



REPORT

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

Project No. G102171228

Date: August 24, 2016

REPORT NO. 102171228CHI-043

TEST OF ONE LED BOLLARD

MODEL NO. 700OBRVL42SDUNV830C
LED MODEL NO. (CITIZEN) CLU028-1202C4-303M2K1
DRIVER MODEL NO. LTF DS25W750C1533LI2D010-0000

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-00718855-0.

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 700OBRVL42SDUNV830C. The sample was received by Intertek on August 18, 2016, in undamaged condition and one sample was tested as received. The sample designation was AH08182016094438-043.

DATES OF TESTS: August 22, 2016 through August 24, 2016.



SUMMARY

Model No.:	700OBRVL42SDUNV830C
Description:	LED Bollard

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	125.2	123.1
Total Power (W)	18.98	19.04
Luminaire Efficacy (LPW)	6.60	6.47

Criteria	Result
Power Factor	0.981
Current ATHD %	10.66
Correlated Color Temperature (CCT - K)	3887
Color Rendering Index (CRI - Ra)	82.8
Color Rendering Index (CRI - R9)	14.4
DUV	0.001
Chromaticity Coordinate (x)	0.385
Chromaticity Coordinate (y)	0.377
Chromaticity Coordinate (u')	0.228
Chromaticity Coordinate (v')	0.502
BUG Rating	B0-U2-G0
IES Classification	Type IV
Longitudinal Classification	Very Short

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	08/24/16
Omega Newport Thermometer	DPI8-C24	146920	10/09/15	10/09/16	08/24/16
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	08/24/16
Newport Thermohygrometer	iServer	146956	01/04/16	01/04/17	08/24/16
Pacific, AC power supply	118-ACX	CHI0358	VBU	VBU	08/24/16
Labsphere 2M Sphere & Spectroradiometer	CDS1100	146137	VBU	VBU	08/22/16
Elgar AC Power Supply	CW1251M	146113	VBU	VBU	08/22/16
Sorenson DC Power Supply	XFR150-8	146847	VBU	VBU	08/22/16
Yokogawa Power Analyzer	WT1600	146767	04/14/16	04/14/17	08/22/16
Omega Temperature	MDSi8	146873	06/24/16	06/24/17	08/22/16
Newport Thermohygrometer	iTHX-M	146382	06/27/16	06/27/17	08/22/16



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.

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. The maximum lumen rating in each zone was compared against the BUG zonal requirements of Energy Star. Photometric Toolbox software was used to calculate results.

RESULTS OF TEST

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

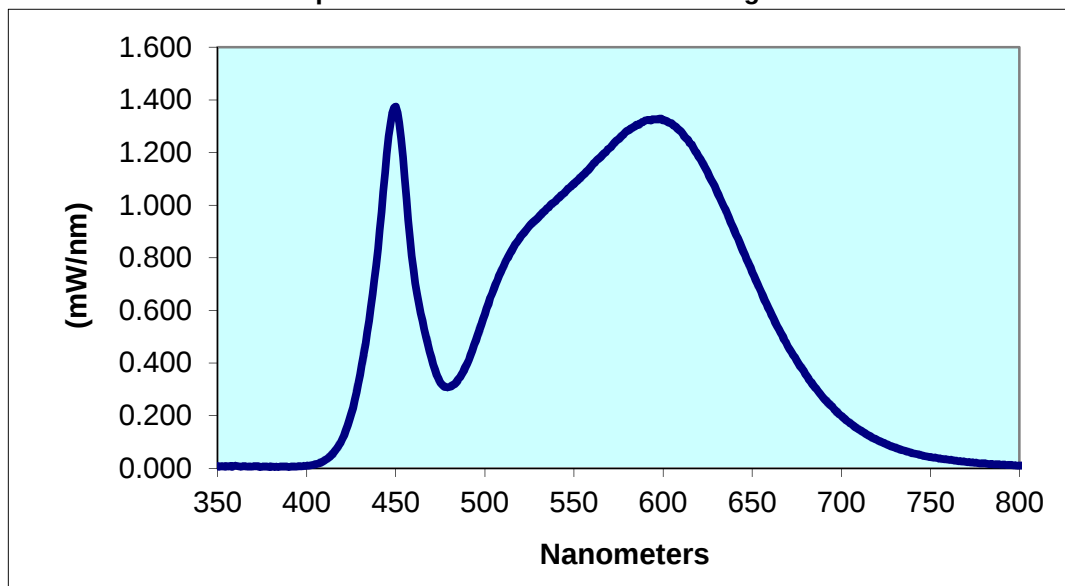
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH08182016094438-043	Down	120.0	161.2	18.98	0.981	10.66	125.2	6.60

