REPORT

545 EAST ALGONQUIN ROAD ARLINGTON HEIGHTS, IL 60005

Project No. G101153935 Date: April 27, 2013

REPORT NO. 101153935CHI-002

TEST OF ONE LED LUMINAIRE

FIXTURE MODEL NO. JDHT-06SH-W35-CR2-10

RENDERED TO

HEATRON
11 W. COLLEGE DRIVE
UNIT J
ARLINGTON HEIGHTS, IL 60004

TEST: Electrical and Photometric tests as required to the IESNA test standard.

AUTHORIZATION: The testing performed was authorized by signed quote number 500445876.

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 Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products

ANSI NEMA ANSLG C78.377: 2008 Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one prototype sample of model number JDHT-06SH-W35-CR2-10 The sample was received by Intertek on April 18, 2013, in undamaged condition, and one sample was tested as received. The sample identification was CHI04182013045210.

DATES OF TESTS: April 23, 2013 through April 24, 2013

SUMMARY

Model No.:	JDHT-06SH-W35-CR2-10
Description:	6” LED Downlight

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	2089	2103
Total Power (W)	45.30	45.74
Luminaire Efficacy (LPW)	46.12	45.99

Criteria	Result
Power Factor – 120VAC	0.993
Power Factor – 277VAC	0.916
Current ATHD (%) – 120VAC	5.27
Current ATHD (%) – 277VAC	15.66
Correlated Color Temperature (CCT - K)	3449
Color Rendering Index (CRI - Ra)	81.0
Color Rendering Index (CRI - R9	5.4
Duv	0.001
Chromaticity Coordinate (x)	0.410
Chromaticity Coordinate (y)	0.396
Chromaticity Coordinate (u’)	0.236
Chromaticity Coordinate (v’)	0.514
Backlight Rating: (B)	2
Uplight Rating: (U)	0
Glare Rating: (G)	0

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Calibration Date	Calibration Due Date
Labsphere Spectroradiometer	CDS1100	CHI0091	VBU	VBU
3 Meter Sphere	SPR600	CHI0088	VBU	VBU
Elgar AC Power Supply	CW1251M	146112	VBU	VBU
Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU
Newport Temperature and Humidity Recorder	iTHX-SD	146382	9/14/12	9/14/13
Yokogawa Power Meter	WT1600	146769	5/18/12	5/18/13
Omega Temperature Meter	MDSi8	146139	7/19/12	7/19/13
Yokogawa Power Meter	WT210	146919	12/21/12	12/21/13
Omega Thermometer	DPI8-C24	146920	11/15/12	11/15/13
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU
Newport Hygrometer	iServer	146960	2/21/13	2/21/14
Sorenson DC Power Supply	XHR 150-7	146922	VBU	VBU
Cole-Parmer Triple Timer	94440-00	CHI0041	7/19/12	7/19/13

TEST METHODS

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79.

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 Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus and Cooper Photometric Toolbox software.

Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere Model CDS 1100 CCD Array Spectroradiometer and three meter integrating 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 Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

Estimated Total Operating Time

Model No.	Total Hours
JDHT-06SH-W35-CR2-10	5

TEST METHODS (cont'd)

BUG Ratings (Backlight, Uplight, Glare) – for Outdoor Fixtures Only

Zonal Lumens were calculated and grouped using the formula in IESNA TM-15-11 for each zone as defined in the BUG addendum.

RATING TABLE: BACKLIGHT

NOTE: MAX RATING IN ANY ZONE = RATING FOR LUMINAIRE

	B0	B1	B2	B3	B4	B5
BH	110	500	1000	2500	5000	>5000
BM	220	1000	2500	5000	8500	>8500
BL	110	500	1000	2500	5000	>5000

RATING TABLE: UPLIGHT

NOTE: MAX RATING IN ANY ZONE = RATING FOR LUMINAIRE

	U0	U1	U2	U3	U4	U5
UH	0	10	50	500	1000	>1000
UL	0	10	50	500	1000	>1000

GLARE RATINGS

NOTE: MAX RATING IN ANY ZONE = RATING FOR LUMINAIRE

FOR ASYMMETRICAL LUMINAIRE TYPES (I, II, III, IV)

