

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

700OPASHH927CHUNV

PROJECT NUMBER

G104941221

REPORT NUMBER

104941221CRT-009

ISSUE DATE

7/14/2022

REVISED DATE

None

TEST DATES

7/12/2022 through 7/14/2022

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104941221CRT-009

MODEL NUMBER(s)

700OPASHH927CHUNV

REPORT RENDERED TO:

VISUAL COMFORT AND COMPANY
7400 LINDER AVE
SKOKIE, IL 60077

STATEMENT OF LIMITATION

NVLAP Lab Code 100402-0. 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-01236637-1.

TEST STANDARDS

ANSI/IES LM-79-19: Optical and Electrical Measurements of Solid State Lighting Products

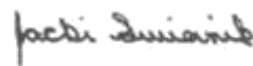
ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

In Charge of Testing:

Reviewer:



Melanie Brittain
Senior Associate Engineer
Lighting Division



Jacki Swiernik
Staff Engineer
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SAMPLE INFORMATION

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ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	CRT2206301053-009	700OPASHH927CHUNV	Ash 12 Outdoor Pendant	Production	6/30/2022

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700OPASHH927CHUNV
Product Description:	Ash 12 Outdoor Pendant
LED Model No.:	BRIDGELUX Bridgelux DS413 V13 Gen 8
Driver Model No.:	LTF/DS18W440C2040LI3UD-0000
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	1178.7	1178.5
Input Power (W) @ 120 (Vac)	15.54	15.55
Luminous Efficacy (lm/W)	75.86	75.79
Input Power Factor (I) @ 120 (Vac)	0.978	0.976

Criteria	Results
Input ATHD (%) @ 120 (Vac)	19.80
Correlated Color Temperature (K)	2699
Color Rendering Index - Ra (I)	92.0
Color Rendering Index - R9 (I)	69.5
Duv (I)	-0.0008
Chromaticity Coordinate (x)	0.458
Chromaticity Coordinate (y)	0.408
Chromaticity Coordinate (u')	0.263
Chromaticity Coordinate (v')	0.526

TEST METHODS

SEASONING IN SAMPLE ORIENTATION - LED PRODUCTS

No seasoning was performed in accordance with ANSI/IES LM-79-19

INTEGRATING SPHERE TESTING

A spectroradiometer and integrating sphere were used to measure the spectral power distribution for photometric and colorimetric data of the EUT. Electrical measurements of the unit were measured using a power analyzer. Each EUT was operated at the rated input voltage of the system in its designated orientation. The ambient temperature and relative humidity was measured at $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ and 10-65% respectively at a position inside of the sphere within 1.5m and at equal height of the EUT. Stabilization procedures to LM-79-19 were followed. The EUT was mounted in a 4π configuration.

TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

A Type C Mirror Goniophotometer system was used to measure the luminous intensity (candela) at each angle of distribution for the EUT. Electrical measurements of the unit were measured using a power analyzer. Each EUT was operated at the rated input voltage of the system in its designated orientation. The ambient temperature and relative humidity was measured at $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ and 10-65% respectively at a position within 1.5m and at equal height of the EUT. Stabilization procedures to LM-79-19 were followed. The test distance was $\geq 5x$ the longest luminous dimension of the EUT.

TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

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PHOTOMETRIC AND ELECTRICAL MEASUREMENTS

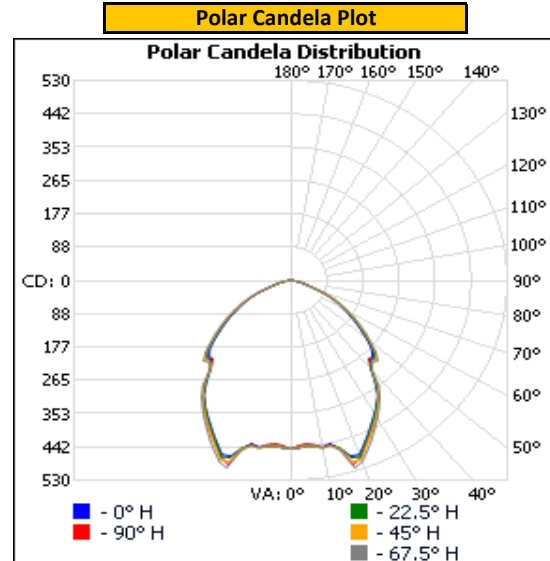
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	120.18	132.3	15.54	0.978

Light Output (lm)	Efficacy (lm/W)
1178.7	75.9

LUMINOUS INTENSITY SUMMARY (candela)