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')
3887	82.8	14.4	0.001	0.385	0.377	0.228	0.502

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.008	440	0.834	530	0.953	620	1.184	710	0.147
355	0.008	445	1.194	535	0.988	625	1.125	715	0.126
360	0.010	450	1.375	540	1.017	630	1.056	720	0.108
365	0.008	455	1.105	545	1.049	635	0.983	725	0.092
370	0.007	460	0.754	550	1.082	640	0.905	730	0.078
375	0.006	465	0.560	555	1.114	645	0.824	735	0.067
380	0.007	470	0.420	560	1.149	650	0.746	740	0.057
385	0.006	475	0.327	565	1.183	655	0.671	745	0.050
390	0.005	480	0.309	570	1.218	660	0.597	750	0.043
395	0.007	485	0.337	575	1.251	665	0.528	755	0.037
400	0.009	490	0.396	580	1.283	670	0.465	760	0.032
405	0.015	495	0.486	585	1.304	675	0.409	765	0.028
410	0.030	500	0.587	590	1.322	680	0.356	770	0.024
415	0.057	505	0.682	595	1.326	685	0.309	775	0.020
420	0.111	510	0.760	600	1.322	690	0.267	780	0.018
425	0.206	515	0.826	605	1.310	695	0.233		
430	0.356	520	0.879	610	1.281	700	0.199		
435	0.561	525	0.920	615	1.235	705	0.171		

Spectral Data Over Visible Wavelengths



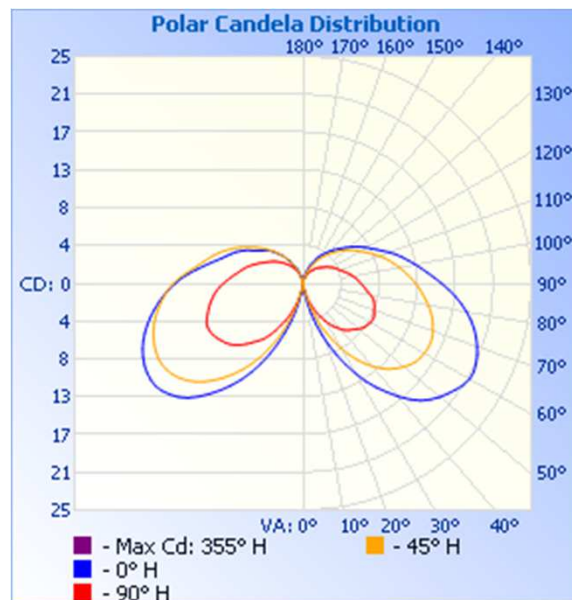
RESULTS OF TEST (cont'd)

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)
AH08182016094438-043	Down	119.9	161.9	19.04	0.981	123.1	6.47

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	45	90	135	180
0	0	0	0	0	0
5	0	0	0	0	0
10	1	0	0	0	1
15	3	2	1	2	3
20	6	4	2	4	6
25	9	6	4	6	9
30	11	8	5	8	11
35	14	10	6	10	14
40	16	12	7	12	16
45	18	13	7	13	18
50	20	14	8	14	19
55	20	15	8	15	20
60	21	15	9	15	20
65	21	15	9	15	19
70	20	15	8	15	19
75	19	15	8	15	18
80	18	14	8	14	17
85	17	13	7	13	15
90	15	12	6	13	14
95	14	11	6	12	13
100	12	11	5	11	11
105	11	10	5	10	10
110	10	9	4	9	9
115	9	8	4	8	9
120	8	7	4	7	8
125	7	6	3	6	7
130	6	6	3	5	6
135	5	5	2	5	5
140	5	4	2	4	4
145	4	3	2	3	4
150	3	3	1	3	3
155	3	2	1	2	2
160	2	1	1	1	2
165	1	1	1	1	1



