

OL 200, OL 220, and OL 245 High-Accuracy Irradiance Standards



OL 200 Calibration Standard

irradiance calibrations over all or part of the 250 to 2500 nm wavelength region. In addition, the 1000-W DXW and 200-W lamps can be calibrated out to 4500 nm.

The spectral irradiance standards issued by Optronic Laboratories are based on the National Institute of Standards and Technology (NIST) Spectral Irradiance Scale for the wavelength range of 250 to 2400 nm and on a blackbody for the wavelength range above 2400 nm. The NIST Scale has an uncertainty (k=2) of 0.63% in the visible, 1.56% in the ultraviolet at 250 nm, and 0.31% in the infrared at 2000 nm.

Optronic Laboratories offers 1000-W DXW, 200-W, and 45-W lamps as standards of spectral irradiance, total irradiance, illuminance, and color temperature. These lamps have tungsten coiled-coil filaments enclosed in a small quartz envelope. The lamp standards can be obtained with spectral



OL 220 Calibration Standard

Calibration of the 1000-W DXW and 200-W lamps over the wavelength range of 250 to 2400 nm are available with two levels of accuracy: high-accuracy and super high-accuracy. The High-Accuracy Standards of Spectral Irradiance issued by Optronic Laboratories have a transfer uncertainty (k=2) relative to the NIST Scale of $\pm 1-2\%$. The



OL 245 Calibration Standard

Super High-Accuracy Standards have a transfer uncertainty relative to the NIST Scale of $\pm 0.5\%$.

PERFORMANCE SPECIFICATIONS

	1000-W	200-W	45-W
Spectral Irradiance (nominal)			
@ 250 nm (W/(cm ² nm))	2×10^{-8}	5×10^{-9}	2×10^{-10}
@ 1050 nm (W/(cm ² nm))	2.5×10^{-5}	5×10^{-6}	9×10^{-7}
Total Irradiance (nominal mW/cm ²)	30	6	1.5
Illuminance (nominal footcandles)	800	170	22
Transfer Uncertainty *			
High-Accuracy	$\pm 1\%$	$\pm 1-1.5\%$	$\pm 1-2\%$
Super High-Accuracy	$\pm 0.5\%$	$\pm 0.5\%$	N/A
Uncertainty * - Illuminance	$\pm 1\%$	$\pm 1\%$	$\pm 1\%$
Long Term Photometric Stability	$\leq \pm 0.06\%$	$\leq \pm 0.06\%$	$< \pm 0.06\%$
**	/ hr	/ hr	/ hr
Operating Current (amps DC)	8.000	6.500	6.500

*Uncertainty is relative to NIST Scale at k=2

** High stability option available

CALIBRATION OPTIONS

	1000-W	200-W	45-W
Spectral Irradiance:			
250 - 750 nm	OL 200A	OL 220A	OL 245A
750 - 2500 nm	OL 200B	OL 220B	OL 245B
250 - 2500 nm	OL 200C	OL 220C	OL 245C
250 - 1100 nm	OL 200M	OL 220M	OL 245M
380 - 780 nm	OL 200V	OL 220V	OL 245V
250 - 4500 nm	OL 200IR	OL 220IR	N/A
Total Irradiance	OL 200D	OL 220D	OL 245D
Total and Full Spectral	OL 200H	OL 220H	OL 245H
Illuminance (only)	OL 200P	OL 220P	OL 245P
Color Temperature (only)	OL 200K	OL 220K	OL 245K
Uncalibrated (seasoned)	OL 200U	OL 220U	OL 245U

For illuminance and/or color temperature calibrations in addition to any of the above calibrations, add the suffix "P" and/or "K" respectively to the appropriate model number.

For super high-accuracy calibrations (1000-W or 200-W) add the suffix "S" to the appropriate model number.

OPTIONAL ACCESSORIES

	1000-W	200-W	45-W
Lamp Holder	OL 56	OL 57W	OL 57
Adjustable Lamp Holder Mount	OL 63	OL 63	OL 63
Programmable DC Current Source	OL 83A	OL 65A	OL 65A

Method of Calibration

The instrumentation and methods used by Optronic Laboratories to transfer calibrations from a standard of spectral irradiance to an uncalibrated lamp is patterned after that used at NIST. The measurement procedure employs the highly accurate wavelength-by-wavelength method of comparison (Figure 1). This minimizes the errors associated with setting the lamp current, distance, wavelength, and repeatability.

In this technique, both lamps (standard and test) are operated at the same distance. The spectral irradiance of both lamps is measured at a set wavelength by translating the double monochromator along the optical bench to view each source. A wavelength-by-wavelength comparison is made at all of the NIST calibration wavelengths.

