



REPORT

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

Project No. G102171228

Date: March 8, 2016

REPORT NO. 102171228CHI-011

TEST OF ONE LED RECESSED FIXTURE - MULTIPLES

MODEL NO. EMO830A60B
LED MODEL NO. CITIZEN CLU024-1203B8-303M1A2
DRIVER MODEL NO. LTF DA18W440C

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 500606081.

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 EMO830A60B. The sample was received by Intertek on February 23, 2016, in undamaged condition and one sample was tested as received. The sample designation was AH02232016052244.

DATES OF TESTS: March 1, 2016 through March 3, 2016.



SUMMARY

Model No.:	EMO830A60B
Description:	LED Recessed Fixture - Multiples

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	1412	1401
Total Power (W)	21.05	21.10
Luminaire Efficacy (LPW)	67.08	66.40

Criteria	Result
Power Factor	0.984
Current ATHD %	10.01
Correlated Color Temperature (CCT - K)	2960
Color Rendering Index (CRI - Ra)	83.6
Color Rendering Index (CRI - R9)	9.2
DUV	0.000
Chromaticity Coordinate (x)	0.441
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	Date Used
Yokogawa Power Meter	WT210	146919	07/14/15	07/14/16	03/03/16
Omega Thermometer	DPI8-C24	146920	10/09/15	10/09/16	03/03/16
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	03/03/16
Newport Hygrometer	iServer	146956	01/04/16	01/04/17	03/03/16
Elgar, AC Power Supply	CW1251P	146918	VBU	VBU	03/03/16
Labsphere Spectroradiometer	CDS1100	CHI0091	VBU	VBU	03/01/16
3 Meter Sphere	SPR600	CHI0088	VBU	VBU	03/01/16
Elgar AC Power Supply	CW1251M	146112	VBU	VBU	03/01/16
Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU	03/01/16
Newport Humidity Recorder	iTHX-SD	146382	07/09/15	07/09/16	03/01/16
Yokogawa Power Meter	WT1600	146768	01/14/16	01/14/17	03/01/16
Omega Temperature Meter	MDSi8	146139	04/03/15	04/03/16	03/01/16



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 Two Meter or Ten Foot 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

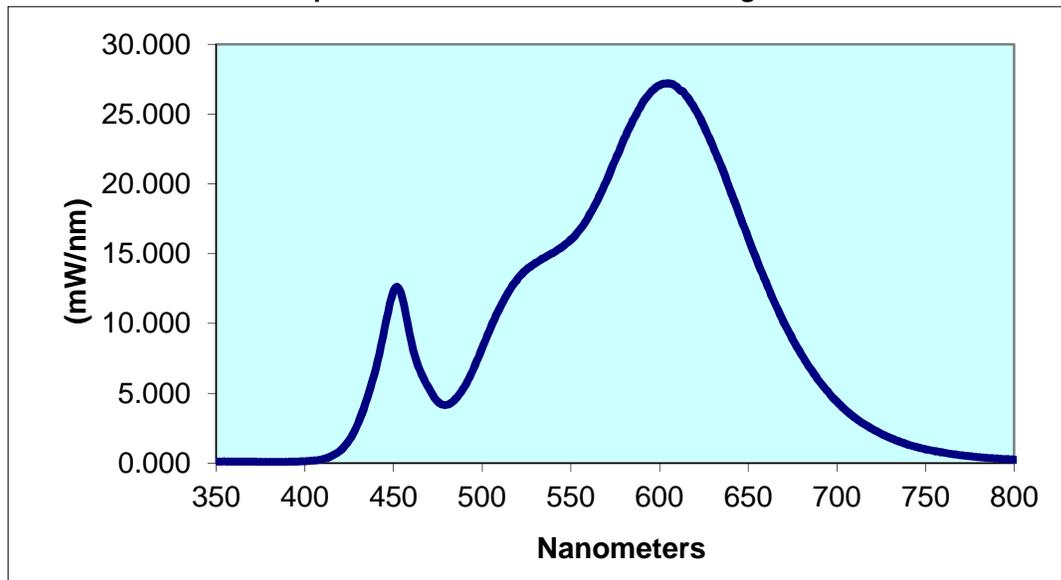
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH02232016052244	Up	120.0	178.2	21.05	0.984	10.01	1412	67.08

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')
2960	83.6	9.2	0.000	0.441	0.407	0.252	0.523

Spectral Distribution over Visible Wavelengths

nm	mW/nm								
350	0.093	440	6.767	530	14.34	620	25.35	710	3.256
355	0.100	445	9.644	535	14.71	625	24.14	715	2.815
360	0.095	450	12.32	540	15.05	630	22.72	720	2.431
365	0.091	455	11.81	545	15.48	635	21.19	725	2.090
370	0.085	460	8.726	550	16.00	640	19.51	730	1.800
375	0.076	465	6.604	555	16.71	645	17.81	735	1.544
380	0.072	470	5.323	560	17.66	650	16.12	740	1.322
385	0.075	475	4.398	565	18.83	655	14.52	745	1.135
390	0.072	480	4.169	570	20.21	660	12.97	750	0.985
395	0.089	485	4.593	575	21.68	665	11.45	755	0.852
400	0.116	490	5.456	580	23.21	670	10.11	760	0.740
405	0.169	495	6.713	585	24.59	675	8.878	765	0.638
410	0.276	500	8.227	590	25.72	680	7.768	770	0.552
415	0.489	505	9.761	595	26.57	685	6.772	775	0.476
420	0.888	510	11.11	600	27.07	690	5.874	780	0.412
425	1.627	515	12.28	605	27.22	695	5.096		
430	2.839	520	13.21	610	26.96	700	4.390		
435	4.591	525	13.86	615	26.31	705	3.779		