RESULTS OF TEST (cont'd)

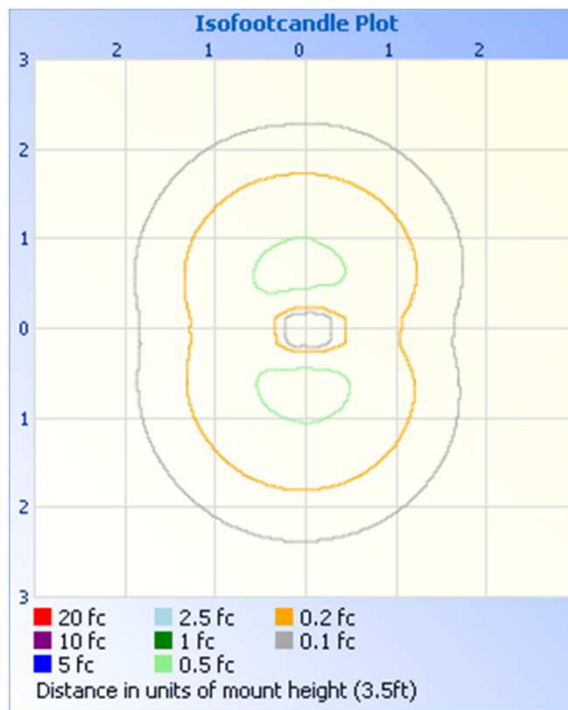
Illumination Plots

Mounting Height: 3.5 ft.

Illuminance - Cone of Light

Illuminance at a Distance		
	Center Beam fc	Beam Width
1.0ft	0.07 fc	1.6 ft 5.9 ft
2.0ft	0.02 fc	3.2 ft 11.9 ft
3.0ft	0.01 fc	4.8 ft 17.8 ft
4.0ft	0.00 fc	6.5 ft 23.8 ft
■ Vert. Spread: 77.9° ■ Horiz. Spread: 142.8°		

Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	3.6	3.0
0-40	10.2	8.3
0-60	34.5	28.1
60-90	46.4	37.7
0-90	80.9	65.7
90-180	42.2	34.3
0-180	123.1	100.0

Luminaire Classification System (LCS)

LCS	Zone	Lumens	% Luminaire
FL	(0-30)	1.8	1.5
FM	(30-60)	15.5	12.6
FH	(60-80)	16.0	13.0
FVH	(80-90)	7.4	6.0
BL	(0-30)	1.8	1.5
BM	(30-60)	15.4	12.5
BH	(60-80)	15.8	12.8
BVH	(80-90)	7.2	5.9
UL	(90-100)	12.5	10.1
UH	(100-180)	29.7	24.1
Total		123.1	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	0.0	0.0
10-20	0.7	0.5
20-30	2.9	2.4
30-40	6.5	5.3
40-50	10.5	8.5
50-60	13.9	11.3
60-70	15.8	12.8
70-80	15.9	13.0
80-90	14.6	11.9
90-100	12.5	10.1
100-110	10.0	8.1
110-120	7.6	6.2
120-130	5.4	4.4
130-140	3.6	2.9
140-150	2.0	1.7
150-160	0.9	0.7
160-170	0.2	0.2

BUG Rating: B0-U2-G0

IES Classification: Type IV

Longitudinal Classification: Very Short

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:



Timothy Quigley
Engineer
Lighting Division

Attachment: None

Report Reviewed By:



Vladimir Kozak
Senior Associate Engineer
Lighting Division