

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

ESSF0604D473009W3018FW1

PROJECT NUMBER

G104349704

REPORT NUMBER

104349704CHI-073

ISSUE DATE

4/14/2021

REVISED DATE

None

TEST DATES

04/09/2021 through 04/12/2021.

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104349704CHI-073

MODEL NUMBER(s)

ESSF0604D473009W3018FW1

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-01080748-3.

TEST STANDARDS

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

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

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

In Charge of Testing:



Tim Quigley
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Lighting Division

Reviewer:



Jeff Davis
N.A. Technical Lead
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SAMPLE INFORMATION

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ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	AH04082021114642-001	ESSF0604D473009W301 8FW1	WARM DIM 350LM/FT 0604 FROSTED	Production	4/8/2021

TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	ESSF0604D473009W3018FW1	1

SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	ESSF0604D473009W3018FW1
Product Description:	WARM DIM 350LM/FT 0604 FROSTED
LED Model No.:	U series
Driver Model No.:	NA
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	1188.4	1228.7
Input Power (W) @ 24 (Vdc)	13.77	13.80
Lumen Efficacy (lm/W)	86.3	89.0
Input Power Factor () @ 24 (Vdc)	--	--

Criteria	Results
Input ATHD (%) @ 24 (Vdc)	--
Correlated Color Temperature (K)	3011
Color Rendering Index - Ra ()	98.4
Color Rendering Index - R9 ()	96.2
Duv ()	0.0006
Chromaticity Coordinate (x)	0.435
Chromaticity Coordinate (y)	0.402
Chromaticity Coordinate (u')	0.250
Chromaticity Coordinate (v')	0.521

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.

TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

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Test Configuration	Tested Model No.	Pass/Fail/NA
1	ESSF0604D473009W3018FW1	NA

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

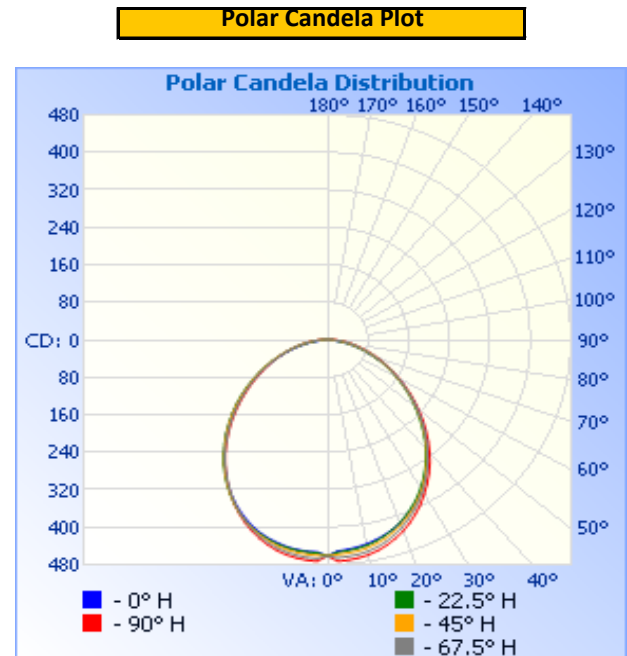
Base Orientation	Input Voltage (Vdc)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	24.00	573.5	13.77	--

