

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

700TDFND*-LED930

PROJECT NUMBER

G104349704

REPORT NUMBER

104349704CHI-071

ISSUE DATE

4/9/2021

REVISED DATE

None

TEST DATES

04/06/2021 through 04/08/2021.

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104349704CHI-071

MODEL NUMBER(s)

700TDFND*-LED930

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:



Ian Smith
Engineer
Lighting Division

Reviewer:



Jeff Davis
NA Technical Lead
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SAMPLE INFORMATION

REPORT NO. 104349704CHI-071

ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	AH04052021070257	700TDFND*-LED930	FOUNDRY PENDANT	Production	4/5/2021

TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	700TDFND*-LED930	1

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

REPORT NO. 104349704CHI-071

PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700TDFND*-LED930
Product Description:	FOUNDRY PENDANT
LED Model No.:	CITIZEN CLU028-1203C4
Driver Model No.:	LTF DA12W30C2742-3001-01
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	221.3	225.8
Input Power (W) @ 120 (Vac)	12.94	12.89
Lumen Efficacy (lm/W)	17.1	17.5
Input Power Factor (I) @ 120 (Vac)	0.978	0.955

Criteria	Results
Input ATHD (%) @ 120 (Vac)	25.52
Correlated Color Temperature (K)	3050
Color Rendering Index - Ra (I)	94.1
Color Rendering Index - R9 (I)	63.3
Duv (I)	-0.0009
Chromaticity Coordinate (x)	0.432
Chromaticity Coordinate (y)	0.400
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.

TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

REPORT NO. 104349704CHI-071

Test Configuration	Tested Model No.	Pass/Fail/NA
1	700TDFND*-LED930	NA

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

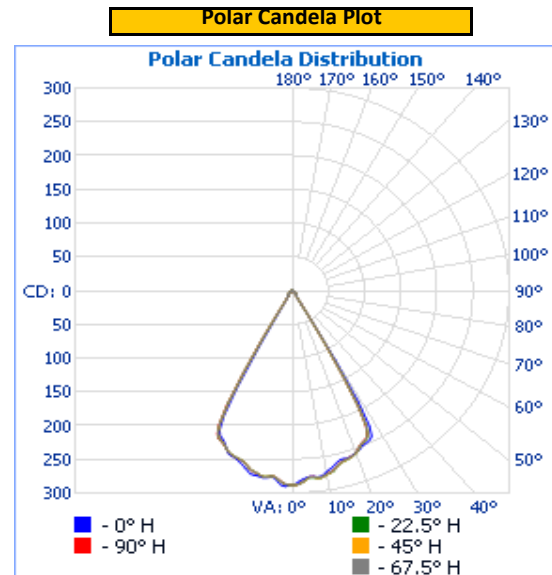
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	120.04	110.2	12.94	0.978

Light Output (lm)	Lumen Efficacy (lm/W)
221.3	17.1

INTENSITY SUMMARY - CANDELA

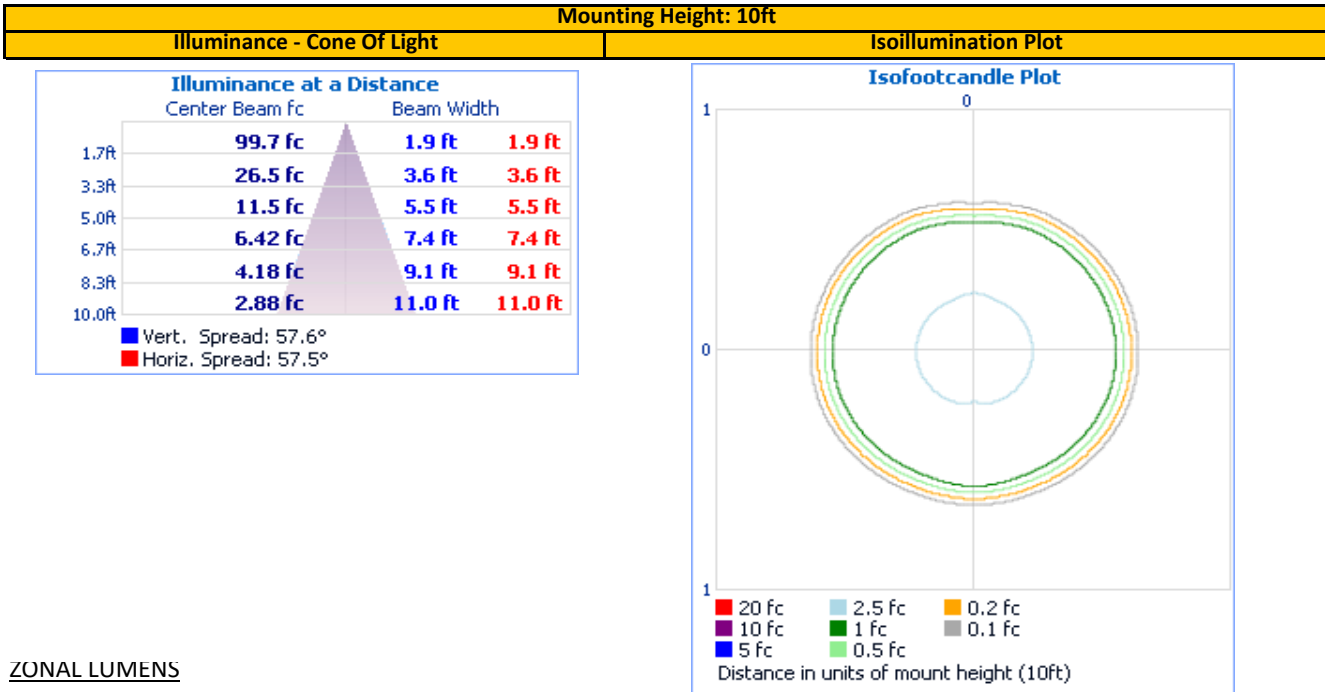
Angle	0	22.5	45	67.5	90
0	288	288	288	288	288
5	277	278	278	277	277
10	272	276	276	276	276
15	259	264	263	263	262
20	256	257	257	256	256
25	247	243	242	242	241
30	120	89	94	95	88
35	11	11	11	11	11
40	9	9	9	9	9
45	7	7	7	7	7
50	5	5	5	5	5
55	4	3	3	3	3
60	2	2	2	2	2
65	1	1	1	1	1
70	0	0	0	0	0
75	0	0	0	0	0
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0
95	0	0	0	0	0
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