Angle (°)	0	22.5	45	67.5	90
0	446	446	446	446	446
5	442	442	441	438	434
10	449	451	451	449	449
15	460	460	462	466	462
20	492	498	506	512	499
25	448	450	457	467	457
30	409	411	416	423	415
35	371	372	375	380	373
40	305	306	308	309	304
45	282	288	296	301	291
50	244	249	254	256	248
55	194	198	204	208	200
60	150	154	157	160	152
65	109	111	114	116	111
70	62	63	64	64	62
75	33	33	34	35	34
80	18	18	19	19	19
85	5	5	5	5	4
90	0	0	0	0	0
95	2	1	1	1	1
100	2	1	1	1	1
105	1	1	1	1	1
110	1	1	1	1	1
115	1	1	1	1	1
120	2	1	1	1	1
125	1	1	1	1	1
130	0	0	0	0	0
135	0	0	0	0	0
140	0	0	0	0	0
145	0	0	0	0	0
150	0	0	0	0	0
155	0	0	0	0	0
160	0	0	0	0	0
165	0	0	0	0	0
170	0	0	0	0	0
175	0	0	0	0	0
180	0	0	0	0	0

Entire luminous intensity matrix found in .IES file



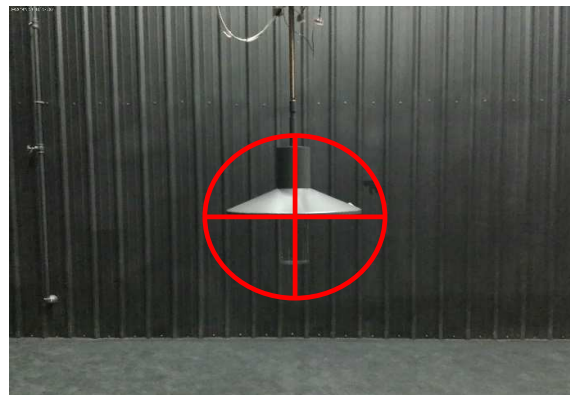
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ORIENTATION AND ALIGNMENT OF EUT

Luminous Opening		
Length (ft)	Width (ft)	Height (ft)
0.22	0.22	0.58
0°-180° H	90°-270° H	0°-180° V

