

ELECTRICAL INSTRUMENTATION CALIBRATION REPORT

DUE DATE: 31-Mar-06

This document 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.

Date: 31-Mar-05 Certificate #: 503319303E SO#: 115185

Temp: 22 degrees C Humidity: 23 % Procedure: 140300-REVD

Rendered To: Instrumatic Espanola, S.A.

Instrument Model-S/N: IL1700 #330

Calibration/Repair Remarks: Replaced aging RAM battery.

Parts (If Needed): 1- 3.5V lithium battery

As Found Tolerance		As Found Readings	As Found Permissible Error	Applied Current	Adjusted Readings	Permissible Error
In	Out					
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.003 E-3	+/- 0.5%	1.000E-3	1.000 E-3	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.003 E-4	+/-0.5%	1.000E-4	1.002 E-4	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.001 E-5	+/-0.7%	1.000E-5	1.000 E-5	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.006 E-6	+/-1.0%	1.000E-6	1.000 E-6	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.005 E-7	+/-1.0%	1.000E-7	9.98 E-8	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.007 E-8	+/-1.0%	1.000E-08	1.000 E-8	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.008 E-9	+/-1.0%	1.000E-09	1.002 E-9	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.008 E-10	+/-1.5%	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 0730631 calibrated on 18Nov04.

Calibrated By: *Robert Fowler* Checked By: *C. Dumaine*

ELECTRICAL INSTRUMENTATION CALIBRATION REPORT

DUE DATE: 31-Mar-06

This document 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.

Date: 31-Mar-05 Certificate #: 503319304E SO#: 115185

Temp: 22 degrees C Humidity: 23 % Procedure: 140300-REVD

Rendered To: Instrumatic Espanola, S.A.

InstrumentModel-S/N: IL1700 #2338

Calibration/Repair Remarks: Repaired intermitent LSD and Display buttons, replaced aging RAM battery.

Parts (If Needed): 1- 3.5V lithium battery.

As Found Tolerance In	Out	As Found Readings	As Found Permissible Error	Applied Current	Adjusted Readings	Permissible Error
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.000 E-3	+/- 0.5%	1.000E-3	1.000 E-3	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.000 E-4	+/-0.5%	1.000E-4	1.001 E-4	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.000 E-5	+/-0.7%	1.000E-5	1.000 E-5	+/- 0.2%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10.00 E-7	+/-1.0%	1.000E-6	1.000 E-6	+/- 0.2%
<input type="checkbox"/>	<input checked="" type="checkbox"/>	9.80 E-8	+/-1.0%	1.000E-7	9.97 E-8	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9.90 E-9	+/-1.0%	1.000E-08	1.001 E-8	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9.90 E-10	+/-1.0%	1.000E-09	1.004 E-9	+/- 0.5%
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9.90 E-11	+/-1.5%	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 0730631 calibrated on 18Nov04.

Calibrated By: Robert Fowle Checked By: C. Dumare

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CALIBRATION CERTIFICATE

International Light 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/NCSTL Z540-1-1994, ISO 10012-1:1992(E) and ISO/IEC Guide 25:1990(E).

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: 31-Mar-2005

$8.58E-4$ (A)(cm²)(sr)(W-1) assuming monochromatic radiance at 600nm

-2.61% *Change In Sensitivity From Previous Calibration Dated: 09-Oct-1996

Tolerance As Found: In Out

Unit will read directly in watts per square centimeter per steradian when used with an IL1700 and the Sensitivity Factor Above.
Calibrated with IL1700 #2338.

