



# CALIBRATION CERTIFICATE

InternationalLight  
TECHNOLOGIES

International Light Technologies certifies that the instrument described below has been compared with the laboratory working standards whose calibrations are traceable to the U.S. National Institute of Standards and Technology and whose procedures are in accordance with the requirements of ANSI/NCSL Z540-1-1994, ISO 10012-1:1992(E) and ISO/IEC 17025:2005.

Rendered-to: INSTRUMATIC ESPANOLA S.A.  
Detector: SED033 #4776 Input Optic: W #5599  
Filter: F #16702 Misc.: N/A  
Spectral Response (half power points):

(PIR) PEAK IRRADIANCE RESPONSE SENSITIVITY FACTOR AS CALIBRATED ON: 07-Mar-2008

1.129E-2 (A)(cm2)(W-1) assuming monochromatic irradiance at 600nm

-0.5% \*Change In Sensitivity From Previous Calibration Dated: 31-Mar-2005

Tolerance As Found: In  Out  Tolerance As Left: In  Out

Unit will read directly in watts per square centimeter when used with an IL1700 Calibrated with IL1700 #2338.

CALIBRATED WITH ILT1700 +5V BIAS: ON  OFF

REFERENCE PLANE: Groove ONE formed by filter or diffuser elements and next element, counted from front surface of assembly.  
\*difference includes intrinsic detector change, NIST recertification updates, lab experimental error or modifications to the hardware adjustments.

PRIMARY STANDARD: U.S. National Institute of Standards and Technology Detector Response  
1219 - November 2005 - NIST Test No. 844/272521-05 ; U1023 - January 1997 - NIST Test No. 844/257423-96/2 : D204 -  
January 1997 - NIST Test No. 844/257423-96/1

N.I.S.T. Uncertainty: 200-250nm=5%;250-400nm=1.0%;400-900nm=0.31%;900-1000nm=0.58%;1000-1100nm=2.93%

INTERNATIONAL LIGHT TECHNOLOGIES PRIMARY TRANSFER STANDARDS:  
IL.#01,#02,#3275,#139,#1490,U522,H627 JAN 2008 - JAN 2018

ILT Transfer Uncertainty to Customer = +/- 3.0 % plus NIST uncertainty above.

LIGHT SOURCE: 1F 1000W QTH LAMP OUTPUT: 2.72E-5 W/cm2  
INSTRUMENTATION: IL #04 PROCEDURE: PIR1F  
TEMPERATURE: 22 degrees C HUMIDITY: 20 %  
CALIBRATED BY: Calibration Technician  
CHECKED BY: QA Manager, Calibrations

FOR AUTHORIZED COPIES OF THIS CERTIFICATE OR OTHER INFORMATION PLEASE REFER TO THESE NUMBERS. THIS CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF INTERNATIONAL LIGHT TECHNOLOGIES

Calibration Date: 07-Mar-08 Certificate No.: 803077806 FO/Sales Order #: 126148

ILT RECOMMENDS AN ANNUAL CALIBRATION CONFIRMATION INTERVAL. INTERVALS OF CONFIRMATION MAY NEED TO BE ADJUSTED DEPENDING ON RESULTS OF PRECEDING CALIBRATIONS.



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Rendered-to: INSTRUMATIC ESPANOLA S.A.

Detector: SED033 #4776

Input Optic: R #415

Filter: F #16702

Misc.: N/A

Spectral Response (half power points):

PRR) PEAK RADIANCE RESPONSE SENSITIVITY FACTOR AS CALIBRATED ON: 07-Mar-2008

9.20E-4 (A)(cm<sup>2</sup>)(sr)(W-1) assuming monochromatic radiance at 600nm

7.2% \*Change In Sensitivity From Previous Calibration Dated: 31-Mar-2005

Tolerance As Found: In \_\_\_\_\_ Out  Tolerance As Left: In  Out \_\_\_\_\_

Unit will read directly in watts per square centimeter per steradian when used with an IL1700 Calibrated with IL1700 #2338.

