



# REPORT

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

Project No. G101518786

Date: November 19, 2014

REPORT NO. 101518786CHI-070

TEST OF ONE LED RECESSED FIXTURE - 20° OPTIC

MODEL NO. EMO11L-LH9352AN-B  
LED MODEL NO. CITIZEN CLU024-1203B8-353H5D2  
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-LH9352AN-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.

DATE OF TESTS: November 17, 2014

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SUMMARY

Model No.:	EMO11L-LH9352AN-B
Description:	LED Recessed Fixture - 20° Optic

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	1267	1262
Total Power (W)	18.79	18.77
Luminaire Efficacy (LPW)	67.43	67.23

Criteria	Result
Power Factor	0.981
Current ATHD %	10.62
Correlated Color Temperature (CCT - K)	3398
Color Rendering Index (CRI - Ra)	92.5
Color Rendering Index (CRI - R9)	69.5
DUV	0.001
Chromaticity Coordinate (x)	0.412
Chromaticity Coordinate (y)	0.396
Chromaticity Coordinate (u')	0.238
Chromaticity Coordinate (v')	0.515

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	12/04/13	12/04/14
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**

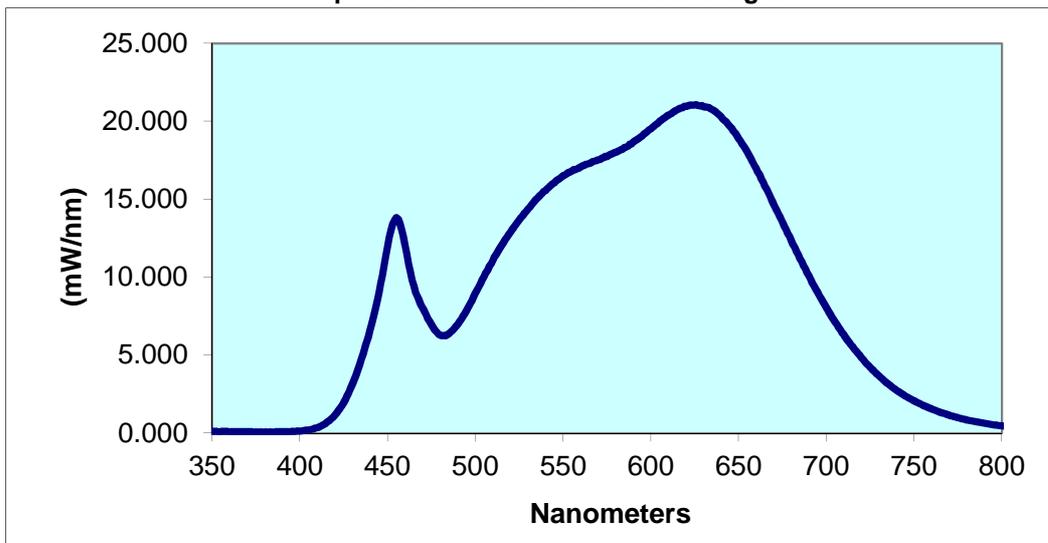
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH10292014041553	UP	120.0	159.7	18.79	0.981	10.62	1267	67.43

Correlated Color Temperature	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
3398	92.5	69.5	0.001	0.412	0.396	0.238	0.515

**Spectral Distribution over Visible Wavelengths**

nm	mW/nm								
350	0.1	440	6.593	530	14.38	620	20.96	710	6.288
355	0.099	445	8.969	535	15.04	625	21.06	715	5.523
360	0.094	450	12	540	15.56	630	20.96	720	4.837
365	0.089	455	13.82	545	16.07	635	20.74	725	4.218
370	0.079	460	12.07	550	16.51	640	20.3	730	3.667
375	0.074	465	9.414	555	16.82	645	19.68	735	3.178
380	0.073	470	8.006	560	17.09	650	18.91	740	2.752
385	0.073	475	6.959	565	17.3	655	18.01	745	2.385
390	0.084	480	6.291	570	17.53	660	16.98	750	2.072
395	0.101	485	6.393	575	17.74	665	15.85	755	1.794
400	0.136	490	6.995	580	18.02	670	14.7	760	1.554
405	0.213	495	7.874	585	18.33	675	13.51	765	1.343
410	0.361	500	8.95	590	18.67	680	12.35	770	1.156
415	0.652	505	10.05	595	19.06	685	11.2	775	0.99
420	1.149	510	11.08	600	19.53	690	10.09	780	0.852
425	1.966	515	12.04	605	20	695	9.032		
430	3.155	520	12.9	610	20.4	700	8.049		
435	4.73	525	13.68	615	20.74	705	7.135		

