REPORT

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

Project No. G102171228 Date: April 12, 2017

REPORT NO. 102171228CHI-093

TEST OF ONE LED DOWNLIGHT

MODEL NO. E3SFF-LHWD4AN W/ E3SFB-OW
LED MODEL NO. CITIZEN CLC030-081B8-313H3H3-185
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 production sample of model number E3SFF-LHWD4AN w/ E3SFB-OW. The sample was received by Intertek on April 6, 2017, in undamaged condition and one sample was tested as received. The sample designation was 04062017115221K.

DATES OF TESTS: April 12, 2017

SUMMARY

Model No.:	E3SFF-LHWD4AN w/ E3SFB-OW
Description:	LED Downlight

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	1320	1277
Total Power (W)	17.42	17.44
Luminaire Efficacy (LPW)	75.77	73.22

Criteria	Result
Power Factor	0.977
Current ATHD %	11.76
Correlated Color Temperature (CCT - K)	2933
Color Rendering Index (CRI - Ra)	91.7
Color Rendering Index (CRI - R9)	53.8
DUV	0.003
Chromaticity Coordinate (x)	0.447
Chromaticity Coordinate (y)	0.416
Chromaticity Coordinate (u')	0.252
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	04/12/17
Omega Newport Thermometer	DPI8-C24	146920	10/07/16	10/07/17	04/12/17
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	04/12/17
Newport Thermohygrometer	iServer	146956	01/06/17	01/06/18	04/12/17
Pacific, AC power supply	118-ACX	CHI0358	VBU	VBU	04/12/17
Labsphere Spectroradiometer	CDS1100	CHI0091	VBU	VBU	04/12/17
3 Meter Sphere	SPR600	CHI0088	VBU	VBU	04/12/17
Elgar AC Power Supply	CW1251M	146112	VBU	VBU	04/12/17
Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU	04/12/17
Newport Humidity Recorder	iTHX-SD	146382	06/27/16	06/27/17	04/12/17
Yokogawa Power Meter	WT1600	146768	01/10/17	01/10/18	04/12/17
Fluke J/K Temperature Meter	52	146004	01/10/17	01/10/18	04/12/17

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

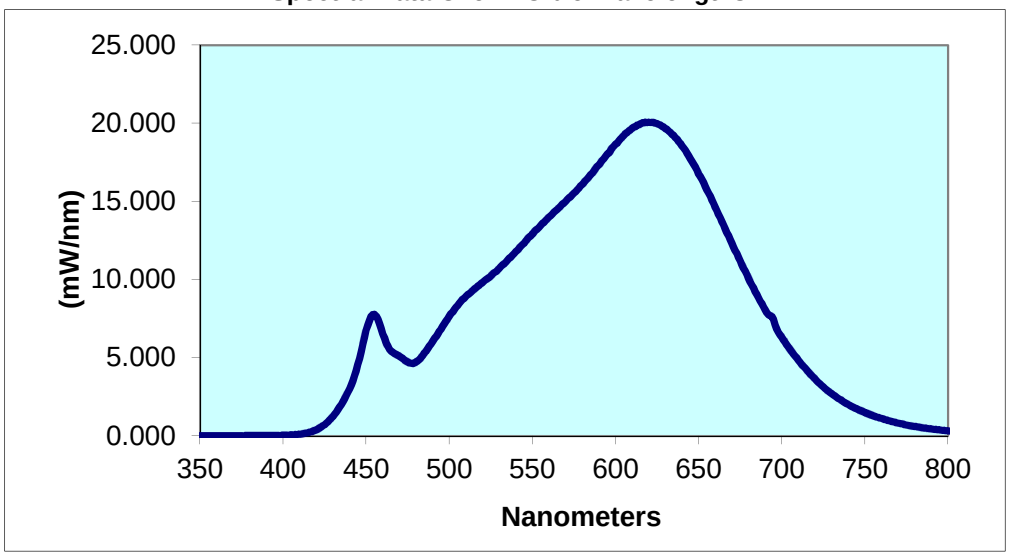
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
04062017115221K	Up	120.0	148.6	17.42	0.977	11.76	1320	75.77

