

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

700CLR24N-LED930S

PROJECT NUMBER

G105408958

REPORT NUMBER

105408958CHI-010

ISSUE DATE

4/13/2023

REVISED DATE

None

TEST DATES

2023-04-11 through 2023-04-13.

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

105408958CHI-010

MODEL NUMBER(s)

700CLR24N-LED930S

REPORT RENDERED TO:

VISUAL COMFORT AND COMPANY
7400 LINDER AVE
SKOKIE, IL 60077
USA

STATEMENT OF LIMITATION

NVLAP Lab Code 600186-0. 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-01297671-0.

TEST STANDARDS

IES LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

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

ANSI/IES TM-30-18: IES Method for Evaluating Light Source Color Rendition

In Charge of Testing:



David Dalo
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Reviewer:



Jeff Davis
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SAMPLE INFORMATION

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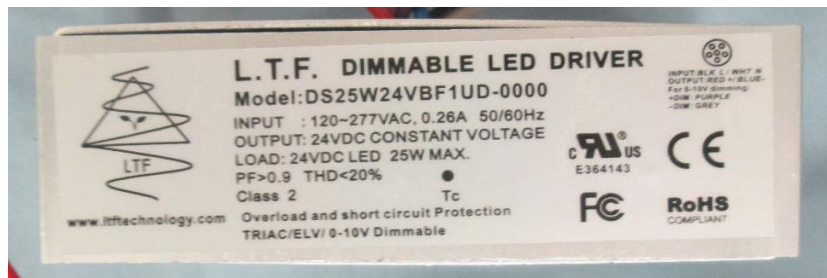
ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	AH04062023065219-004	700CLR24N-LED930S	Collier 24 Pendant	Production	4/6/2023

TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	700CLR24N-LED930S	1

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700CLR24N-LED930S
Product Description:	Collier 24 Pendant
LED Model No.:	AA3965-01-0x (Samsung SPMWH12245Q7W8WMSA)
Driver Model No.:	DS25W24VBF1UD-0000 (AA7580)
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	524.1	544.4
Input Power (W) @ 120 (Vac)	10.08	10.10
Lumen Efficacy (lm/W)	52.0	53.9
Input Power Factor () @ 120 (Vac)	0.936	0.939

Criteria	Results
Input ATHD (%) @ 120 (Vac)	17.34
Correlated Color Temperature (K)	3051
Color Rendering Index - Ra ()	91.9
Color Rendering Index - R9 ()	52.4
Duv ()	-0.0007
Chromaticity Coordinate (x)	0.432
Chromaticity Coordinate (y)	0.401
Chromaticity Coordinate (u')	0.249
Chromaticity Coordinate (v')	0.519

TEST METHODS

SEASONING IN SAMPLE ORIENTATION - LED PRODUCTS

No seasoning was performed in accordance with IESNA LM-79.

INTEGRATING SPHERE TESTING

A spectroradiometer and integrating sphere were used to measure the spectral distribution for each EUT resulting in photometric and colorimetric data. 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 was measured at a position inside the sphere and stabilization procedures to LM-79 were followed.

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 was measured at a position near the EUT at equal height and stabilization procedures to LM-79 were followed.

*ANSI/IES Technical Memorandums (TM) reported are not NVLAP accredited

TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

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Test Configuration	Tested Model No.	Pass/Fail/NA
1	700CLR24N-LED930S	NA

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS (25°C +/- 1°C)

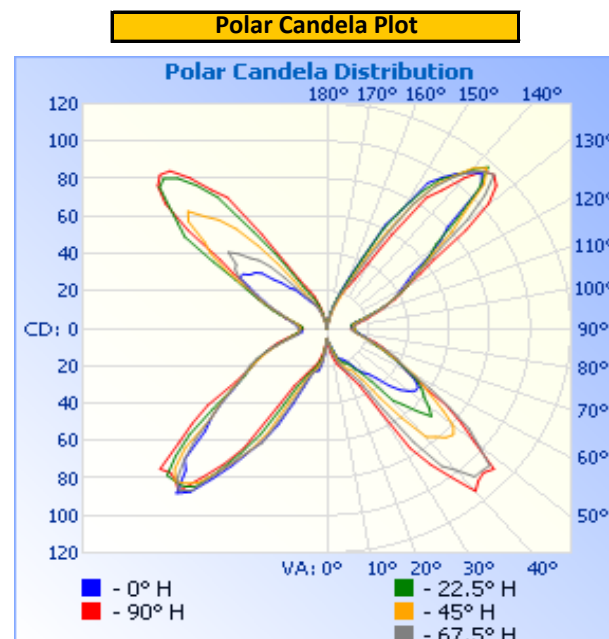
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (I)
Up	120.03	89.7	10.08	0.936