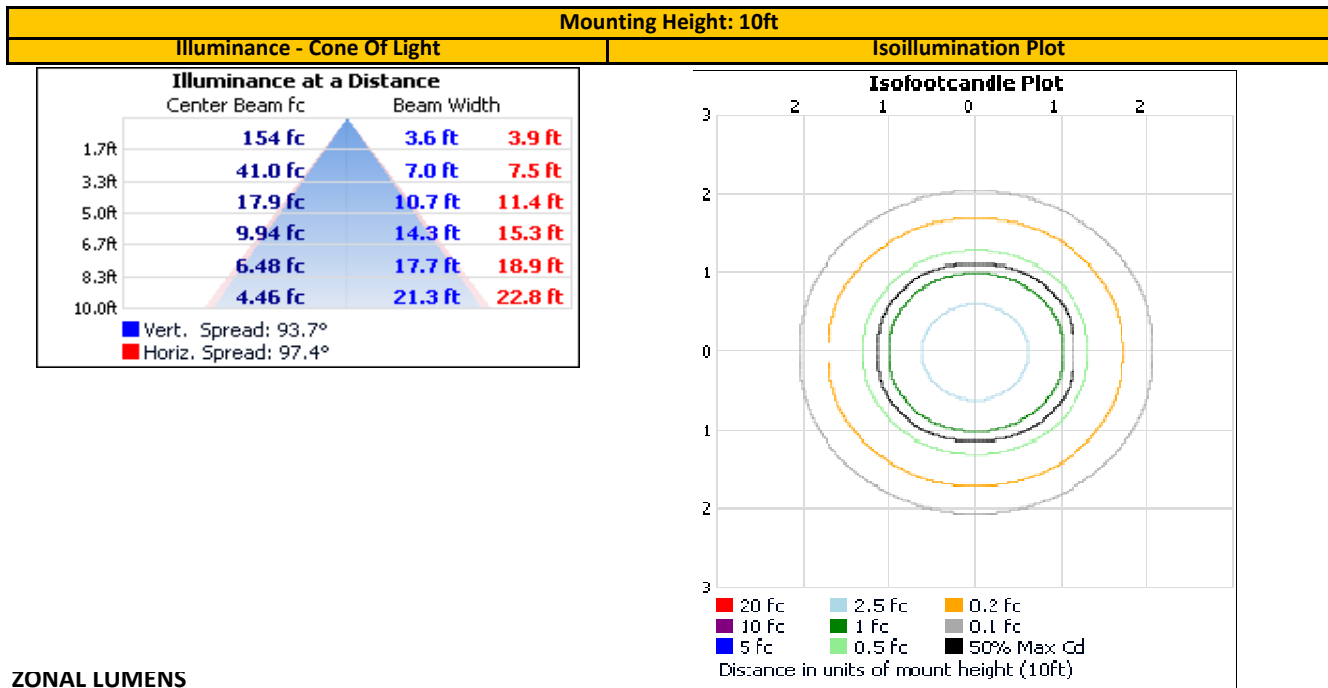
Test Distance (ft)
29.6

PHOTOMETRIC CENTER OF EUT



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ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary									
Zone	Lumens	Luminaire	Zone	Lumens	Total	Zone	Lumens	Total	
0-30	387.9	32.9%	0-10	42.4	3.6%	90-100	1.1	0.1%	
0-40	618.7	52.5%	10-20	135.1	11.5%	100-110	1.1	0.1%	
0-60	1,019.4	86.5%	20-30	210.5	17.9%	110-120	1.1	0.1%	
60-90	155.2	13.2%	30-40	230.8	19.6%	120-130	0.7	0.1%	
70-100	46.4	3.9%	40-50	220.2	18.7%	130-140	0.0	0.0%	
90-120	3.4	0.3%	50-60	180.5	15.3%	140-150	0.0	0.0%	
0-90	1,174.6	99.7%	60-70	109.9	9.3%	150-160	0.0	0.0%	
90-180	4.1	0.3%	70-80	38.3	3.3%	160-170	0.0	0.0%	
0-180	1,178.7	100.0%	80-90	7.0	0.6%	170-180	0.0	0.0%	

INTEGRATING SPHERE TESTING

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PHOTOMETRIC, RADIOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS

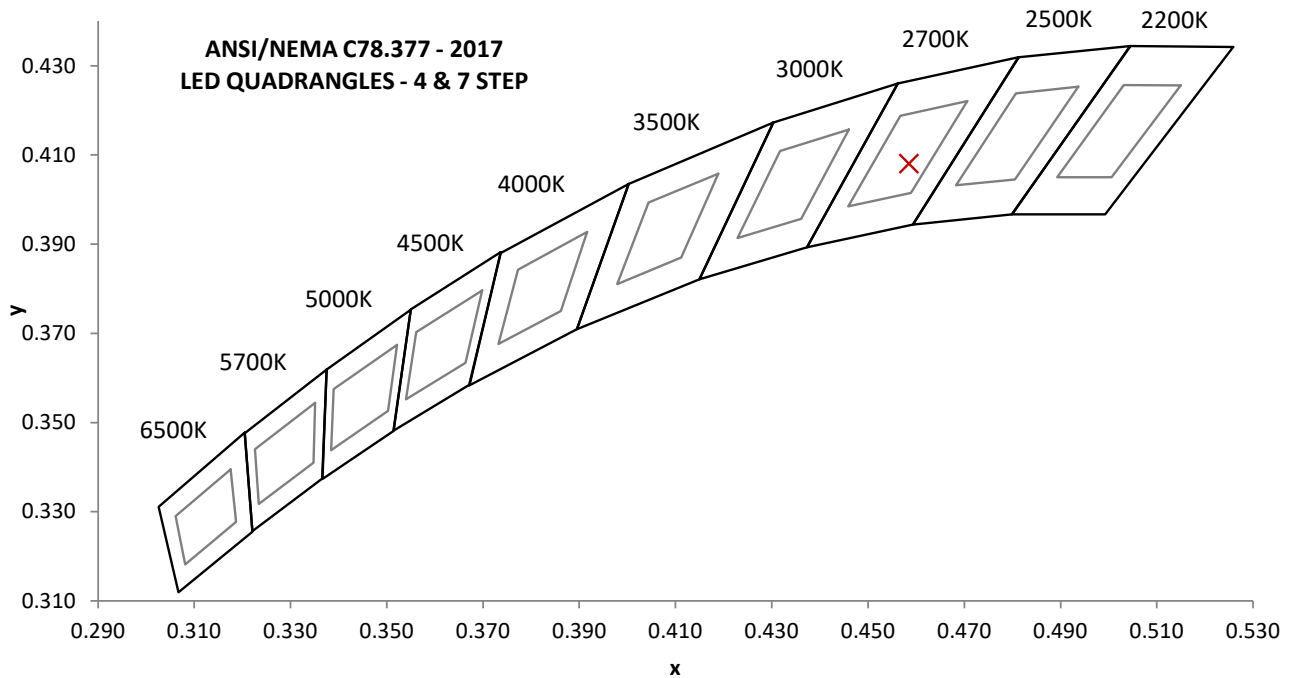
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.00	132.8	15.55	0.976	19.80

Measured at 120(Vac)

Light Output (lm)	Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
1178.5	75.8	2699	92.0	69.5

