

**PHOTOMETRIC TESTING & EVALUATION TO IES LM-79-08**

Sample Tested  
**PosterBOX 701946-NWPBM**

Prepared for:


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**Technical Report Number  
2652778-12**

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## Program Description

Photometric and electrical testing of a “PosterBOX 701946-NWPBM” replacement fixture to IES LM-79-08.

## Executive Summary

Sample Tested = **PosterBOX 701946-NWPBM**

<b>Luminous Efficacy*</b> <b>(Lumens/Watt)</b>	<b>Luminous Flux*</b> <b>(Lumens)</b>	<b>Input Power*</b> <b>(Watts)</b>	<b>Power Factor*</b>
<b>73.50</b>	<b>488.8</b>	<b>6.65</b>	<b>1.00</b>

<b>CCT (K)*</b>	<b>CRI*</b>	<b>Stabilization Time</b> <b>(Light &amp; Power)</b>
<b>5255.8</b>	<b>68.8</b>	<b>45 minutes</b>

\* The above results are recorded / derived from measurements made using an Integrating Sphere

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**Sample**

The following sample was submitted for evaluation:

**Sloan LED:** PosterBOX 701946-NWPBM

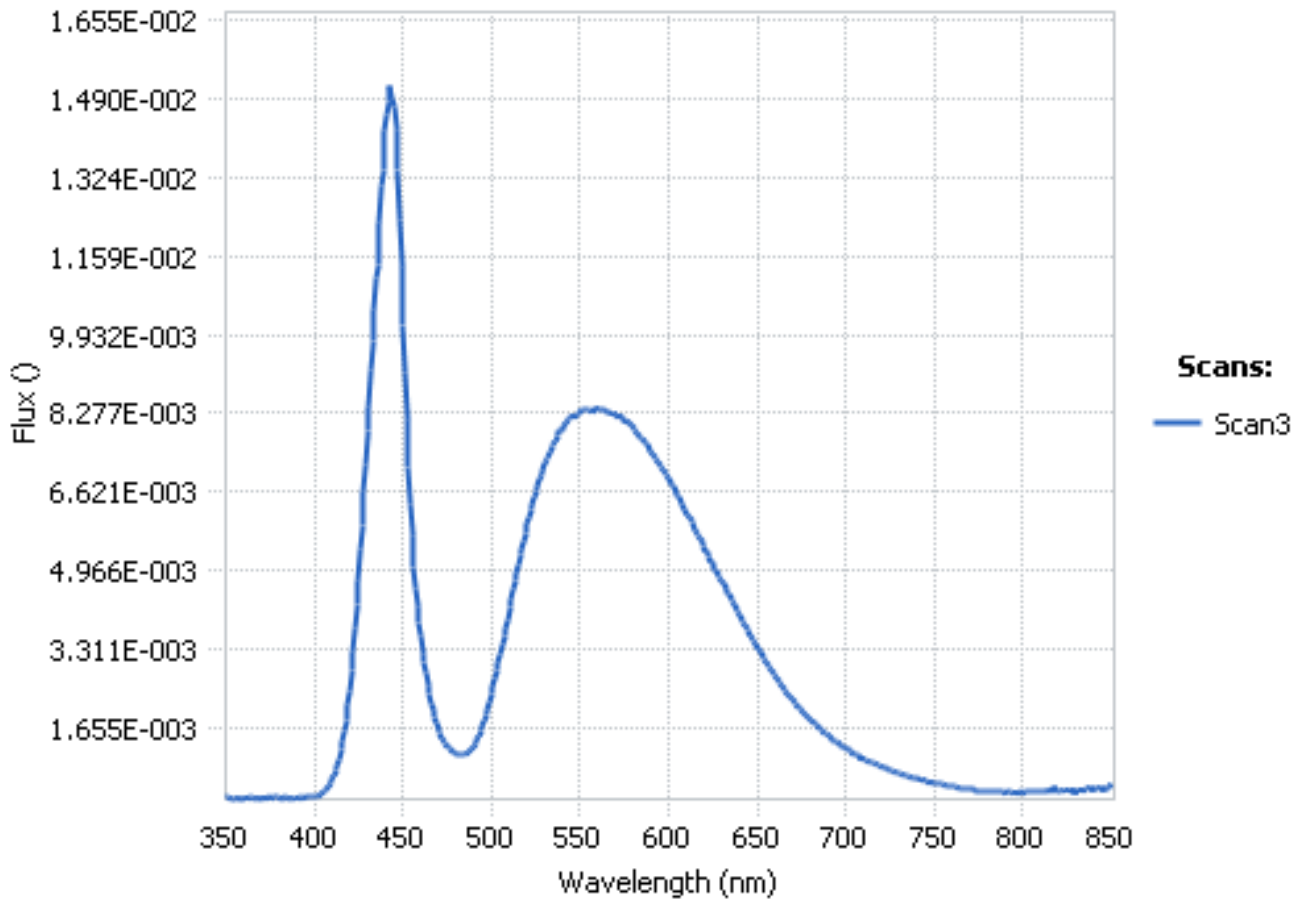


**PosterBOX 701946-NWPBM**

<b>Test Results –</b>							
The following results were measured after stabilization of the sample in the <b>Integrating Sphere</b> (unless otherwise stated). Stability is reached when the variation of 3 readings of light output and electrical power, taken 15 minutes apart, is less than 0.50% (in accordance with IES LM-79-08).							
<b>Key Photometric Results</b>	<b>Sample Reference</b>						
	<b>PosterBOX 701946-NWPBM</b>						
