

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

700BCLUFS36S-LED930

PROJECT NUMBER

G104941221

REPORT NUMBER

104941221CRT-015

ISSUE DATE

7/28/2022

REVISED DATE

None

TEST DATES

7/14/2022 through 7/23/2022

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104941221CRT-015

MODEL NUMBER(s)

700BCLUFS36S-LED930

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

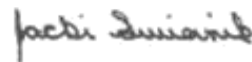
ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

In Charge of Testing:

Reviewer:



Melanie Brittain
Senior Associate Engineer
Lighting Division



Jacki Swiernik
Staff Engineer
Lighting Division

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SAMPLE INFORMATION

REPORT NO. 104941221CRT-015

ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	CRT2206301053-015	700BCLUFS36S-LED930	Lufe Square 36 Bath	Production	6/30/2022

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

REPORT NO. 104941221CRT-015

PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700BCLUFS36S-LED930
Product Description:	Lufe Square 36 Bath
LED Model No.:	Everlight 62-217D/HK4C-H3030QA1R32835Z15/2T 5630D package, 300mA, CRI90, CCT3000K, Bin:30K-F/30K-G, 22PCS
Driver Model No.:	LTF,DA32W900C2036-3001
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	2845.3	2762.4
Input Power (W) @ 120 (Vac)	37.62	37.73
Luminous Efficacy (lm/W)	75.64	73.22
Input Power Factor (I) @ 120 (Vac)	0.995	0.987

Criteria	Results
Input ATHD (%) @ 120 (Vac)	14.69
Correlated Color Temperature (K)	2982
Color Rendering Index - Ra (I)	92.8
Color Rendering Index - R9 (I)	55.4
Duv (I)	0.0016
Chromaticity Coordinate (x)	0.441
Chromaticity Coordinate (y)	0.409
Chromaticity Coordinate (u')	0.251
Chromaticity Coordinate (v')	0.524

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

REPORT NO. 104941221CRT-015

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS

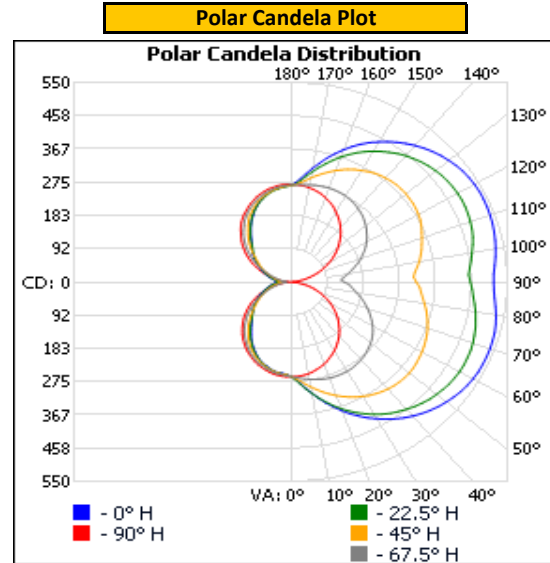
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Wall Mount	120.12	314.8	37.62	0.995

Light Output (lm)	Efficacy (lm/W)
2845.3	75.6

LUMINOUS INTENSITY SUMMARY (candela)

Angle (°)	0	22.5	45	67.5	90
0	260	260	260	260	260
5	281	283	274	266	261
10	312	312	294	272	257
15	345	342	314	278	250
20	378	372	333	282	242
25	408	398	350	284	232
30	435	421	364	285	220
35	461	442	376	283	206
40	482	458	385	279	191
45	500	472	390	272	174
50	515	483	392	264	156
55	527	491	389	254	136
60	534	495	385	240	116
65	538	495	378	223	94
70	538	492	370	206	72
75	536	485	358	188	50
80	529	476	345	170	30
85	519	465	332	154	12
90	515	456	319	136	2
95	520	456	316	134	10
100	528	467	332	151	28
105	534	478	344	170	50
110	539	486	354	190	72
115	540	489	366	207	94
120	538	489	374	222	118
125	533	486	379	235	139
130	523	479	380	247	159
135	509	468	379	258	178
140	491	454	374	265	196
145	470	437	367	272	213
150	446	416	356	275	227
155	419	393	343	277	240
160	387	366	327	277	250
165	354	337	309	275	258
170	318	308	291	272	264
175	287	280	274	269	268
180	266	265	266	268	270

