REPORT

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

Project No. G103017649 Date: June 13, 2017

REPORT NO. 103017649CHI-042

TEST OF ONE LED DOWNLIGHT

MODEL NO. E3SFF-LHWD4AN
LED MODEL NO. CITIZEN CLC030-081B8-313H3H3-185
DRIVER MODEL NO. DA18W440C40BF-0000
TRIM MODEL NO. E3SFB-OW

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 Qu-00779063-2.

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 E3SFF-LHWD4AN. The sample was received by Intertek on June 7, 2017, in undamaged condition and one sample was tested as received. The sample designation was AH06072017043347-42.

DATES OF TESTS: June 12, 2017 through June 13, 2017.

SUMMARY

Model No.:	E3SFF-LHWD4AN
Description:	LED Downlight

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	1029	981.6
Total Power (W)	17.39	17.37
Luminaire Efficacy (LPW)	59.17	56.51

Criteria	Result
Power Factor	0.977
Current ATHD %	11.82
Correlated Color Temperature (CCT - K)	3038
Color Rendering Index (CRI - Ra)	93.1
Color Rendering Index (CRI - R9)	59.7
DUV	0.000
Chromaticity Coordinate (x)	0.434
Chromaticity Coordinate (y)	0.403
Chromaticity Coordinate (u')	0.249
Chromaticity Coordinate (v')	0.520

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	06/13/17
Omega Newport Thermometer	DPI8-C24	146920	10/07/16	10/07/17	06/13/17
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	06/13/17
Newport Thermohygrometer	iServer	146956	01/06/17	01/06/18	06/13/17
Pacific, AC power supply	118-ACX	CHI0358	VBU	VBU	06/13/17
Labsphere Spectroradiometer	CDS1100	CHI0091	VBU	VBU	06/12/17
3 Meter Sphere	SPR600	CHI0088	VBU	VBU	06/12/17
Elgar AC Power Supply	CW1251M	146112	VBU	VBU	06/12/17
Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU	06/12/17
Newport Humidity Recorder	iTHX-SD	146961	12/21/16	12/21/17	06/12/17
Yokogawa Power Meter	WT1600	146768	01/10/17	01/10/18	06/12/17
Fluke J/K Temperature Meter	52	146004	01/10/17	01/10/18	06/12/17

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

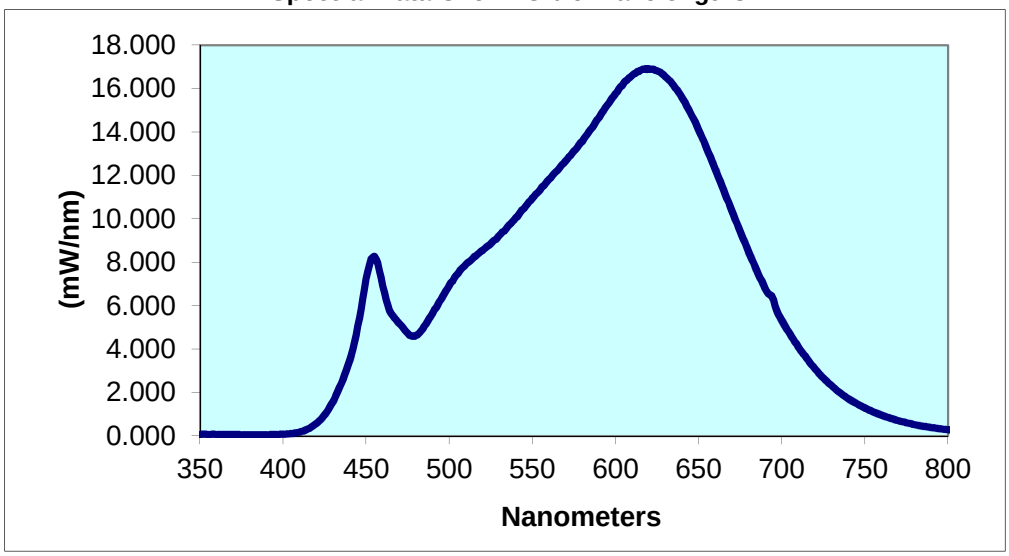
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH06072017043347-42	Up	120.0	148.3	17.39	0.977	11.82	1029	59.17

