FOR THE SCOPE OF
ACCREDITATION UNDER NVLAP LAB
CODE 100402-0.

REPORT

3933 US ROUTE 11, CORTLAND, NEW YORK 13045

Project No. G102322298 Date: July 11, 2016

REPORT NO. 102322298CRT-034

TEST OF ONE 6" EYEBALL DOWNLIGHT 3000K DIMMABLE

MODEL NO. LED 6" DOWNLIGHT D6-L900-C30-EB-E
PART NO. 99510

RENDERED TO:

VERBATIM AMERICAS
1200 W.T. HARRIS BLVD.
CHARLOTTE, NC 28269

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

STATEMENT OF LIMITATION: This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION The testing performed was authorized by signed quote number Qu-00647973.

STANDARDS USED:

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting
ANSI NEMA ANSLG C78.377: 2011: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number LED 6" DOWNLIGHT D6-L900-C30-EB-E. The sample was received by Intertek on June 20, 2016 in undamaged condition and one sample was tested as received. The sample designation was CRT1606201051-001D.

DATE OF TESTS: June 21, 2016 through July 1, 2016.

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SUMMARY:

MODEL NO. LED 6" DOWNLIGHT D6-L900-C30-EB-E
DESCRIPTION: 6" Eyeball Downlight 3000K Dimmable

Criteria	Integrating Sphere	Goniophotometer
Light Output (Lumens)	991.4	979.8
Total Power (W)	11.81	11.78
Lumen Efficacy (Lm/W)	84.00	83.20
Power Factor ( )	0.921	0.919

Criteria	Results
Current ATHD (%)	31.57
Correlated Color Temp. (CCT-K)	3038
Color Rendering Index (CRI - Ra)	82.0
CRI - R9	6.7
DUV ( )	0.000
Chromaticity Coordinate (x)	0.434
Chromaticity Coordinate (y)	0.402
Chromaticity Coordinate (u')	0.249
Chromaticity Coordinate (v')	0.520

EQUIPMENT LIST

Equipment Used	Model No.	Control No.	Last Cal.	Cal. Due
LSI High Speed Mirror Goniometer	6440	---	06/02/16	07/02/16
Elgar AC Power Supply	CW1251	---	VBU	VBU
Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
Yokogawa Power Analyzer	WT210	E464	05/02/16	05/02/17
Omega Thermometer	DPi8-C24	M263	05/02/16	05/02/17
M-D Building Products Digital Level	Smart Tool	L112	04/08/16	04/08/17
NIST Luminous Intensity Standard Source	NBS10322	N1427	12/12/14	12/12/16
NIST Luminous Intensity Standard Source	NBS10215	N1432	12/12/14	12/12/16
NIST Luminous Intensity Standard Source	960629-3	N1428	12/12/14	12/12/16
NIST Luminous Flux Standard Source	NBS10428	N1424	12/17/14	12/17/16
2M Integrating Sphere Spectrometer System	CDS 600	W/N308	06/15/16	07/15/16
Yokogawa Power Analyzer	WT1600	E474	04/25/16	04/25/17
Extech Hygro-Thermometer	445715	T1550	01/08/16	01/08/17
Fisher Scientific Stopwatch	14-649-9	N1404	08/22/15	08/22/16
Sorensen DC Power Supply	XFR 35-35	---	VBU	VBU
Xantrex DC Power Supply	XTR 150-5.6	---	VBU	VBU
Elgar AC Power Supply	CW1251	---	VBU	VBU
Secondary Spectral Intensity Standard Source	BS5186	RF5186	01/27/16	01/27/17
Secondary Luminous Flux Standard Source	BS3616	---	01/27/16	01/27/17
Secondary Luminous Flux Standard Source	BS4116	---	01/27/16	01/27/17
Secondary Luminous Flux Standard Source	BS3612	---	01/27/16	01/27/17

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. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a 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 the SSL sample.

Ambient temperature was measured equal to the height of the sample mounted on the goniometer equipment. The SSL sample was operated on the client provided driver at rated input volts in its designated orientation. The SSL sample was allowed to stabilize for at least thirty minutes before measurements were made. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a power analyzer.