Entire luminous intensity matrix found in .IES file



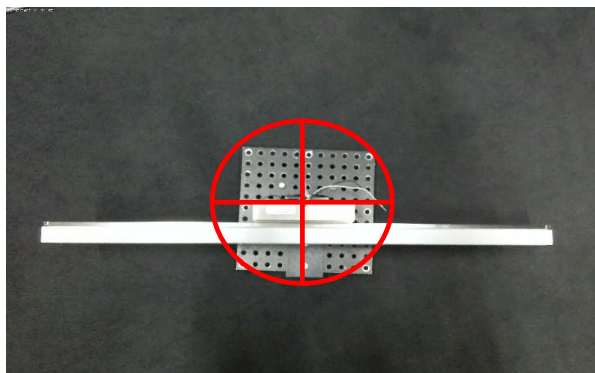
REPORT NO. 104941221CRT-015

ORIENTATION AND ALIGNMENT OF EUT

Luminous Opening		
Length (ft)	Width (ft)	Height (ft)
0.10	3.00	0.13
0°-180° H	90°-270° H	0°-180° V

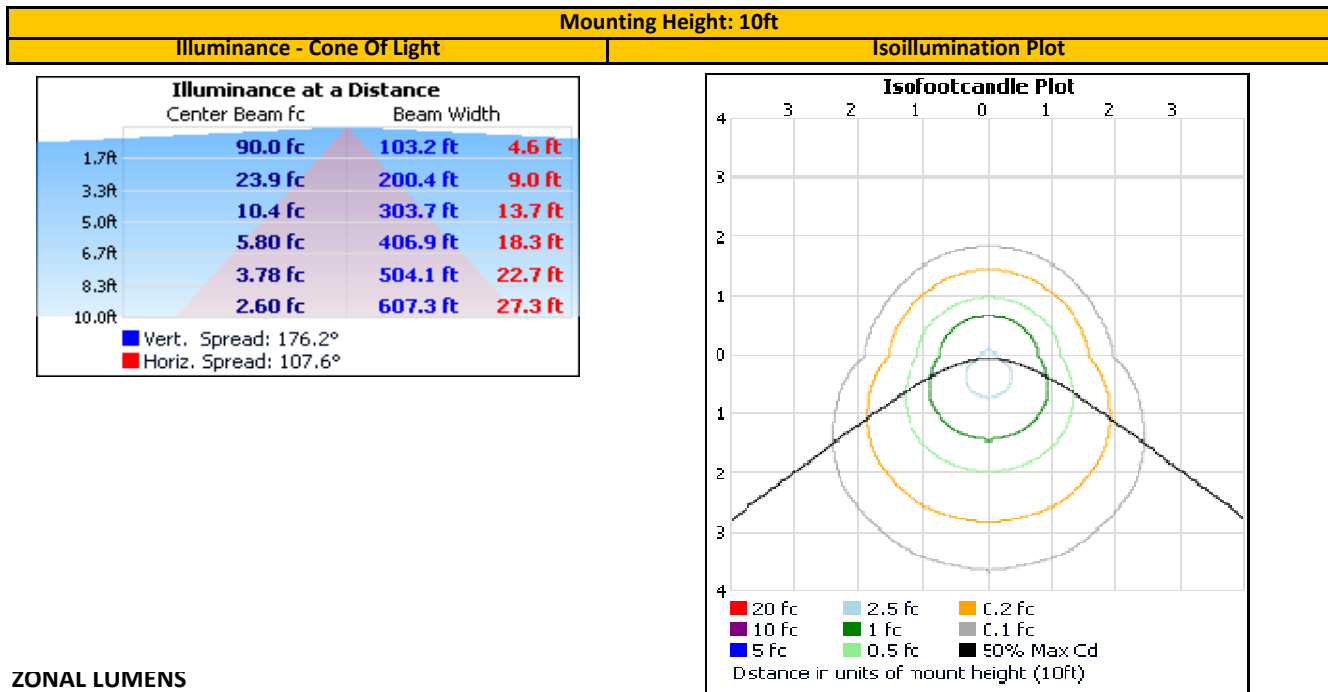
Test Distance (ft)
29.6

PHOTOMETRIC CENTER OF EUT



REPORT NO. 104941221CRT-015

ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary																																																																																																			
<table><tr><th>Zone</th><th>Lumens</th><th>Luminaire</th></tr><tr><td>0-30</td><td>232.9</td><td>8.2%</td></tr><tr><td>0-40</td><td>404.5</td><td>14.2%</td></tr><tr><td>0-60</td><td>821.9</td><td>28.9%</td></tr><tr><td>60-90</td><td>599.6</td><td>21.1%</td></tr><tr><td>70-100</td><td>564.6</td><td>19.8%</td></tr><tr><td>90-120</td><td>597.2</td><td>21.0%</td></tr><tr><td>0-90</td><td>1,421.5</td><td>50.0%</td></tr><tr><td>90-180</td><td>1,423.8</td><td>50.0%</td></tr><tr><td>0-180</td><td>2,845.3</td><td>100.0%</td></tr></table>			Zone	Lumens	Luminaire	0-30	232.9	8.2%	0-40	404.5	14.2%	0-60	821.9	28.9%	60-90	599.6	21.1%	70-100	564.6	19.8%	90-120	597.2	21.0%	0-90	1,421.5	50.0%	90-180	1,423.8	50.0%	0-180	2,845.3	100.0%	