



REPORT

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

Project No. G102171228

Date: April 11, 2017

REPORT NO. 102171228CHI-090

TEST OF ONE LED DOWNLIGHT

MODEL NO. E2SL-LH83040AI
LED MODEL NO. CITIZEN CLU028-1203C4-303M2M2-F1
DRIVER MODEL NO. LTF DA18W440C40BF-0000

RENDERED TO

GENERATION BRANDS
7400 LINDER AVE.
SKOKIE, IL 60077 USA

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

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 prototype sample of model number E2SL-LH83040AI. The sample was received by Intertek on April 4, 2017, in undamaged condition and one sample was tested as received. The sample designation was 04042017041733H.

DATES OF TESTS: April 11, 2017

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SUMMARY

Model No.:	E2SL-LH83040AI
Description:	LED Downlight

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	1565	1494
Total Power (W)	18.70	18.75
Luminaire Efficacy (LPW)	83.69	79.68

Criteria	Result
Power Factor	0.982
Current ATHD %	10.97
Correlated Color Temperature (CCT - K)	2975
Color Rendering Index (CRI - Ra)	82.9
Color Rendering Index (CRI - R9)	6.0
DUV	0.003
Chromaticity Coordinate (x)	0.444
Chromaticity Coordinate (y)	0.415
Chromaticity Coordinate (u')	0.250
Chromaticity Coordinate (v')	0.527

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Yokogawa Power Meter	WT210	146919	07/11/16	07/11/17	04/11/17
Omega Newport Thermometer	DPI8-C24	146920	10/07/16	10/07/17	04/11/17
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	04/11/17
Newport Thermohygrometer	iServer	146956	01/06/17	01/06/18	04/11/17
Pacific, AC power supply	118-ACX	CHI0358	VBU	VBU	04/11/17
Labsphere Spectroradiometer	CDS1100	CHI0091	VBU	VBU	04/11/17
3 Meter Sphere	SPR600	CHI0088	VBU	VBU	04/11/17
Elgar AC Power Supply	CW1251M	146112	VBU	VBU	04/11/17
Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU	04/11/17
Newport Humidity Recorder	iTHX-SD	146382	06/27/16	06/27/17	04/11/17
Yokogawa Power Meter	WT1600	146768	01/10/17	01/10/18	04/11/17
Fluke K/L Temperature Meter	52	146004	01/10/17	01/10/18	04/11/17



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

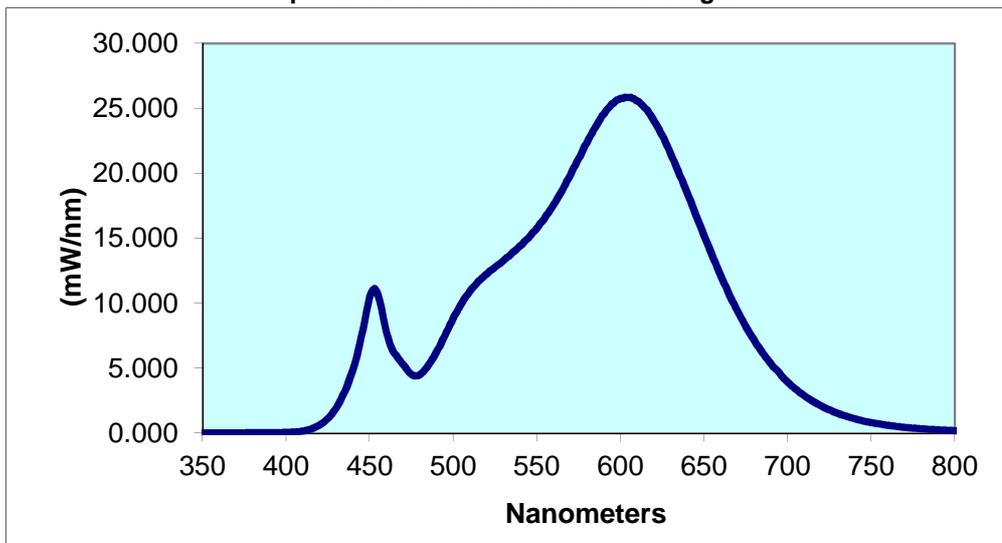
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
04042017041733H	Up	120.0	158.7	18.70	0.982	10.97	1565	83.69

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')
2975	82.9	6.0	0.003	0.444	0.415	0.250	0.527

Spectral Distribution over Visible Wavelengths

nm	mW/nm								
350	0.008	440	4.911	530	13.29	620	24.07	710	2.873
355	0.009	445	7.396	535	13.83	625	22.92	715	2.464
360	0.011	450	10.44	540	14.43	630	21.53	720	2.103
365	0.012	455	10.67	545	15.02	635	20.07	725	1.790
370	0.014	460	7.806	550	15.77	640	18.48	730	1.533
375	0.016	465	6.113	555	16.64	645	16.84	735	1.303
380	0.018	470	5.297	560	17.60	650	15.20	740	1.117
385	0.022	475	4.534	565	18.65	655	13.64	745	0.949
390	0.027	480	4.510	570	19.86	660	12.14	750	0.816
395	0.035	485	5.208	575	21.13	665	10.73	755	0.705
400	0.050	490	6.254	580	22.37	670	9.419	760	0.605
405	0.083	495	7.490	585	23.57	675	8.220	765	0.517
410	0.162	500	8.834	590	24.55	680	7.144	770	0.445
415	0.327	505	9.974	595	25.36	685	6.183	775	0.382
420	0.623	510	10.93	600	25.75	690	5.336	780	0.331
425	1.129	515	11.69	605	25.83	695	4.657		
430	1.942	520	12.25	610	25.59	700	3.932		
435	3.179	525	12.78	615	25.00	705	3.367		

