Newport Corporation, 1791 Deere Avenue, Irvine, CA 92606 USA
Tel: 1-877-835-9620

Certificate of Calibration

Description: Spectral Irradiance (250 - 2500 nm) calibrated 200 Watt QTH Lamp
Certiticate No.: SAMPLE
Model Number : 63355 Lamp Serial Number: 5XXXX
Calibration Date : Aug 08 2024
Environmental Conditions: Temperature: 22 °C Relative Humidity (%): 50 %

1. Material

One 200 Watt, Quartz Tungsten halogen filament lamp with serial number designation 5XXXX

2. Calibration Procedures

The lamp was pre-treated and calibrated using custom designed equipment in Newport's contractor calibration facility and modeled on the equipment and procedures described in the NBS Special Publication 250-20.

3. Calibration Reference

The working standards used as reference were F-1484 and F-1485 which, in turn, were calibrated using NIST reference standard: F-708.

4. Results

The spectral irradiance produced by Standard 5XXXX at a distance of 0.5 m when operated at the calibration current is provided in two formats, as data files, to facilitate the use of this tool. Irradiance levels at wavelengths for which NIST provides data, are provided for best traceability to NIST.

A fitting formula is also provided, found using NIST suggested cubic spline interpolation method, slightly modified for faster convergence when using commercial algorithms, is listed with the data. Irradiance values, calculated using this formula, are tabulated on the attached sheets in 1 nm increments.

Calibrated by T. Smith
Date: Aug 08 2024

Newport certifies that the calibration was performed using intrinsic standards. The calibration complies with ISO 9001. This certificate shall not be reproduced, except in full, without written approval from Newport. The expanded claims are based on ±2 standard deviations from all known calibration variables. Newport recommends an operational lifetime of 100 hours for calibration standards to apply. Expect an approximate 1-2% increase in uncertainties for every additional 50 hours of operation, up to 250 hours maximum.

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Calibration Results

Model Number: 63355 Quartz Tungsten Halogen Lamp
Lamp Serial No.: 5XXXX
Spectral Range: 250-2500nm
Lamp Current: 6.5 Amps
Voltage (ref. Only) = 31 V
Environmental Conditions: Temperature: 22 C Relative Humidity (%): 50 %

Fitting equation for non-NIST wavelengths (divide values by 10 to obtain results in $\mu W/cm^2$ nm):

$$\textbf{Irradiance } (mW/m^2\ nm) = \lambda^{-5} * \exp(A + B/\lambda) * (C + D*\lambda + E*\lambda^2 + F*\lambda^3 + G*\lambda^4 + H*\lambda^5)$$

Where:
A= 22.0656
B=-3864.36
C=-362218000
D=1954660
E=-1338.96
F=0.465875
G=-0.000062503
H=0

NIST Results

The principle set of results is provided at NIST specified wavelength data points, with Estimated Transfer Uncertainty (2δ) included. This data, along with the fitting equation and interpolated curve data for non-NIST wavelengths, is charted on the proceeding graph.

Irradiance data for lamp# 5XXXX

WL	Irradiance of DUT (mw/m2-nm)	K=2 Relative Uncertainty %
250.0	0.03987	7.8
260.0	0.08386	4.3
270.0	0.14349	6.4
280.0	0.22970	3.4
290.0	0.34778	2.2
300.0	0.48783	2.2
310.0	0.70822	2.0
320.0	0.94062	1.9
330.0	1.25720	1.9
340.0	1.62236	1.8
350.0	2.06895	1.7
360.0	2.62601	1.7
370.0	3.22324	1.6
380.0	3.90926	1.6
390.0	4.67990	1.6
400.0	5.52478	1.5
450.0	11.02531	1.3
500.0	17.98435	1.2
555.0	26.38850	1.1
600.0	33.07305	1.0
654.6	40.36100	0.9
700.0	45.20438	0.9
800.0	51.91584	0.8
900.0	53.89908	0.7
1050.0	51.34069	0.6
1150.0	47.24121	0.5
1200.0	44.91105	0.6
1300.0	40.12347	0.5
1540.0	29.53759	0.5
1600.0	27.25550	0.5
1700.0	23.81513	0.6
2000.0	15.92919	0.6
2100.0	13.95944	0.6
2300.0	10.72554	0.7
2400.0	9.41314	1.2
2500.0	8.33444	1.3

Irradiance (mW/m^2 nm) = λ^{-5} * exp(A + B/λ) * (C + D*λ + E*λ^2 + F*λ^3 + G*λ^4 + H*λ^5)

22.0656	A
-3864.36	B
-362218000	C
1954660	D
-1338.96	E
0.465875	F
-0.000062503	G
0	H