	G0	G1	G2	G3	G4	G5
FVH	10	100	225	500	750	>750
BVH	10	100	225	500	750	>750
FH	660	1800	5000	7500	12000	>12000
BH	110	500	1000	2500	5000	>5000

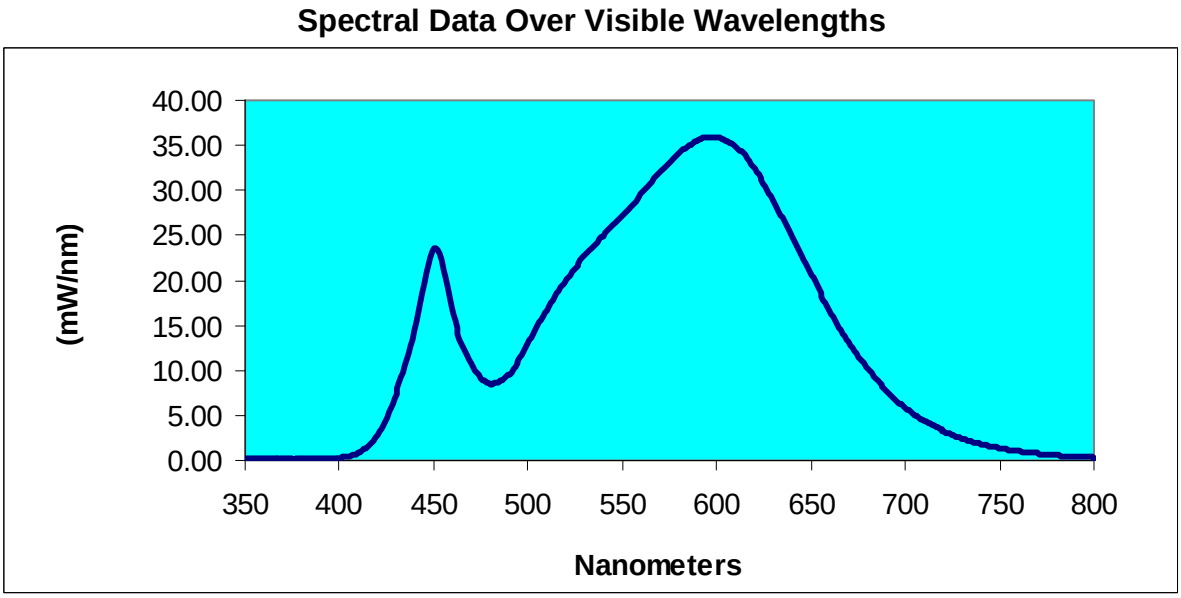
FOR QUADRILATERAL SYMMETRICAL LUMINAIRE TYPES (V, VSQUARE)

	G0	G1	G2	G3	G4	G5
FVH	10	100	225	500	750	>750
BVH	10	100	225	500	750	>750
FH	660	1800	5000	7500	12000	>12000
BH	660	1800	5000	7500	12000	>12000

RESULTS OF TESTS

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
JDHT-06SH-W35-CR2-10							
350	0.15	460	16.32	570	31.97	680	10.16
355	0.15	465	12.97	575	33.08	685	8.90
360	0.15	470	10.77	580	34.13	690	7.76
365	0.13	475	9.13	585	35.01	695	6.73
370	0.12	480	8.53	590	35.60	700	5.85
375	0.11	485	8.77	595	35.85	705	5.06
380	0.11	490	9.61	600	35.89	710	4.38
385	0.12	495	11.07	605	35.53	715	3.80
390	0.15	500	12.89	610	34.83	720	3.30
395	0.20	505	14.86	615	33.84	725	2.85
400	0.29	510	16.71	620	32.41	730	2.45
405	0.47	515	18.49	625	30.74	735	2.12
410	0.83	520	20.06	630	28.91	740	1.81
415	1.54	525	21.39	635	26.92	745	1.57
420	2.84	530	22.65	640	24.86	750	1.35
425	4.86	535	23.84	645	22.70	755	1.17
430	7.44	540	24.95	650	20.63	760	1.02
435	10.50	545	26.08	655	18.61	765	0.88
440	14.44	550	27.19	660	16.67	770	0.76
445	19.74	555	28.36	665	14.80	775	0.66
450	23.47	560	29.54	670	13.10	780	0.57
455	21.26	565	30.80	675	11.55		