**Spectral Data Over Visible Wavelengths**



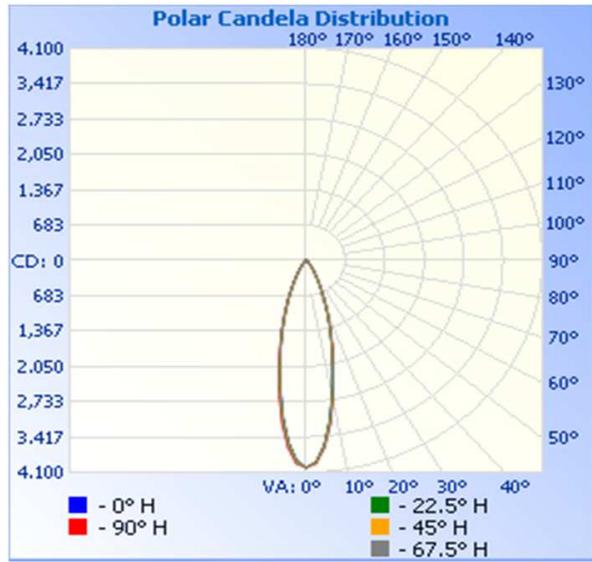
**RESULTS OF TEST**

**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	159.4	18.77	0.981	1262	67.23

**Intensity (Candlepower) Summary at 25°C - Candelas**

Angle	0	22.5	45	67.5	90
0	4004	4004	4004	4004	4004
5	3589	3589	3610	3627	3632
10	2613	2620	2653	2683	2682
15	1720	1717	1732	1761	1765
20	1071	1066	1077	1091	1094
25	606	601	608	625	623
30	323	322	326	333	333
35	180	178	178	183	183
40	104	103	101	103	102
45	58	58	58	58	57
50	34	34	34	34	34
55	21	20	20	21	21
60	13	13	13	13	13
65	8	8	8	8	8
70	2	3	3	3	3
75	0	0	1	0	0
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: 20%

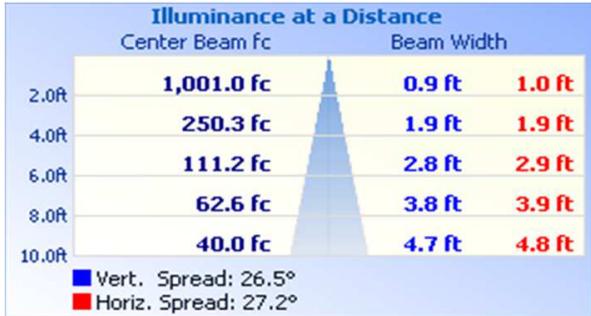
RCC %:	80				70				50				30				10				0
RW %:	70	50	30	0	70	50	30	0	50	30	20	50	30	20	50	30	20	50	30	20	0
RCR: 0	1.19	1.19	1.19	1.19	1.16	1.16	1.16	1.00	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	1.00			
1	1.14	1.12	1.10	1.08	1.12	1.10	1.08	.95	1.06	1.04	1.03	1.02	1.01	1.00	.99	.98	.97	.95			
2	1.10	1.05	1.02	.99	1.08	1.04	1.01	.91	1.01	.98	.96	.98	.96	.94	.95	.93	.92	.90			
3	1.05	1.00	.96	.92	1.03	.98	.95	.87	.96	.93	.90	.94	.91	.89	.91	.89	.87	.86			
4	1.01	.95	.90	.86	.99	.94	.89	.83	.92	.88	.85	.90	.87	.84	.88	.85	.83	.82			
5	.97	.90	.85	.82	.96	.89	.85	.79	.88	.84	.81	.86	.83	.80	.85	.82	.79	.78			
6	.93	.86	.81	.77	.92	.85	.81	.76	.84	.80	.77	.83	.79	.76	.81	.78	.76	.75			
7	.90	.82	.77	.74	.89	.82	.77	.72	.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	.67	.75	.70	.67	.74	.70	.67	.73	.70	.67	.66			
10	.81	.73	.68	.65	.80	.73	.68	.64	.72	.68	.65	.71	.67	.65	.71	.67	.65	.63			

