



REPORT

545 E. Algonquin Rd., Arlington Heights, IL 60005

Project No. G101518786

Date: November 19, 2014

REPORT NO. 101518786CHI-067

TEST OF ONE LED RECESSED LUMINAIRE - 20° OPTIC

MODEL NO. EMO11L-LH9302AN-B
LED MODEL NO. CITIZEN CLU024-1203B8-303H5D2
DRIVER MODEL NO. LTF DA18W440C40BF-0000

RENDERED TO

GENERATION BRANDS
7400 LINDER AVE
SKOKIE, IL 60077

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

STATEMENT OF LIMITATION: This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION: The testing performed was authorized by signed quote number 500506211.

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: Electrical and Photometric Measurements of Solid State Lighting

ANSI NEMA ANSLG C78.377: 2012: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number EMO11L-LH9302AN-B. The sample was received by Intertek on October 29, 2014, in undamaged condition and one sample was tested as received. The sample designation was AH10292014041553.

DATES OF TESTS: November 13, 2014 through November 18, 2014.

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

SUMMARY

Model No.:	EMO11L-LH9302AN-B
Description:	LED Recessed Luminaire - 20° Optic

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	1187	1176
Total Power (W)	18.95	18.93
Luminaire Efficacy (LPW)	62.64	62.12

Criteria	Result
Power Factor	0.981
Current ATHD %	10.56
Correlated Color Temperature (CCT - K)	2960
Color Rendering Index (CRI - Ra)	93.8
Color Rendering Index (CRI - R9)	71.4
DUV	0.000
Chromaticity Coordinate (x)	0.440
Chromaticity Coordinate (y)	0.407
Chromaticity Coordinate (u')	0.252
Chromaticity Coordinate (v')	0.523

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
Labsphere Spectroradiometer	CDS1100	CHI0091	VBV	VBV
3 Meter Sphere	SPR600	CHI0088	VBV	VBV
Elgar AC Power Supply	CW1251M	146112	VBV	VBV
Sorenson DC Power Supply	XFR150-8	146846	VBV	VBV
Newport Humidity Recorder	iTHX-SD	146382	07/02/14	07/02/15
Yokogawa Power Meter	WT1600	146768	01/16/14	01/16/15
Omega Temperature Meter	MDSi8	146139	04/02/14	04/02/15
Yokogawa Power Meter	WT210	146919	07/16/14	07/16/15
Omega Thermometer	DPI8-C24	146920	10/09/14	10/09/15
LSI High Speed Mirror Goniometer	6440T	146928	VBV	VBV
Newport Hygrometer	iServer	146956	01/02/14	01/02/15
Elgar, AC Power Supply	CW1251P	146918	VBV	VBV
Cole-Parmer Triple Timer	94440-00	CHI0041	04/01/14	04/01/15

TEST METHODS

Seasoning in Sample Orientation – LED Products

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

Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere Model CDS 1100 CCD 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 Xitron or Yokogawa Power Analyzer.

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

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 Xitron or Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

RESULTS OF TEST

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method

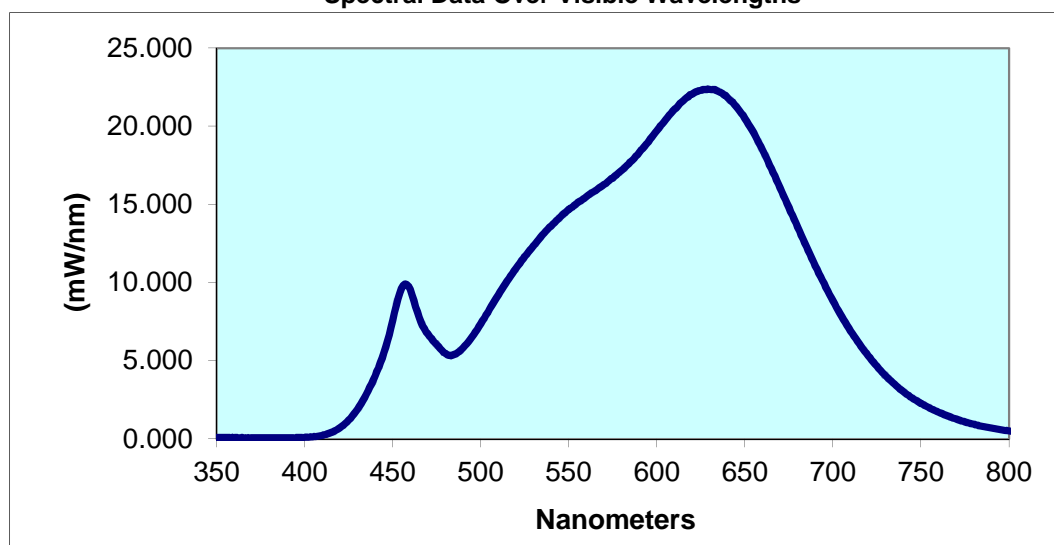
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH10292014041553	UP	120.0	160.9	18.95	0.981	10.56	1187	62.64