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')
3038	93.1	59.7	0.000	0.434	0.403	0.249	0.520

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.065	440	3.483	530	9.225	620	16.92	710	4.091
355	0.068	445	5.052	535	9.625	625	16.82	715	3.576
360	0.065	450	7.241	540	10.05	630	16.55	720	3.089
365	0.061	455	8.272	545	10.48	635	16.15	725	2.671
370	0.060	460	6.920	550	10.95	640	15.58	730	2.312
375	0.051	465	5.645	555	11.38	645	14.89	735	1.995
380	0.053	470	5.183	560	11.83	650	14.11	740	1.720
385	0.051	475	4.742	565	12.22	655	13.21	745	1.487
390	0.052	480	4.630	570	12.67	660	12.29	750	1.292
395	0.060	485	5.053	575	13.12	665	11.34	755	1.114
400	0.080	490	5.656	580	13.57	670	10.37	760	0.963
405	0.112	495	6.282	585	14.13	675	9.437	765	0.827
410	0.182	500	6.925	590	14.65	680	8.502	770	0.708
415	0.320	505	7.457	595	15.25	685	7.616	775	0.609
420	0.572	510	7.898	600	15.76	690	6.805	780	0.524
425	0.973	515	8.253	605	16.25	695	6.278		
430	1.582	520	8.540	610	16.60	700	5.320		
435	2.425	525	8.858	615	16.84	705	4.684		

Spectral Data Over Visible Wavelengths



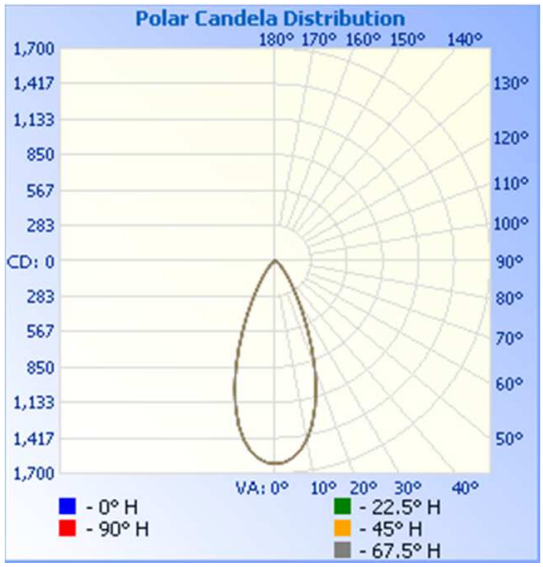
RESULTS OF TEST (cont'd)

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)
AH06072017043347-42	Up	120.0	148.1	17.37	0.977	981.6	56.51

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	1622	1622	1622	1622	1622
5	1581	1581	1581	1581	1581
10	1446	1446	1446	1446	1446
15	1212	1212	1212	1212	1212
20	910	910	910	910	910
25	603	603	603	603	603
30	364	364	364	364	364
35	212	212	212	212	212
40	126	126	126	126	126
45	76	76	76	76	76
50	45	45	45	45	45
55	25	25	25	25	25
60	11	11	11	11	11
65	3	3	3	3	3
70	1	1	1	1	1
75	1	1	1	1	1
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0