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')
2933	91.7	53.8	0.003	0.447	0.416	0.252	0.527

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.006	440	3.021	530	10.72	620	20.08	710	4.840
355	0.007	445	4.569	535	11.24	625	19.99	715	4.214
360	0.009	450	6.756	540	11.81	630	19.67	720	3.640
365	0.010	455	7.778	545	12.33	635	19.23	725	3.140
370	0.011	460	6.540	550	12.92	640	18.56	730	2.711
375	0.013	465	5.439	555	13.47	645	17.73	735	2.335
380	0.014	470	5.110	560	14.02	650	16.77	740	2.016
385	0.017	475	4.737	565	14.50	655	15.74	745	1.739
390	0.021	480	4.735	570	15.02	660	14.63	750	1.508
395	0.026	485	5.297	575	15.55	665	13.50	755	1.298
400	0.040	490	6.053	580	16.10	670	12.33	760	1.122
405	0.061	495	6.832	585	16.72	675	11.21	765	0.962
410	0.111	500	7.657	590	17.34	680	10.09	770	0.825
415	0.211	505	8.339	595	18.04	685	9.050	775	0.705
420	0.401	510	8.930	600	18.66	690	8.062	780	0.606
425	0.729	515	9.410	605	19.21	695	7.451		
430	1.258	520	9.805	610	19.67	700	6.301		
435	2.013	525	10.25	615	19.97	705	5.540		

Spectral Data Over Visible Wavelengths



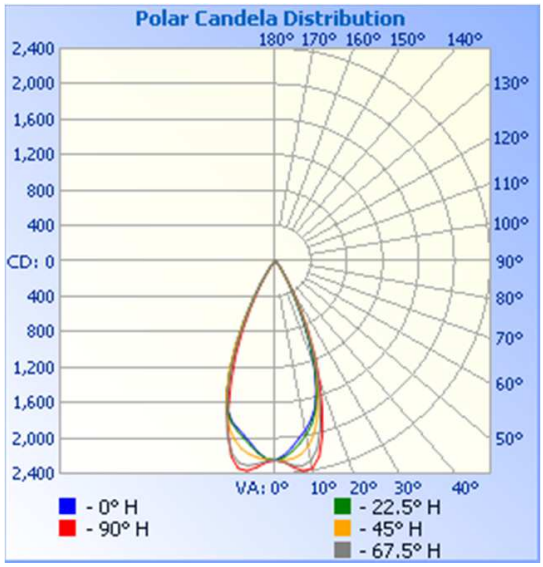
RESULTS OF TEST (cont'd)

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)
04062017115221K	Up	120.0	148.7	17.44	0.977	1277	73.22

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	2251	2251	2251	2251	2251
5	2113	2159	2242	2315	2338
10	1936	1990	2125	2290	2379
15	1716	1740	1818	1943	2032
20	1276	1302	1358	1392	1444
25	716	732	812	828	871
30	304	322	339	376	394
35	118	125	126	152	155
40	52	59	61	68	67
45	24	27	32	30	29
50	8	9	16	9	8
55	4	5	6	5	4
60	1	2	3	2	2
65	1	1	1	1	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