	<b>Integrating Sphere</b>			<b>Goniophotometer</b>			
Luminous Efficacy (Lumens/Watt)	73.50			73.64			
Total Luminous Flux (Lumens)	488.8			489.68			
Total Radiant Flux (Watts)	1.583						
Correlated Color Temperature (CCT)	5255.8						
Color Rendering Index (CRI) (Ra)	68.8						
R1 thru R7 Value	76	66.5	53.8	78.1	76.3	54.6	71.3
R8 thru R14 Value	73.9	9.9	15.5	83.6	31.7	69.3	73.1
Chromaticity (Chroma x / Chroma y)	0.3380 / 0.3409						
Chromaticity (Chroma u / Chroma v)	0.2107 / 0.3189						
Chromaticity (Chroma u' / Chroma v')	0.2107 / 0.4783						
Duv Value	-0.00246						
Stabilization Time (Light and Power)	Approx. 45 minutes						
Total Run Time – Integrating Sphere	49 minutes						
Total Run Time – Goniophotometer	118 minutes						
Spacing Criteria	1.30 (0° – 180°) / 0.16 (90° – 270°)						
Scotopic/Photopic ratio $\Phi(v')/\Phi(v)$	1.723						
<b>Electrical Input Results:</b>	<b>Sample Reference</b>						
	<b>PosterBOX 701946-NWPBM</b>						
	<b>Integrating Sphere</b>			<b>Goniophotometer</b>			
Input Power (Watts)	6.65			6.64			
Input Voltage (Volts DC)	12.0			12.0			
Input Current (Amps)	0.55			0.55			
Input Frequency (Hertz)	0			0			
Power Factor	1.00			1.00			
Total Harmonic Distortion (%THD V/A)	0 / 0						
<b>Additional Information</b>	<b>Sample Reference</b>						
	<b>PosterBOX 701946-NWPBM</b>						
Ambient Temperature	24.9°C						
Integrating Sphere Detector	CDS 600 Spectroradiometer						
Absorption Correction used?	Yes						

**Spectral Flux**

The following graph shows the spectral response curve of the radiant flux for the sample:

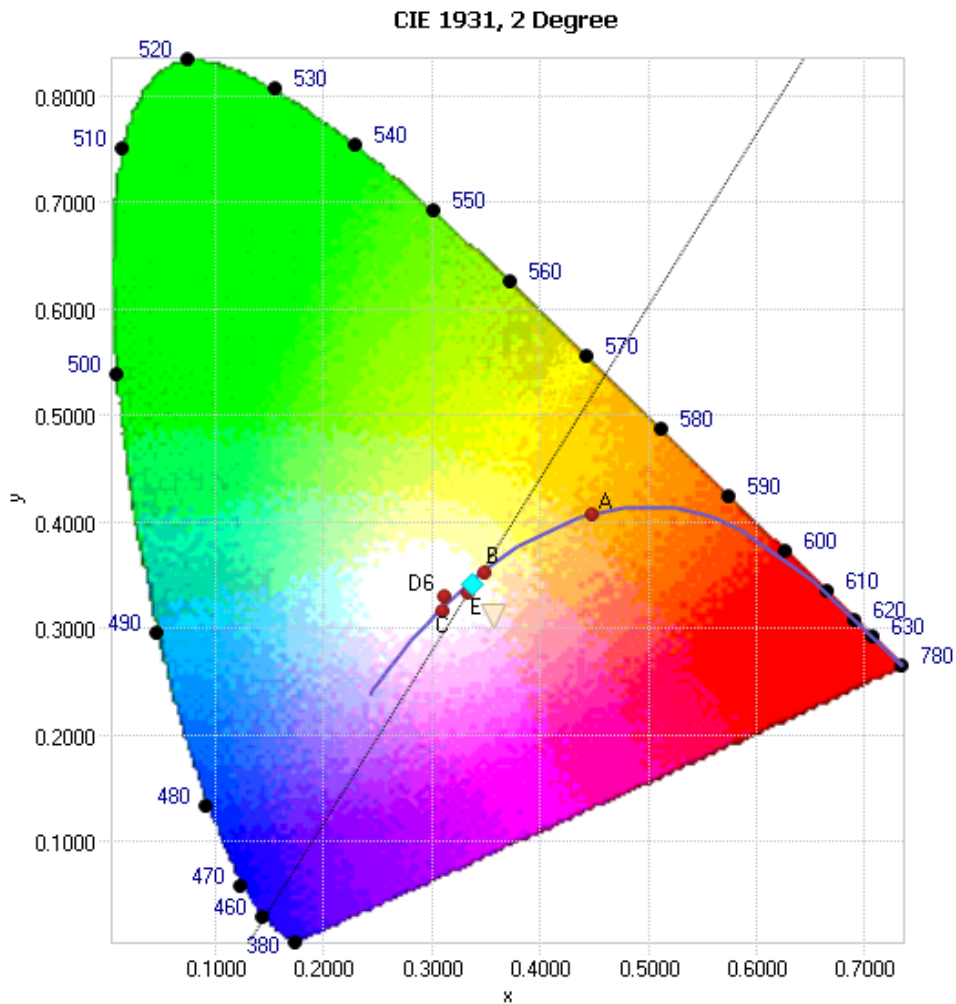


701946-NWPBM Sample #4.xml

**Spectral response of the Radiant Flux**  
 (350nm to 850nm – calibrated range of the Spectroradiometer).

**Chromaticity Diagram**

The following image shows the chromaticity diagram for the sample:



**Tristimulus values (from page 6):**  
 $x / y = 0.3380 / 0.3409$

The locations on the diagram of the tristimulus coordinates are indicated by the blue diamond.

**Test Results – Flux Distribution – Zonal Lumen Summary**

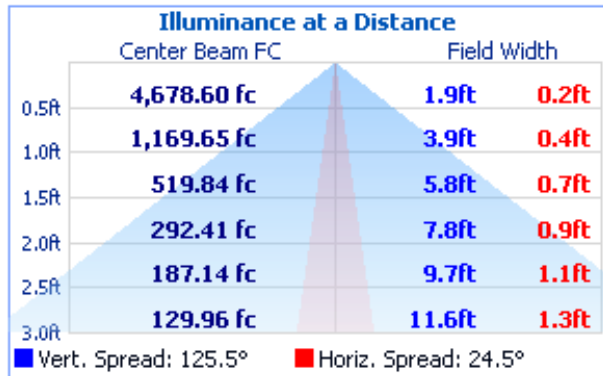
The following table depicts the zonal lumen distribution for the sample:

<b>Zone</b>	<b>Lumens</b>	<b>% Total</b>
0 - 10	72.8	14.90%
10 - 20	102.2	20.90%
20 - 30	99.5	20.30%
30 - 40	80.8	16.50%
40 - 50	61	12.50%
50 - 60	37.8	7.70%
60 - 70	20.4	4.20%
70 - 80	11.5	2.30%
80 - 90	3.4	0.70%
90-100	0.4	0.10%
100-110	0	0%
110-120	0	0%
120-130	0	0%
130-140	0	0%
140-150	0	0%
150-160	0	0%
160-170	0	0%
170-180	0	0%
<b>Total</b>	<b>489.7 LUMENS</b>	
<b>Zone</b>		
0-60	454	92.70%
60-90	35.3	7.20%
0-90	489.3	99.90%
90-180	0.4	0.10%
0-180	489.7	100%