CALIBRATED WITH IL1700 +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

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 PRIMARY TRANSFER STANDARDS:

IL #01,#02,#3275,#139,#1490,U522,H627

JAN 1998 - JAN 2008

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

LIGHT SOURCE: 1S Tungsten Halogen/Reflectance Tablet

LAMP OUTPUT: 1.078E-5 W/cm²/sr

INSTRUMENTATION: IL #04

PROCEDURE: PRR1S

TEMPERATURE: 25 degrees C

HUMIDITY: 26 %

CALIBRATED BY:

Calibration Technician

CHECKED BY:

Qx Manager, Calibrations

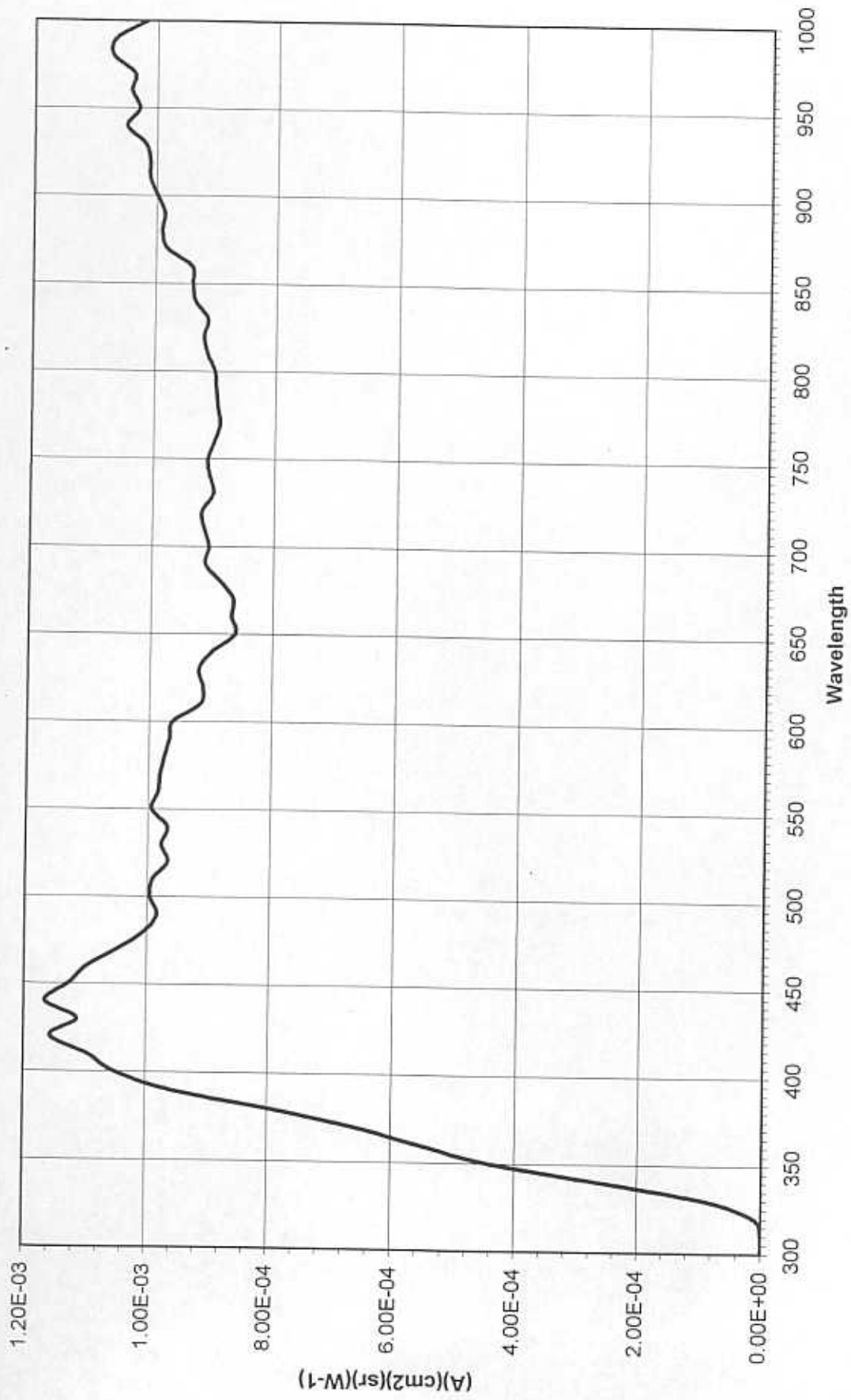
FOR AUTHORIZED COPIES OF THIS CERTIFICATE OR OTHER INFORMATION PLEASE REFER TO THESE NUMBERS. THIS CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF INTERNATIONAL LIGHT, INC.

