

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

700FMSPRR-LED927

PROJECT NUMBER

G104941221

REPORT NUMBER

104941221CRT-033

ISSUE DATE

7/28/2022

REVISED DATE

None

TEST DATES

7/20/2022 through 7/27/2022

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104941221CRT-033

MODEL NUMBER(s)

700FMSPRR-LED927

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

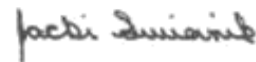
ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

In Charge of Testing:

Reviewer:



Melanie Brittain
Senior Associate Engineer
Lighting Division



Jacki Swiernik
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SAMPLE INFORMATION

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ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	CRT2206301053-033A	700FMSPRR-LED927	Spur Flush Mount	Production	6/30/2022
2	CRT2206301053-008	--	Glass		

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700FMSPRR-LED927
Product Description:	Spur Flush Mount
LED Model No.:	Luminus 3020,CCT2700K,CRI90,3-Step,6 chips
Driver Model No.:	MACRON, MDR-608-24-60-LD
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	2034.2	1997.2
Input Power (W) @ 120 (Vac)	42.13	42.25
Luminous Efficacy (lm/W)	48.29	47.27
Input Power Factor (I) @ 120 (Vac)	0.992	0.991

Criteria	Results
Input ATHD (%) @ 120 (Vac)	8.53
Correlated Color Temperature (K)	2630
Color Rendering Index - Ra (I)	93.0
Color Rendering Index - R9 (I)	60.7
Duv (I)	-0.0023
Chromaticity Coordinate (x)	0.462
Chromaticity Coordinate (y)	0.405
Chromaticity Coordinate (u')	0.266
Chromaticity Coordinate (v')	0.525

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

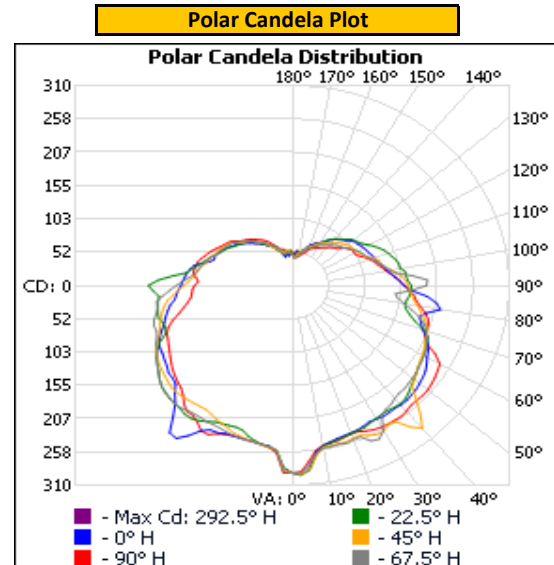
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	120.20	353.2	42.13	0.992

Light Output (lm)	Efficacy (lm/W)
2034.2	48.3

LUMINOUS INTENSITY SUMMARY (candela)

Angle (°)	0	22.5	45	67.5	90
0	291	291	291	291	291
5	283	288	286	278	274
10	252	254	255	256	252
15	246	248	254	255	250
20	244	245	252	254	245
25	241	243	256	266	249
30	240	238	261	260	254
35	241	237	258	234	255
40	242	240	289	228	254
45	240	235	250	227	252
50	237	227	228	224	253
55	232	220	220	221	249
60	222	217	215	217	243
65	214	213	209	212	211
70	198	200	205	204	204
75	188	173	194	187	201
80	215	164	182	163	185
85	193	169	171	148	175
90	160	170	165	192	160
95	147	163	158	172	148
100	137	156	142	141	135
105	130	153	131	130	126
110	124	146	124	120	119
115	120	137	111	114	107
120	117	126	106	108	102
125	113	116	104	99	99
130	108	111	99	92	90
135	100	101	93	88	83
140	93	94	86	82	77
145	84	85	80	76	71
150	76	75	75	71	67
155	71	68	68	65	63
160	64	62	62	61	55
165	54	56	53	55	50
170	53	51	52	45	46
175	48	47	43	42	51
180	48	48	48	48	48

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)
2.33	2.67	1.42
0°-180° H	90°-270° H	0°-180° V