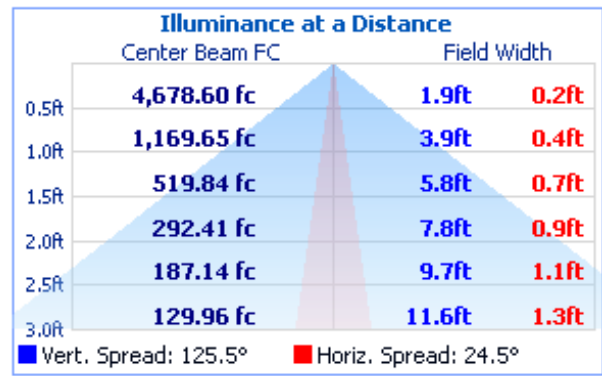


**Test Results – Illuminance Plots**

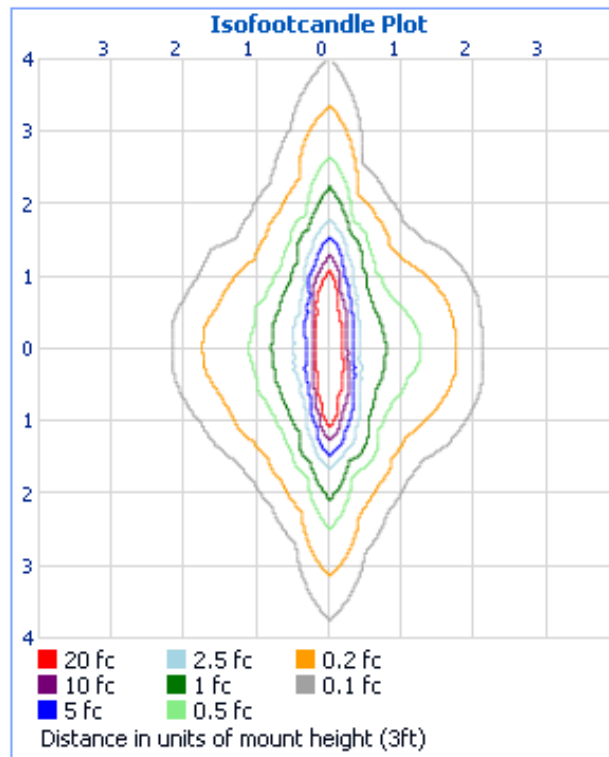
The following images depict the illuminance characteristics of the luminaire.