Calibration Date: 31-Mar-05 Certificate No.: 503314422

FO/Sales Order #: 115185

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

SED033/F/R Typical Response May98



International Light

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

(PIR) PEAK IRRADIANCE RESPONSE SENSITIVITY FACTOR AS CALIBRATED ON: 31-Mar-2005

1.135E-2 (A)(cm²)(W-1) assuming monochromatic irradiance at 600nm

Unit will read directly in watts per square centimeter when used with an IL1700 and the Sensitivity Factor Above. Calibrated with IL1700 #2338.

CALIBRATED WITH IL1700 +5V BIAS: ON OFF

REFERENCE PLANE: Groove ONE formed by filter or diffuser elements and next element, counted from front surface of assembly.

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

IL #01,#02,#3275,#139,#1490,U522,H627

JAN 1998 - JAN 2008

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

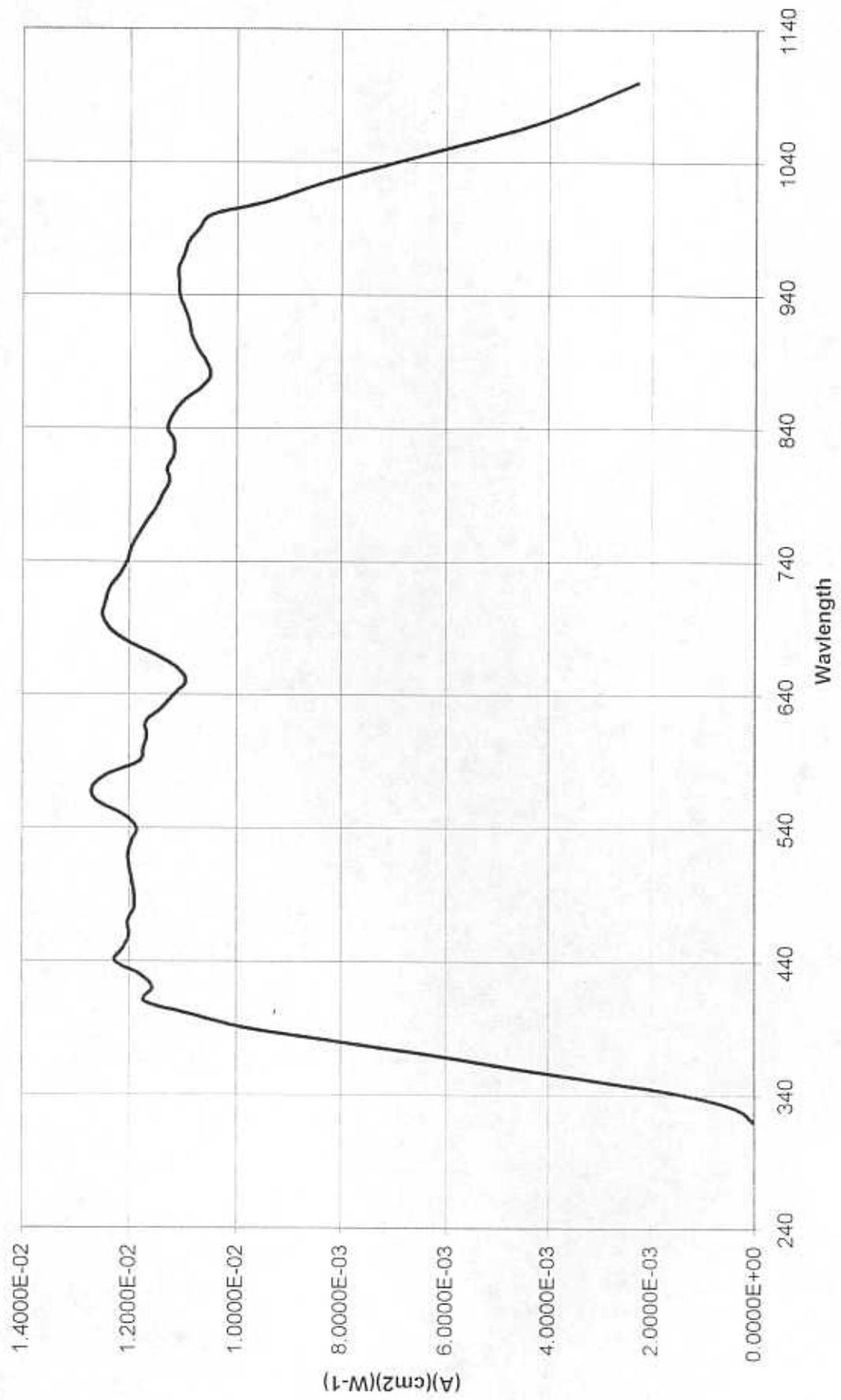
LIGHT SOURCE: 1S Tungsten Halogen LAMP OUTPUT: 3.49E-5 W/cm²
INSTRUMENTATION: IL #04 PROCEDURE: PIRIS
TEMPERATURE: 25 degrees C HUMIDITY: 26 %
CALIBRATED BY: [Signature] CHECKED BY: [Signature]
Calibration Technician QA Manager, Calibrations

