



# REPORT

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

Project No. G102171228

Date: April 11, 2017

REPORT NO. 102171228CHI-086

TEST OF ONE LED DOWNLIGHT

MODEL NO. E2SL-LO83040AI  
LED MODEL NO. CITIZEN CLU028-1203C4-303M2M2-F1  
DRIVER MODEL NO. LTF DA15W300C2042BF-00HE

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-LO83040AI. The sample was received by Intertek on April 4, 2017, in undamaged condition and one sample was tested as received. The sample designation was 04042017041733D.

DATES OF TESTS: April 10, 2017 through April 11, 2017.

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SUMMARY

Model No.:	E2SL-LO83040AI
Description:	LED Downlight

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	1163	1100
Total Power (W)	12.45	12.46
Luminaire Efficacy (LPW)	93.41	88.28

Criteria	Result
Power Factor	0.980
Current ATHD %	8.06
Correlated Color Temperature (CCT - K)	2959
Color Rendering Index (CRI - Ra)	83.5
Color Rendering Index (CRI - R9)	8.4
DUV	0.003
Chromaticity Coordinate (x)	0.445
Chromaticity Coordinate (y)	0.416
Chromaticity Coordinate (u')	0.251
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	04/10/17
Omega Newport Thermometer	DPI8-C24	146920	10/07/16	10/07/17	04/10/17
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	04/10/17
Newport Thermohygrometer	iServer	146956	01/06/17	01/06/18	04/10/17
Pacific, AC power supply	118-ACX	CHI0358	VBU	VBU	04/10/17
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)
04042017041733D	Up	120.0	105.9	12.45	0.980	8.06	1163	93.41

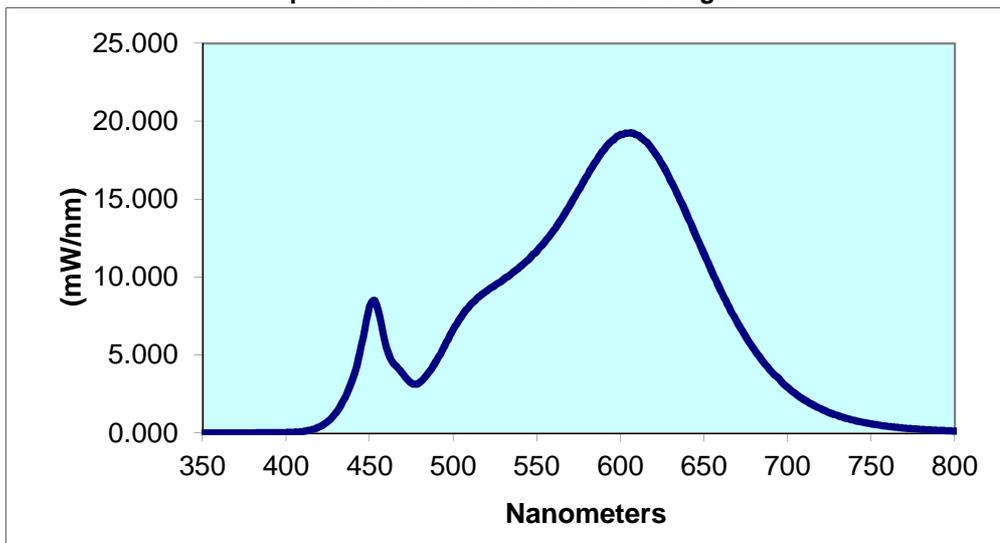
  

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
2959	83.5	8.4	0.003	0.445	0.416	0.251	0.527

**Spectral Distribution over Visible Wavelengths**

nm	mW/nm								
350	0.006	440	3.538	530	9.847	620	18.09	710	2.132
355	0.006	445	5.595	535	10.25	625	17.24	715	1.822
360	0.008	450	8.125	540	10.68	630	16.23	720	1.551
365	0.009	455	7.941	545	11.13	635	15.14	725	1.318
370	0.010	460	5.508	550	11.68	640	13.95	730	1.124
375	0.012	465	4.391	555	12.31	645	12.72	735	0.954
380	0.013	470	3.792	560	13.01	650	11.50	740	0.813
385	0.015	475	3.212	565	13.78	655	10.30	745	0.693
390	0.019	480	3.265	570	14.66	660	9.160	750	0.596
395	0.025	485	3.851	575	15.60	665	8.087	755	0.509
400	0.035	490	4.657	580	16.51	670	7.081	760	0.437
405	0.057	495	5.623	585	17.41	675	6.184	765	0.374
410	0.107	500	6.649	590	18.16	680	5.361	770	0.320
415	0.211	505	7.497	595	18.79	685	4.631	775	0.274
420	0.408	510	8.188	600	19.14	690	3.986	780	0.237
425	0.752	515	8.729	605	19.25	695	3.480		
430	1.327	520	9.122	610	19.13	700	2.925		
435	2.230	525	9.484	615	18.72	705	2.503		

