

# LDLS™

## Laser-Driven Light Sources

### EQ-99CAL Broadband, High Brightness Calibration Source

Traditional calibration sources for radiometric calibration, such as Deuterium, Quartz Tungsten Halogen, and Xenon-arc, all have limitations in spectral range. No one source covers the full UV-Visible range from 200nm-800nm with output at comparable levels across that spectrum. In addition, traditional sources require recalibration after 100 hours or less of use and lamp replacement typically after 500 hours. With its revolutionary Laser-Driven Light Source™ (LDLS), Energetiq offers a calibration solution that addresses these limitations and provides a single, broadband, high brightness source for radiometric calibration.

The EQ-99CAL combines radiometric performance with long life, longer recalibration intervals, and low cost of ownership. Calibrations made in the 350nm range are particularly challenging with Deuterium and Quartz Tungsten Halogen lamps. In the case of Deuterium lamps at 350nm, the irradiance is approximately an order of magnitude lower than its value in the deep UV at 200nm. Similarly, Quartz Tungsten Halogen lamps at 350nm are more than an order of magnitude lower in irradiance compared to their value in the visible range. Additionally, it is frequently problematic to have the two separately calibrated lamps agree at the overlapping wavelengths, adding additional uncertainty. With the LDLS, a single calibrated light source covers the whole range from 200nm to 800nm, and at 350nm exhibits an irradiance an order of magnitude higher than traditional calibrated Deuterium and Quartz Tungsten Halogen lamps.

Energetiq's EQ-99CAL product is calibrated at our calibration partner, Bentham Instruments, Ltd. Bentham's calibration standards are traceable to the National Physical Laboratory (UK). A certificate of calibration, which comprises the calibration data and the uncertainty analysis, is included with each EQ-99CAL. Sample calibration reports are available upon request.



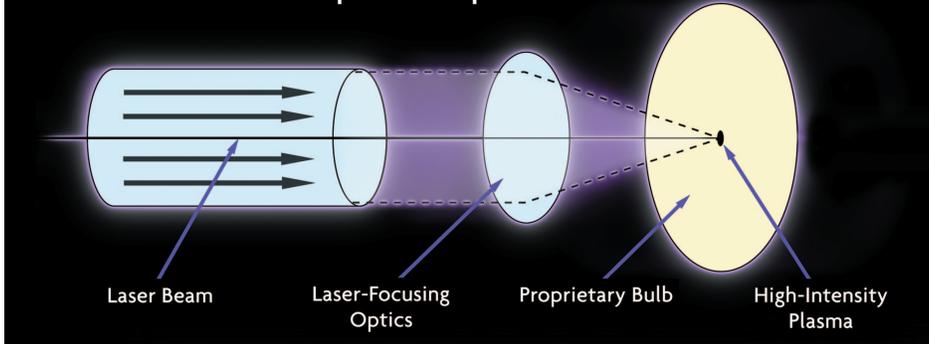
## Features & Benefits

- Based on Field Proven, Laser-Driven Light Source Technology
  - Highest performance and stability
- Single Light Source Covers 200nm-800nm
  - Avoids the need for multiple traditional Deuterium/Tungsten/Xenon sources
  - Strong signal in critical 350nm range (D2/Tungsten crossover)
- Long-Life Bulb – >5000 Hours Typical Life
  - Low consumable cost
- Long Intervals Between Calibrations
  - Low drift compared to D2/Tungsten/Xenon sources
  - Low cost of ownership
- Traceable Calibration
  - Calibrations performed by our calibration partner, traceable to NPL
- Temperature Stabilized Lamp House
  - For highly stable measurements

## Applications

- Light Source Spectral Radiometry
- Spectral Sensitivity Measurements for Sensors, Detectors, Cameras
- Manufacturing Quality Control

## The LDLS™ Principle of Operation



## Specifications

### Overview

- Spectral output from 170nm to 2100nm
- Calibrated spectral irradiance from 200nm – 800nm
- Calibration uncertainty:
  - 200nm - 210nm  $\pm$  12%
  - 210nm - 300nm  $\pm$  8%
  - 300nm - 800nm  $\pm$  5%
 (Confidence level 95% - see calibration report for details)
- Typical bulb life > 5,000 hrs.
- Recommended recalibration frequency: 1000 hours of operation (or one year, whichever comes first)
- Emitting plasma size: 60 $\mu$ m wide X 140 $\mu$ m high, (FWHM), typical
- Optical interface: Diverging beam, Numerical Aperture (NA) up to 0.47

### Physical Specifications

- Lamp
- Power Supply
- Chiller

### System Dimensions (H x W x D)

96.5 x 85.7 x 76.2 mm (3.8 x 3.4 x 3.0 in)  
 107 x 111 x 254 mm (4.2 x 4.4 x 10 in) (excl. feet)  
 325 x 280 x 328 mm (12.8 x 11.0 x 12.8 in)

### Weight

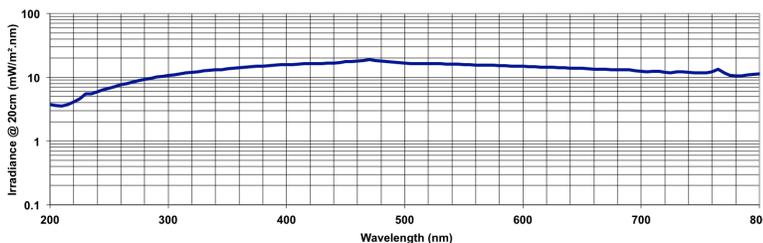
0.9 kg (2 lbs.)  
 1.4 kg (3 lbs.)  
 12.7 kg (28 lbs.)

### Utility Requirements

- Electrical 100-240v, 50/60Hz, 2.5A
- Chiller 100-240v, 50/60Hz, 7A/5A
- Nitrogen Grade 6, 20 psig (0.14 MPa)
- Compliance CE Mark; Class 1 Laser Product

Patent Numbers: US 7,435,982; US 7,786,455; GB 2,450,045; Other patents applied for.

Typical Calibrated Irradiance Spectrum, 200nm - 800nm



## About Energetiq

*Energetiq Technology, Inc. is a developer and manufacturer of advanced light sources that enable the analysis and manufacture nano-scale structures and products. The Energetiq team combines its deep understanding of the high power plasma physics needed for high-brightness light generation with its long experience in building rugged industrial and scientific products. The result is that users can expect the highest levels of performance combined with the highest reliability.*



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**Specifications are subject to change without notice.**  
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