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
2960	93.8	71.4	0.000	0.440	0.407	0.252	0.523

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.09	440	4.03	530	12.36	620	22.06	710	6.913
355	0.083	445	5.512	535	13.04	625	22.31	715	6.078
360	0.079	450	7.59	540	13.62	630	22.36	720	5.319
365	0.08	455	9.637	545	14.18	635	22.23	725	4.643
370	0.07	460	9.553	550	14.68	640	21.85	730	4.032
375	0.067	465	7.804	555	15.11	645	21.26	735	3.499
380	0.06	470	6.696	560	15.51	650	20.49	740	3.024
385	0.063	475	6.036	565	15.87	655	19.57	745	2.621
390	0.063	480	5.461	570	16.28	660	18.5	750	2.277
395	0.075	485	5.403	575	16.7	665	17.29	755	1.976
400	0.098	490	5.829	580	17.19	670	16.06	760	1.708
405	0.14	495	6.523	585	17.74	675	14.79	765	1.474
410	0.233	500	7.372	590	18.34	680	13.53	770	1.267
415	0.41	505	8.301	595	18.99	685	12.29	775	1.089
420	0.711	510	9.211	600	19.72	690	11.07	780	0.938
425	1.202	515	10.09	605	20.45	695	9.927		
430	1.9	520	10.92	610	21.09	700	8.84		
435	2.856	525	11.67	615	21.64	705	7.832		

Spectral Data Over Visible Wavelengths



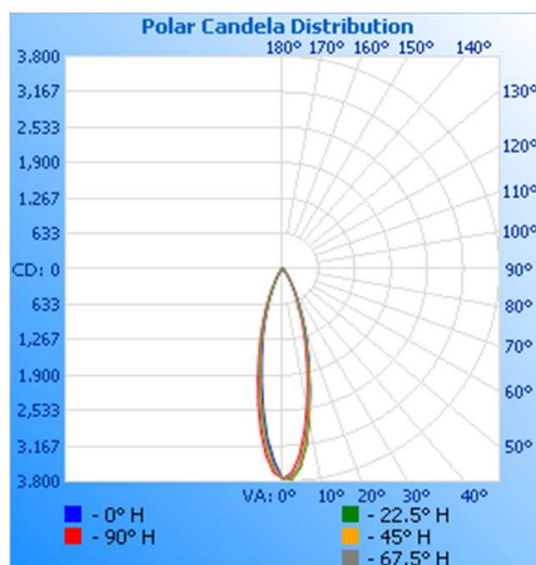
RESULTS OF TEST (cont'd)

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – 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)
AH10292014041553	UP	120.0	160.6	18.93	0.982	1176	62.12

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	3744	3744	3744	3744	3744
5	3542	3572	3522	3446	3347
10	2686	2703	2664	2569	2459
15	1803	1791	1751	1698	1620
20	1148	1135	1101	1062	1000
25	669	652	629	607	571
30	358	351	337	328	305
35	194	191	184	176	168
40	111	109	105	100	92
45	61	61	59	57	53
50	35	35	34	33	31
55	21	21	21	20	19
60	14	14	13	13	12
65	9	9	9	8	8
70	4	4	4	4	3
75	1	1	1	1	1
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0



Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

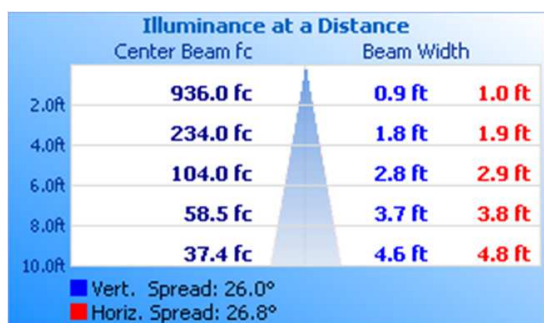
RC	80				70				50			30			10			0
Rw	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	114	112	110	108	112	110	108	106	106	104	103	102	101	100	99	98	97	95
2	110	105	102	99	107	104	101	98	101	98	96	98	96	94	95	93	92	90
3	105	100	95	92	103	98	94	91	96	93	90	93	91	89	91	89	87	86
4	101	95	90	86	99	94	89	86	91	88	85	90	86	84	88	85	83	82
5	97	90	85	82	96	89	85	81	88	84	81	86	83	80	84	82	79	78
6	93	86	81	77	92	85	81	77	84	80	77	83	79	76	81	78	76	74
7	90	82	77	74	89	82	77	74	80	76	73	79	76	73	78	75	73	71
8	87	79	74	71	86	78	74	70	77	73	70	76	73	70	76	72	70	68
9	84	76	71	68	83	75	71	68	75	70	67	74	70	67	73	69	67	66
10	81	73	68	65	80	73	68	65	72	68	65	71	67	65	71	67	64	63