Light Output (lm)	Lumen Efficacy (lm/W)
1188.4	86.3

INTENSITY SUMMARY - CANDELA

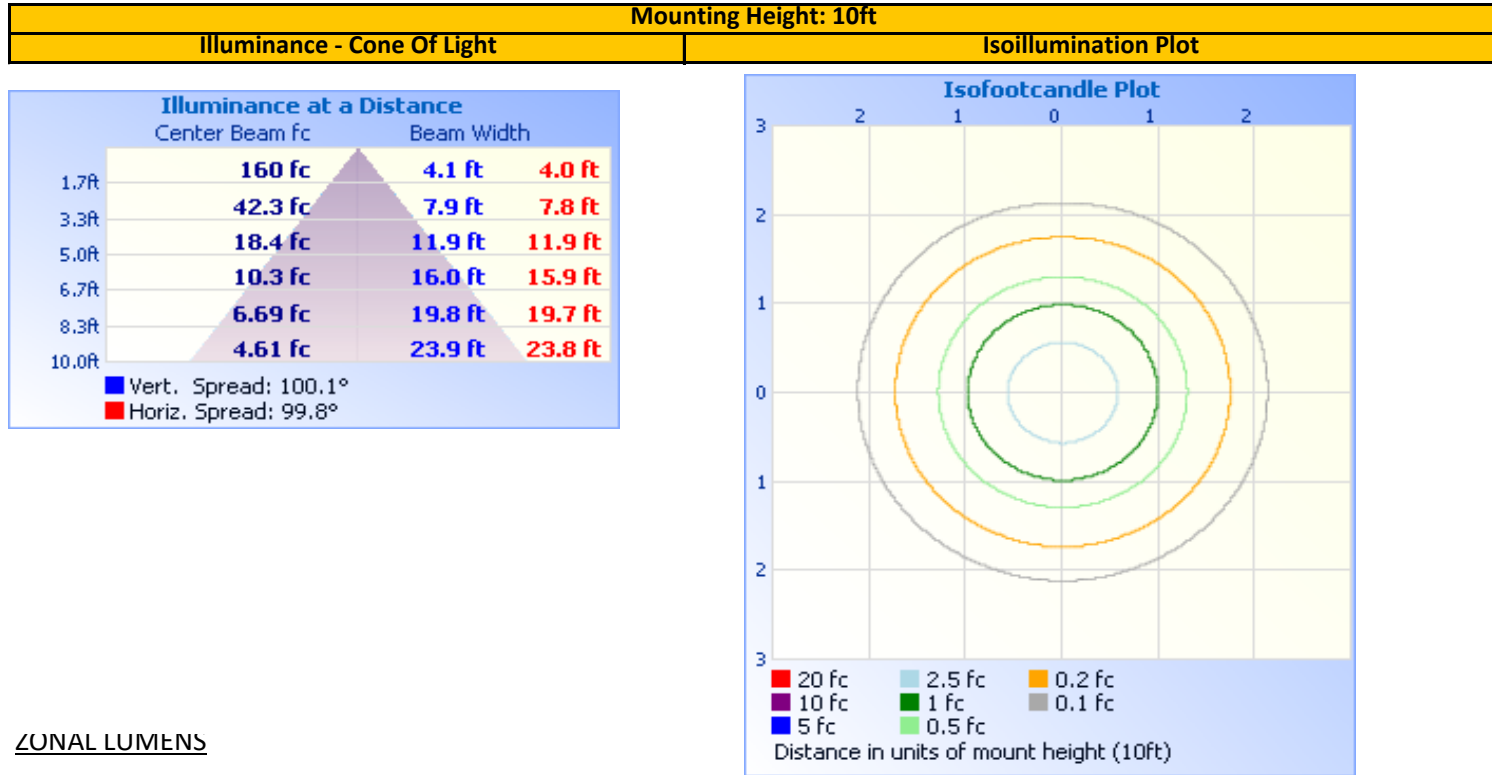
Angle	0	22.5	45	67.5	90
0	461	461	461	461	461
5	449	452	457	464	472
10	442	445	451	458	466
15	431	433	439	446	453
20	416	416	421	426	435
25	396	393	397	402	410
30	369	366	370	374	381
35	339	335	338	342	349
40	305	301	304	306	313
45	268	264	267	269	275
50	232	227	230	231	236
55	194	191	194	194	198
60	158	156	157	159	162
65	124	122	124	126	129
70	91	90	94	96	98
75	62	62	67	70	72
80	36	36	42	46	48
85	13	16	22	26	29
90	0	3	8	12	14
95	0	0	1	4	5
100	0	0	0	0	0
105	0	0	0	0	0
110	0	0	0	0	0
115	0	0	0	0	0
120	0	0	0	0	0
125	0	0	0	0	0
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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ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary					
Zone	Lumens	Luminaire	Zone	Lumens	Total
0-30	354.1	29.8%	0-10	43.7	3.7%
0-40	569.5	47.9%	10-20	124.8	10.5%
0-60	958.3	80.6%	20-30	185.6	15.6%
60-90	227.1	19.1%	30-40	215.5	18.1%
70-100	102.3	8.6%	40-50	210.9	17.7%
90-120	3.0	0.3%	50-60	177.8	15.0%
0-90	1,185.4	99.7%	60-70	127.8	10.8%
90-180	3.0	0.3%	70-80	73.3	6.2%
0-180	1,188.4	100.0%	80-90	26.0	2.2%
			90-100	3.0	0.3%
			100-110	0.0	0.0%
			110-120	0.0	0.0%
			120-130	0.0	0.0%
			130-140	0.0	0.0%
			140-150	0.0	0.0%
			150-160	0.0	0.0%
			160-170	0.0	0.0%
			170-180	0.0	0.0%