Spectral Data Over Visible Wavelengths



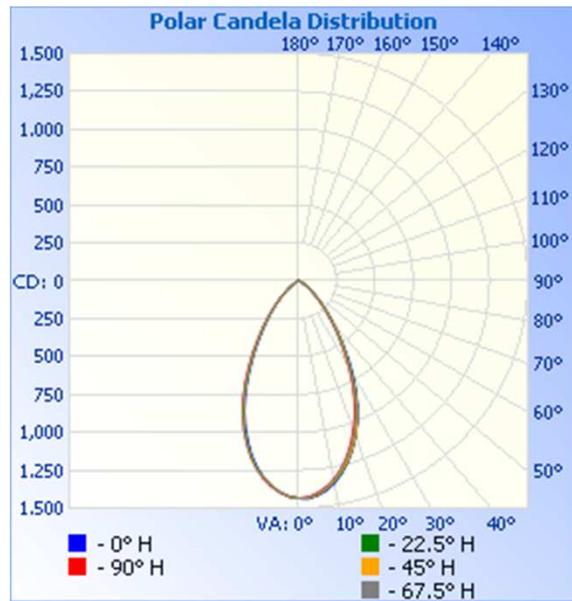
RESULTS OF TEST (cont'd)

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 (LPW)
AH02232016052244	Up	120.0	178.6	21.10	0.984	1401	66.40

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	1435	1435	1435	1435	1435
5	1422	1418	1414	1409	1404
10	1356	1347	1340	1332	1327
15	1241	1237	1231	1212	1206
20	1091	1091	1088	1063	1047
25	913	905	897	878	862
30	707	693	679	667	655
35	503	495	486	471	465
40	340	338	332	322	315
45	225	220	213	204	201
50	137	132	130	123	119
55	80	78	76	70	66
60	43	42	41	37	35
65	22	22	21	19	17
70	8	8	7	6	6
75	1	0	0	0	0
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0

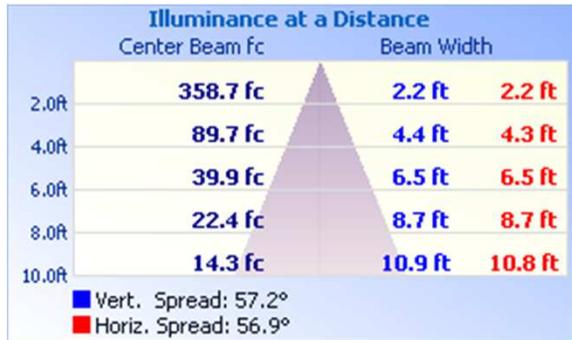


RESULTS OF TEST (cont'd)

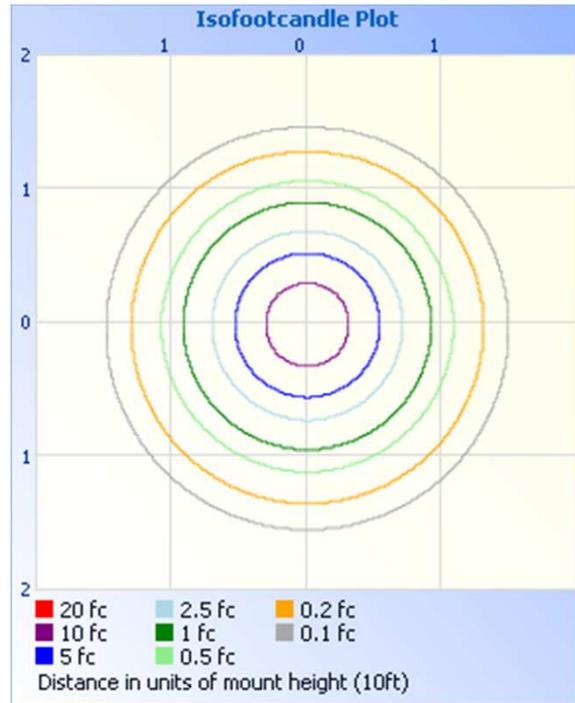
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	863.3	61.6
0-40	1156	82.6
0-60	1380	98.5
60-90	20.9	1.5
0-90	1401	100.0
90-180	0.0	0.0
0-180	1401	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	131.7	9.4
10-20	337.5	24.1
20-30	394.1	28.1
30-40	293.2	20.9
40-50	159.1	11.4
50-60	64.2	4.6
60-70	19.0	1.4
70-80	1.8	0.1
80-90	0.2	0.0

PICTURES (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:



Timothy Quigley
Engineer
Lighting Division

Attachment: None

Report Reviewed By:



Vladimir Kozak
Senior Associate Engineer
Lighting Division