Light Output (lm)	Lumen Efficacy (lm/W)
524.1	52.0

INTENSITY SUMMARY - CANDELA

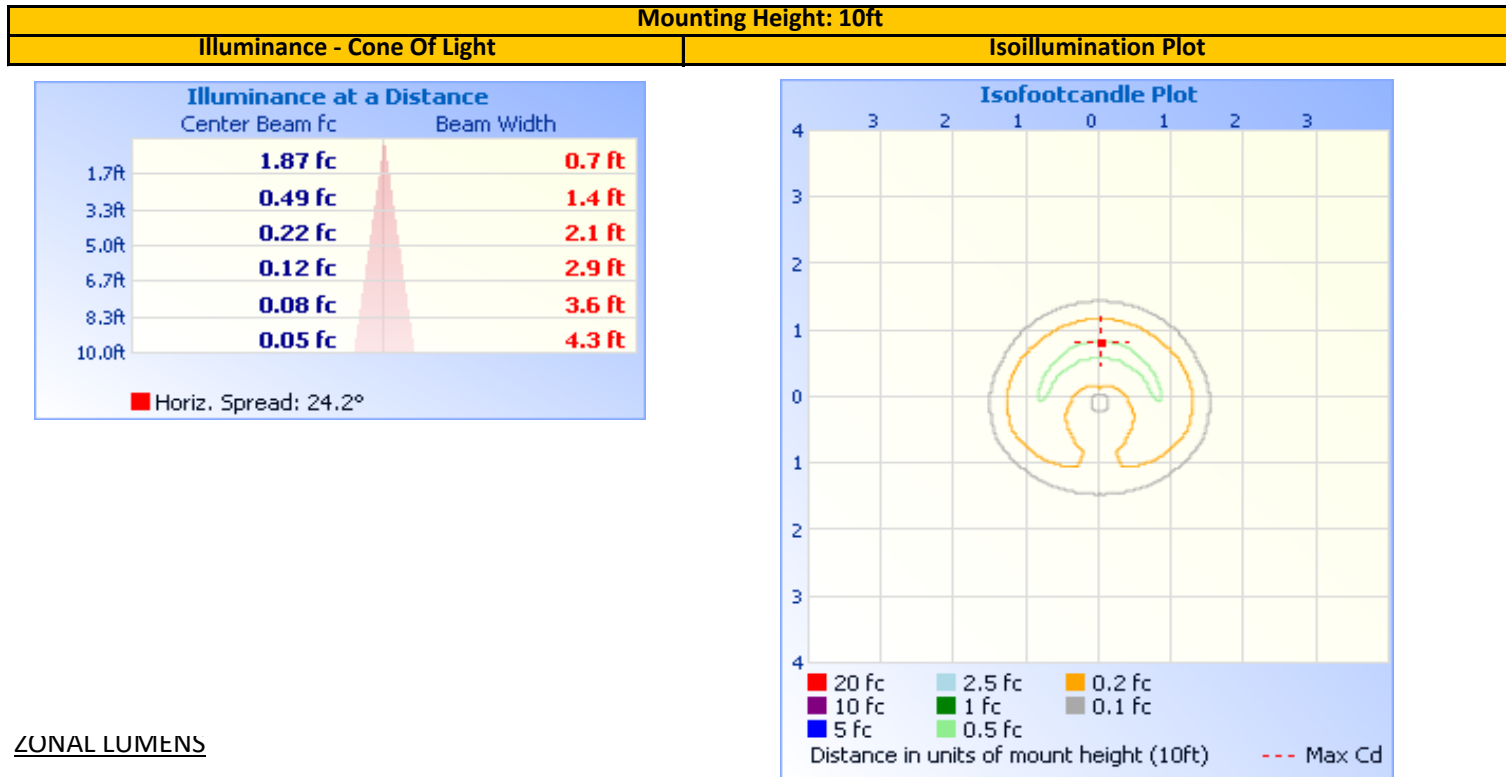
Angle	0	22.5	45	67.5	90
0	5	5	5	5	5
5	7	7	8	8	10
10	9	10	11	13	15
15	13	14	15	17	20
20	17	18	20	23	24
25	18	21	24	26	30
30	21	23	28	35	48
35	28	29	45	74	89
40	32	50	76	99	114
45	43	62	83	108	109
50	52	65	81	97	95
55	55	57	62	73	71
60	45	46	50	48	45
65	35	34	35	38	36
70	25	25	26	28	29
75	20	20	19	20	21
80	16	16	15	15	15
85	14	14	13	13	13
90	14	14	13	12	12
95	12	12	13	14	13
100	13	13	14	15	16
105	17	17	18	19	21
110	25	25	26	26	27
115	35	35	35	35	37
120	42	45	44	44	46
125	52	56	58	59	64
130	73	70	80	90	104
135	108	106	109	116	116
140	109	111	112	109	105
145	98	97	94	93	85
150	73	73	60	56	40
155	42	41	31	28	25
160	23	22	16	20	18
165	13	13	9	11	10
170	4	5	2	3	3
175	0	0	0	0	0
180	0	0	0	0	0