INTEGRATING SPHERE TESTING

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Test Configuration	Tested Model No.	Pass/Fail/NA
1	ESSF0604D473009W3018FW1	NA

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

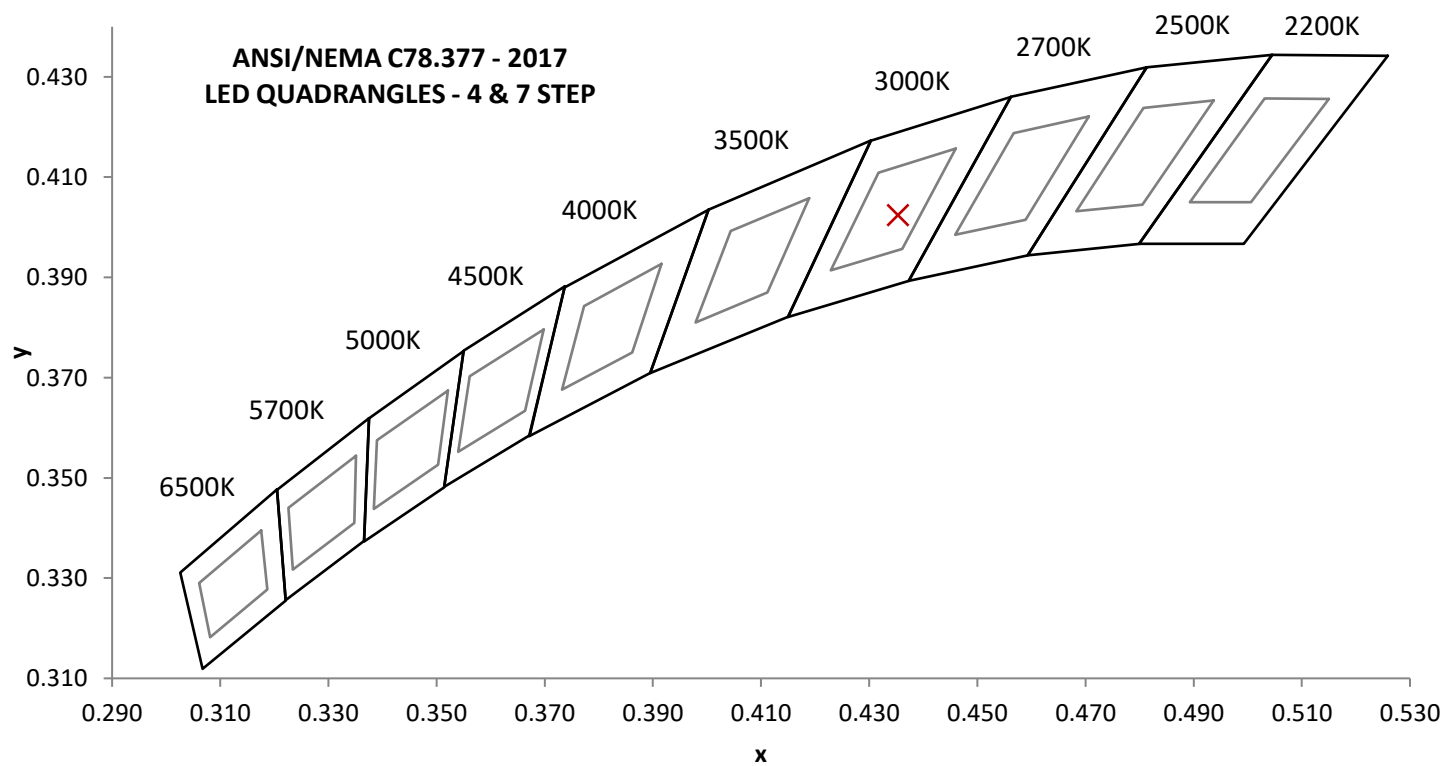
Base Orientation
Up

Input Voltage (Vdc)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
24.01	575.1	13.80	--	--

Measured at 24.01(Vdc)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
1228.7	89.0	3011	98.4	96.2

Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
0.0006	0.435	0.402	0.250	0.521

