

Report No: 0012710-01
Sales Order No: 0012710

SN: L6-1
Issue Date: 02-11-2016

Test Report

Customer Name: LIKE, LLC

Customer Contact: David Cox

Customer Address: 7211 NW 83rd Street, Suite 255, Kansas City, MO, 64152, USA

Testing Laboratory: Gamma Scientific

9925 Carroll Canyon Road, San Diego, CA, 92131, USA

Contact: Jonathan Lipscomb (jlipscomb@gamma-sci.com)

Product: LED Prototype Replacement Kit

Amount: 1

Model Name: L6/120 Retrofit Kit

Serial Number: L6-1

Approved method: IES LM-79-2008: Electrical and Photometric Measurement of Solid-State Lighting Products

Date(s) of Tests: 02-09-2016

Test Results: PLEASE SEE ATTACHED SHEETS.

Prepared by: Jonathan Lipscomb 

Signature:

Reviewed by: Robert Hamill

Signature: 

Quality Assurance: Susan Xanten

Signature: 

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NVLAP Lab Code 200823-0

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1 Test Overview

The lamp was evaluated for the following optical and electrical characteristics. A description of main equipment is provided below.

- Optical Characteristics
 - a. Total Luminous Flux, lm
 - b. Luminous Efficacy, lm/W
 - c. Dominant Wavelength, nm
 - d. Peak Wavelength, nm
 - e. Chromaticity Coordinates
 - f. Color Rendering Index (CRI)
 - g. Color Purity
 - h. Correlated Color Temperature (CCT), K
 - i. Duv
 - j. Spectral Power Distribution
 - k. Candela Table
 - l. Polar Distribution graph
 - m. Zonal Lumen Distribution
 - n. Lumens Per Zone

- Electrical Characteristics
 - o. Input Voltage , V
 - p. Input Current, A
 - q. Input Power, W
 - r. Power Factor, PF
 - s. THD%A, %
 - t. THD%V, %

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1. Main Test Equipment (include model and serial number, calibration due date):

Description	Manufacturer	Model	Serial Number	Last Calibration Date	Calibrate Due Date
Integrating Sphere	Gamma Scientific	GS-IS-2000	RE0229	03/25/15	03/25/16
Spectroradiometer	Gamma Scientific	GS-I290-2	1832	03/25/15	03/25/16
AC Power Supply	California Instruments	751iX	11532	05/15/15	05/15/16
Digital Power Meter	Yokogawa	WT310	C2PJ02071V	11/23/15	11/23/16
NIST Traceable Total Luminous Flux Standard(s)	Gamma Scientific	RS-15-55-2P	HL2008	07/09/15	8 of 24 hours logged
Mercury-Argon Physical Standard	Gamma Scientific	NM-22BP	TC22	N/A	N/A
Flexoptometer	Gamma Scientific	S480	XBO261	07/30/15	07/30/16
Low-Uncertainty Photoreceptor	Gamma Scientific	424	85003	05/15/15	05/15/16
Goniophotometer	Gamma Scientific	940LED-1200	DG0110	03/25/15	03/25/16

2. Test Conditions:

Description	Number	Unit
Ambient Temperature	22.3	°C
Humidity	44	%
Pre-test run time	0:15	HH:MM
Stabilization time	1:00	HH:MM
Total Measurement time	1:15	HH:MM
Frequency	60	Hz

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3. Measurement Procedure (Identify any additions, exclusions or deviations from the calibration method):

- a. QOP0092_TOTAL LUMINOUS FLUX CALIBRATION – Integration Sphere
- b. QOP0119_TOTAL LUMINOUS FLUX SPECTRAL IRRADIANCE CALIBRATION - Goniophotometer

2 Test Results

Description	Sample	Unit
Total Luminous Flux	5653	lm
Luminous Efficacy	75.7	lm/W
CCT Degrees	4749	K
CIE x	0.3529	-
CIE y	0.3602	-
CIE u'	0.2133	-
CIE v'	0.4900	-
CRI	86.07	-
Dom.Wavelength	574.2	nm
Peak Wavelength	435.5	nm
Duv	0.0012	-
Input Voltage	120.01	V
Input Current	0.651	A
Input Wattage	74.64	W
Power Factor	0.95	-
THD%V	0.02	%
THD%A	27.23	%

Test Parameters

Spectroradiometer WL Range	350 - 850 nm
Sphere size	2 meter
Sample geometry	4 π
Goniometer distance	7.247 meter
Self-absorption factor	0.8370