<table><tr><th>Zone</th><th>Lumens</th><th>Total</th><th>Zone</th><th>Lumens</th><th>Total</th></tr><tr><td>0-10</td><td>25.5</td><td>0.9%</td><td>90-100</td><td>180.7</td><td>6.4%</td></tr><tr><td>10-20</td><td>78.2</td><td>2.7%</td><td>100-110</td><td>201.3</td><td>7.1%</td></tr><tr><td>20-30</td><td>129.2</td><td>4.5%</td><td>110-120</td><td>215.2</td><td>7.6%</td></tr><tr><td>30-40</td><td>171.6</td><td>6.0%</td><td>120-130</td><td>216.4</td><td>7.6%</td></tr><tr><td>40-50</td><td>201.1</td><td>7.1%</td><td>130-140</td><td>201.7</td><td>7.1%</td></tr><tr><td>50-60</td><td>216.4</td><td>7.6%</td><td>140-150</td><td>172.8</td><td>6.1%</td></tr><tr><td>60-70</td><td>215.7</td><td>7.6%</td><td>150-160</td><td>130.5</td><td>4.6%</td></tr><tr><td>70-80</td><td>202.2</td><td>7.1%</td><td>160-170</td><td>79.3</td><td>2.8%</td></tr><tr><td>80-90</td><td>181.7</td><td>6.4%</td><td>170-180</td><td>25.9</td><td>0.9%</td></tr></table>							Zone	Lumens	Total	Zone	Lumens	Total	0-10	25.5	0.9%	90-100	180.7	6.4%	10-20	78.2	2.7%	100-110	201.3	7.1%	20-30	129.2	4.5%	110-120	215.2	7.6%	30-40	171.6	6.0%	120-130	216.4	7.6%	40-50	201.1	7.1%	130-140	201.7	7.1%	50-60	216.4	7.6%	140-150	172.8	6.1%	60-70	215.7	7.6%	150-160	130.5	4.6%	70-80	202.2	7.1%	160-170	79.3	2.8%	80-90	181.7	6.4%	170-180	25.9	0.9%
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INTEGRATING SPHERE TESTING