Entire luminous intensity matrix found in .IES file



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ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary										
Zone	Zone	Lumens	Luminaire	Zone	Zone	Lumens	Total	Zone	Lumens	Total
	0-30	23.4	4.5%		0-10	1.1	0.2%	90-100	14.7	2.8%
	0-40	69.6	13.3%		10-20	5.7	1.1%	100-110	20.8	4.0%
	0-60	195.2	37.2%		20-30	16.6	3.2%	110-120	35.4	6.8%
	60-90	71.2	13.6%		30-40	46.2	8.8%	120-130	56.0	10.7%
	70-100	50.3	9.6%		40-50	70.4	13.4%	130-140	71.3	13.6%
	90-120	70.9	13.5%		50-60	55.2	10.5%	140-150	43.8	8.3%
	0-90	266.3	50.8%		60-70	35.7	6.8%	150-160	13.1	2.5%
	90-180	257.8	49.2%		70-80	20.7	4.0%	160-170	2.7	0.5%
	0-180	524.1	100.0%		80-90	14.8	2.8%	170-180	0.1	0.0%

INTEGRATING SPHERE TESTING

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Test Configuration	Tested Model No.	Pass/Fail/NA
1	700CLR24N-LED930S	NA

PHOTOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS (25°C +/- 1°C)

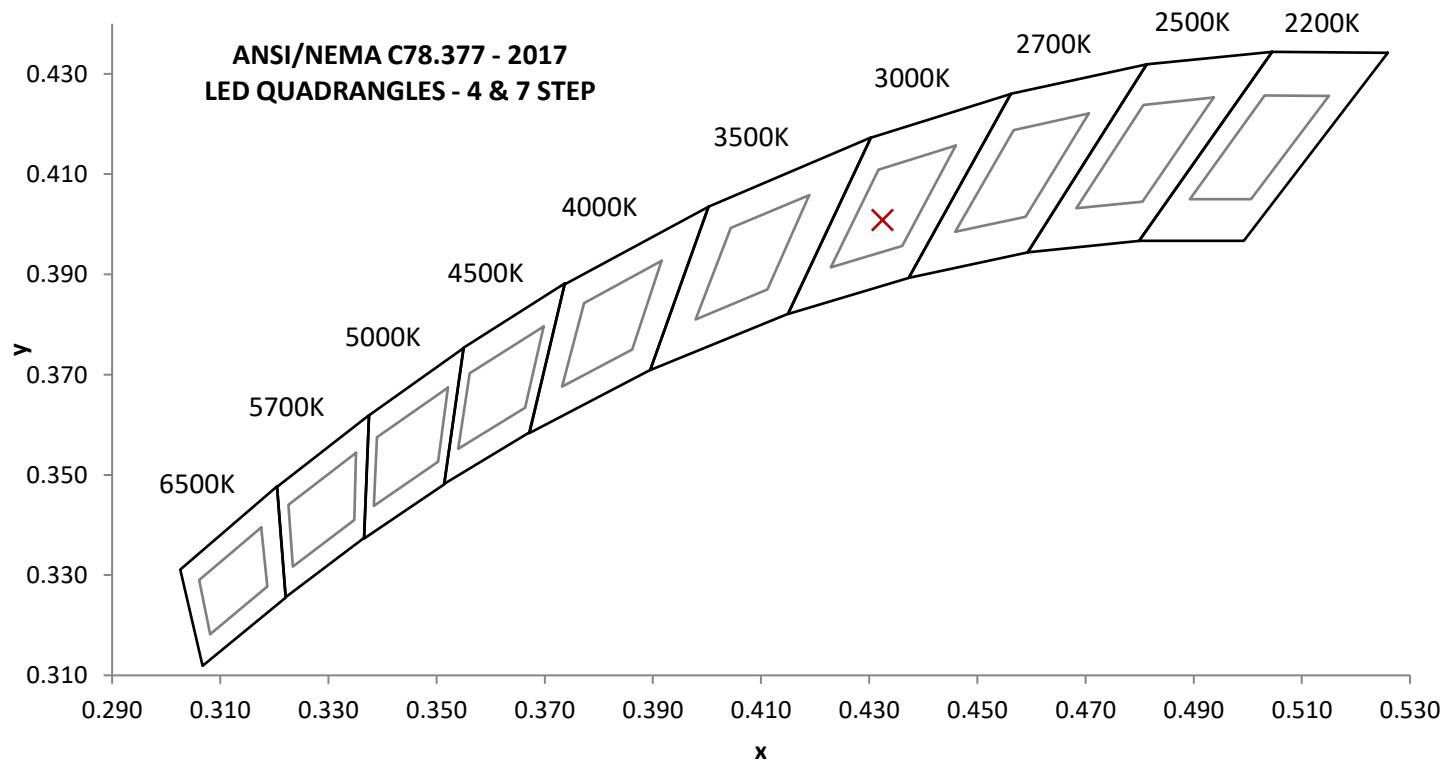
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.01	89.7	10.10	0.939	17.34