The High-Accuracy Standards are calibrated by comparison to a standard that was calibrated directly against a NIST standard. The Super High-Accuracy Standards are compared directly to a NIST standard.

Optional Accessories

Optronic Laboratories offers several accessories to enable the user to realize the high accuracy assigned to its NIST-traceable standards. These accessories are designed to minimize errors due to current setting, alignment, and orientation.

The OL 65A and OL 83A Programmable DC Current Sources are specifically designed for operating the lamp standards at the exact calibration current. (See Bulletin 121 for further details).

There are six dimensional variables involved in the NIST recommended alignment of a lamp relative to the instrument. The OL 56, OL 57, and OL 57W Lamp Holders and OL 63 Adjustable Lamp Holder Mount (Figure 2) are designed to allow the user to control the physical positioning of the lamp including distance, horizontal distance, vertical distance, pitch (tilt), yaw (rotation), and roll.

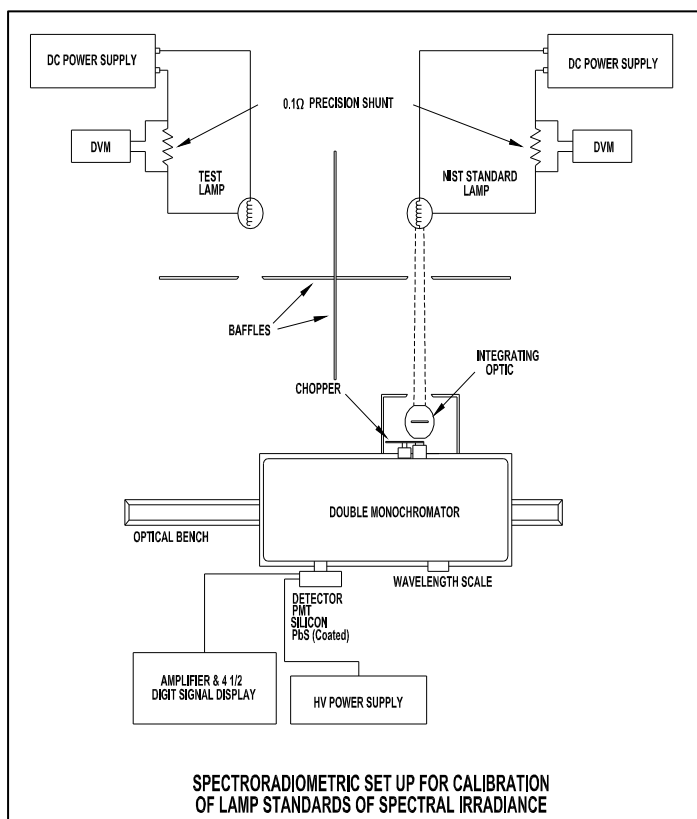


Figure 1

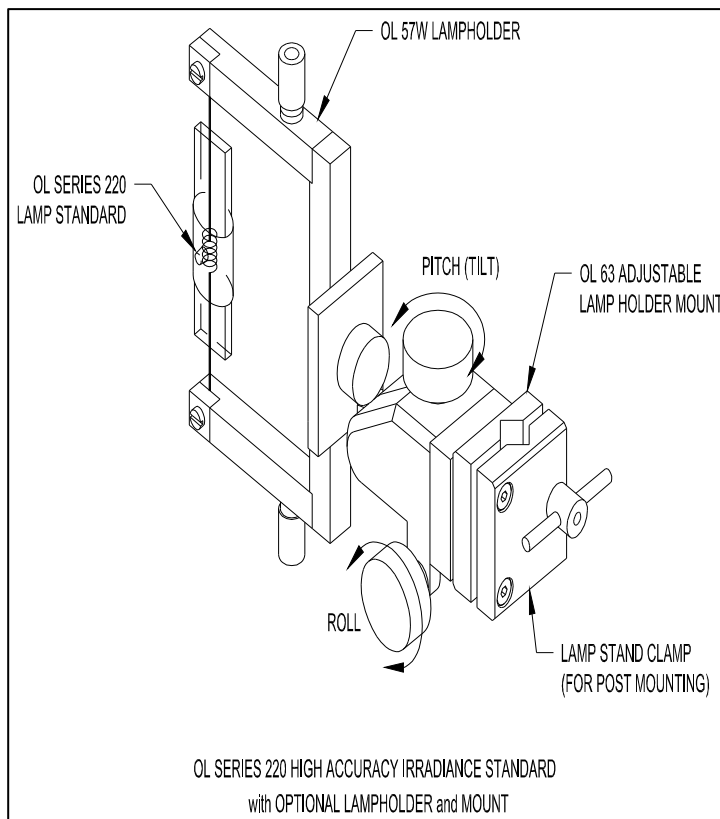


Figure 2