

# Model 5000 FEL 1000-Watt Lamp Source

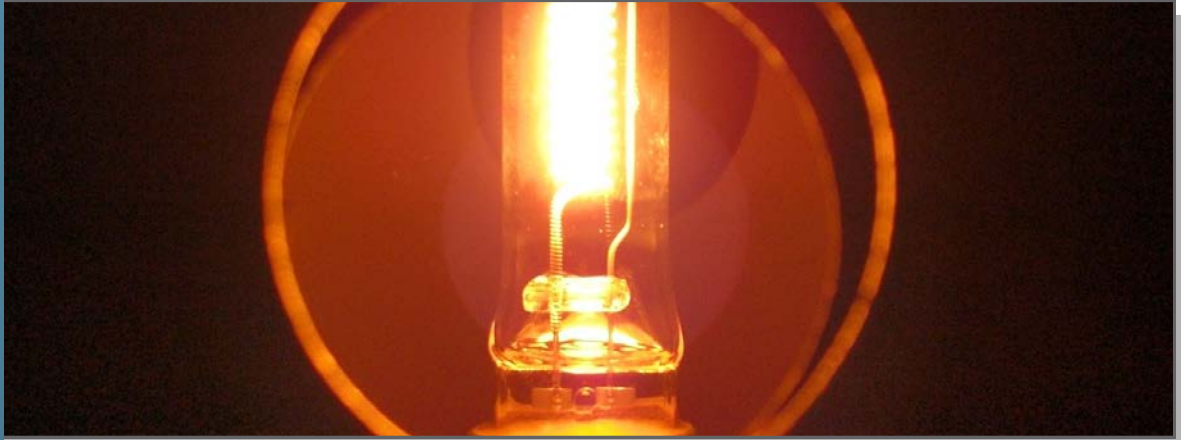


***GAMMA SCIENTIFIC***  
*Light Measurement Solutions*



# **GAMMA SCIENTIFIC** Light Measurement Solutions

## Model 5000 FEL 1000-Watt Lamp Source



### About Gamma Scientific

Since 1961 Gamma Scientific has produced LED, display and light measurement test solutions for production and R&D environments. Gamma Scientific instruments are trusted by leading global organizations that require high-speed, precision measurements and custom configurations for the most challenging environments. Gamma Scientific also operates a NVLAP accredited laboratory that performs LM-79/LM-80 LED testing and is ISO 17025 compliant. NVLAP Lab Code 200823-0.

To view the complete line of test and measurement solutions from Gamma Scientific, please visit our website at [www.gamma-sci.com](http://www.gamma-sci.com).

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**Gamma Scientific's Model 5000 FEL 1000-Watt 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 is calibrated to the 2000 NIST spectral irradiance scale.

The [5000 FEL Lamp](#) comes in two models. The Model 5000-16C is calibrated, while the Model 5000-16A is uncalibrated.

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 5000-15 Lamp Holder and 5000-17 Lamp Alignment Jig to obtain a higher degree of accuracy as a result of improved alignment reproducibility.

### NIST Traceable Calibration

Lamp calibration is directly traceable to NIST 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.

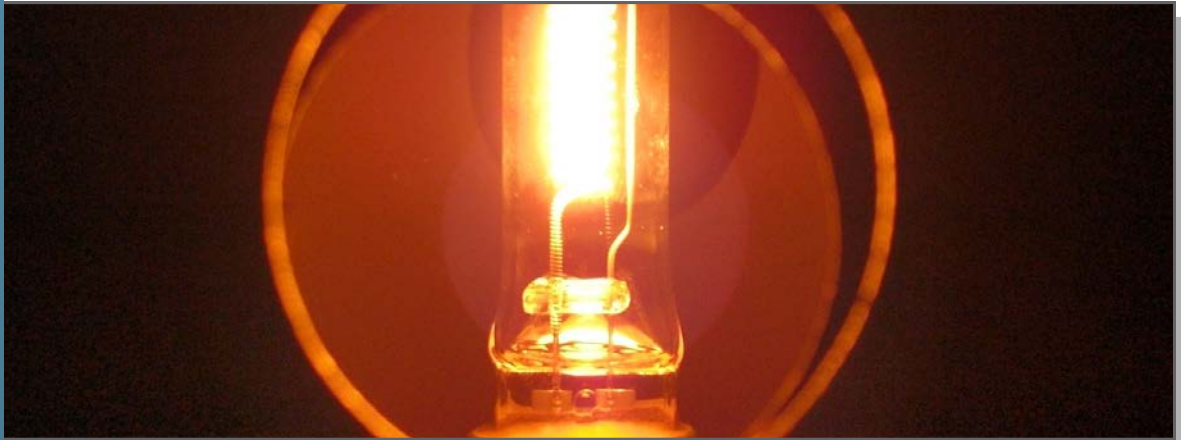
The precise techniques of transfer calibration at Gamma Scientific result in estimated accuracies for the 5000-16C lamp standard of 2.4% at 250 nm, 1.8% at 450 nm and 1.5% over the range from 555 to 1600 nm. The 1965 NIST scale of spectral irradiance is used over the spectral range from 1700 to 2500 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.





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### 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 and 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 250nm and to  $\pm 5\%$  at 2500 nm (refer to NIST Technical Note 262)
- Estimated accuracy of illuminance and luminous intensity is  $\pm 3\%$
- Estimated accuracy of chromaticity coordinates is  $\pm 0.2\%$
- Estimated accuracy of correlated color temperature (CCT) is  $\pm 5^\circ\text{K}$

### Typical Irradiance Values

NM	WATTS/cm <sup>2</sup> -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





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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 ( $\pm 0.0005$  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 the 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 Model 5000-6 lamp housing.** This adaptor can simply be removed from the lamp holder in applications which do not require the 5000-6 lamp housing.





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#### 5000-2C 2000W DC Single Output Power Supply

Line Regulation	0.05%
Output Ratings:	
Current	0 to 18 A
Voltage	0 to 120 V
Programming Accuracy:	
Voltage	120 mV
Current	12 mA
Ripple and Noise from 20Hz to 20MHz:	
Voltage rms	1.9 mV
Voltage peak to peak	16 mV
Current rms	12 mA
Weight	28.2 kg
Dimensions	425.5 mm W x 132.6 mm H x 640mm D
Failsafe Circuit	Yes
Circuit Breaker On-Off	Yes
Warranty	1 year
Long Term Accuracy	0.05%/8 hours; 0.1%/1000 hours
Temperature Range	0—55° C



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### Model 5000-6 Lamp Housing

- Compact and portable lamp housing to shield the 1000-watt lamp from users
- Eliminates stray light from room reflection
- Proprietary thermal exhaust design and integrated fans maintain constant working temperature for the lamp
- Integrated elapsed time meter to track lamp usage





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### Model 5000-6B Precision Shunt Box for Model 5000 Lamp

- High precision dual shunt circuit for monitoring of lamp current
- Lamp current is monitored using an external 6.5 digit voltmeter
- NIST traceable calibration

\*Standard Operating Range for Gamma Scientific Instruments- Temperature: Minimum: 0°C (32°F) - Maximum: 35°C (95°F); Relative Humidity (Non-Condensing): Minimum: 20% - Maximum 70%

\*\*The information contained in this data sheet is based on Gamma Scientific's internal evaluation and is subject to change at any time without notice.

\*\*\*Revised on April 14, 2015