Measured at 120.01(Vac)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
544.4	53.9	3051	91.9	52.4

Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
-0.0007	0.432	0.401	0.249	0.519

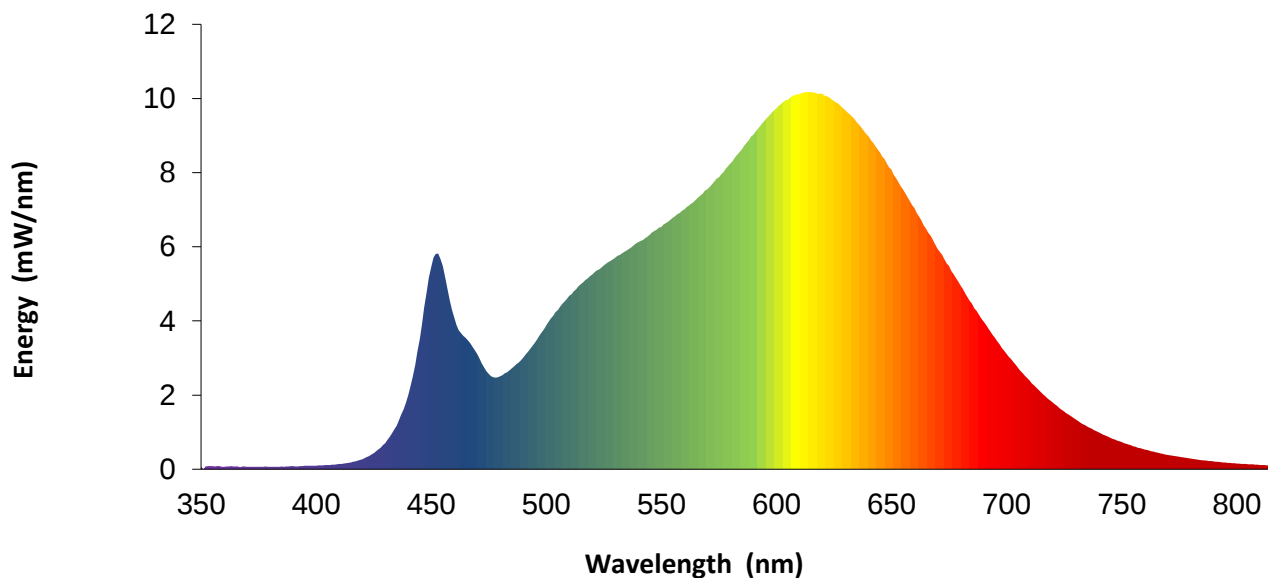


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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.1		460	4.1		570	7.6		680	5.0
355	0.1		465	3.5		575	7.9		685	4.5
360	0.1		470	3.1		580	8.2		690	4.0
365	0.1		475	2.6		585	8.6		695	3.5
370	0.1		480	2.5		590	9.0		700	3.1
375	0.1		485	2.7		595	9.4		705	2.7
380	0.1		490	3.0		600	9.7		710	2.4
385	0.1		495	3.4		605	10.0		715	2.1
390	0.1		500	3.9		610	10.1		720	1.8
395	0.1		505	4.3		615	10.2		725	1.6
400	0.1		510	4.7		620	10.1		730	1.3
405	0.1		515	5.0		625	9.9		735	1.2
410	0.1		520	5.3		630	9.7		740	1.0
415	0.2		525	5.5		635	9.4		745	0.8
420	0.3		530	5.7		640	9.0		750	0.7
425	0.4		535	5.9		645	8.5		755	0.6
430	0.7		540	6.1		650	8.1		760	0.5
435	1.2		545	6.3		655	7.5		765	0.5
440	2.0		550	6.5		660	7.0		770	0.4
445	3.5		555	6.8		665	6.5		775	0.3
450	5.5		560	7.0		670	5.9		780	0.3
455	5.5		565	7.3		675	5.5		---	---

Without correction of sample absorption.



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	Yokogawa Power Meter	WT310E	CHI0664	4/3/2023	4/3/2024
2	Omega Thermometer	DPI8-C24	146920	10/4/2022	10/4/2023
3	LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU
4	Newport Thermohygrometer	iServer	146958	10/6/2022	10/6/2023
5	Chroma Power Supply	61604	CHI0371	VBU	VBU
6	Sorenson DC Power Supply	XHR 150-7	146922	VBU	VBU
7	Multi Channel Spectroradiometer	OL770	CHI0092	VBU	VBU
8	Omega Thermohygrometer	OM-CP-RFPRHTEMP2000A	CHI0778	4/3/2023	4/3/2024
9	Labsphere Spectroradiometer	CDS2600	CHI0539	VBU	VBU
10	3 Meter Sphere	SPR600	CHI0088	VBU	VBU
11	Elgar AC Power Supply	CW1251	146112	VBU	VBU
12	Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU
13	Yokogawa Power Meter	WT1600	146767	4/4/2023	4/4/2024
17	Omega thermometer	USB TC08	EQAH002615	4/4/2023	4/4/2024
26	Xitron Power Analyzer	XT-2640	CHI0611	7/6/2022	7/6/2023

Note: Standard sources listed above are traceable to NIST: National Institute of Standards and Technology

REVISION HISTORY

#	Revision Date	Updated By	Reviewed By	Description of Change
---	None	---	---	---
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Test Configuration	Tested Model No.	Pass/Fail/NA
1	700CLR24N-LED930S	NA