RESULTS OF TESTS (cont'd)

Photometric and Electrical Measurements at 25°C – Integrating Sphere Method

Intertek Sample No.	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')
CHI04182013045210	3449	81.0	5.4	0.001	0.410	0.396	0.236	0.514

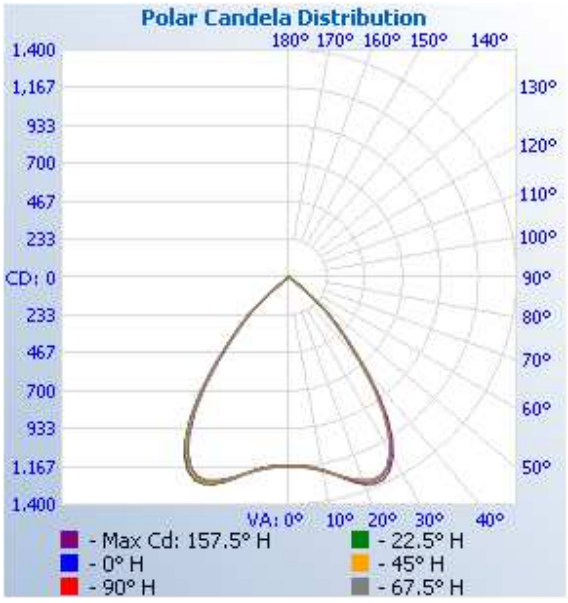
Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
CHI04182013045210	Up	120.0	380.1	45.30	0.993	5.27	2089	46.12
		277.0			0.916	15.66		

Photometric and Electrical Measurements – 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 (Lumens Per Watt)
CHI04182013045210	Up	120.0	385.3	45.74	0.989	2103	45.99

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	1162	1162	1162	1162	1162
5	1168	1168	1169	1170	1176
10	1204	1207	1206	1206	1212
15	1272	1273	1272	1270	1272
20	1338	1340	1336	1331	1333
25	1355	1353	1349	1344	1348
30	1250	1245	1242	1245	1250
35	1016	1014	1015	1024	1031
40	685	689	697	714	715
45	400	405	413	431	429
50	147	155	164	185	186
55	20	21	22	27	29
60	10	10	10	10	10
65	6	6	6	6	6
70	4	4	4	4	4
75	2	2	2	2	2
80	1	1	1	1	1
85	0	0	0	0	0
90	0	0	0	0	0

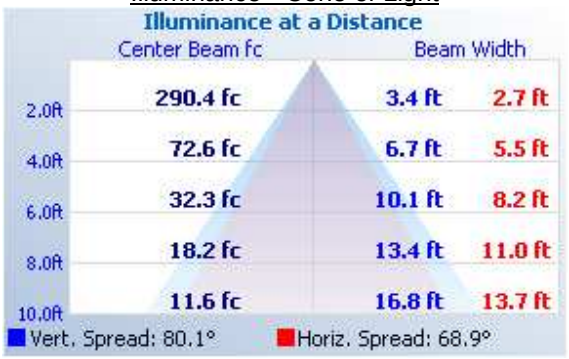


RESULTS OF TESTS (cont'd)

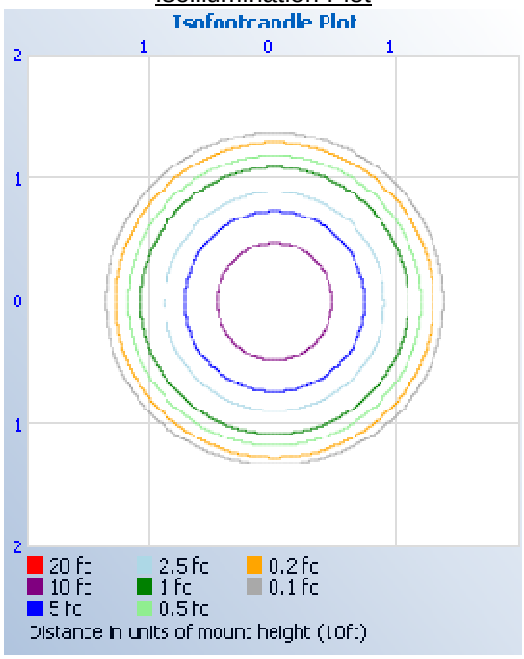
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	1092	51.9
0-40	1721	81.8
0-60	2094	99.6
60-90	9.2	0.4
0-90	2103	100.0
90-180	0.0	0.0
0-180	2103	100.0

