REPORT

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

Project No. G102171228 Date: April 12, 2017

REPORT NO. 102171228CHI-095

TEST OF ONE LED DOWNLIGHT

MODEL NO. E4SF-LHWD40AN W/ E4SFB-OW
LED MODEL NO. CITIZEN CLC035-093C1-313H3H3-185
DRIVER MODEL NO. DA30W750C40BF-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 E4SF-LHWD40AN w/ E4SFB-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 04062017115221M.

DATES OF TESTS: April 12, 2017

SUMMARY

Model No.:	E4SF-LHWD40AN w/ E4SFB-OW
Description:	LED Downlight

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	2374	2298
Total Power (W)	30.08	30.24
Luminaire Efficacy (LPW)	78.92	75.99

Criteria	Result
Power Factor	0.983
Current ATHD %	9.60
Correlated Color Temperature (CCT - K)	2833
Color Rendering Index (CRI - Ra)	91.8
Color Rendering Index (CRI - R9)	54.5
DUV	0.002
Chromaticity Coordinate (x)	0.453
Chromaticity Coordinate (y)	0.416
Chromaticity Coordinate (u')	0.256
Chromaticity Coordinate (v')	0.528

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

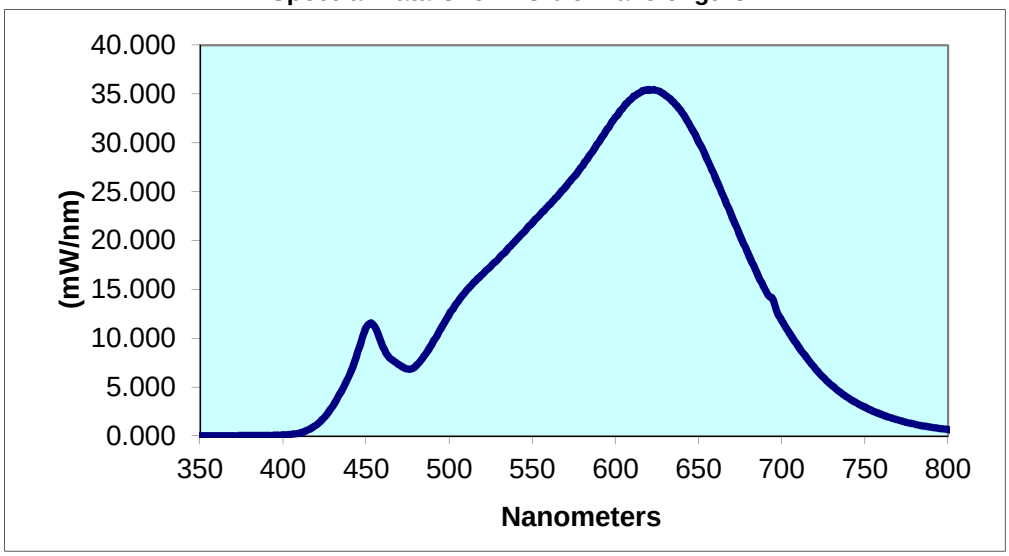
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
04062017115221M	Up	120.0	255.0	30.08	0.983	9.60	2374	78.92

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')
2833	91.8	54.5	0.002	0.453	0.416	0.256	0.528

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.012	440	6.287	530	18.21	620	35.44	710	9.149
355	0.012	445	8.631	535	19.12	625	35.36	715	8.008
360	0.014	450	11.11	540	20.04	630	34.87	720	6.933
365	0.017	455	11.23	545	20.87	635	34.18	725	5.996
370	0.019	460	9.152	550	21.81	640	33.08	730	5.192
375	0.022	465	7.875	555	22.74	645	31.71	735	4.496
380	0.026	470	7.277	560	23.66	650	30.10	740	3.895
385	0.032	475	6.853	565	24.52	655	28.35	745	3.380
390	0.043	480	7.190	570	25.48	660	26.49	750	2.937
395	0.061	485	8.234	575	26.55	665	24.50	755	2.542
400	0.095	490	9.539	580	27.62	670	22.48	760	2.201
405	0.165	495	10.98	585	28.86	675	20.52	765	1.895
410	0.315	500	12.45	590	30.10	680	18.57	770	1.631
415	0.612	505	13.70	595	31.44	685	16.72	775	1.395
420	1.129	510	14.81	600	32.64	690	14.97	780	1.204
425	1.937	515	15.76	605	33.69	695	13.85		
430	3.095	520	16.56	610	34.59	700	11.80		
435	4.572	525	17.37	615	35.17	705	10.42		

Spectral Data Over Visible Wavelengths



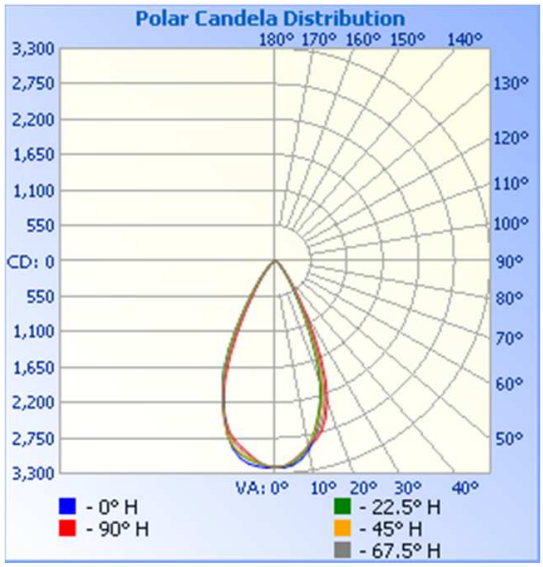
RESULTS OF TEST (cont'd)