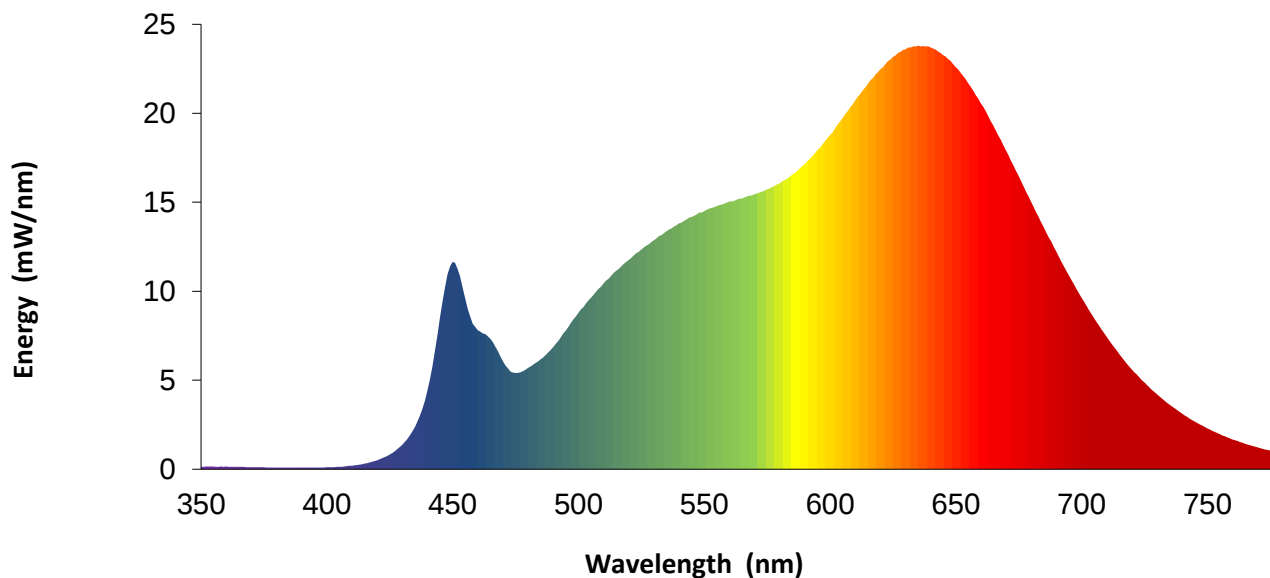


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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.1		460	7.8		570	15.4		680	15.0
355	0.2		465	7.3		575	15.7		685	13.6
360	0.2		470	6.1		580	16.1		690	12.2
365	0.1		475	5.4		585	16.6		695	10.9
370	0.1		480	5.7		590	17.1		700	9.6
375	0.1		485	6.2		595	17.9		705	8.5
380	0.1		490	6.9		600	18.8		710	7.4
385	0.1		495	7.8		605	19.7		715	6.5
390	0.1		500	8.8		610	20.7		720	5.6
395	0.1		505	9.6		615	21.7		725	4.9
400	0.1		510	10.4		620	22.5		730	4.2
405	0.1		515	11.2		625	23.2		735	3.6
410	0.2		520	11.8		630	23.6		740	3.1
415	0.3		525	12.3		635	23.8		745	2.7
420	0.5		530	12.9		640	23.7		750	2.3
425	0.8		535	13.4		645	23.3		755	2.0
430	1.4		540	13.8		650	22.6		760	1.7
435	2.4		545	14.2		655	21.7		765	1.4
440	4.4		550	14.5		660	20.6		770	1.2
445	8.5		555	14.8		665	19.3		775	1.0
450	11.7		560	15.0		670	17.9		780	0.9
455	9.6		565	15.2		675	16.5		---	---

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	WT210	146919	7/1/2020	7/1/2021
2	Omega Thermometer	DPI8-C24	146920	10/1/2020	10/1/2021
3	LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU
4	Newport Thermohygrometer	iServer	146957	1/29/2021	1/29/2022
6	Sorenson DC Power Supply	XHR 150-7	146922	VBU	VBU
8	Newport Humidity Recorder	iServer	146961	9/3/2020	9/3/2021
21	Labsphere 2M Sphere & Spectroradiometer	CDS1100	146137	VBU	VBU
23	Sorenson DC Power Supply	XFR150-8	146847	VBU	VBU
24	Yokogawa Power Meter	WT1600	146768	10/2/2020	10/2/2021
25	Omega Thermometer	MDSi8	146873	7/1/2020	7/1/2021
26					
27					
28					
29					
30					