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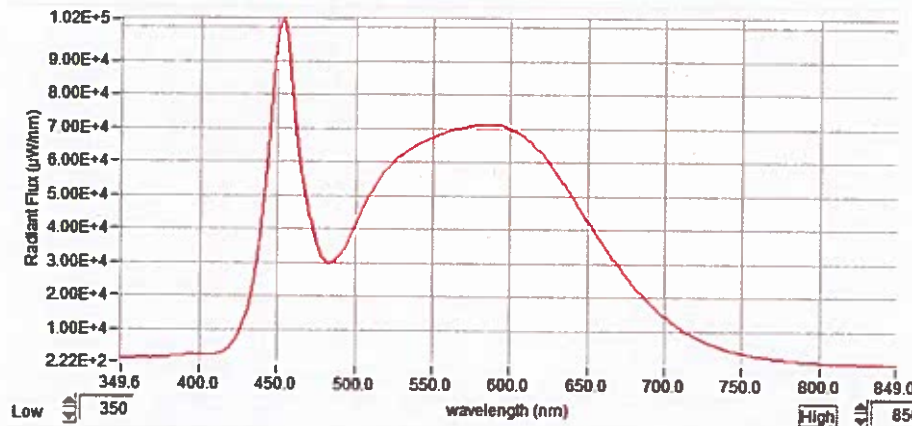
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Spectral Power Distribution

Wavelength $\mu\text{W}/\text{nm}$	Wavelength $\mu\text{W}/\text{nm}$	Wavelength $\mu\text{W}/\text{nm}$	Wavelength $\mu\text{W}/\text{nm}$	Wavelength $\mu\text{W}/\text{nm}$	
350	1.77E+03	455	1.16E+05	560	8.52E+04
355	1.63E+03	460	9.86E+04	565	8.61E+04
360	1.60E+03	465	7.57E+04	570	8.65E+04
365	1.63E+03	470	5.81E+04	575	8.70E+04
370	1.88E+03	475	4.66E+04	580	8.74E+04
375	2.08E+03	480	3.97E+04	585	8.76E+04
380	2.42E+03	485	3.80E+04	590	8.75E+04
385	2.63E+03	490	4.03E+04	595	8.68E+04
390	2.83E+03	495	4.51E+04	600	8.56E+04
395	3.03E+03	500	5.10E+04	605	8.38E+04
400	3.12E+03	505	5.70E+04	610	8.20E+04
405	3.20E+03	510	6.26E+04	615	7.96E+04
410	3.50E+03	515	6.73E+04	620	7.66E+04
415	4.45E+03	520	7.11E+04	625	7.30E+04
420	6.77E+03	525	7.40E+04	630	6.90E+04
425	1.16E+04	530	7.68E+04	635	6.50E+04
430	2.06E+04	535	7.90E+04	640	6.08E+04
435	3.49E+04	540	8.06E+04	645	5.65E+04
440	5.70E+04	545	8.17E+04	650	5.21E+04
445	8.74E+04	550	8.28E+04	655	4.77E+04
450	1.12E+05	555	8.40E+04	660	4.35E+04
				665	3.94E+04
				670	3.56E+04
				675	3.20E+04
				680	2.85E+04
				685	2.53E+04
				690	2.24E+04
				695	1.97E+04
				700	1.73E+04
				705	1.51E+04
				710	1.32E+04
				715	1.14E+04
				720	9.90E+03
				725	8.57E+03
				730	7.44E+03
				735	6.43E+03
				740	5.54E+03
				745	4.75E+03
				750	4.09E+03
				755	3.55E+03
				760	3.07E+03
				765	2.65E+03
				770	2.29E+03
				775	1.98E+03
				780	1.71E+03
				785	1.48E+03
				790	1.27E+03
				795	1.09E+03
				800	9.43E+02
				805	8.14E+02
				810	7.09E+02
				815	6.20E+02
				820	5.53E+02
				825	4.94E+02
				830	4.35E+02
				835	3.81E+02
				840	3.26E+02
				845	2.90E+02
				850	2.57E+02