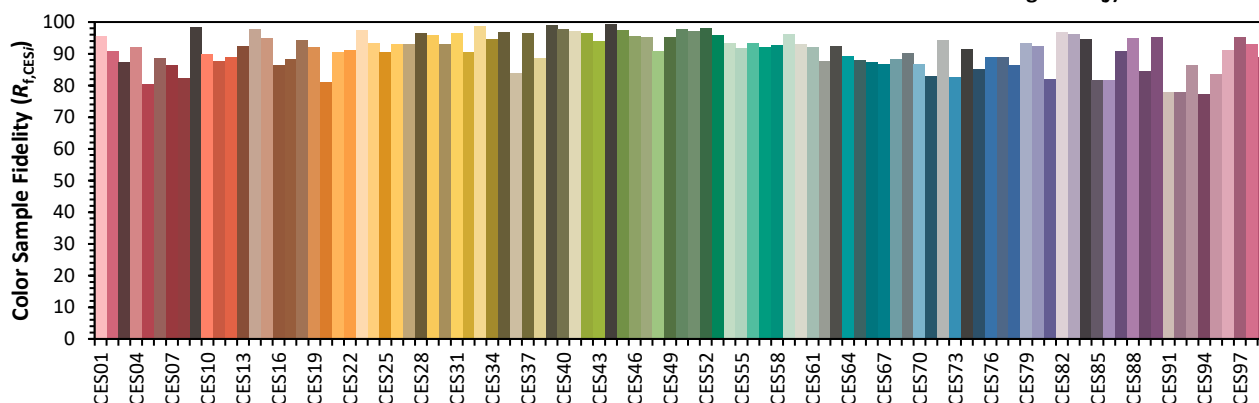
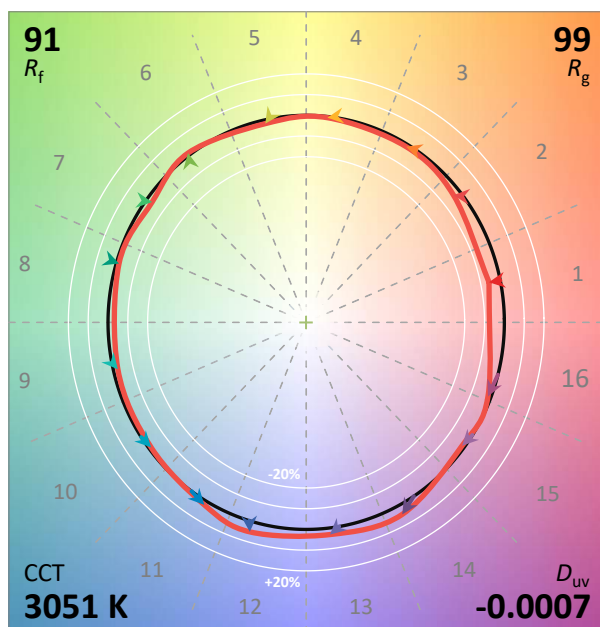
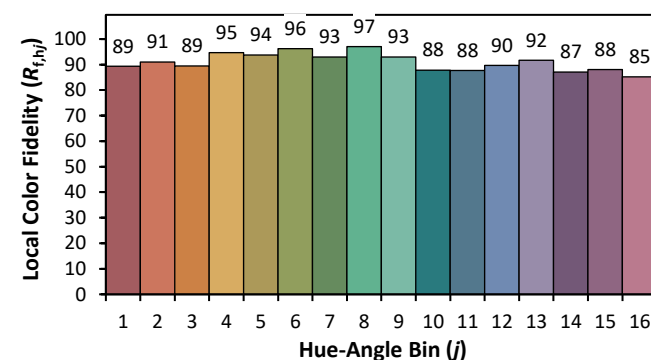
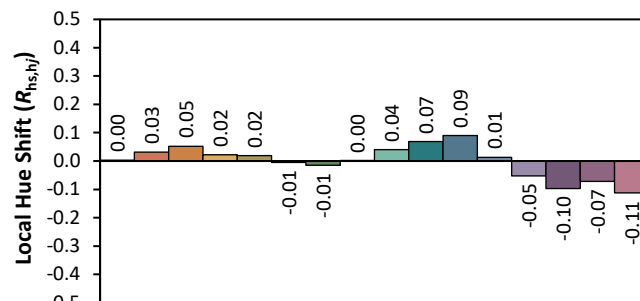
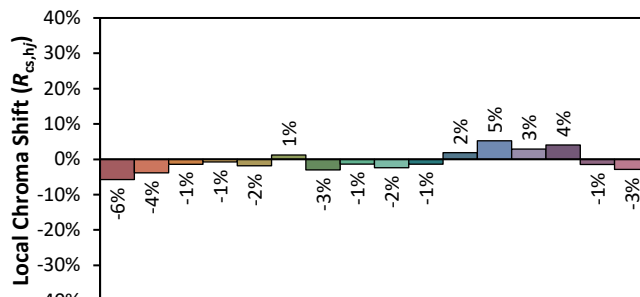
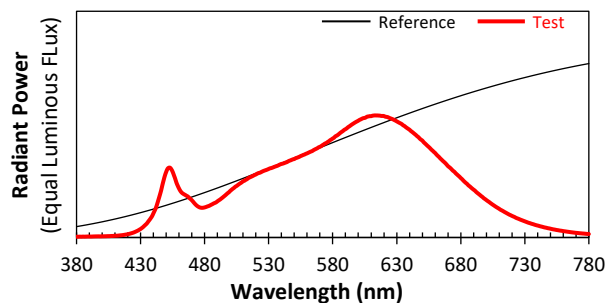
ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: VISUAL COMFORT AND COMPANY

Date: 4/13/2023

Model: 700CLR24N-LED930S



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

 x 0.4324 y 0.4008 u' 0.2491 v' 0.5194