

5000 FEL 1000 Watt Lamp Source

PRODUCT SUMMARY

The Model 5000-16C 1000 WATT FEL Lamp Standard provides absolute calibration of spectral irradiance from 250 nm to 2.5 microns. This Tungsten-Halogen Lamp Standard bears the ANSI designation of FEL. It has been selected by the National Institute of Standards and Technology to replace the 1000 watt, DXW standard. In addition, the new 5000-16C Lamp Standard is calibrated to the 1973 NIST spectral irradiance scale whereas the DXW standard was calibrated to the 1965 NIST Scale. The 5000-16C Lamp Standard is a bi-pin 1000 watt lamp that is adapted by Gamma Scientific into a bi-post configuration. It is used in conjunction with the 5000-18 Lamp Holder and 5000-17 Lamp Alignment Jig to obtain a higher degree of accuracy as a result of improved alignment reproducibility.

Lamp calibration is directly traceable to the National Institute of Standards and Technology by incorporation of two NIST spectral irradiance scales. The new, more accurate 1973 NIST scale is used in the spectral region of 250 to 1600 nanometers. The NIST specified uncertainty is approximately 2% at 250 nm, decreases to 1% at 450 nm, and becomes less than 1% up to 1600 nm. The precise techniques of transfer calibration at Gamma Scientific result in estimated accuracies for the 5000-16C Lamp Standard of 2.4% at 250 nm, 1.8% at 450 nm, and 1.5% over the range from 555 to 1600 nm. The 1965 NIST Scale of spectral irradiance is used over the spectral range from 1700 to 2500 nanometers. The NIST uncertainty over this wavelength region is approximately 3%. No appreciable degradation of accuracy occurs as a result of the Gamma Scientific transfer calibration process. A slight discontinuity might be discernible at the crossover point of the two referenced NIST Scales.



FEATURES

- Quartz Halogen, ANSI Type FEL, 1000 Watt Lamp
- 1.0 - 8.3 AMP Operating Current
- Spectral Irradiance, 193 Tabulated points consisting of:
 - 34 direct transfer points
 - 159 derived points
- 250 to 2500 nm Spectral Range
- Spectral Irradiance Uncertainties (NIST Standards):
 - $\pm 0.8\%$ from 450-1600 nm, widening to $\pm 1.94\%$ at 250 nm and to $\pm 5\%$ at 2500 nm - Refer to NIST Technical Note 262
- Estimated Accuracy of Illuminance and Luminous Intensity Data is $\pm 3\%$
- Estimated Accuracy of Chromaticity Coordinates is $\pm 0.2\%$
- Estimated Accuracy of Correlated Color Temp. is $\pm 5^\circ K$

TYPICAL IRRADIANCE VALUES

NM	WATTS/cm ² -nm
250	1.55e-08
350	7.44e-07
555	1.04e-05
1100	2.09e-05
1700	1.09e-05
2500	4.17e-06



GAMMA SCIENTIFIC

8581 Aero Drive San Diego, CA 92123 Ph (800) 637-2758 Fax (619) 576-9286

Website: www.gamma-sci.com

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MODEL 5000-17 LAMP ALIGNMENT JIG

The Model 5000-17 Lamp Alignment Jig is used to align the 5000-18 Lamp Holder with respect to the optical axis of the instrumentation to be calibrated. It consists of a rod-mounted piece of plane glass that contains intersection scribe marks. These marks are precisely positioned (± 0.0005 inch) with respect to the bottom of the medium bi-post base. A Helium-Neon laser is used with the 5000-17 and 5000-18 to achieve a high precision of optical axis alignment. It is estimated that this improved mechanical alignment of the Lamp Holder and the Lamp Standard results in a reproducibility of lamp output of 0.3%.

MODEL 5000-18 LAMP HOLDER

The Model 5000-18 Lamp Holder is based upon the original NIST design as described in NIST tech Note 594-2. Its kinematic design permits precise positioning and repositioning of the Lamp Standard when used with the 5000-17 Lamp Alignment Jig. Once alignment of the Lamp Holder is achieved, lamps can be readily interchanged with minimal loss of accuracy. The positioning surfaces consist of one "V-shaped" contact and one "tongue" contact that work with spring loaded cylinders to precisely secure the lamp bi-posts. An Adapter baseplate permits the Lamp Holder to be mounted directly into Gamma Scientific's Mode 5000-6 Lamp Housing. This adapter can simply be removed from the Lamp Holder in applications which do not require the 5000-6 Lamp Housing.



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Model 5000-2B Power Supply

Line Regulation	0.05%
Ramp	8 AMP/min. or other customer required rate
Current Range	1.0 - 8.3A
Elapsed Time Meter	Built into lamp housing ⁽¹⁾
Front Panel Ammeter	LCD digital
Front Panel Voltmeter	LCD digital
Temp. Range	0 - 50° C
Enclosure Size	19 x 5.75 x 20 inches
Weight	15 lbs.
Failsafe Circuit	Yes
Circuit Breaker On-Off	Yes
Warranty	2 years
Digit Current Set	Standard
Long-Term Accuracy	0.05%/8 hrs., 0.1%/1000 hrs.
Temp. Coefficient	0.03%/° C
AC Power Requirements	95-127 or 190-240 ⁽²⁾
Line Frequency	47-63 Hz

(1) Timer may be built into power supply as an option.

(2) Specify at time of order.



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Typical Data Presentation

Certificate Of Calibration/Standard Of Spectral Irradiance	
Lamp NO.	F17
Type	FEL, 1000 Watt Tungsten Halogen
Lamp Current	7.90 Amperes
Calibration Distance	50 Centimeters
NIST Comparison Standards	AS265, AS266, FW011
Gamma Scientific Test NO(S)	508001, 508002, 510001, 510002, 51000, 510004
Derived Photometric Calibrations	
Illuminance At 50 cm	7.674-01 Lumen/Sq. cm. (Phot) 7.130+02 Lumen/Sq. ft. (Foot Candle)
Luminous Intensity	1.919_03 Lumen/Steradian (Candela)
Chromaticity Coordinates	X = .42176 Y = .40619
Correlated Color Temp.	3282 Deg. Kelvin



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