**Spectral Data Over Visible Wavelengths**



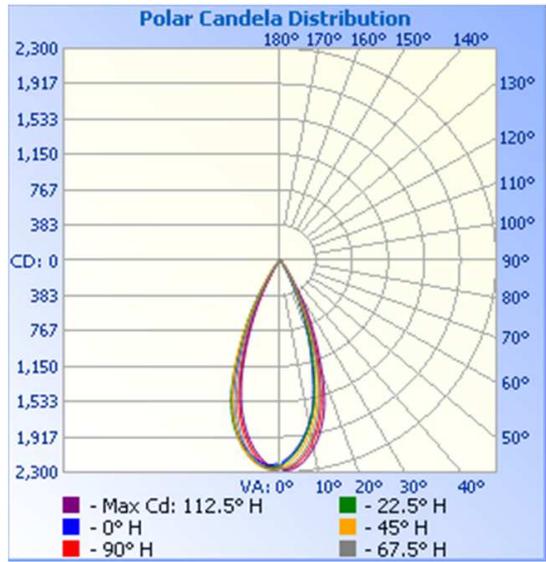
RESULTS OF TEST (cont'd)

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)
04042017041733D	Up	120.0	105.9	12.46	0.980	1100	88.28

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	2246	2246	2246	2246	2246
5	2046	2070	2119	2171	2198
10	1794	1804	1873	1944	1996
15	1369	1415	1532	1600	1671
20	885	919	1070	1114	1175
25	436	486	562	638	696
30	165	190	254	281	289
35	64	71	101	103	109
40	23	24	38	37	39
45	8	10	13	13	15
50	1	2	5	4	3
55	0	0	1	0	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

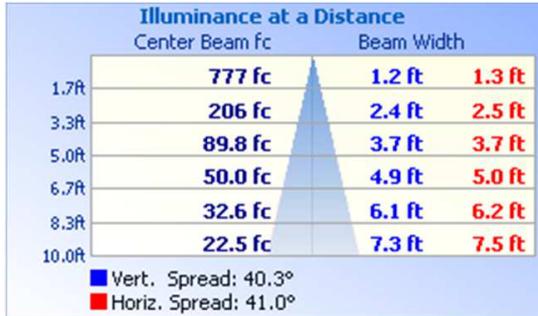


RESULTS OF TEST (cont'd)

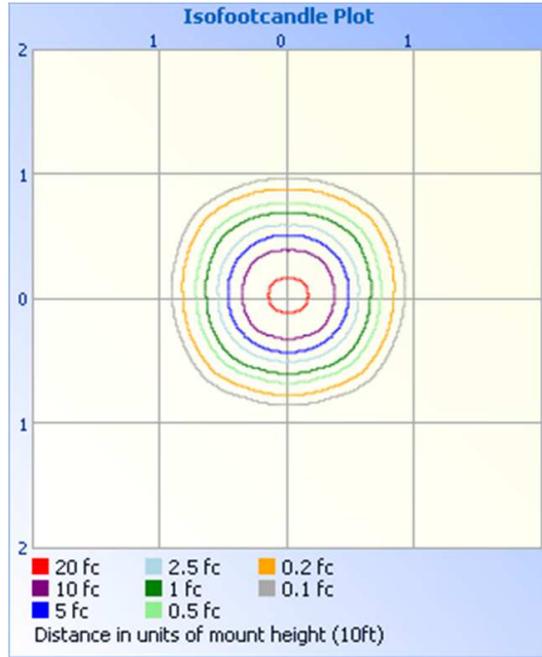
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



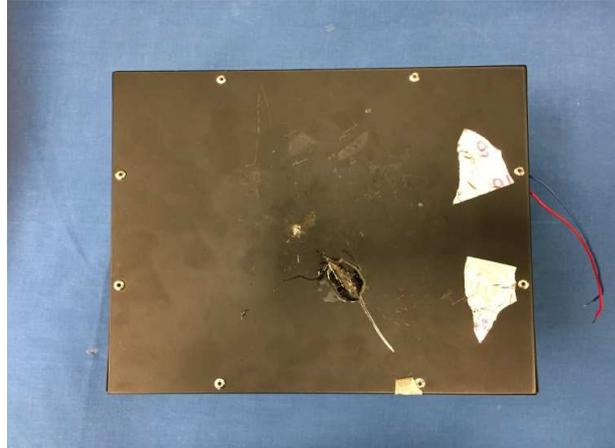
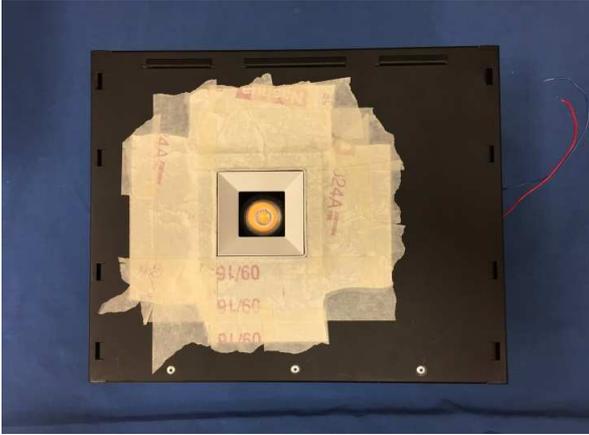
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	987.5	89.8
0-40	1082	98.4
0-60	1099	99.9
60-90	0.9	0.1
0-90	1100	100.0
90-180	0.0	0.0
0-180	1100	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	201.3	18.3
10-20	453.1	41.2
20-30	333.1	30.3
30-40	94.1	8.6
40-50	15.9	1.4
50-60	1.4	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