Beam Angle



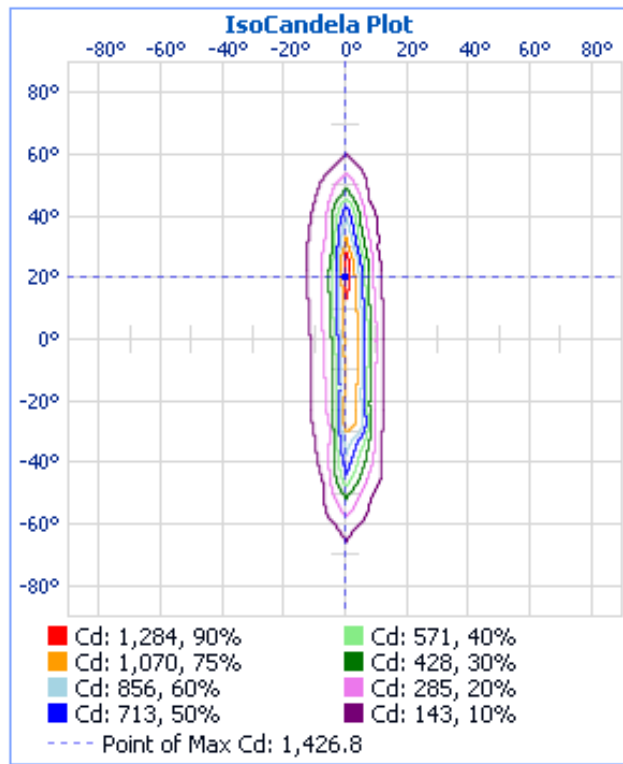
Field Angle



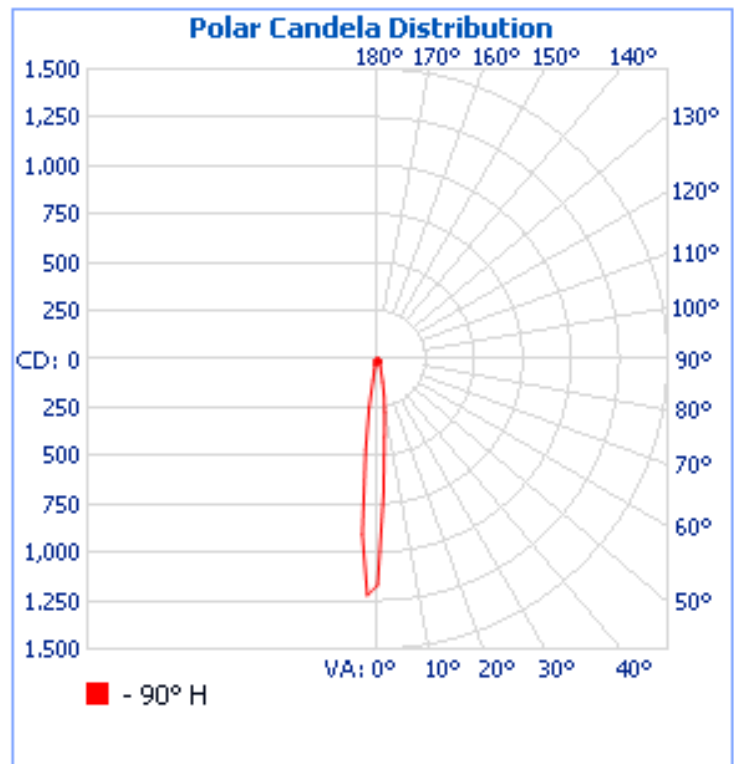
Illuminance Plot (Footcandles)

**Test Results – Candela Plots**

The following images depict the luminous intensity distribution characteristics of the luminaire.



Isocandela Plot



Polar Candela Distribution

**Coefficients Of Utilization - Zonal Cavity Method**

Effective Floor Cavity Reflectance: 20%

RCC %:	80				70				50				30				10				0
RW %:	70	50	30	0	70	50	30	0	50	30	20	50	30	20	50	30	20	0	0		
RCR: 0	1.19	1.19	1.19	1.19	1.16	1.16	1.16	1.00	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	1.00	1.00		
1	1.12	1.09	1.06	1.03	1.09	1.06	1.04	.91	1.02	1.00	.98	.98	.97	.95	.95	.94	.92	.90	.90		
2	1.05	.99	.94	.90	1.03	.97	.93	.82	.94	.90	.87	.91	.88	.85	.88	.86	.83	.82	.82		
3	.99	.91	.85	.80	.97	.90	.84	.75	.87	.82	.78	.84	.80	.77	.82	.79	.76	.74	.74		
4	.93	.84	.77	.72	.91	.83	.77	.69	.80	.75	.71	.78	.74	.70	.76	.73	.69	.68	.68		
5	.88	.78	.71	.66	.86	.77	.71	.64	.75	.69	.65	.73	.68	.65	.72	.67	.64	.62	.62		
6	.83	.73	.66	.61	.81	.72	.65	.59	.70	.64	.60	.69	.64	.60	.67	.63	.59	.58	.58		
7	.78	.68	.61	.56	.77	.67	.61	.55	.66	.60	.56	.65	.59	.56	.63	.59	.55	.54	.54		
8	.74	.64	.57	.53	.73	.63	.57	.52	.62	.56	.52	.61	.56	.52	.60	.55	.52	.50	.50		
9	.71	.60	.54	.49	.70	.60	.54	.49	.59	.53	.49	.58	.53	.49	.57	.52	.49	.47	.47		
10	.68	.57	.51	.47	.66	.57	.51	.46	.56	.50	.46	.55	.50	.46	.54	.49	.46	.45	.45		



Test Results - Candela Tabulation

The following table provides the tabulated Candela measurements:

Candela Table - Type C
Table with 360 columns and 360 rows of numerical data representing candela measurements.

### Photometric Testing Information

The sample was evaluated for photometric and electrical characteristics using an integrating sphere and a goniophotometer, each located in purpose-built, temperature and humidity-controlled, draft free environments.