CALIBRATED WITH ILT1700 +5V BIAS: ON \_\_\_\_\_ OFF

REFERENCE PLANE: Average Field of Vision +/-0.75 Degrees

\*difference includes intrinsic detector change, NIST recertification updates, lab experimental error or modifications to the hardware adjustments.

PRIMARY STANDARD: U.S. National Institute of Standards and Technology Detector Response

1219 - November 2005 - NIST Test No. 844/272521-05 : U1023 - January 1997 - NIST Test No. 844/257423-96/2 : D204 - January 1997 - NIST Test No. 844/257423-96/1

N.I.S.T. Uncertainty: 200-250nm=5%;250-400nm=1.0%;400-900nm=0.31%;900-1000nm=0.58%;1000-1100nm=2.93%

INTERNATIONAL LIGHT TECHNOLOGIES PRIMARY TRANSFER STANDARDS:

L.#01.#02.#3275.#139.#1490,U522,H627

JAN 2008 - JAN 2018

LT Transfer Uncertainty to Customer = +/- 3.0 % plus NIST uncertainty above.

LIGHT SOURCE: 1F 1000W QTH

LAMP OUTPUT: 8.40E-6 W/cm<sup>2</sup>/sr

INSTRUMENTATION: IL #04

PROCEDURE: PRRIF

TEMPERATURE: 22 degrees C

HUMIDITY: 20 %

CALIBRATED BY:

*[Signature]*  
Calibration Technician

CHECKED BY:

*[Signature]*  
QA Manager, Calibrations

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Calibration Date: 07-Mar-08

Certificate No.: 803077807

FO/Sales Order #: 126148

ILT RECOMMENDS AN ANNUAL CALIBRATION CONFIRMATION INTERVAL INTERVALS OF CONFIRMATION MAY NEED TO BE ADJUSTED DEPENDING ON RESULTS OF PRECEDING CALIBRATIONS.

International Light Technologies, Inc.

Technology Drive, Peabody, MA 01960, USA

8180 / 978-818-6181 fax

iltech.com

Form F-074 (Rev B)

International Light

Gilway  
Technical Lamp





**International Light**  
TECHNOLOGIES

# CALIBRATION CERTIFICATE

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Rendered-to: INSTRUMATIC ESPANOLA S.A.

Detector: SED038 #1386 Input Optic: R #172

Filter: Y #5485 Misc.: N/A

Spectral Response (half power points):

PHOTOPIC LUMINANCE RESPONSE SENSITIVITY FACTOR AS CALIBRATED ON: 07-Mar-2008

5.80E-10 (A)(fL-1) assuming 3215 K Color Temperature

1.693E-10 (A)(m2)(cd-1) assuming 3215 K Color Temperature

5.5% \*Change In Sensitivity From Previous Calibration Dated: 31-Mar-2005

Tolerance As Found: In  Out  Tolerance As Left: In  Out

it will read directly in foot-Lamberts when used with an IL1700 Calibrated with IL1700 #330.

CALIBRATED WITH ILT1700 +5V BIAS: ON  OFF

REFERENCE PLANE: Average Field of Vision +/-0.75 Degrees

Difference includes intrinsic detector change, NIST recertification updates, lab experimental error or modifications to the hardware adjustments.

PRIMARY STANDARD: U.S. National Institute of Standards and Technology Detector Response  
SED033#4528/Y#16218/R#204 - December 14, 2005 - NIST Test No.:844/272571-05/3

N.I.S.T. Uncertainty: 1.3%

INTERNATIONAL LIGHT TECHNOLOGIES PRIMARY TRANSFER STANDARDS:

#01,#02,#3275,#139,#1490,U522,H627 JAN 2008 - JAN 2018

Transfer Uncertainty to Customer = +/- 4.3 % plus NIST uncertainty above.