RESULTS OF TEST (cont'd)

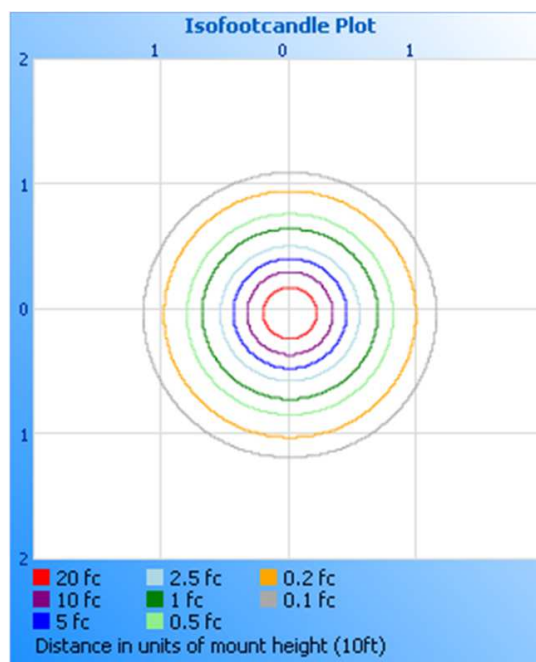
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



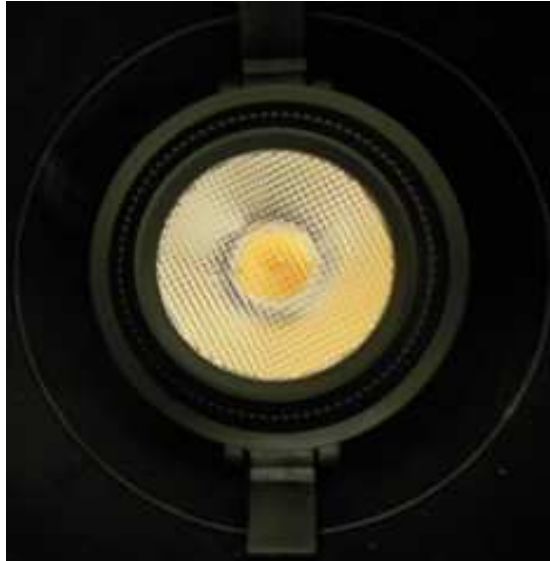
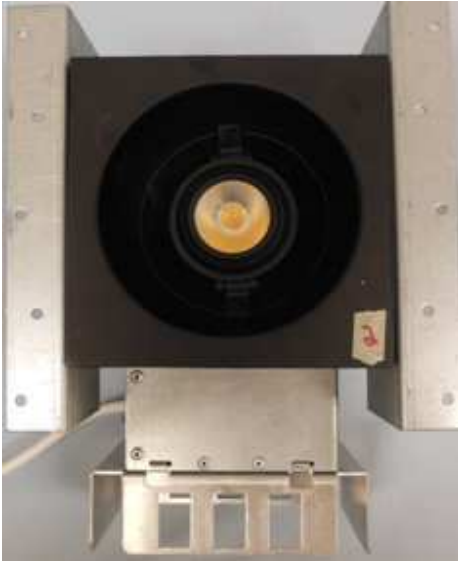
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	998.2	84.9
0-40	1107	94.1
0-60	1168	99.2
60-90	9.0	0.8
0-90	1176	100.0
90-180	0.0	0.0
0-180	1176	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	287.8	24.5
10-20	445.0	37.8
20-30	265.4	22.6
30-40	108.4	9.2
40-50	42.9	3.7
50-60	17.9	1.5
60-70	7.7	0.7
70-80	1.0	0.1
80-90	0.3	0.0

PICTURE (not to scale)



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:



Kenneth Prettyman
Technician
Lighting Division

Attachment: None

Report Reviewed By:



Tim Quigley
Engineer
Lighting Division