REPORT

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

Project No. G103017649 Date: May 4, 2017

REPORT NO. 103017649CHI-020

TEST OF ONE LED RECESSED FIXTURE

MODEL NO. E4SF-LH93540AN
LED MODEL NO. CITIZEN CLU038-1205C4-353H5K2
DRIVER MODEL NO. LTF DA30W750C40BF-0000
TRIM MODEL NO. E4SFF-OW

RENDERED TO

GENERATION BRANDS
7400 LINDER AVE
SKOKIE, IL 60077

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-LH93540AN. The sample was received by Intertek on April 19, 2017, in undamaged condition and one sample was tested as received. The sample designation was AH04192017041604-020.

DATES OF TESTS: May 3, 2017 through May 4, 2017.

SUMMARY

Model No.:	E4SF-LH93540AN
Description:	LED RECESSED FIXTURE

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	2622	2525
Total Power (W)	32.64	32.65
Luminaire Efficacy (LPW)	80.33	77.34

Criteria	Result
Power Factor	0.986
Current ATHD %	8.42
Correlated Color Temperature (CCT - K)	3506
Color Rendering Index (CRI - Ra)	91.7
Color Rendering Index (CRI - R9)	61.6
DUV	0.001
Chromaticity Coordinate (x)	0.406
Chromaticity Coordinate (y)	0.395
Chromaticity Coordinate (u')	0.235
Chromaticity Coordinate (v')	0.513

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	05/04/17
Omega Newport Thermometer	DPI8-C24	146920	10/07/16	10/07/17	05/04/17
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	05/04/17
Newport Thermohygrometer	iServer	146956	01/06/17	01/06/18	05/04/17
Pacific, AC power supply	118-ACX	CHI0358	VBU	VBU	05/04/17
Labsphere Spectroradiometer	CDS1100	CHI0091	VBU	VBU	05/03/17
3 Meter Sphere	SPR600	CHI0088	VBU	VBU	05/03/17
Elgar AC Power Supply	CW1251M	146112	VBU	VBU	05/03/17
Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU	05/03/17
Newport Humidity Recorder	iTHX-SD	146382	06/27/16	06/27/17	05/03/17
Yokogawa Power Meter	WT1600	146768	01/10/17	01/10/18	05/03/17
Fluke J/K Temperature Meter	52	146004	01/10/17	01/10/18	05/03/17

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

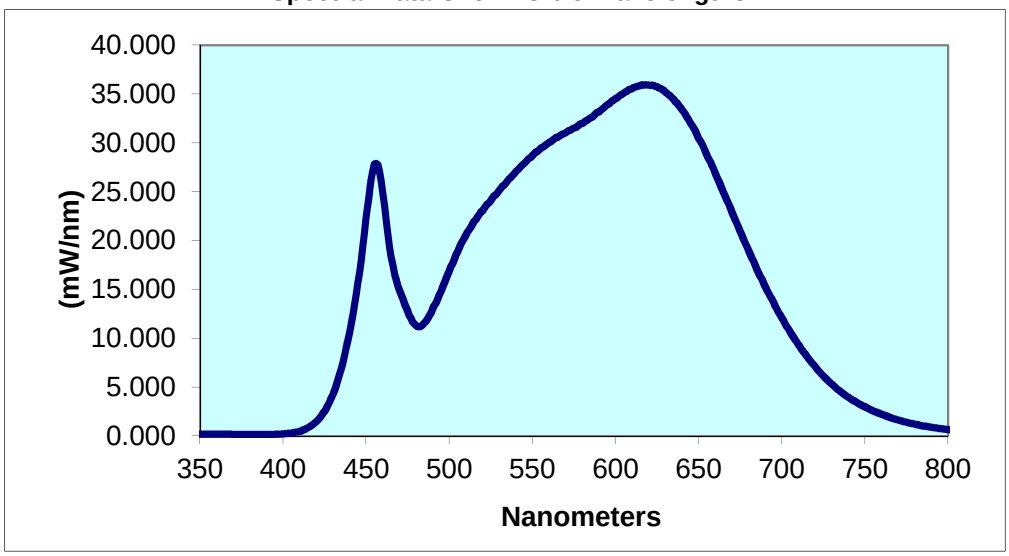
Intertek Sample No.	Base Orientation	Input Voltage {VAC}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
\H04192017041604-02(	Up	120.0	275.8	32.64	0.986	8.42	2622	80.33