REPORT NO. 104941221CRT-015

PHOTOMETRIC, RADIOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS

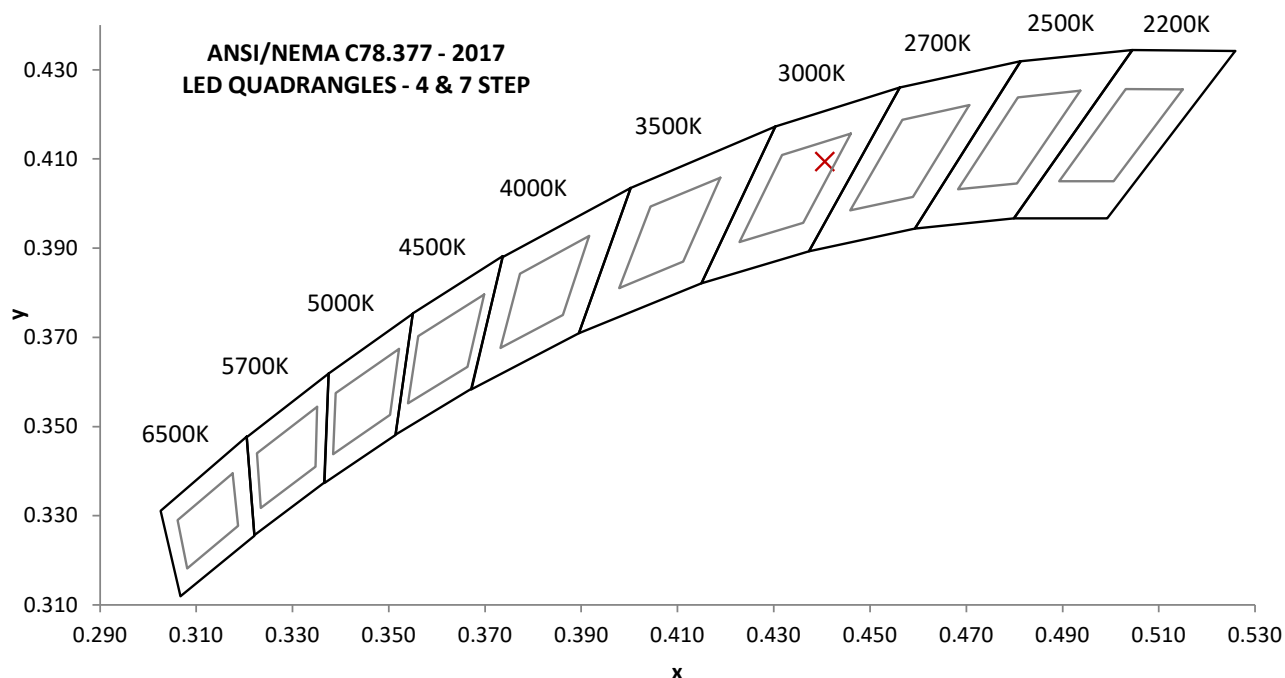
Base Orientation
Wall Mount

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.02	318.4	37.73	0.987	14.69

Measured at 120.02(Vac)

Light Output (lm)	Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
2762.4	73.2	2982	92.8	55.4

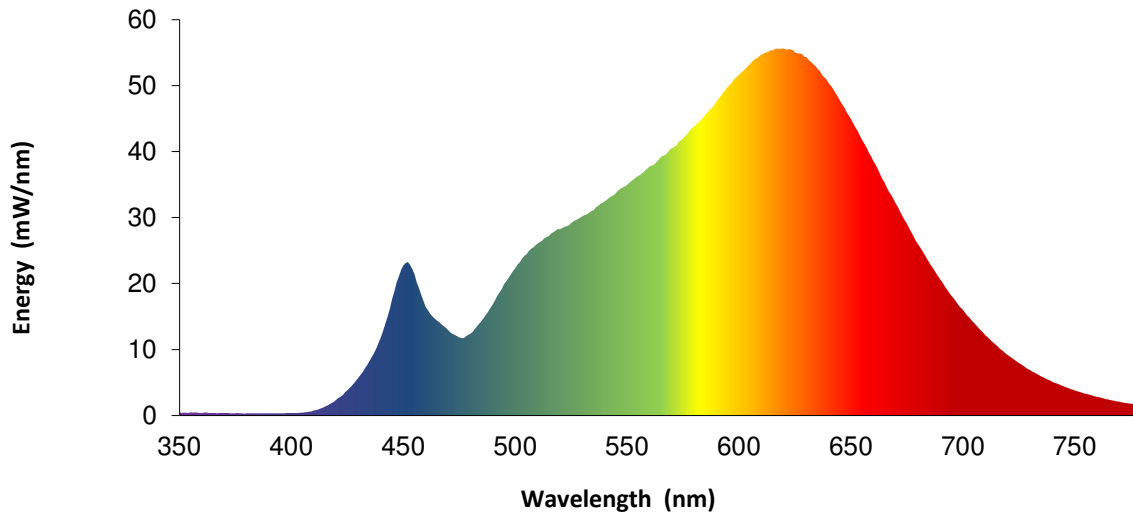
Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
0.0016	0.441	0.409	0.251	0.524



REPORT NO. 104941221CRT-015

SPECTRAL POWER DISTRIBUTION

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.5		460	16.4		570	40.5		680	25.9
355	0.5		465	14.4		575	42.1		685	23.1
360	0.4		470	12.9		580	43.8		690	20.6
365	0.4		475	11.8		585	45.7		695	18.1
370	0.4		480	12.4		590	47.7		700	16.0
375	0.3		485	14.3		595	49.9		705	14.0
380	0.3		490	16.9		600	51.7		710	12.2
385	0.3		495	19.9		605	53.3		715	10.6
390	0.3		500	22.3		610	54.7		720	9.1
395	0.3		505	24.4		615	55.3		725	7.9
400	0.4		510	26.1		620	55.6		730	6.9
405	0.4		515	27.2		625	55.0		735	5.9
410	0.7		520	28.2		630	54.3		740	5.1
415	1.3		525	29.2		635	52.5		745	4.4
420	2.3		530	30.2		640	50.3		750	3.8
425	3.8		535	31.1		645	47.7		755	3.3
430	5.7		540	32.5		650	44.9		760	2.8
435	8.3		545	33.7		655	41.8		765	2.4
440	11.9		550	35.0		660	38.5		770	2.1
445	17.6		555	36.3		665	35.3		775	1.8
450	22.7		560	37.8		670	32.1		780	1.5
455	21.4		565	39.2		675	29.0		---	---



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

EQUIPMENT LIST

REPORT NO. 104941221CRT-015

#	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

REPORT NO. 104941221CRT-015

TM-30 REPORT