Spectral Data Over Visible Wavelengths



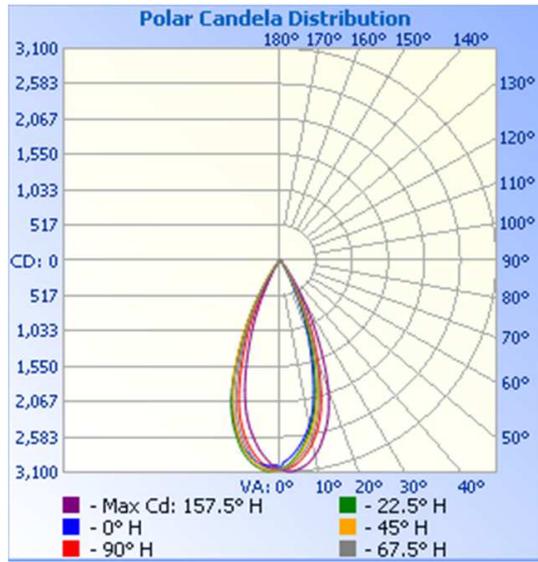
RESULTS OF TEST (cont'd)

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)
04042017041733H	Up	120.0	159.1	18.75	0.982	1494	79.68

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	3050	3050	3050	3050	3050
5	2774	2850	2892	2920	2971
10	2436	2490	2549	2624	2701
15	1847	1954	2085	2172	2260
20	1188	1276	1460	1508	1594
25	571	679	776	875	959
30	216	266	353	393	411
35	84	98	142	146	154
40	30	34	53	52	55
45	11	14	18	18	20
50	1	4	7	5	4
55	0	1	2	1	0
60	0	0	0	0	0
65	0	0	0	0	0
70	0	0	0	0	0
75	0	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)

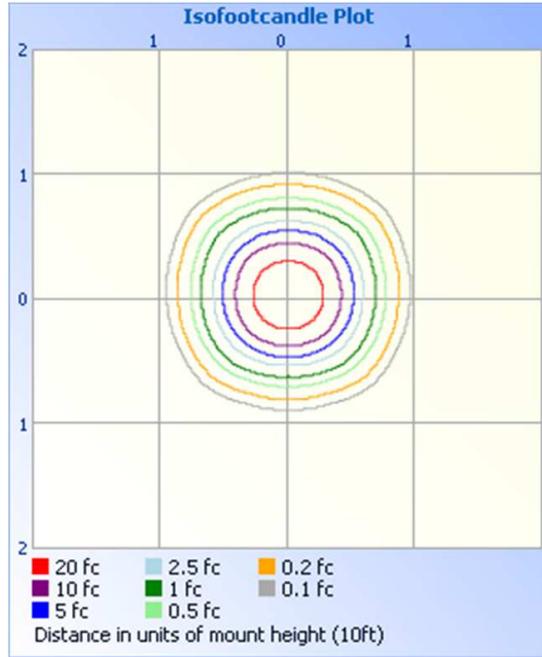
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



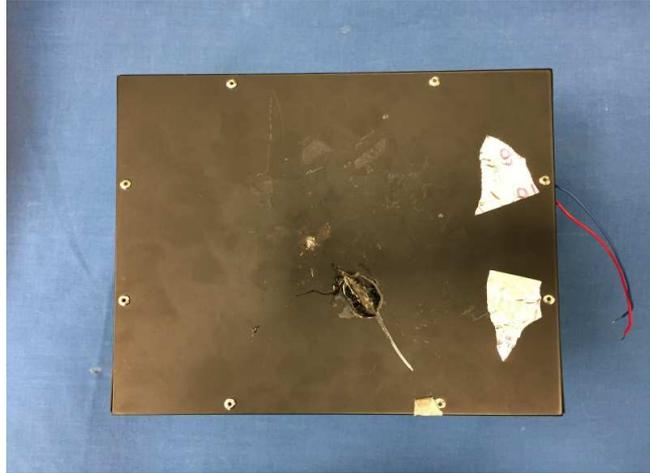
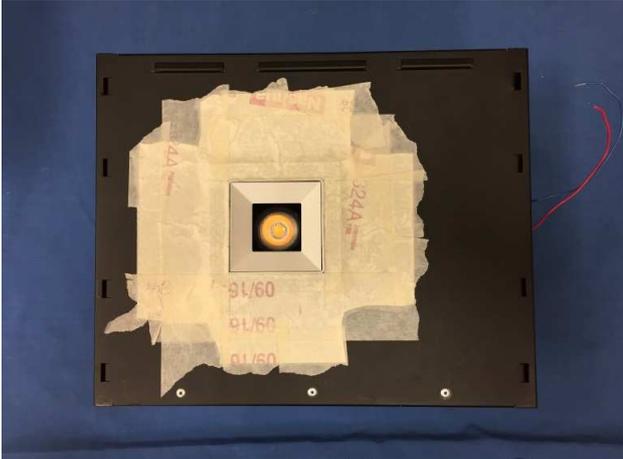
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	1340	89.7
0-40	1470	98.4
0-60	1493	99.9
60-90	0.9	0.1
0-90	1494	100.0
90-180	0.0	0.0
0-180	1494	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	273.5	18.3
10-20	614.1	41.1
20-30	452.4	30.3
30-40	129.6	8.7
40-50	21.8	1.5
50-60	1.9	0.1
60-70	0.4	0.0
70-80	0.3	0.0
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:



Jehue Williams
Associate Engineer
Lighting Division

Attachment: None

Report Reviewed By:



Timothy Quigley
Engineer
Lighting Division