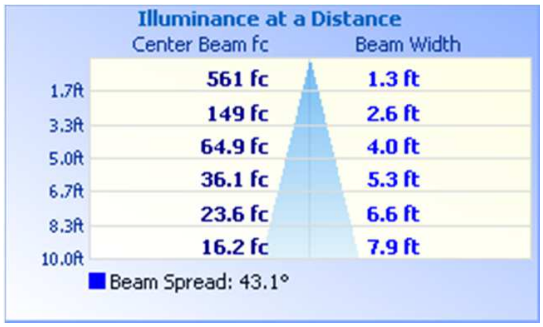


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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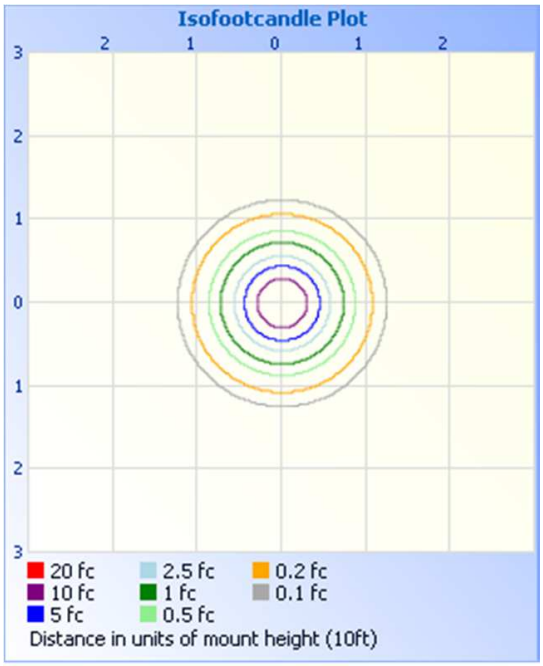


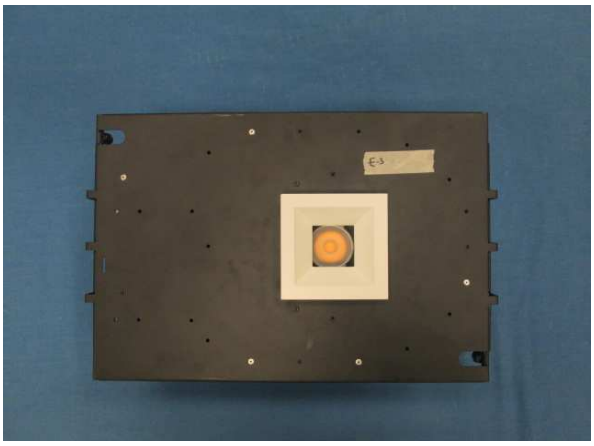
Zonal Lumen Summary and Percentages at 25°C

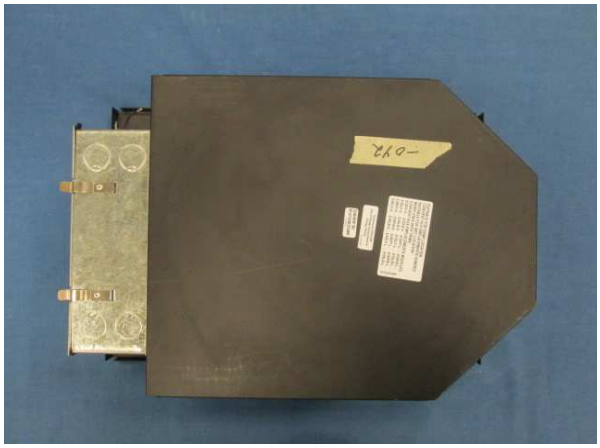
Zone	Lumens	% Luminaire
0-30	754.7	76.9
0-40	892.4	90.9
0-60	976.4	99.5
60-90	5.3	0.5
0-90	981.6	100.0
90-180	0.0	0.0
0-180	981.6	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	146.4	14.9
10-20	331.3	33.8
20-30	277.0	28.2
30-40	137.6	14.0
40-50	60.7	6.2
50-60	23.3	2.4
60-70	4.4	0.5
70-80	0.8	0.1
80-90	0.0	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:

Hector Huitron
Associate Engineer
Lighting Division

Report Reviewed By:

Timothy Quigley
Engineer
Lighting Division

Attachment: None