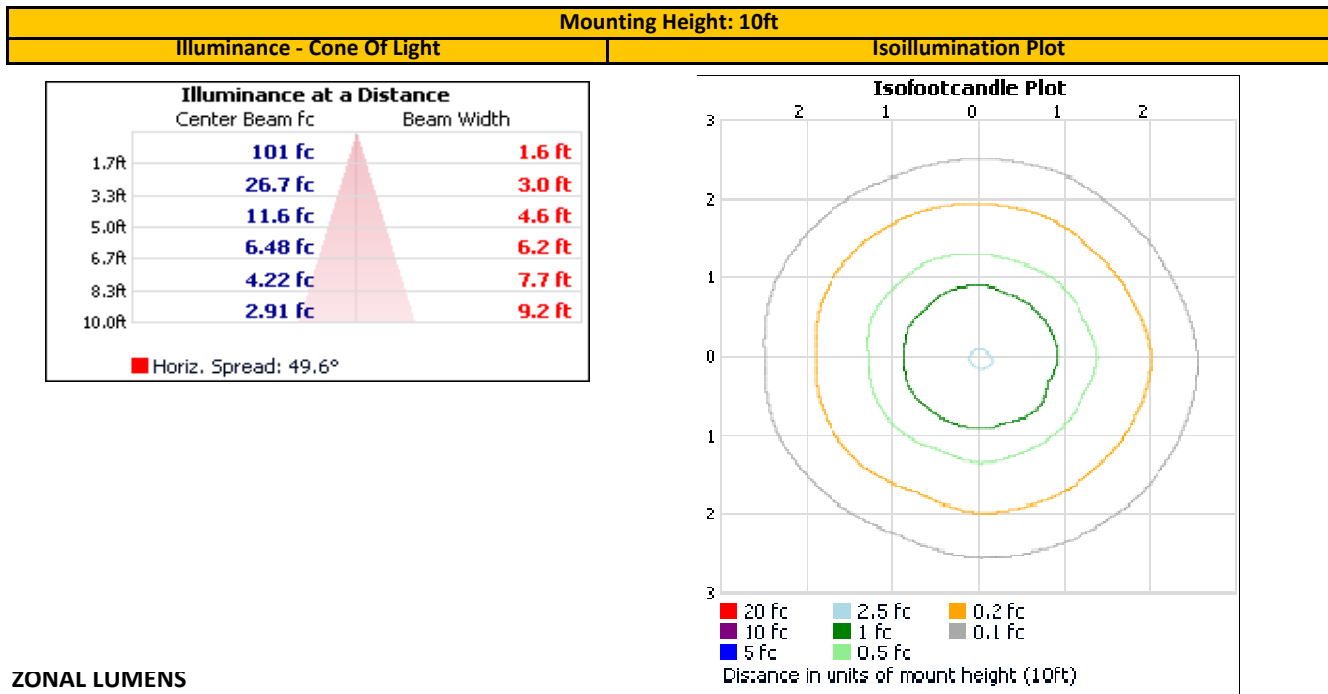
Test Distance (ft)
29.6

PHOTOMETRIC CENTER OF EUT



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ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary					
Zone	Lumens	Luminaire	Zone	Lumens	Total
0-30	208.7	10.3%	90-100	165.2	8.1%
0-40	365.4	18.0%	100-110	140.5	6.9%
0-60	749.7	36.9%	110-120	118.7	5.8%
60-90	586.2	28.8%	120-130	97.0	4.8%
70-100	547.6	26.9%	130-140	73.9	3.6%
90-120	424.3	20.9%	140-150	51.4	2.5%
0-90	1,335.9	65.7%	150-160	31.3	1.5%
90-180	698.3	34.3%	160-170	15.6	0.8%
0-180	2,034.2	100.0%	170-180	4.7	0.2%

INTEGRATING SPHERE TESTING

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PHOTOMETRIC, RADIOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS

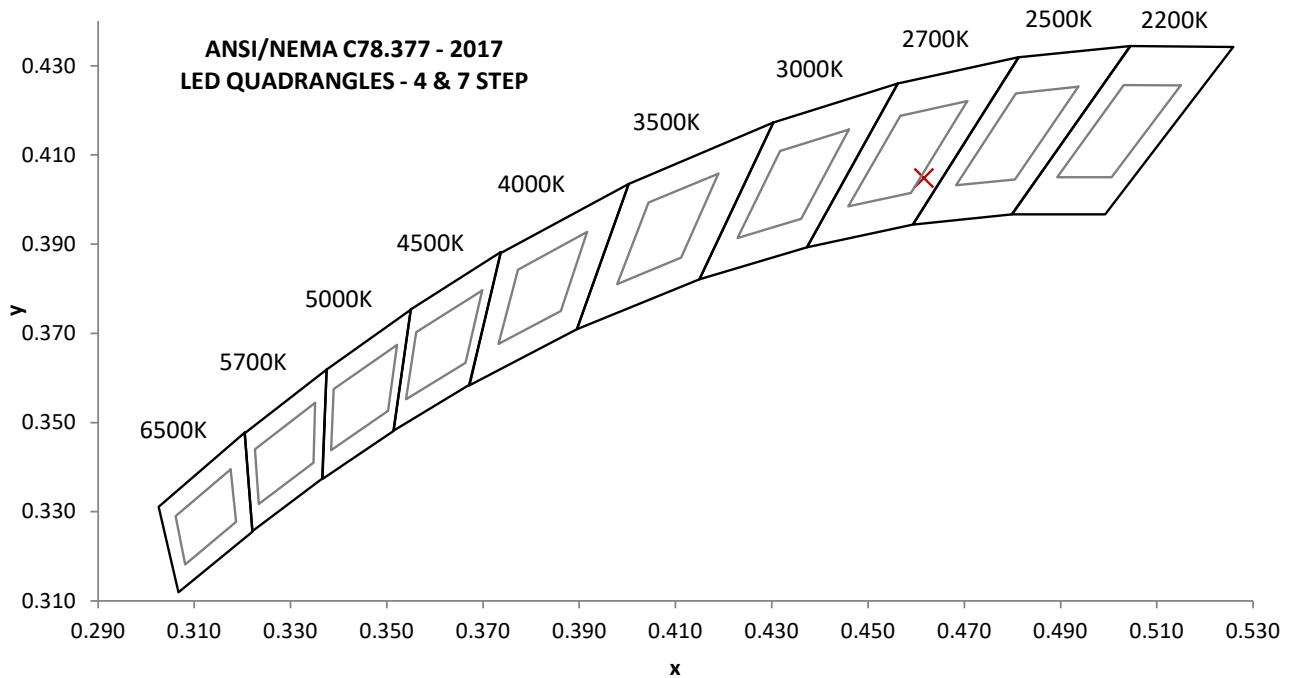
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.01	355.3	42.25	0.991	8.53