REPORT NO. 104349704CHI-071

ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary								
Zone	Lumens	Luminaire	Zone	Lumens	Total	Zone	Lumens	Total
0-30	201.1	90.9%	0-10	26.6	12.0%	90-100	0.0	0.0%
0-40	212.1	95.8%	10-20	74.7	33.8%	100-110	0.0	0.0%
0-60	220.2	99.5%	20-30	99.8	45.1%	110-120	0.0	0.0%
60-90	1.1	0.5%	30-40	11.0	5.0%	120-130	0.0	0.0%
70-100	0.2	0.1%	40-50	5.2	2.4%	130-140	0.0	0.0%
90-120	0.0	0.0%	50-60	2.9	1.3%	140-150	0.0	0.0%
0-90	221.3	100.0%	60-70	0.8	0.4%	150-160	0.0	0.0%
90-180	0.0	0.0%	70-80	0.2	0.1%	160-170	0.0	0.0%
0-180	221.3	100.0%	80-90	0.0	0.0%	170-180	0.0	0.0%

INTEGRATING SPHERE TESTING

REPORT NO. 104349704CHI-071

Test Configuration	Tested Model No.	Pass/Fail/NA
1	700TDFND*-LED930	NA

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

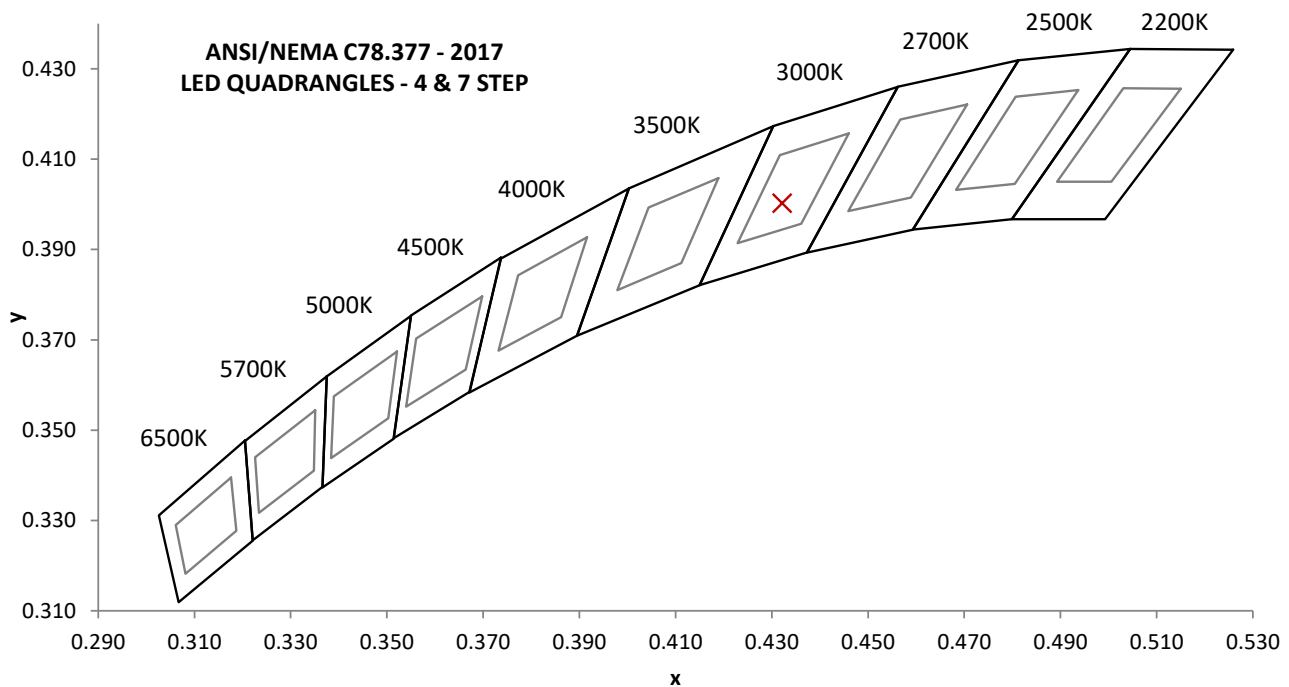
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()	Input ATHD (%)
119.96	112.5	12.89	0.955	25.52

