REPORT
545 EAST ALGONQUIN ROAD, ARLINGTON HEIGHTS, ILLINOIS 60005

Project No. G100932027 Date: April 1, 2013

REPORT NO. 100932027CHI-002

TEST OF ONE LED RETROFIT LAMP

FIXTURE MODEL NO. DEG-250300 WITH TYPE V OPTICS

RENDERED TO

LEADER MANUFACTURING, INC.
1540 LEADER INTERNATIONAL DRIVE
PORT ORCHARD, WA 98367-6437

TEST: Electrical and Photometric tests as required to the IESNA test standard.

AUTHORIZATION: The testing performed was authorized by signed quote number 500438870.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:

IESNA LM-79: 2008 Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one prototype sample of model number DEG-250300 with Type V optics. The sample was received by Intertek on February 27, 2013, in undamaged condition, and one sample was tested as received. The sample identification was 02272013105110C.

DATES OF TESTS: March 27, 2013 through March 28, 2013

SUMMARY

Model No.:	DEG-250300 with Type V Optics
Description:	LED Retrofit Lamp

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	8630	8605
Total Power (W)	107.2	107.6
Luminaire Efficacy (LPW)	80.50	79.97

Criteria	Result
Power Factor – 120VAC	0.992
Power Factor – 277VAC	0.957
Current ATHD (%) – 120VAC	9.31
Current ATHD (%) – 277VAC	12.64
Correlated Color Temperature (CCT - K)	4538
Color Rendering Index (CRI - Ra)	75.0
Color Rendering Index (CRI - R9	-6.7
Duv	0.001
Chromaticity Coordinate (x)	0.360
Chromaticity Coordinate (y)	0.366
Chromaticity Coordinate (u')	0.216
Chromaticity Coordinate (v')	0.494

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Calibration Date	Calibration Due Date
Yokogawa Power Meter	WT210	146919	12/21/12	12/21/13
Omega Thermometer	DPI8-C24	146920	11/15/12	11/15/13
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU
Newport Hygrometer	iServer	146960	2/21/13	2/21/14
Elgar, AC Power Supply	CW1251P	146918	VBU	VBU
Cole-Parmer Triple Timer	94440-00	CHI0041	7/19/12	7/19/13
Labsphere Spectroradiometer	CDS1100	CHI0091	VBU	VBU
3 Meter Sphere	SPR600	CHI0088	VBU	VBU
Elgar AC Power Supply	CW1251M	146112	VBU	VBU
Sorenson DC Power Supply	XFR150-8	146846	4/20/12	4/20/13
Newport Thermohygrometer	iTHX-SD	146382	9/14/12	9/14/13
Yokoga Power Meter	WT1600	146769	5/18/12	5/18/13
Omega Temperature Meter	MDSi8	146139	7/19/12	7/19/13

TEST METHODS

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79.

Photometric and Electrical measurements – Distribution Method

A LSI Type C High Speed Model 6440 Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample.

Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere Model DAS 1100 Diode Array Spectroradiometer and Three Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