The integrating sphere is by Labsphere which exhibits a “ $4\pi$  geometry” configuration according to IES LM-79-08 and is applicable for all types of LED products (directional and non-directional light projections). Its spectroradiometer is an array-type detector manufactured and calibrated by Labsphere.

The integrating sphere uses self-absorption correction to eliminate errors due to mismatches between the standard reference lamp and the test samples being measured. The auxiliary lamp used to perform this task is a halogen type lamp powered by a calibrated *Lamp Power Supply* manufactured and calibrated by Labsphere. Ambient temperature (for photometric analysis) is measured using a “J-Type” thermocouple located inside the integrating sphere at the same height as the sample under test and not more than 1 meter in horizontal distance away from the sample. The thermocouple is located behind the baffle of the photo detector in order to eliminate any direct optical radiation from the sample under test.

#### Luminaire Stabilization.

The sample was placed inside the integrating sphere and powered by a regulated and conditioned Voltage alternating current supply. The correlated color temperature, color rendering index, chromaticity coordinates and electrical power measurements contained in this report are the numeric **averages** of the three readings upon which stabilization is verified. The stabilization times shown on the results pages of this report denote the time of the 1<sup>st</sup> measurement (of the 3 consecutive readings) since this is the minimum time that the sample is assumed to have taken to reach stabilization.

The integrating sphere is calibrated using a quartzline halogen lamp with the following specifications:

Manufacturer: Sylvania

Model# 75Q/CL-28V

Voltage = 28.0 Volt

Wattage = 75.0 Watts

Calibration Current = 2.679 Amperes

Luminous Flux = 1538.8 Lumens

Calibration Date = 8-18-2005 (calibrated by Labsphere – NIST traceable).

Continued.....

**Photometric Testing Information** (continued)

The goniophotometer Mayer Engineering Type C is calibrated using a frosted tungsten filament FDS/DZE lamp with the following specifications:

Manufacturer: GE  
Part Number: DZE 88  
Bulb Number: 114-A  
Voltage: 16.59 Volts DC reference  
Calibration Current: 4.810 Amperes  
Luminous Intensity: 154.7 Candelas  
Calibration Date: 7/12/12 (NIST traceable)

Manufacturer: GE  
Part Number: DZE 88  
Bulb Number: 114-B  
Voltage: 16.61 Volts DC reference  
Calibration Current: 4.819 Amperes  
Luminous Intensity: 150.6 Candelas  
Calibration Date: 7/12/12(NIST traceable)

Manufacturer: GE  
Part Number: DZE 88  
Bulb Number: 114-C  
Voltage: 16.66 Volts DC reference  
Calibration Current: 4.815 Amperes  
Luminous Intensity: 155.4 Candelas  
Calibration Date: 7/12/12 (NIST traceable)

A *Yokogawa WT210 Power Analyzer* was used to measure all electrical characteristics of the sample.

CSA is an accredited Test Laboratory (TL-430)  
to IESNA LM79-08 by IAS (International Accreditation  
Service)  
National Voluntary Laboratory Accreditation Program  
(NVLAP)200732-0

<b>Equipment List: Goniophotometer Type C (Mirror 1)</b>			
<b>Description</b>	<b>Manufacturer and Model Number</b>	<b>CSA Instrument Reference Number</b>	<b>Calibration Due Date</b>
Optometer	Gigahertz Optik P9801	N/A	N/A
Regulated Power Supply	Chroma Instruments 61602P-80-60	N/A	N/A
Regulated Power Supply	Chroma Instruments 61602	N/A	N/A
Power Analyzer	Yokogawa WT210	POA400	11/2013

<b>Equipment List: Sphere C Equipment</b>			
<b>Description</b>	<b>Manufacturer and Model Number</b>	<b>CSA Instrument Reference Number</b>	<b>Calibration Due Date</b>
Integrating Sphere 76"	Labsphere LMS760	SPH300	N/A
Spectroradiometer	Labsphere CDS1100	CDS600C	N/A
Auxiliary Lamp PSU	Labsphere LPS100	LPS100	N/A
Power Analyzer	Yokogawa WT210	PA112	1/2014
Regulated Power Supply	Chroma Instruments 61603	AC302	N/A

All equipment is calibrated to ISO / IEC 17025-2005 guidelines.