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, INC.

Calibration Date: 31-Mar-05 Certificate No.: 503314423 FO/Sales Order #: 115185

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

SEL033/F/W Typical Response November 2001





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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): See Chart

(YIS) PHOTOPIC ILLUMINANCE RESPONSE SENSITIVITY FACTOR AS CALIBRATED ON: 31-Mar-2005

3.74E-8 (A)(ft²)(lm-1) assuming 3215 K Color Temperature
3.475E-09 (A)(lux-1) assuming 3215 K Color Temperature

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

CALIBRATED WITH IL1700 +5V BIAS: ON _____ OFF

REFERENCE PLANE: Groove ONE formed by filter or diffuser elements and next element, counted from front surface of assembly.

PRIMARY STANDARD: U.S. National Institute of Standards and Technology Detector Response
 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 PRIMARY TRANSFER STANDARDS:
 IL.#01,#02,#3275,#139,#1490,U522,H627 JAN 1998 - JAN 2008

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

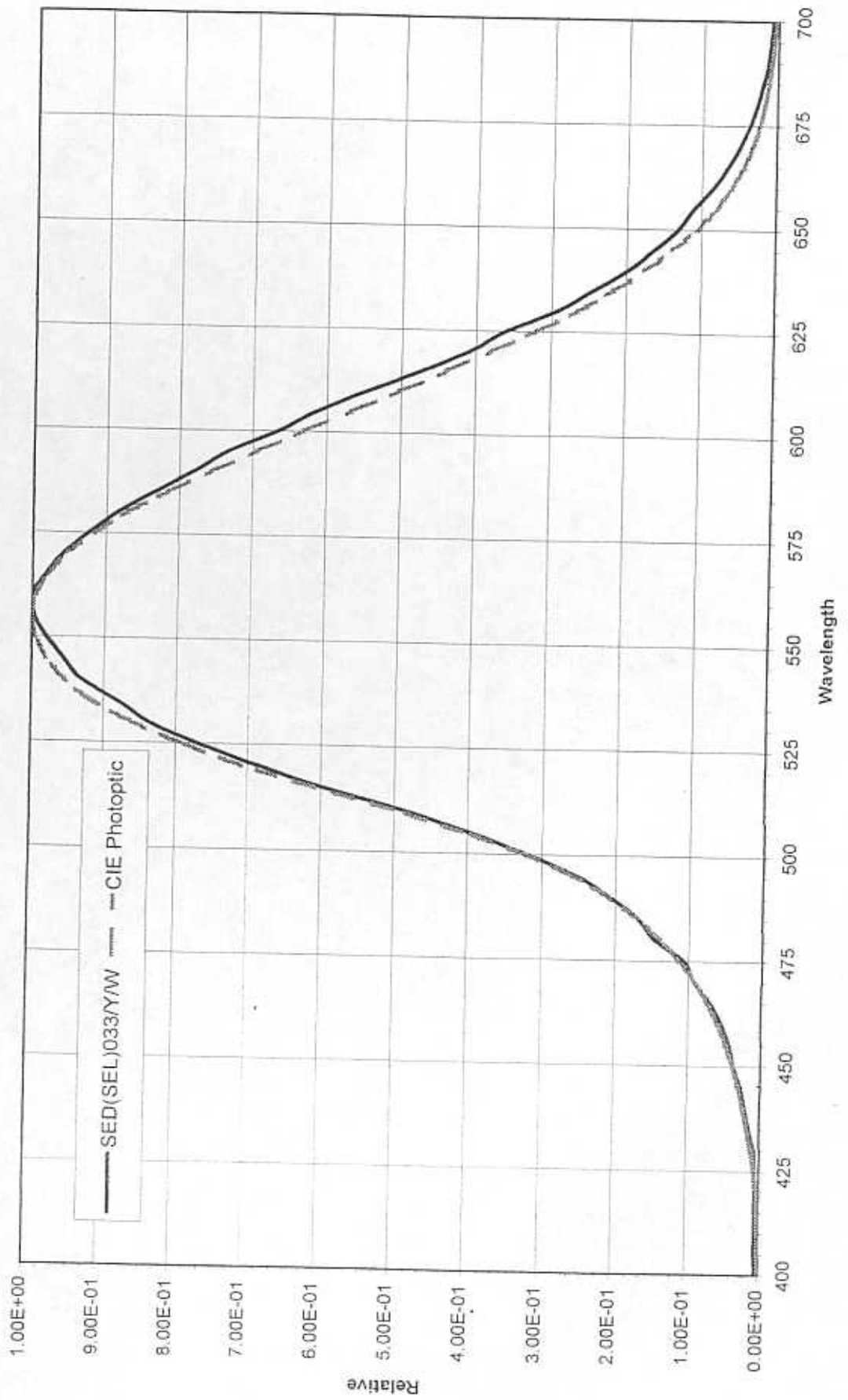
LIGHT SOURCE: 1S Tungsten Halogen LAMP OUTPUT: 272 lm/ft²
 INSTRUMENTATION: IL #04/Y PROCEDURE: Y1S1S
 TEMPERATURE: 25 degrees C HUMIDITY: 26 %
 CALIBRATED BY:  Calibration Technician
 CHECKED BY:  QA Manager/Calibrations

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Calibration Date: 31-Mar-05 Certificate No.: 503314424 FO/Sales Order #: 115185