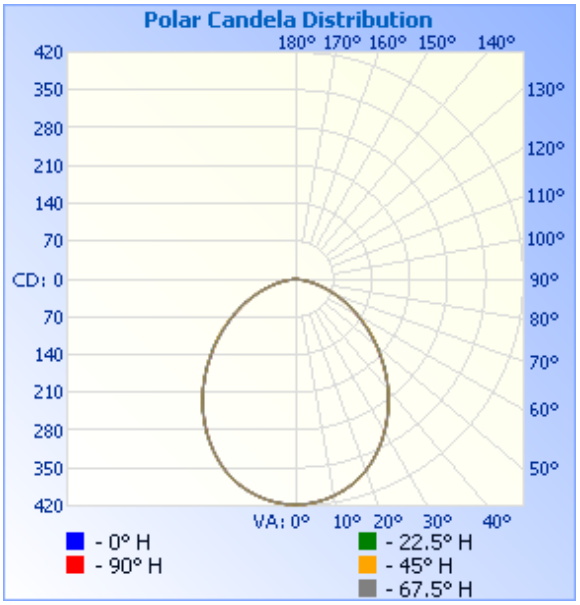
RESULTS:

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Distribution Method

Intertek Control No.	Base Orientation	Input Voltage (VAC)	Input Current (mA)	Input Power (W)	Input Power Factor ( )	Light Output (Lumens)	Lumen Efficacy (lm/W)
CRT1606201051-001D	Base Up	120.09	106.7	11.78	0.919	979.8	83.20

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	418	418	418	418	418
5	415	415	415	415	415
10	407	407	407	407	407
15	395	395	395	395	395
20	377	378	378	377	377
25	354	354	354	354	354
30	327	327	327	327	327
35	298	297	297	297	297
40	265	265	265	265	264
45	231	231	230	230	230
50	197	198	195	196	196
55	162	164	163	162	164
60	131	131	131	131	129
65	101	100	100	100	100
70	72	72	72	72	72
75	46	46	46	46	46
80	23	23	23	23	23
85	6	6	6	6	6
90	0	0	0	0	0

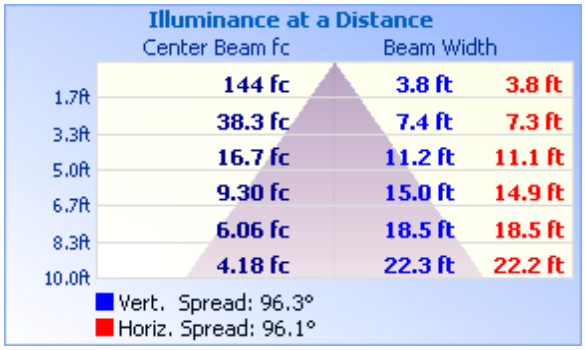


RESULTS:

Illumination Plots

Mounting Height: 10ft

Illuminance - Cone of Light



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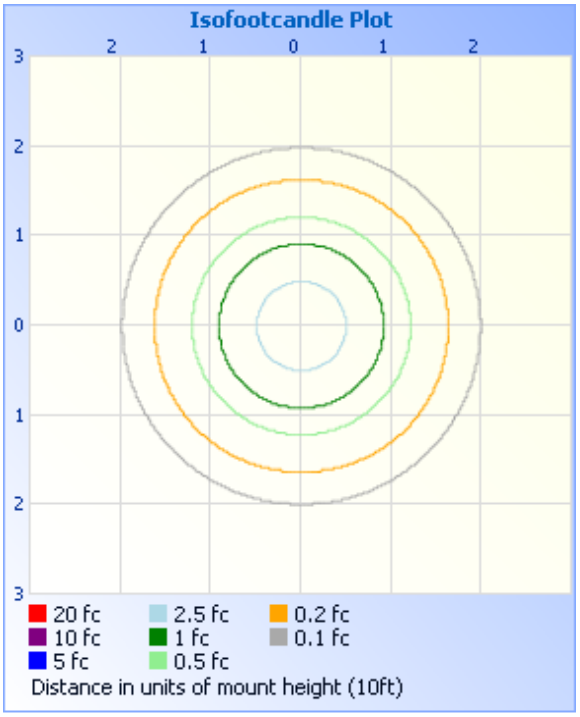


Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	313.5	32.0
0-40	499.1	50.9
0-60	822.5	83.9
60-90	157.3	16.1
0-90	979.8	100.0
90-180	0.0	0.0
0-180	979.8	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	39.3	4.0
10-20	111.2	11.4
20-30	162.9	16.6
30-40	185.6	18.9
40-50	177.8	18.1
50-60	145.6	14.9
60-70	99.5	10.2
70-80	49.0	5.0
80-90	8.7	0.9

RESULTS:

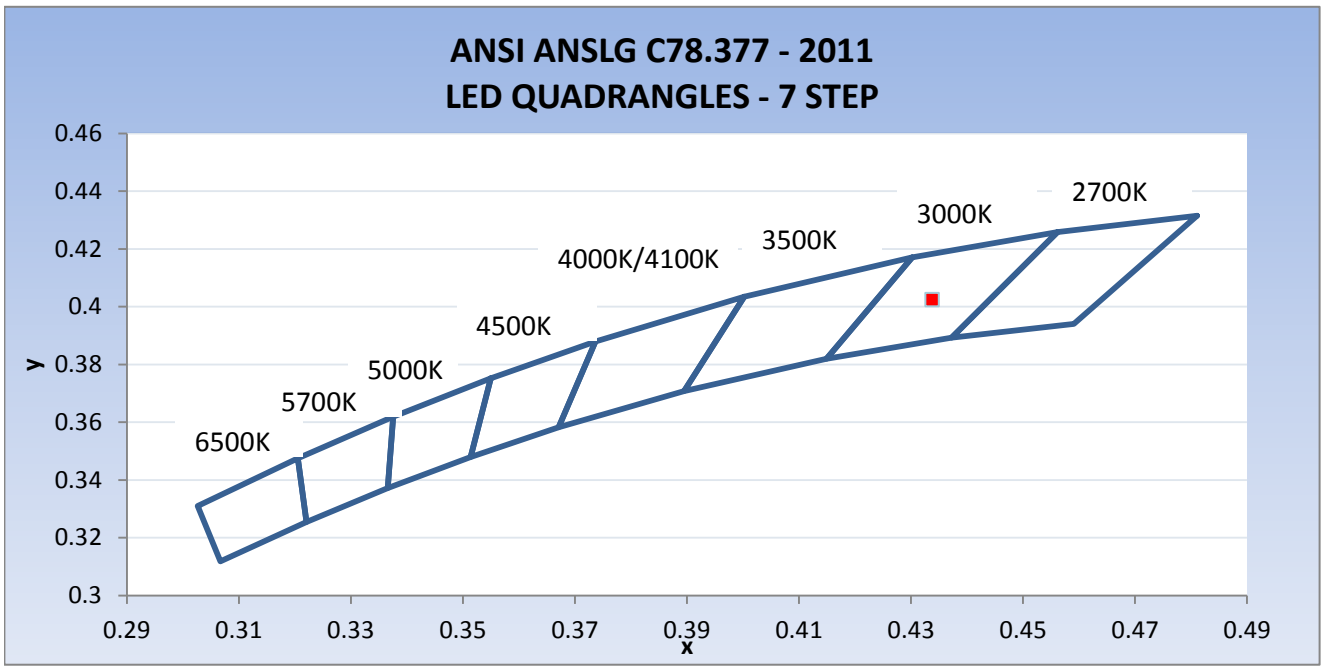
Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Sphere Method

Intertek Control No.	Base Orientation	Input Voltage (VAC)	Input Current (mA)	Input Power (W)	Input Power Factor ( )	Current ATHD (%)
CRT1606201051-001D	Base Up	120.01	107.0	11.81	0.921	31.57

Light Output (Lumens)	Lumen Efficacy (lm/W)	Correlated Color Temperature - CCT (K)	CRI -Ra	CRI -R9	DUV ( )
991.4	84.00	3038	82.0	6.7	0.000

CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
0.434	0.402	0.249	0.520

ANSI C78.377 SSL Chromaticity (2011 Version)