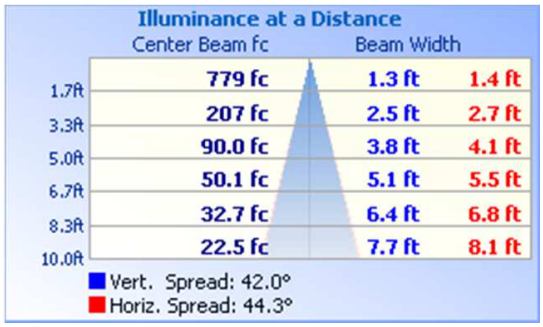


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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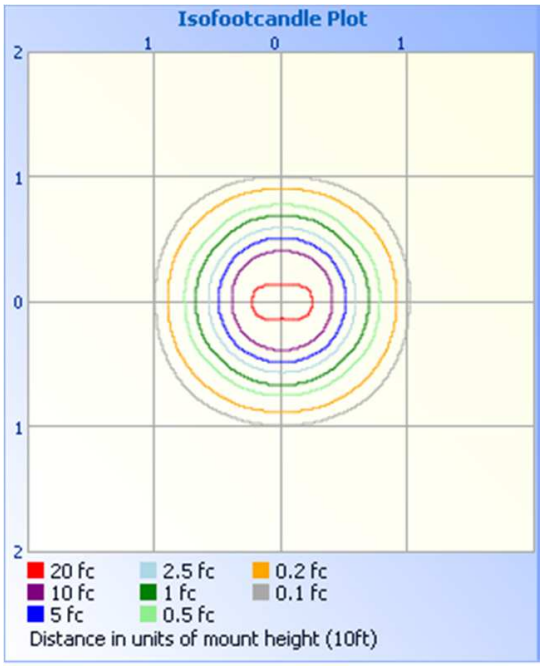


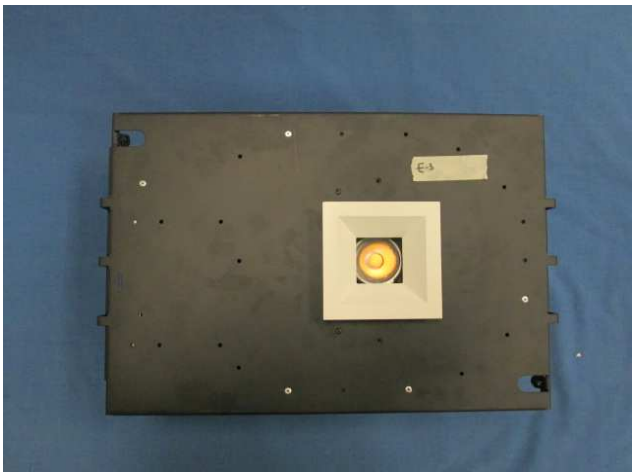
Zonal Lumen Summary and Percentages at 25°C

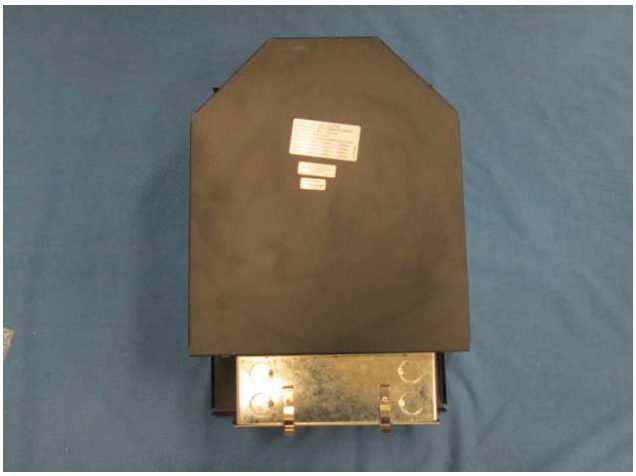
Zone	Lumens	% Luminaire
0-30	1132	88.7
0-40	1245	97.5
0-60	1276	99.9
60-90	1.3	0.1
0-90	1277	100.0
90-180	0.0	0.0
0-180	1277	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	211.0	16.5
10-20	517.5	40.5
20-30	403.6	31.6
30-40	112.6	8.8
40-50	26.2	2.0
50-60	4.8	0.4
60-70	0.9	0.1
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:

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Lighting Division

Report Reviewed By:

Timothy Quigley
Engineer
Lighting Division

Attachment: None