Measured at 120.01(Vac)

Light Output (lm)	Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
1997.2	47.3	2630	93.0	60.7

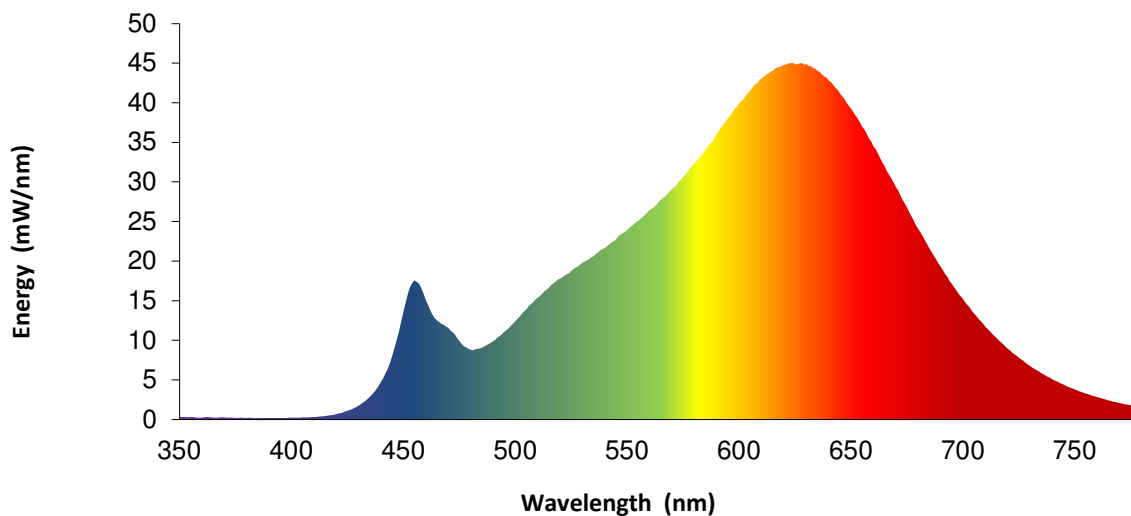
Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
-0.0023	0.462	0.405	0.266	0.525



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SPECTRAL POWER DISTRIBUTION

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.3		460	15.1		570	29.1		680	24.1
355	0.3		465	12.5		575	30.6		685	21.6
360	0.2		470	11.6		580	32.3		690	19.3
365	0.2		475	9.9		585	34.1		695	17.1
370	0.3		480	8.8		590	36.1		700	15.2
375	0.2		485	9.0		595	38.1		705	13.4
380	0.2		490	9.9		600	39.9		710	11.7
385	0.2		495	11.1		605	41.6		715	10.3
390	0.2		500	12.4		610	43.1		720	8.9
395	0.2		505	13.9		615	44.0		725	7.8
400	0.2		510	15.4		620	44.8		730	6.8
405	0.3		515	16.6		625	44.9		735	5.9
410	0.3		520	17.8		630	44.9		740	5.1
415	0.4		525	18.8		635	44.0		745	4.4
420	0.7		530	19.8		640	42.8		750	3.8
425	1.1		535	20.6		645	41.2		755	3.3
430	1.7		540	21.7		650	39.3		760	2.8
435	2.9		545	22.8		655	37.0		765	2.4
440	4.7		550	23.9		660	34.5		770	2.1
445	8.0		555	25.1		665	32.0		775	1.8
450	13.5		560	26.5		670	29.4		780	1.5
455	17.6		565	27.8		675	26.8		---	---



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	---	4/4/2022	7/4/2022
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	Multi Channel Spectroradiometer	OL 770	O230	6/1/2022	9/1/2022
15	Bosch Distance Laser	Pro GLM 20	L210	3/21/2022	3/15/2023
16	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

