



REPORT

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

Project No. G101518786

Date: November 19, 2014

REPORT NO. 101518786CHI-064

TEST OF ONE LED RECESSED LUMINAIRE - 20° OPTIC

MODEL NO. EMO11L-LH9272AN-B
LED MODEL NO. CITIZEN CLU024-1203B8-273H5D2
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-LH9272AN-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 12, 2014 through November 18, 2014.

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SUMMARY

Model No.:	EMO11L-LH9272AN-B
Description:	LED Recessed Luminaire - 20° Optic

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	1149	1145
Total Power (W)	18.76	18.74
Luminaire Efficacy (LPW)	61.25	61.1

Criteria	Result
Power Factor	0.981
Current ATHD %	10.62
Correlated Color Temperature (CCT - K)	2647
Color Rendering Index (CRI - Ra)	92.2
Color Rendering Index (CRI - R9)	65.3
DUV	0.000
Chromaticity Coordinate (x)	0.465
Chromaticity Coordinate (y)	0.413
Chromaticity Coordinate (u')	0.265
Chromaticity Coordinate (v')	0.529

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
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	VBU	VBU
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	VBU	VBU
Newport Hygrometer	iServer	146956	01/02/14	01/02/15
Elgar, AC Power Supply	CW1251P	146918	VBU	VBU
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

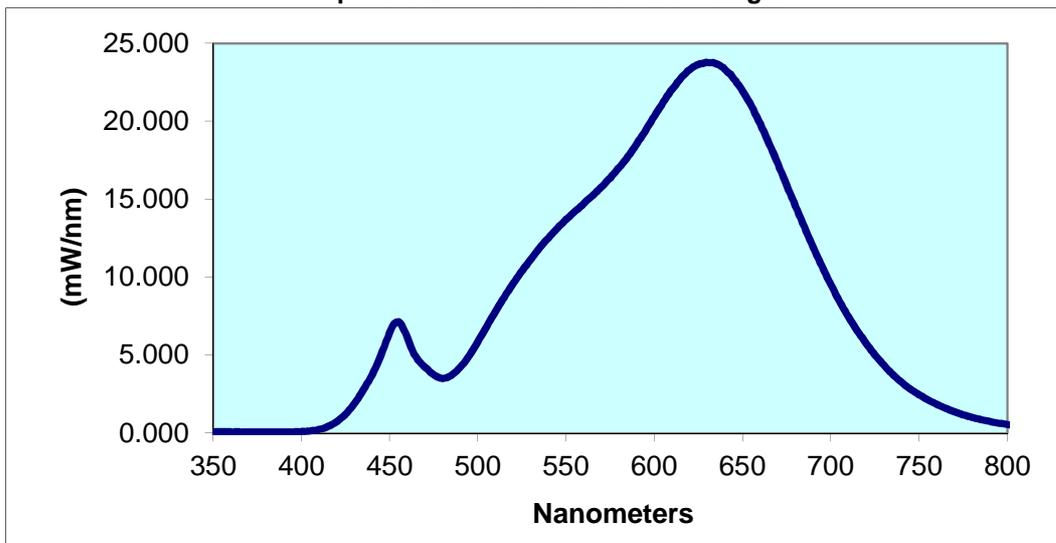
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH10292014041553	UP	120.0	159.3	18.76	0.981	10.62	1149	61.25

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')
2647	92.2	65.3	0.000	0.465	0.413	0.265	0.529

Spectral Distribution over Visible Wavelengths

nm	mW/nm								
350	0.07	440	3.739	530	11.15	620	23.3	710	7.455
355	0.076	445	4.979	535	11.88	625	23.66	715	6.548
360	0.08	450	6.459	540	12.52	630	23.78	720	5.743
365	0.078	455	7.156	545	13.13	635	23.69	725	5.009
370	0.065	460	6.144	550	13.72	640	23.33	730	4.356
375	0.058	465	4.871	555	14.23	645	22.74	735	3.772
380	0.056	470	4.226	560	14.73	650	21.94	740	3.273
385	0.057	475	3.757	565	15.23	655	20.98	745	2.838
390	0.06	480	3.514	570	15.79	660	19.85	750	2.468
395	0.071	485	3.718	575	16.37	665	18.55	755	2.135
400	0.095	490	4.237	580	17.03	670	17.26	760	1.85
405	0.144	495	4.968	585	17.78	675	15.89	765	1.597
410	0.241	500	5.865	590	18.56	680	14.55	770	1.371
415	0.427	505	6.851	595	19.4	685	13.22	775	1.178
420	0.735	510	7.808	600	20.34	690	11.92	780	1.014
425	1.221	515	8.729	605	21.24	695	10.69		
430	1.904	520	9.607	610	22.06	700	9.532		
435	2.763	525	10.41	615	22.77	705	8.446		

Spectral Data Over Visible Wavelengths



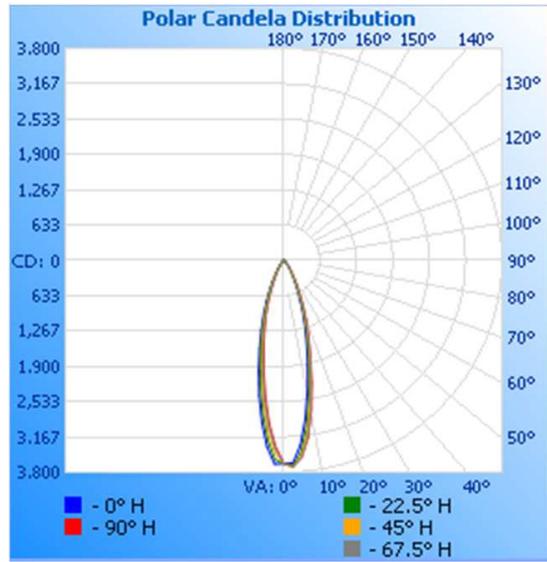
RESULTS OF TEST (cont'd)