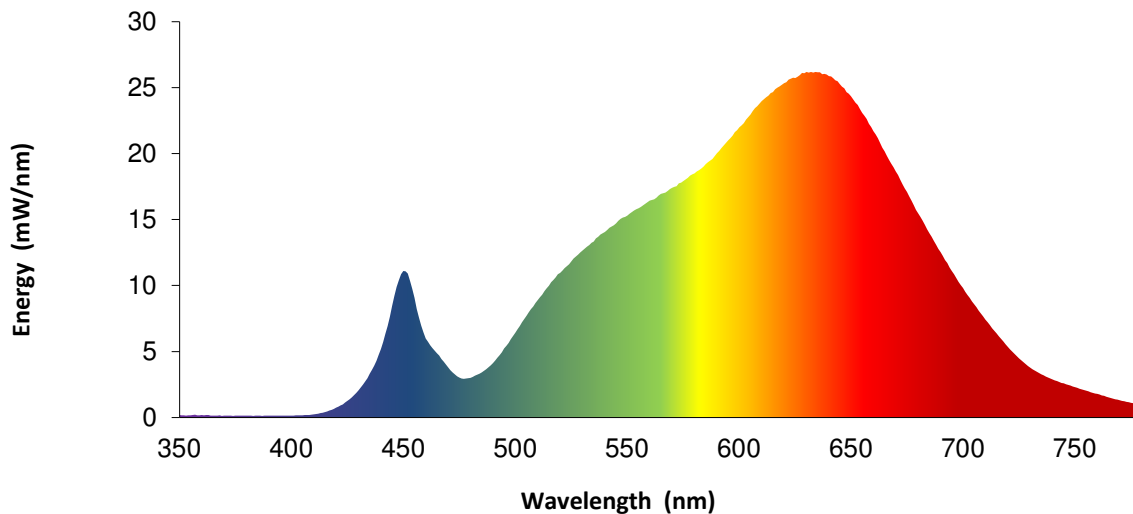
Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
-0.0008	0.458	0.408	0.263	0.526



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SPECTRAL POWER DISTRIBUTION

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.2		460	6.0		570	17.4		680	15.5
355	0.2		465	4.9		575	17.9		685	14.0
360	0.2		470	3.8		580	18.5		690	12.5
365	0.1		475	3.0		585	19.2		695	11.1
370	0.1		480	3.0		590	20.0		700	9.8
375	0.1		485	3.4		595	21.0		705	8.6
380	0.1		490	4.1		600	22.0		710	7.4
385	0.1		495	5.2		605	23.0		715	6.4
390	0.1		500	6.4		610	24.0		720	5.3
395	0.1		505	7.7		615	24.7		725	4.5
400	0.1		510	8.9		620	25.3		730	3.8
405	0.2		515	10.0		625	25.7		735	3.3
410	0.2		520	10.9		630	26.2		740	2.9
415	0.4		525	11.8		635	26.2		745	2.6
420	0.7		530	12.7		640	25.9		750	2.3
425	1.3		535	13.3		645	25.3		755	2.0
430	2.1		540	14.1		650	24.3		760	1.8
435	3.3		545	14.7		655	23.1		765	1.5
440	5.2		550	15.3		660	21.7		770	1.3
445	8.4		555	15.8		665	20.2		775	1.1
450	11.1		560	16.4		670	18.6		780	0.9
455	9.1		565	16.9		675	17.1		---	---



Portrayed color in graphic is estimated by wavelength (nm) and may not be exact - it is a visual representation only

EQUIPMENT LIST

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#	Equipment	Model No	Control No.	Last Cal	Cal Due
1	Elgar AC Power Supply	CW1251	---	VBU	VBU
2	Sorenson DC Power Supply	XFR 150-8	---	VBU	VBU
3	Traceable Hygrothermometer	200110913	L206	2/21/2022	2/21/2023
4	Yokogawa Power Analyzer	WT1600	E462	5/21/2022	5/21/2023
5	Fluke Thermometer	53 II	D588	6/13/2022	6/13/2023
6	Current Monitor	411	A197	8/26/2021	8/26/2024
7	3M Integrating Sphere Spectrometer System	CDS 2600	L231	7/1/2022	10/1/2022
8	LSI High Speed Mirror Goniophotometer	6440	---	6/30/2022	9/30/2022
9	Elgar AC Power Supply	CW1251	---	VBU	VBU
10	Yokogawa Power Analyzer	WT210	307-E464	6/21/2022	6/21/2023
11	Traceable Hygrothermometer	4800	L204	2/21/2022	2/21/2023
12	Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
13	Omega Thermometer	DPi8-C24	M263	3/1/2022	3/1/2023
14	Bosch Distance Laser	Pro GLM 20	L210	3/21/2022	3/15/2023
15	Tape Measure	Crescent	---	9/21/2021	9/21/2024

The AC power supplies used for testing have a crest factor capable of 0-3.5

REVISION HISTORY

#	Revision Date	Updated By	Reviewed By	Description of Change
---	None	---	---	---
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ANNEX A - TM-30 CALCULATIONS

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TM-30 REPORT