LIGHT SOURCE: 1F 1000W QTH/Reflectance Tablet LAMP OUTPUT: 199 fL

INSTRUMENTATION: IL #04/Y PROCEDURE: YLS1F

TEMPERATURE: 22 degrees C HUMIDITY: 20 %

CALIBRATED BY:  Calibration Technician  
CHECKED BY:  QA Manager, Calibrations

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Calibration Date: 07-Mar-08 Certificate No.: 803077808 FO/Sales Order #: 126148

INTERNATIONAL LIGHT TECHNOLOGIES RECOMMENDS AN ANNUAL CALIBRATION CONFIRMATION INTERVAL. INTERVALS OF CONFIRMATION MAY NEED TO BE ADJUSTED DEPENDING ON RESULTS OF PRECEDING CALIBRATIONS.

International Light Technologies, Inc.  
Technology Drive, Peabody, MA 01960 USA  
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tech.com

Form F-074 (Rev B)





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TECHNOLOGIES

# CALIBRATION CERTIFICATE

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Rendered-to: INSTRUMATIC ESPANOLA S.A.  
 Detector: SED038 #1386 Input Optic: W #3728  
 Filter: Y #5485 Misc.: N/A  
 Spectral Response (half power points):

(VIS) PHOTOPIC ILLUMINANCE RESPONSE SENSITIVITY FACTOR AS CALIBRATED ON: 07-Mar-2008

3.65E-8 (A)(ft2)(lm-1) assuming 3215 K Color Temperature  
 3.391E-09 (A)(lux-1) assuming 3215 K Color Temperature  
 -2.4% \*Change In Sensitivity From Previous Calibration Dated: 31-Mar-2005

Tolerance As Found: In  Out  Tolerance As Left: In  Out

Unit will read directly in lumens per square foot (footcandles) or lux when used with an IL1700 Calibrated with IL1700 #330.

CALIBRATED WITH ILT1700 +5V BIAS: ON  OFF

REFERENCE PLANE: Groove ONE formed by filter or diffuser elements and next element, counted from front surface of assembly.  
 \*difference includes intrinsic detector change, NIST recertification updates, lab experimental error or modifications to the hardware adjustments.

PRIMARY STANDARD: U.S. National Institute of Standards and Technology Detector Response  
 SED033 #4528 / Y #16218 - December 8, 2005 - NIST Test No.: 844/272571-05/1

N.I.S.T. Uncertainty: 0.50%

INTERNATIONAL LIGHT TECHNOLOGIES PRIMARY TRANSFER STANDARDS:  
 IL.#01,#02,#3275,#139,#1490,U522,H627 JAN 2008 - JAN 2018

ILT Transfer Uncertainty to Customer = +/- 4.3 % plus NIST uncertainty above.

LIGHT SOURCE: 1F 1000W QTH LAMP OUTPUT: 205 lm/ft2  
 INSTRUMENTATION: IL #04/Y PROCEDURE: YSIF  
 TEMPERATURE: 22 degrees C HUMIDITY: 20 %  
 CALIBRATED BY: *[Signature]* CHECKED BY: *[Signature]*  
 Calibration Technician QA Manager, Calibrations

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Calibration Date: 07-Mar-08 Certificate No.: 803077809 FO/Sales Order #: 126148

ILT RECOMMENDS AN ANNUAL CALIBRATION CONFIRMATION INTERVAL INTERVALS OF CONFIRMATION MAY NEED TO BE ADJUSTED DEPENDING ON RESULTS OF PRECEDING CALIBRATIONS



# CALIBRATION CERTIFICATE

## ELECTRICAL INSTRUMENTATION CALIBRATION REPORT

DUE DATE: 26-Feb-09

This document states that the instrument described below meets or exceeds all manufacturer specifications and has been compared to standards which are directly traceable to the National Institute of Standards and Technology and whose procedures are in accordance with the requirements of ANSI/NCSL Z540-1-1994, ISO 10012-1:1992(E) and ISO/IEC 17025:2005.