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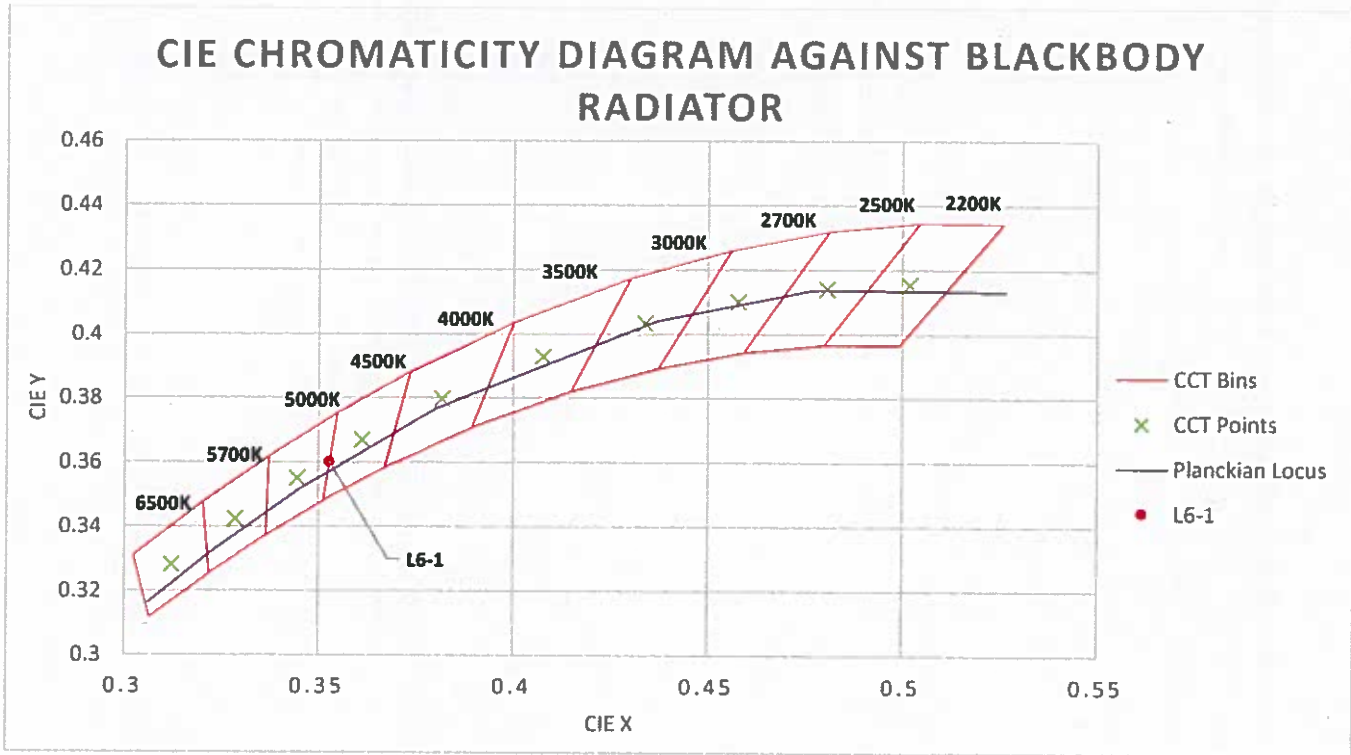


Figure 1 – CIE coordinates plotted onto a Planckian blackbody radiator curve

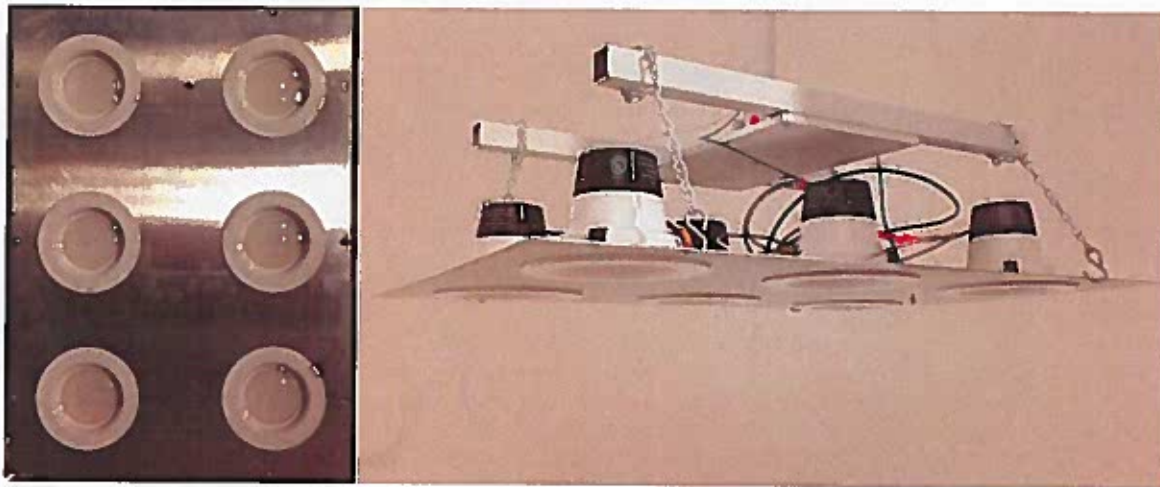


Figure 2 – Photos of samples under test in Integrating sphere and mounted to Gonlphotometer