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	ESSF0604D473009W3018FW1	NA

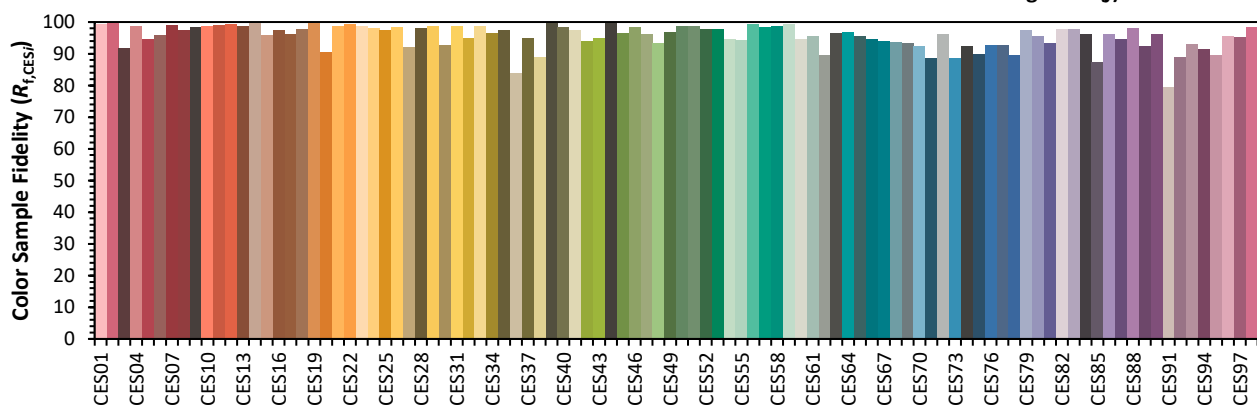
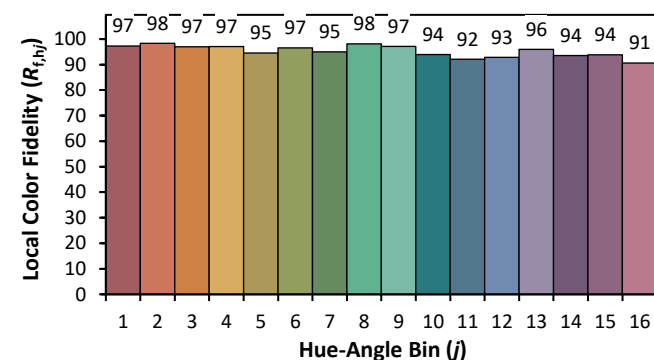
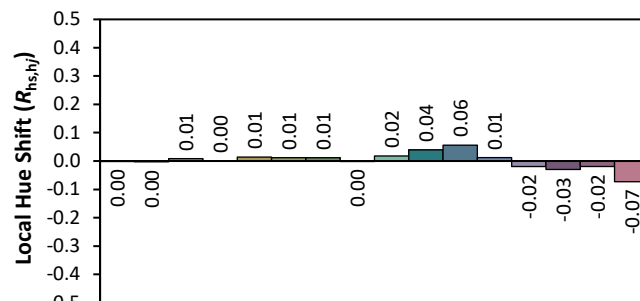
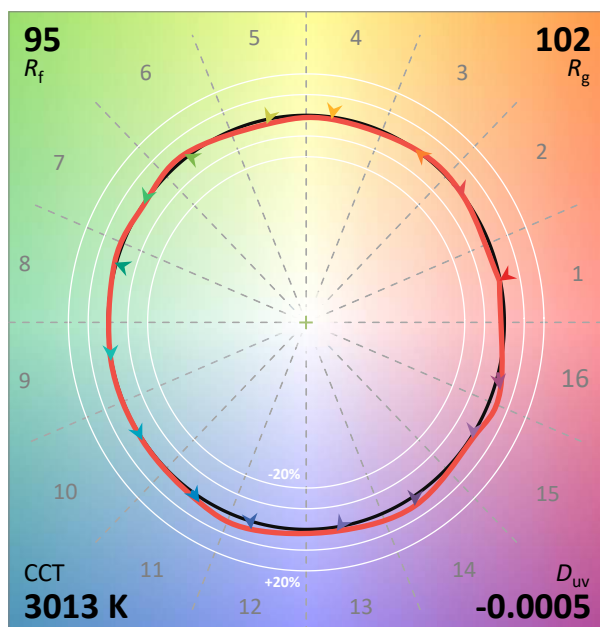
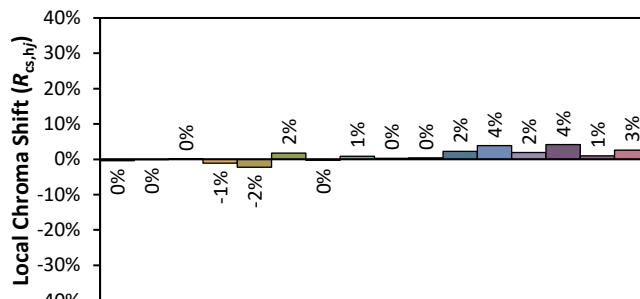
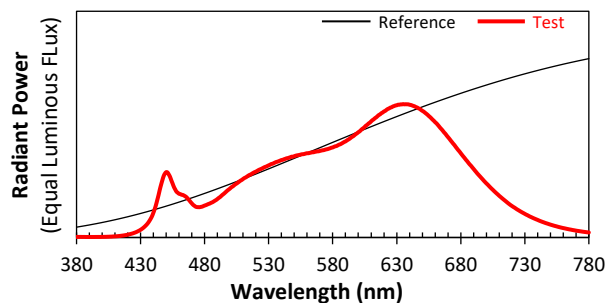
ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: VISUAL COMFORT AND COMPANY

Date: 4/12/2021

Model: ESSF0604D473009W3018FW1



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

x 0.4353

y 0.4024

u' 0.2503

v' 0.5205