REPORT

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

Project No. G103017649 Date: June 13, 2017

REPORT NO. 103017649CHI-043

TEST OF ONE LED DOWNLIGHT

MODEL NO. E4SF-LHWD40AN
LED MODEL NO. CITIZEN CLC035-093C1-313H3H3-185
DRIVER MODEL NO. DA30W750C40BF-0000
TRIM MODEL NO. E4SFB-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 E4SF-LHWD40AN. The sample was received by Intertek on June 7, 2017, in undamaged condition and one sample was tested as received. The sample designation was AH06072017043347-043.

DATES OF TESTS: June 13, 2017

SUMMARY

Model No.:	E4SF-LHWD40AN
Description:	LED Downlight

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	1939	1870
Total Power (W)	30.15	30.15
Luminaire Efficacy (LPW)	64.31	62.02

Criteria	Result
Power Factor	0.983
Current ATHD %	9.59
Correlated Color Temperature (CCT - K)	2940
Color Rendering Index (CRI - Ra)	93.3
Color Rendering Index (CRI - R9)	60.2
DUV	0.001
Chromaticity Coordinate (x)	0.440
Chromaticity Coordinate (y)	0.403
Chromaticity Coordinate (u')	0.253
Chromaticity Coordinate (v')	0.522

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	06/13/17
3 Meter Sphere	SPR600	CHI0088	VBU	VBU	06/13/17
Elgar AC Power Supply	CW1251M	146112	VBU	VBU	06/13/17
Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU	06/13/17
Newport Humidity Recorder	iTHX-SD	146961	12/21/16	12/21/17	06/13/17
Yokogawa Power Meter	WT1600	146768	01/10/17	01/10/18	06/13/17
Fluke J/K Temperature Meter	52	146004	01/10/17	01/10/18	06/13/17

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

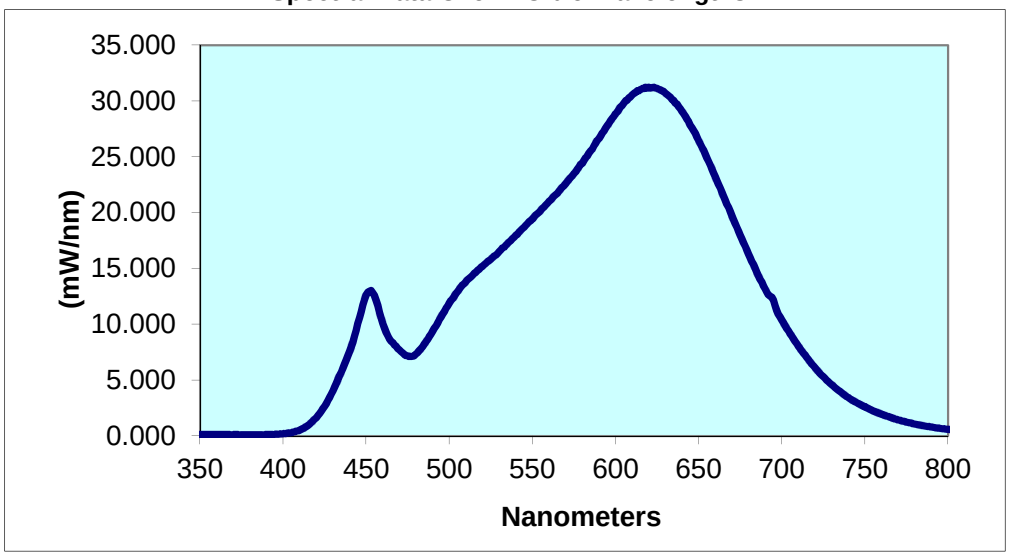
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
\H06072017043347-04:	Up	120.0	255.5	30.15	0.983	9.59	1939	64.31

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')
2940	93.3	60.2	0.001	0.440	0.403	0.253	0.522

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.117	440	7.611	530	16.52	620	31.23	710	8.038
355	0.127	445	10.06	535	17.25	625	31.13	715	7.041
360	0.122	450	12.62	540	17.97	630	30.72	720	6.101
365	0.109	455	12.58	545	18.70	635	30.05	725	5.299
370	0.108	460	10.08	550	19.45	640	29.06	730	4.591
375	0.100	465	8.493	555	20.22	645	27.84	735	3.976
380	0.093	470	7.712	560	21.03	650	26.45	740	3.446
385	0.103	475	7.158	565	21.75	655	24.88	745	2.993
390	0.115	480	7.355	570	22.61	660	23.22	750	2.604
395	0.139	485	8.243	575	23.51	665	21.51	755	2.255
400	0.194	490	9.389	580	24.44	670	19.73	760	1.952
405	0.305	495	10.63	585	25.55	675	18.02	765	1.688
410	0.534	500	11.90	590	26.64	680	16.31	770	1.447
415	0.953	505	12.92	595	27.80	685	14.67	775	1.242
420	1.647	510	13.83	600	28.85	690	13.17	780	1.068
425	2.669	515	14.58	605	29.80	695	12.15		
430	4.056	520	15.19	610	30.53	700	10.38		
435	5.738	525	15.83	615	31.03	705	9.161		