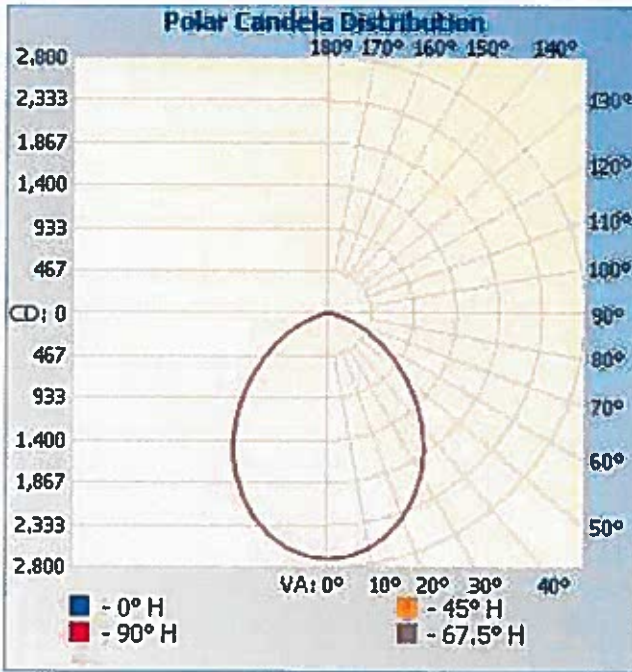
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EDL-SIC-27-4-30 deg optics Goniophotometry



	0	22.5	45	67.5	90	112.5	135	157.5	180
0	2703	2703	2703	2703	2703	2703	2703	2703	2703
5	2686	2686	2685	2684	2682	2682	2682	2682	2681
10	2625	2625	2624	2622	2621	2620	2619	2617	2615
15	2524	2525	2524	2522	2520	2518	2517	2514	2511
20	2390	2390	2390	2388	2385	2383	2380	2377	2373
25	2226	2226	2226	2224	2221	2218	2214	2209	2205
30	2039	2039	2038	2037	2033	2030	2026	2020	2015
35	1833	1834	1833	1831	1827	1822	1817	1811	1806
40	1602	1603	1602	1600	1596	1591	1584	1578	1572
45	1360	1360	1359	1356	1352	1348	1342	1335	1329
50	1117	1117	1115	1112	1109	1105	1099	1093	1087
55	886	886	884	882	879	875	870	864	859
60	674	673	672	670	667	663	659	654	649
65	483	482	481	479	476	473	469	465	461
70	316	315	313	311	309	307	304	300	297
75	177	176	175	174	172	171	168	165	163
80	84	84	83	82	82	81	80	79	78
85	40	40	39	39	38	37	37	36	35
90	5	5	5	5	5	5	5	5	5

Max candela point: 2703 cd
Phi angle steps: 22.5°
Theta angle steps: 5°

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Luminaire
0-30	1,980.2	35%	35%
0-40	3,115.9	55.1%	55.1%
0-60	4,940.7	87.4%	87.4%
60-90	711.2	12.6%	12.6%
0-90	5,651.9	100%	100%

Lumens Per Zone

Zone	Lumens	% Total
0-10	253.7	4.5%
10-20	707.7	12.5%
20-30	1,018.8	18.0%
30-40	1,135.7	20.1%
40-50	1,038.9	18.4%
50-60	785.9	13.9%
60-70	474.3	8.4%
70-80	192.6	3.4%
80-90	44.2	0.8%

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3 Conclusion

The results in this report are representative of the actual test sample submitted for this report only. Absolute photometry was used. Standard test procedure method experienced a deviation from LM-79-2008 by use of Type-D Goniophotometer.

4 Measurement Uncertainties

The calibration uncertainty for total luminous flux is 1%, limits incorporate NIST and Gamma transfer uncertainties with the coverage factor $k=2$.

5 Attachment

Please see the spectral data and IES files on CD.

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