RESULTS OF TEST

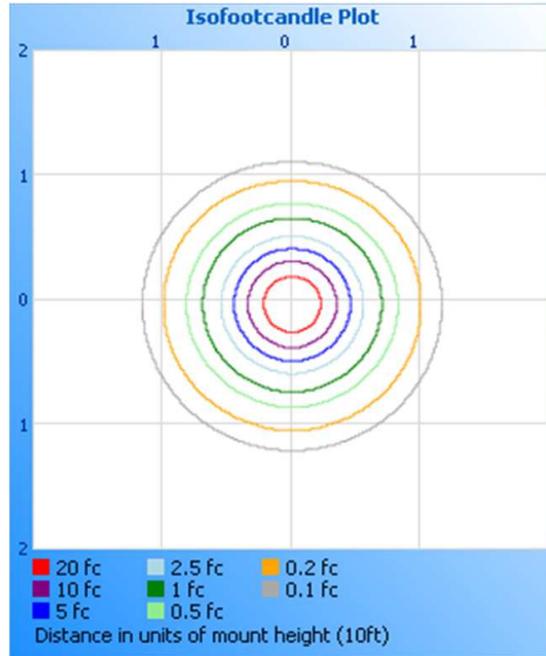
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



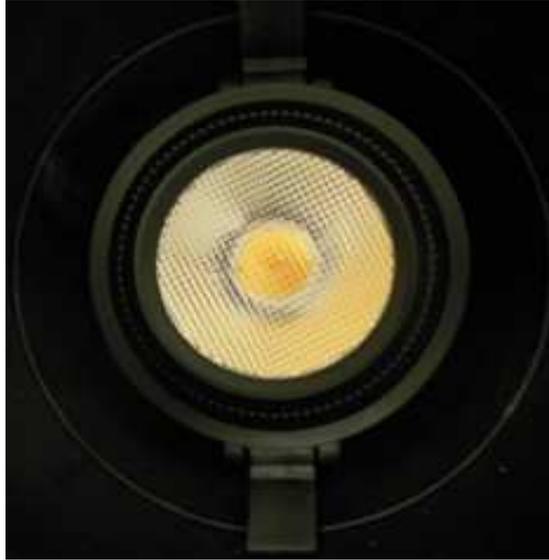
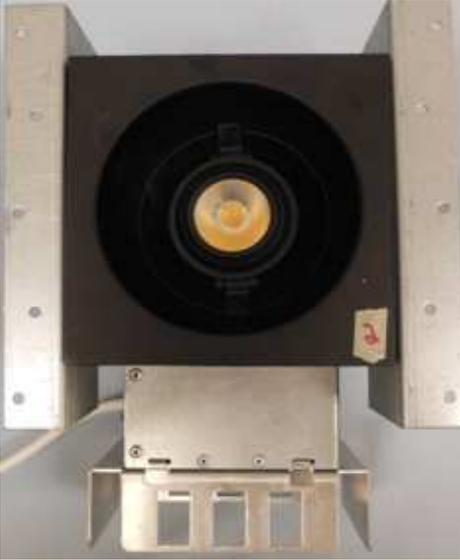
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	1072	84.9
0-40	1188	94.1
0-60	1253	99.3
60-90	9.3	0.7
0-90	1262	100.0
90-180	0.0	0.0
0-180	1262	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	309.5	24.5
10-20	478.1	37.9
20-30	284.3	22.5
30-40	115.9	9.2
40-50	46.0	3.6
50-60	19.1	1.5
60-70	8.1	0.6
70-80	1.0	0.1
80-90	0.3	0.0

PICTURE (not to scale)



CONCLUSIONS

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