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

SED(SEL)033/Y/W Vs. CIE NOV02



International Light 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/NCSS Z540-1-1994, ISO 10012-1:1992(E) and ISO/IEC Guide 25:1990(E).

Rendered-to: INSTRUMATIC ESPANOLA S.A.
Detector: SED038 #1386 Input Optic: R #172
Filter: Y #5485 Misc.: N/A
Spectral Response (half power points): See Chart

(YLS) PHOTOPIC LUMINANCE RESPONSE SENSITIVITY FACTOR AS CALIBRATED ON: 31-Mar-2005

5.50E-10 (A)(fL-1) assuming 3215 K Color Temperature

1.605E-10 (A)(m2)(cd-1) assuming 3215 K Color Temperature

Unit will read directly in foot-Lamberts when used with an IL1700 and the Sensitivity Factor Above. Calibrated with IL1700 #330.

CALIBRATED WITH IL1700 +5V BIAS: ON OFF

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

PRIMARY STANDARD: U.S. National Institute of Standards and Technology Detector Response
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 PRIMARY TRANSFER STANDARDS:
IL.#01,#02,#3275,#139,#1490,U522,H627 JAN 1998 - JAN 2008

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

LIGHT SOURCE: 1S Tungsten Halogen/Reflectance Tablet LAMP OUTPUT: 264 fL

INSTRUMENTATION: IL #04/Y PROCEDURE: YLS1S

TEMPERATURE: 25 degrees C HUMIDITY: 26 %

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, INC.

Calibration Date: 31-Mar-05 Certificate No.: 503314425 FO/Sales Order #: 115185

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

SED033/Y/R Typical Response