Spectral Data Over Visible Wavelengths



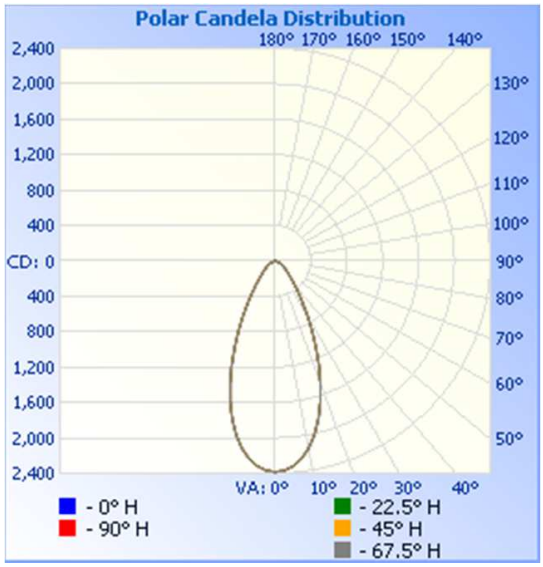
RESULTS OF TEST (cont'd)

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)
AH06072017043347-043	Up	120.0	255.2	30.15	0.985	1870	62.02

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	2381	2381	2381	2381	2381
5	2324	2324	2324	2324	2324
10	2147	2147	2147	2147	2147
15	1853	1853	1853	1853	1853
20	1474	1474	1474	1474	1474
25	1072	1072	1072	1072	1072
30	724	724	724	724	724
35	472	472	472	472	472
40	311	311	311	311	311
45	215	215	215	215	215
50	156	156	156	156	156
55	118	118	118	118	118
60	88	88	88	88	88
65	60	60	60	60	60
70	31	31	31	31	31
75	11	11	11	11	11
80	4	4	4	4	4
85	2	2	2	2	2
90	1	1	1	1	1

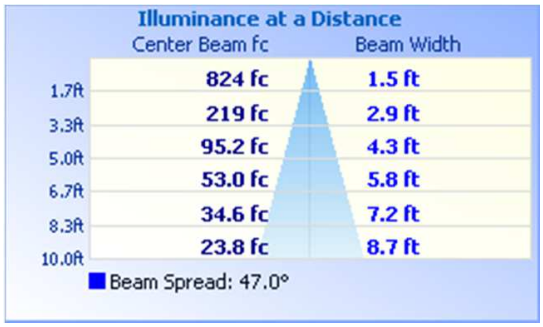


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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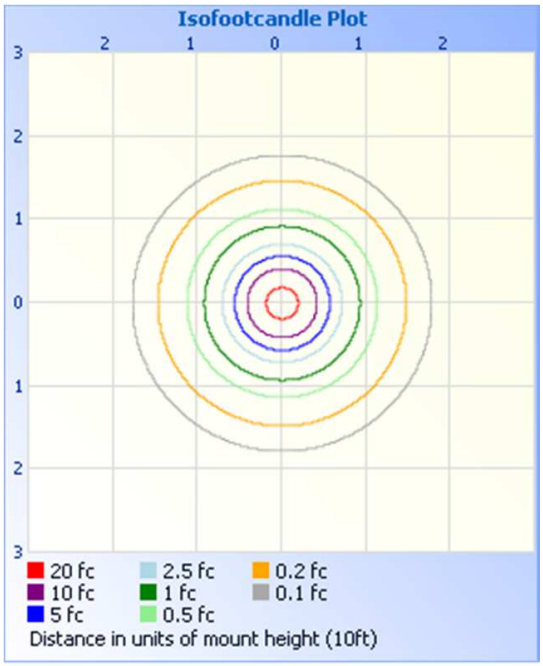


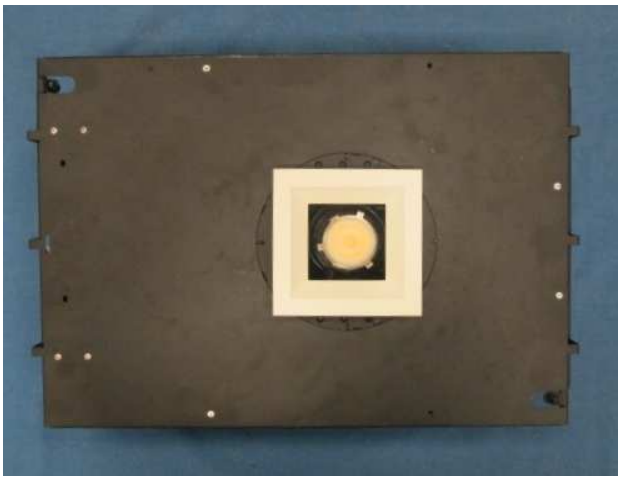
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	1216	65.0
0-40	1517	81.2
0-60	1794	96.0
60-90	75.5	4.0
0-90	1869	100.0
90-180	0.1	0.0
0-180	1870	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	215.8	11.5
10-20	510.1	27.3
20-30	489.6	26.2
30-40	301.7	16.1
40-50	170.0	9.1
50-60	106.7	5.7
60-70	59.0	3.2
70-80	14.1	0.8
80-90	2.4	0.1
90-100	0.1	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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Report Reviewed By:

Timothy Quigley
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Attachment: None