Date: 26-Feb-08 Certificate #: 802260501E SO#: 126148

Temp: 20 degrees C Humidity: 22 % Procedure: TP-0011-REVC

Rendered To: Instrumatic Espanola, S.A.

InstrumentModel-S/N: IL1700 #2338

Calibration/Repair Remarks:

Parts (If Needed):

As Found Tolerance		As Found Readings	Applied Current	Adjusted Readings	Permissible Error
In	Out				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.000E-3	1.000E-3	1.000E-3	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.002E-4	1.000E-4	1.001E-4	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.001E-5	1.000E-5	1.000E-5	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.005E-6	1.000E-6	1.001E-6	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.000E-7	1.000E-7	9.98E-8	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.005E-8	1.000E-08	1.002E-8	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.010E-9	1.000E-09	1.004E-9	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.002E-10	1.000E-10	1.000E-10	+/- 1.0%

Tolerance after repair and/or calibration: Out: In: X

COMBINED NIST AND KEITHLEY TRANSFER UNCERTAINTY IS AS FOLLOWS: 1mA=+/-0.025%, 100uA=+/-0.025%, 10uA=+/-0.025%, 1uA=+/-0.025%, 100nA=+/-0.035%, 10nA=+/-0.065%, 1nA=+/-0.065%, 100pA=+/-0.25%

The above Instrument was compared to the Keithley Current Calibrator/Source Model 263 S/N 0621350 as of 19-Sep-07 which is traceable to NIST and whose calibration is due: 18-Sep-08

Calibrated By: [Signature] Checked By: [Signature]

"For authorized copies of this certificate please contact International Light, Inc."



# CALIBRATION CERTIFICATE

## ELECTRICAL INSTRUMENTATION CALIBRATION REPORT

DUE DATE: 06-Mar-09

This document states that the instrument described below meets or exceeds all manufacturer specifications and has been compared to standards which are directly traceable to the National Institute of Standards and Technology and whose procedures are in accordance with the requirements of ANSI/NCCL Z540-1-1994, ISO 10012-1:1992(E) and ISO/IEC 17025:2005.

Date: 06-Mar-08 Certificate #: 803060501E SO#: 126148

Temp: 22 degrees C Humidity: 28 % Procedure: TP-0011-REVC

Rendered To: Instrumatic Espanola, S.A.

InstrumentModel-S/N: IL1700 #330

Calibration/Repair Remarks: LAST CALIBRATION MAR 2005. Replaced corroded rear panel assembly and bottom cover.

Parts (If Needed): 1- rear panel assembly, 1- enclosure bottom (salvage parts)

As Found Tolerance In	Out	As Found Readings	Applied Current	Adjusted Readings	Permissible Error
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.001 e-3	1.000E-3	1.000 e-3	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.002 e-4	1.000E-4	1.002 e-4	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.000 e-5	1.000E-5	1.000 e-5	+/- 0.2%
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.013 e-6	1.000E-6	1.000 e-6	+/- 0.2%
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.012 e-7	1.000E-7	9.99 e-8	+/- 0.5%
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.014 e-8	1.000E-08	1.000 e-8	+/- 0.5%
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.015 e-9	1.000E-09	1.001 e-9	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.013 e-10	1.000E-10	1.000 e-10	+/- 1.0%

Tolerance after repair and/or calibration: Out: In: X

COMBINED NIST AND KEITHLEY TRANSFER UNCERTAINTY IS AS FOLLOWS: 1mA=+/-0.025%, 100uA=+/-0.025%, 10uA=+/-0.025%, 1uA=+/-0.025%, 100nA=+/-0.035%, 10nA=+/-0.065%, 1nA=+/-0.065%, 100pA=+/-0.25%

The above instrument was compared to the Keithley Current Calibrator/Source Model 263 S/N 0621350 as of 19-Sep-07 which is traceable to NIST and whose calibration is due 19-Sep-08

Calibrated By: Robert Fowler Checked By: [Signature]

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