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)
04062017115221M	Up	120.0	255.9	30.24	0.985	2298	75.99

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	3205	3205	3205	3205	3205
5	3180	3153	3126	3112	3118
10	2976	2920	2906	2914	2940
15	2578	2521	2570	2665	2739
20	2056	2015	2104	2227	2326
25	1332	1284	1371	1514	1655
30	711	701	756	838	932
35	385	379	405	444	491
40	219	218	228	245	267
45	129	128	134	140	150
50	81	80	82	86	91
55	49	52	55	54	52
60	30	33	39	34	32
65	16	18	25	19	17
70	5	7	11	8	6
75	2	2	2	2	2
80	2	2	2	2	2
85	1	1	1	1	1
90	0	0	0	0	0

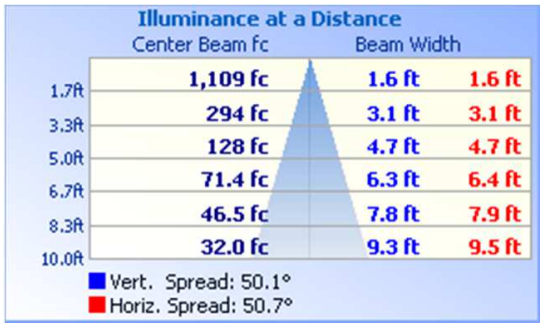


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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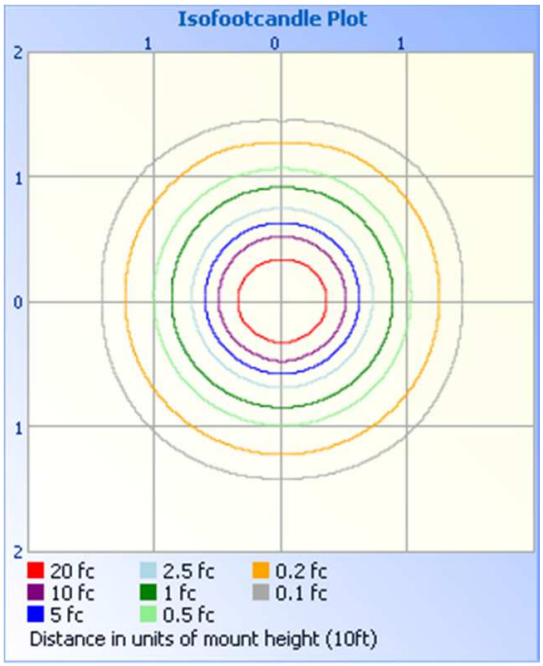


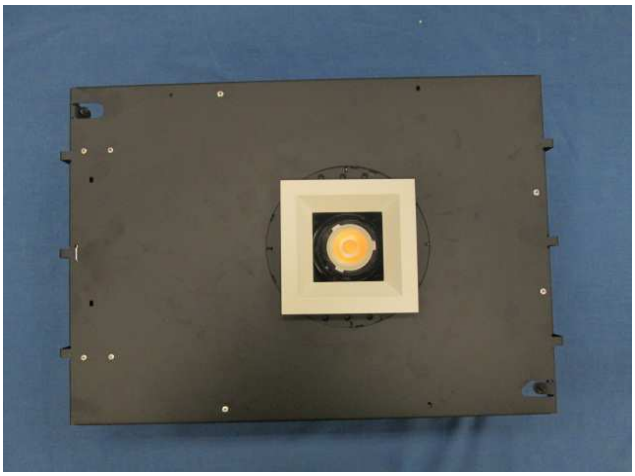
Zonal Lumen Summary and Percentages at 25°C

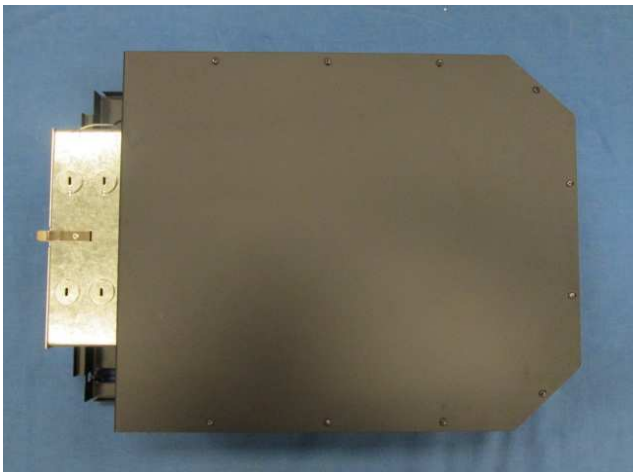
Zone	Lumens	% Luminaire
0-30	1758	76.5
0-40	2089	90.9
0-60	2273	98.9
60-90	25.3	1.1
0-90	2298	100.0
90-180	0.0	0.0
0-180	2298	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	294.0	12.8
10-20	743.4	32.3
20-30	720.4	31.3
30-40	331.6	14.4
40-50	129.0	5.6
50-60	54.5	2.4
60-70	21.1	0.9
70-80	3.4	0.1
80-90	0.9	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
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Lighting Division

Report Reviewed By:

Timothy Quigley
Engineer
Lighting Division

Attachment: None