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')
3506	91.7	61.6	0.001	0.406	0.395	0.235	0.513

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.182	440	10.63	530	25.14	620	35.92	710	9.351
355	0.176	445	15.61	535	26.11	625	35.75	715	8.160
360	0.176	450	22.34	540	27.07	630	35.20	720	7.107
365	0.166	455	27.82	545	27.88	635	34.46	725	6.147
370	0.146	460	24.89	550	28.69	640	33.38	730	5.315
375	0.139	465	18.35	555	29.46	645	32.03	735	4.587
380	0.133	470	14.96	560	30.06	650	30.49	740	3.968
385	0.134	475	12.79	565	30.54	655	28.77	745	3.429
390	0.135	480	11.32	570	31.04	660	26.91	750	2.978
395	0.162	485	11.56	575	31.54	665	24.95	755	2.574
400	0.204	490	12.97	580	31.99	670	22.94	760	2.222
405	0.300	495	14.79	585	32.58	675	20.97	765	1.906
410	0.480	500	16.87	590	33.16	680	19.00	770	1.631
415	0.842	505	18.84	595	33.91	685	17.11	775	1.401
420	1.479	510	20.54	600	34.53	690	15.33	780	1.201
425	2.535	515	21.98	605	35.11	695	13.72		
430	4.249	520	23.04	610	35.57	700	12.08		
435	6.903	525	24.13	615	35.90	705	10.66		

Spectral Data Over Visible Wavelengths



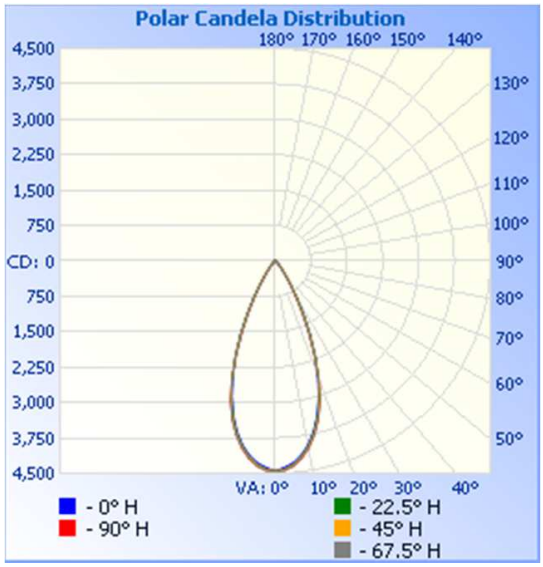
RESULTS OF TEST (cont'd)

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)
AH04192017041604-020	Up	120.0	275.8	32.65	0.986	2525	77.34

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	4452	4452	4452	4452	4452
5	4291	4328	4338	4357	4364
10	3952	3982	4000	4013	4026
15	3388	3415	3444	3465	3470
20	2605	2633	2651	2646	2650
25	1730	1719	1694	1642	1629
30	922	922	892	860	843
35	404	436	459	408	372
40	193	212	240	201	183
45	105	116	126	112	102
50	51	62	73	60	48
55	26	29	40	30	27
60	12	15	17	16	12
65	3	4	6	5	3
70	1	1	1	1	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

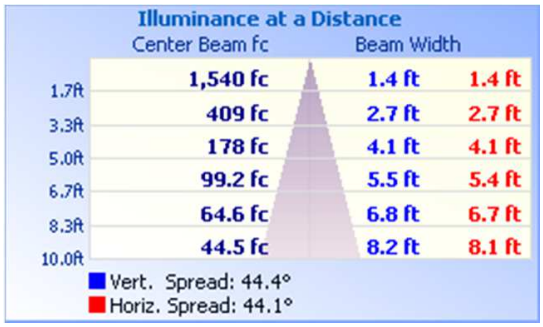


RESULTS OF TEST (cont'd)