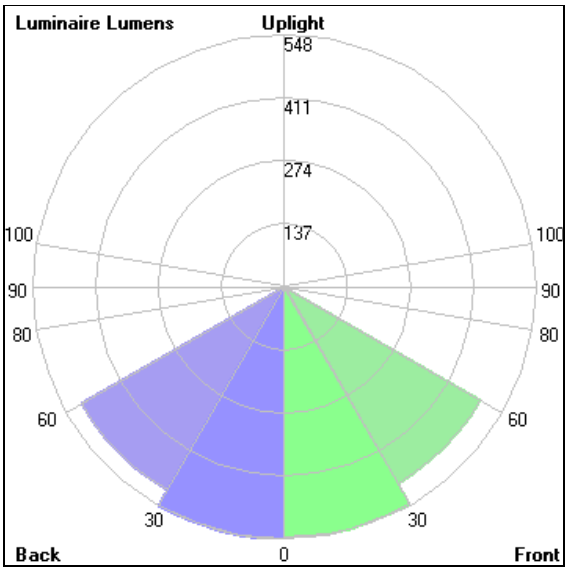
Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	113.0	5.4
10-20	363.3	17.3
20-30	616.0	29.3
30-40	628.4	29.9
40-50	328.7	15.6
50-60	44.8	2.1
60-70	6.3	0.3
70-80	2.4	0.1
80-90	0.5	0.0

BUG Rating (Backlight, Uplight, Glare)

Zone	Total Lumens	Frontlight Category	Frontlight Lumens	Backlight Category	Backlight Lumens	Uplight Category	Uplight Lumens
0-30	1092	FL	544.1	BL	548.1	--	--
30-60	1003	FM	493.1	BM	510.0	--	--
60-80	8.8	FH	4.3	BH	4.5	--	--
80-90	0.6	FVH	0.3	BVH	0.3	--	--
90-100	0.0					UL	0.0
100-180	0.0					UH	0.0

Backlight Rating: B2
Uplight Rating: U0
Glare Rating: G0



Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance: 20%

RCC %:	80				70				50			30			10		0
RW %:	70	50	30	0	70	50	30	0	50	30	20	50	30	20	50	30	20	0
RCR: 0	1.19	1.19	1.19	1.19	1.16	1.16	1.16	1.00	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	1.00
1	1.13	1.10	1.07	1.04	1.10	1.08	1.05	.92	1.03	1.01	1.00	1.00	.98	.97	.96	.95	.94	.92
2	1.06	1.01	.96	.92	1.04	.99	.95	.85	.96	.92	.89	.93	.90	.87	.90	.88	.85	.84
3	1.00	.92	.87	.82	.98	.91	.86	.77	.88	.84	.80	.86	.82	.79	.84	.80	.78	.76
4	.94	.85	.79	.74	.92	.84	.78	.70	.82	.77	.73	.80	.75	.72	.78	.74	.71	.69
5	.88	.78	.72	.67	.86	.77	.71	.64	.75	.70	.66	.74	.69	.65	.72	.68	.65	.63
6	.82	.72	.65	.60	.81	.71	.65	.59	.70	.64	.60	.68	.63	.59	.67	.62	.59	.57
7	.77	.67	.60	.55	.76	.66	.60	.54	.65	.59	.55	.63	.58	.54	.62	.58	.54	.52
8	.73	.62	.55	.50	.72	.61	.55	.49	.60	.54	.50	.59	.54	.50	.58	.53	.50	.48
9	.69	.58	.51	.46	.67	.57	.51	.46	.56	.50	.46	.55	.50	.46	.54	.49	.46	.44
10	.65	.54	.47	.43	.64	.53	.47	.42	.52	.46	.42	.51	.46	.42	.51	.46	.42	.41

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:

Tim Quigley
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Lighting Division

Report Reviewed By:

Joseph Schledorn
Engineer – Lighting Photometry
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Attachment: None