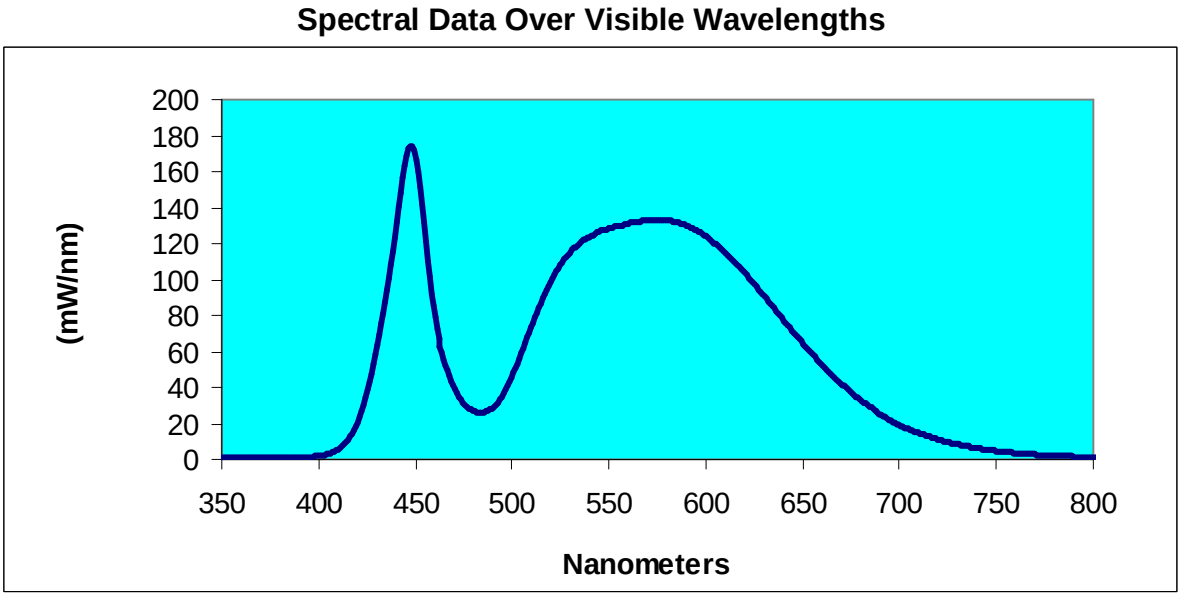
Estimated Total Operating Time

Model No.	Total Hours
DEG-250300 with Type V Optics	6

RESULTS OF TESTS

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
DEG-250300 with Type V Optics							
350	0.69	460	78.56	570	133.01	680	32.64
355	0.72	465	55.56	575	133.15	685	28.75
360	0.72	470	41.29	580	132.90	690	25.22
365	0.67	475	31.67	585	131.95	695	22.11
370	0.63	480	27.14	590	129.98	700	19.37
375	0.62	485	26.10	595	127.09	705	16.90
380	0.63	490	28.22	600	123.93	710	14.67
385	0.69	495	34.82	605	119.66	715	12.79
390	0.90	500	45.47	610	114.73	720	11.14
395	1.26	505	59.06	615	109.39	725	9.70
400	1.93	510	73.14	620	103.30	730	8.39
405	3.23	515	87.00	625	97.12	735	7.29
410	5.77	520	98.91	630	90.51	740	6.32
415	10.87	525	108.07	635	83.91	745	5.49
420	21.06	530	115.02	640	77.21	750	4.77
425	38.77	535	120.05	645	70.56	755	4.16
430	63.51	540	123.69	650	64.11	760	3.63
435	94.06	545	126.37	655	58.01	765	3.16
440	131.46	550	128.17	660	52.21	770	2.76
445	168.92	555	129.80	665	46.67	775	2.39
450	166.72	560	130.97	670	41.49	780	2.07
455	120.83	565	132.23	675	36.85		



RESULTS OF TESTS (cont'd)

Photometric and Electrical Measurements at 25°C – Integrating Sphere Method

Intertek Sample No.	Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
02272013105110C	4538	75.0	-6.7	0.001	0.360	0.366	0.216	0.494

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
02272013105110C	Up	120.0	901.0	107.2	0.992	9.31	8630	80.50
		277.0			0.957	12.64		

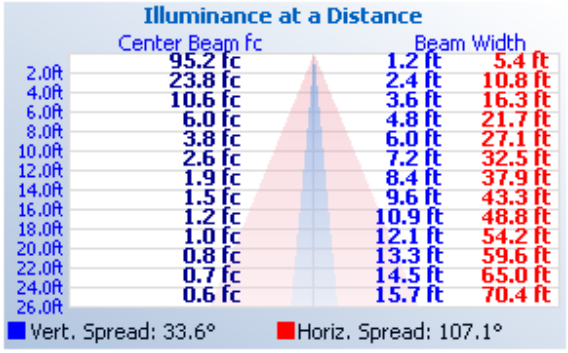
Photometric and Electrical Measurements – Distribution Method

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
02272013105110C	Up	120.1	916.1	107.6	0.979	8605	79.97