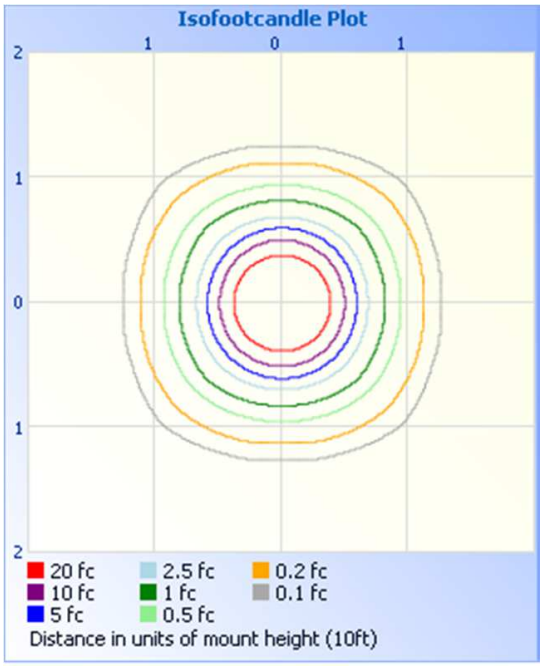
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



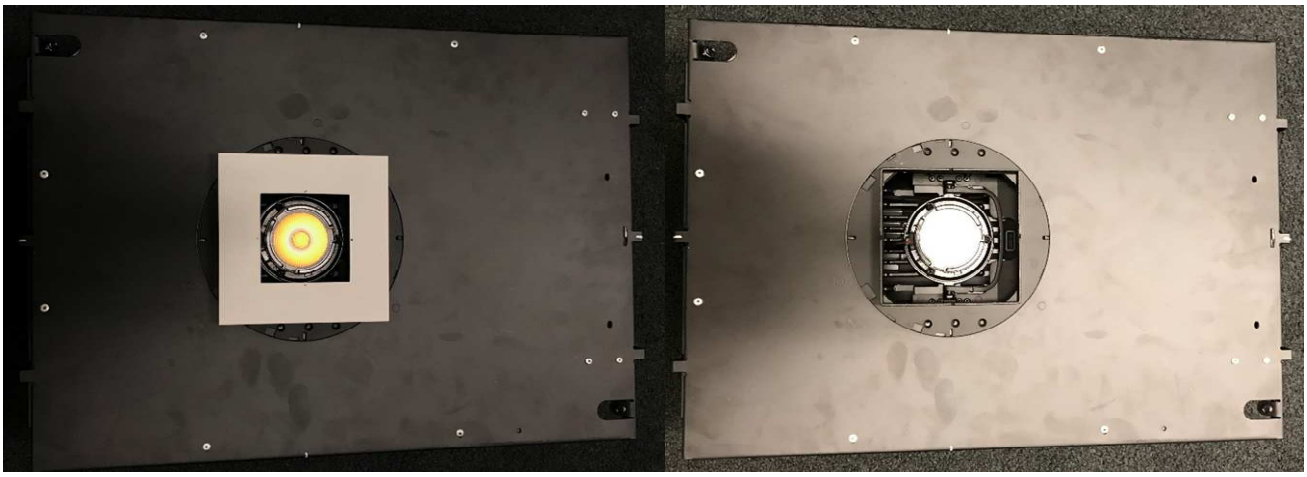
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	2110	83.5
0-40	2396	94.9
0-60	2519	99.8
60-90	5.8	0.2
0-90	2525	100.0
90-180	0.0	0.0
0-180	2525	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	402.4	15.9
10-20	940.2	37.2
20-30	767.0	30.4
30-40	286.7	11.4
40-50	93.0	3.7
50-60	29.9	1.2
60-70	5.7	0.2
70-80	0.1	0.0
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