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	159.2	18.74	0.981	1145	61.1

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	3639	3639	3639	3639	3639
5	3320	3439	3513	3553	3548
10	2369	2503	2617	2720	2745
15	1534	1629	1713	1774	1801
20	951	1005	1064	1111	1139
25	533	573	600	646	669
30	287	306	328	345	360
35	158	170	180	190	197
40	89	98	104	110	111
45	52	55	59	62	63
50	30	33	34	35	37
55	19	20	21	21	21
60	12	13	14	14	13
65	8	8	9	9	9
70	3	4	4	4	2
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

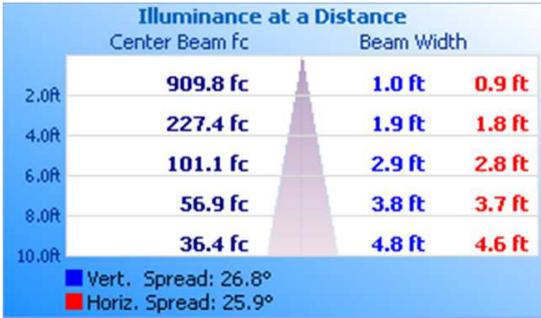
RC	80				70				50			30			10			0
	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	114	112	110	108	112	110	108	106	106	104	103	102	101	100	99	98	97	95
2	110	105	102	99	108	104	101	98	101	98	96	98	96	94	95	93	92	90
3	105	100	96	92	103	98	95	91	96	93	90	94	91	89	91	89	87	86
4	101	95	90	86	99	94	89	86	92	88	85	90	87	84	88	85	83	82
5	97	90	85	82	96	89	85	81	88	84	81	86	83	80	85	82	79	78
6	93	86	81	77	92	85	81	77	84	80	77	83	79	76	81	78	76	75
7	90	82	77	74	89	82	77	74	81	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	70	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)

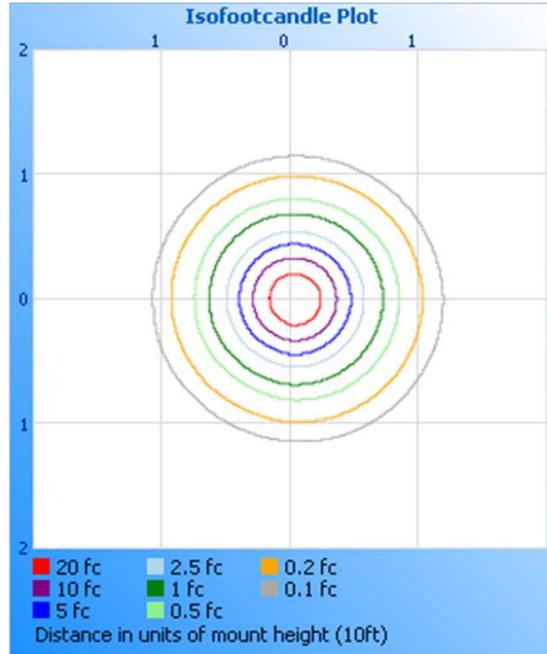
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



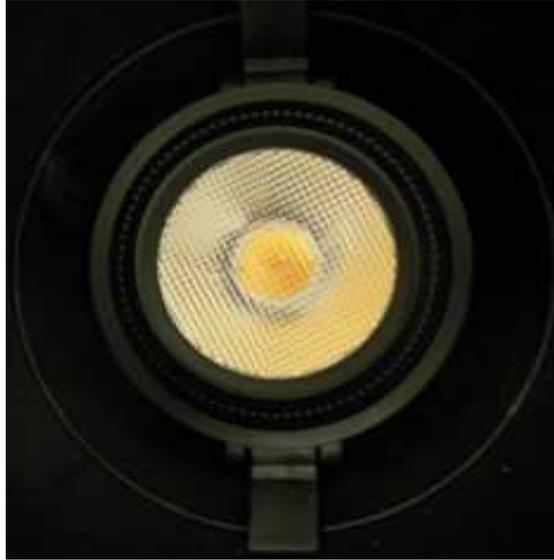
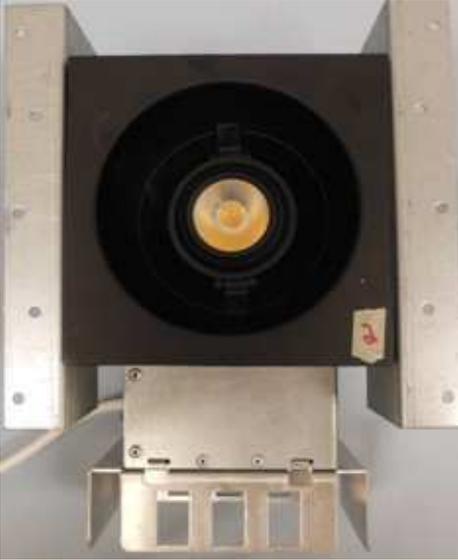
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	971.2	84.8
0-40	1077	94.0
0-60	1137	99.2
60-90	8.6	0.8
0-90	1145	100.0
90-180	0.0	0.0
0-180	1145	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	280.4	24.5
10-20	432.5	37.8
20-30	258.3	22.6
30-40	105.8	9.2
40-50	42.2	3.7
50-60	17.4	1.5
60-70	7.4	0.6
70-80	0.9	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