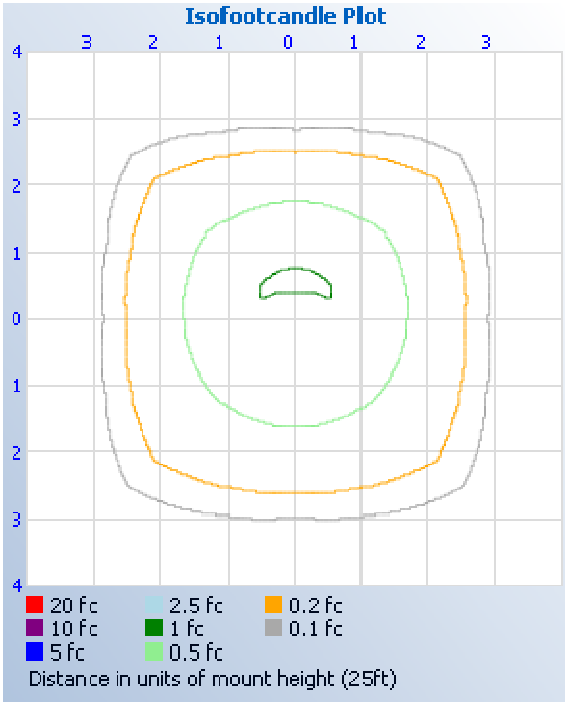
Illumination Plots

Mounting Height: 25 ft.

Illuminance - Cone of Light



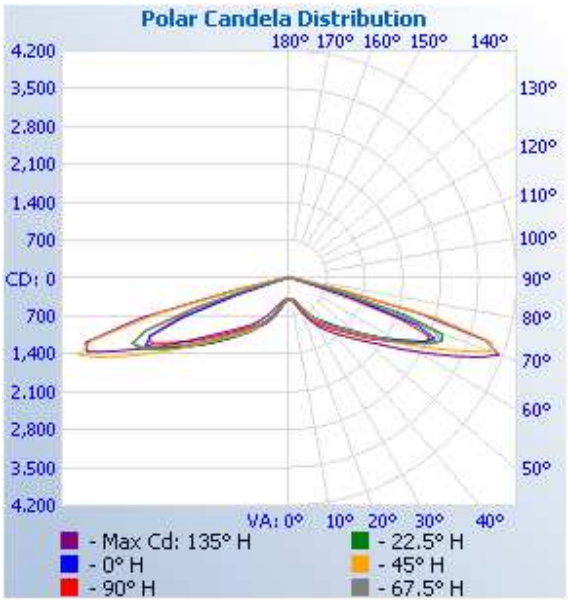
Isoillumination Plot



RESULTS OF TESTS (cont'd)

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	381	381	381	381	381
5	386	383	384	389	392
10	401	398	401	411	421
15	430	427	437	455	480
20	512	494	500	558	616
25	648	622	619	714	788
30	796	774	786	857	932
35	933	929	967	993	1066
40	1073	1088	1140	1140	1213
45	1261	1284	1312	1335	1391
50	1507	1526	1548	1583	1637
55	1849	1862	1885	1921	1972
60	2264	2298	2397	2344	2360
65	2759	2816	3096	2871	2815
70	2514	3016	3967	2869	2179
75	507	982	2832	858	412
80	157	268	380	213	113
85	82	145	160	98	39
90	37	55	53	30	9
95	23	13	14	6	6
100	12	5	4	2	2
105	3	2	3	2	2
110	2	2	3	2	2
115	2	2	3	2	2
120	2	2	3	2	2
125	2	2	3	2	2
130	2	2	2	2	2
135	2	2	2	2	2
140	1	1	1	1	1
145	1	1	1	1	1
150	1	1	1	1	0
155	0	0	0	0	0
160	0	0	0	0	0



RESULTS OF TESTS (cont'd)

Illumination Plots

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	528.0	6.1
0-40	1194	13.9
0-60	4128	48.0
60-90	4453	51.7
0-90	8581	99.7
90-180	24.1	0.3
0-180	8605	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	38.4	0.4
10-20	141.7	1.6
20-30	347.9	4.0
30-40	666.0	7.7
40-50	1107	12.9
50-60	1827	21.2
60-70	2881	33.5
70-80	1445	16.8
80-90	126.4	1.5
90-100	15.4	0.2
100-110	2.8	0.0
110-120	2.3	0.0
120-130	2.0	0.0
130-140	1.2	0.0
140-150	0.4	0.0
150-160	0.1	0.0

Pictures (not to scale)

Model DEG-250300 with Type V Optics

CONCLUSION

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:

Tim Quigley
Engineer
Lighting Division

Report Reviewed By:

Joseph Schledorn
Engineer – Lighting Photometry
Lighting Division

Attachment: None