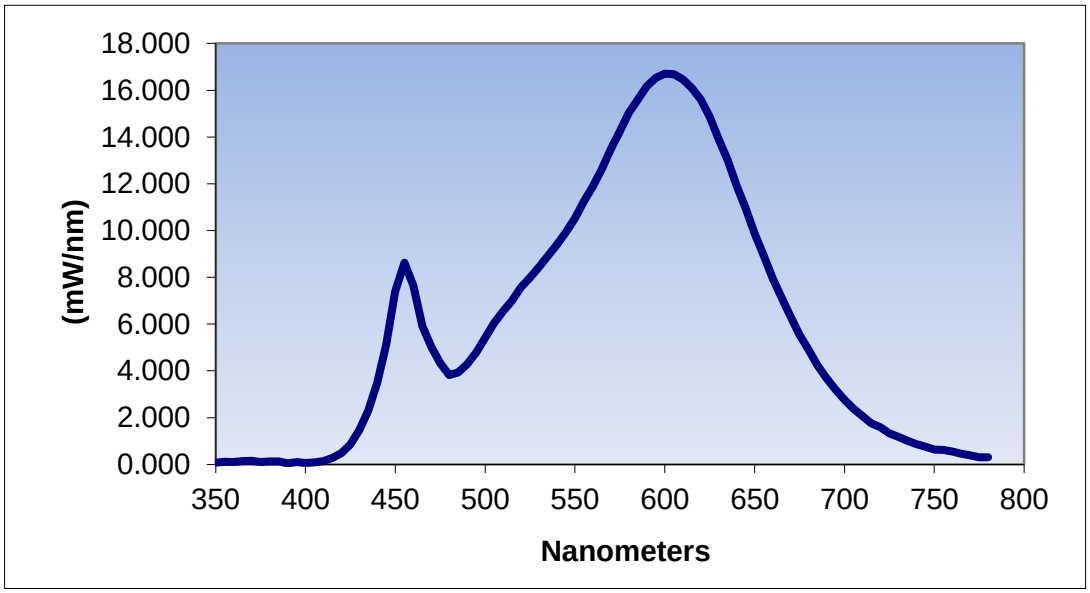


RESULTS:

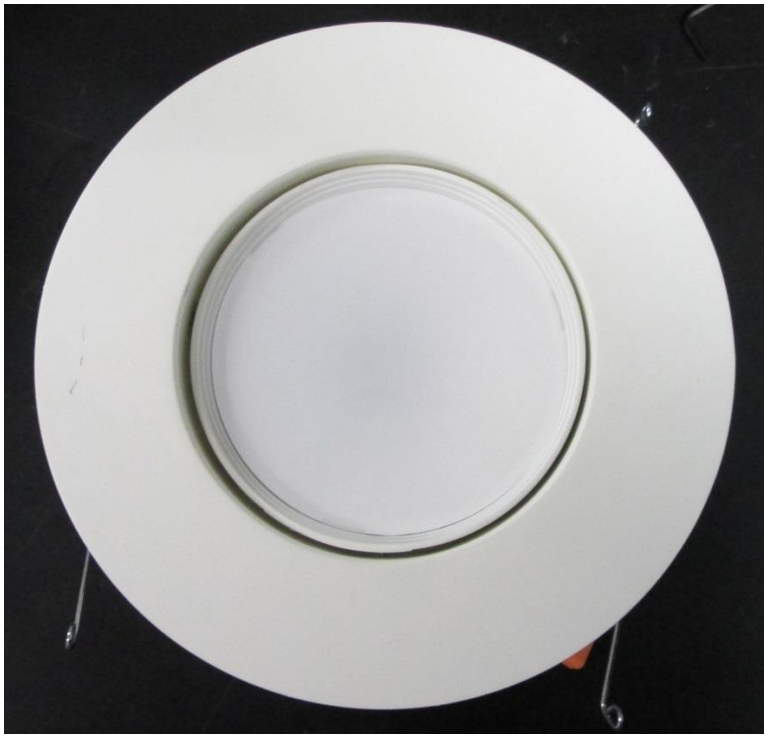
Spectral Distribution Over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.073	460	7.633	570	13.477	680	4.900
355	0.115	465	5.910	575	14.242	685	4.238
360	0.101	470	5.027	580	15.029	690	3.682
365	0.146	475	4.324	585	15.587	695	3.205
370	0.156	480	3.826	590	16.161	700	2.769
375	0.096	485	3.928	595	16.536	705	2.378
380	0.130	490	4.283	600	16.720	710	2.076
385	0.126	495	4.778	605	16.690	715	1.751
390	0.044	500	5.414	610	16.464	720	1.589
395	0.093	505	6.039	615	16.104	725	1.332
400	0.057	510	6.550	620	15.606	730	1.187
405	0.090	515	6.993	625	14.863	735	1.011
410	0.145	520	7.567	630	13.911	740	0.869
415	0.274	525	7.993	635	13.014	745	0.751
420	0.486	530	8.447	640	11.927	750	0.634
425	0.849	535	8.933	645	10.963	755	0.621
430	1.467	540	9.412	650	9.887	760	0.552
435	2.304	545	9.944	655	8.959	765	0.460
440	3.488	550	10.532	660	7.986	770	0.382
445	5.124	555	11.259	665	7.119	775	0.300
450	7.397	560	11.897	670	6.307	780	0.298
455	8.620	565	12.630	675	5.527		

Spectral Data Over Visible Wavelengths



PRODUCT PICTURE:



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:

Melanie Brittain

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Report Reviewed By:

Ryan Siddon

Ryan Siddon
Engineer
Lighting Division

Attachments: IES File - CRT1606201051-001D