	Sphere Diameter	Exit Port Diameter	Uniformity	Maximum Luminance		Display Resolution
				@ 2856 K	@ 3000 K	
OL 426-4	4"	1"	±0.5%	80 fL	130 fL	1 E-7 fL
OL 426-6	6"	1½"	±0.5%	40 fL	70 fL	1 E-7 fL
OL 426-8	8"	2"	±0.5%	29 fL	40 fL	1 E-7 fL
OL 426-12	12"	3"	±0.5%	14 fL	3 fL	1 E-7 fL
OL 426-18	18"	6"	±1.0%	4 fL	7 fL	1 E-7 fL

Other configurations available upon request.

CALIBRATION OPTIONS

OL 426-X.....	luminance, color temperature
OL 426-X-1	luminance, color temperature, ^{1/} spectral radiance (350 to 1100 nm)
OL 426-X-U.....	uncalibrated

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

^{1/}Spectral radiance measured at a color temperature of ~3000K unless otherwise specified.