Measured at 119.96(Vac)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra ()	CRI - R9 ()
225.8	17.5	3050	94.1	63.3

Duv ()	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
-0.0009	0.432	0.400	0.249	0.519

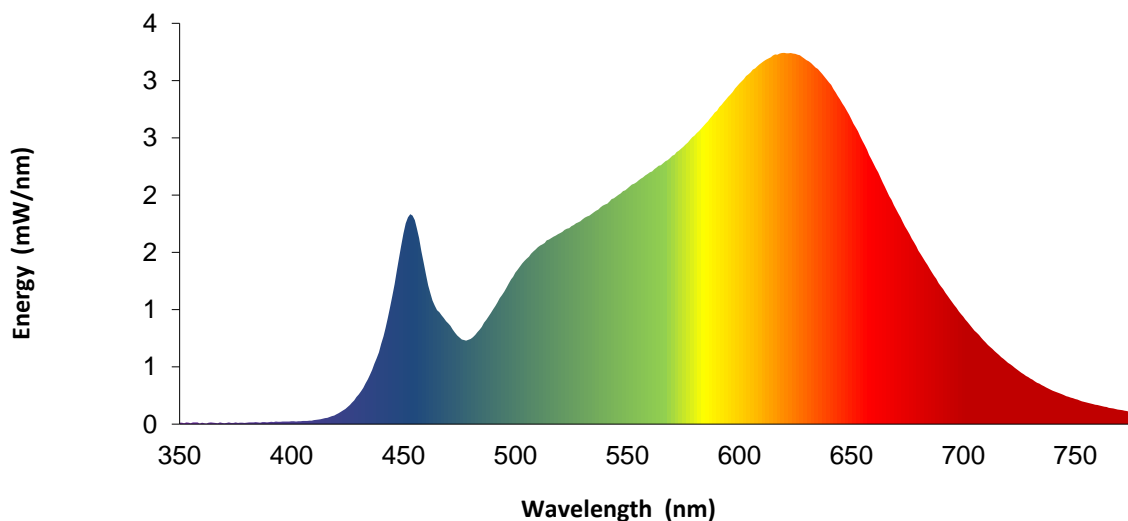


REPORT NO. 104349704CHI-071

SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.0		460	1.3		570	2.3		680	1.5
355	0.0		465	1.0		575	2.4		685	1.4
360	0.0		470	0.9		580	2.5		690	1.2
365	0.0		475	0.8		585	2.6		695	1.1
370	0.0		480	0.7		590	2.7		700	0.9
375	0.0		485	0.8		595	2.9		705	0.8
380	0.0		490	1.0		600	3.0		710	0.7
385	0.0		495	1.2		605	3.1		715	0.6
390	0.0		500	1.3		610	3.2		720	0.5
395	0.0		505	1.4		615	3.2		725	0.5
400	0.0		510	1.5		620	3.2		730	0.4
405	0.0		515	1.6		625	3.2		735	0.3
410	0.0		520	1.7		630	3.2		740	0.3
415	0.1		525	1.7		635	3.1		745	0.3
420	0.1		530	1.8		640	3.0		750	0.2
425	0.2		535	1.8		645	2.8		755	0.2
430	0.3		540	1.9		650	2.7		760	0.2
435	0.4		545	2.0		655	2.5		765	0.1
440	0.7		550	2.1		660	2.3		770	0.1
445	1.1		555	2.1		665	2.1		775	0.1
450	1.7		560	2.2		670	1.9		780	0.1
455	1.8		565	2.3		675	1.7		---	---

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

REPORT NO. 104349704CHI-071

#	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	VBUE	VBUE
4	Newport Thermohygrometer	iServer	146957	1/29/2021	1/29/2022
5	Pacific AC Power Supply	118-ACX	CHI0153	VBUE	VBUE
6	Newport Humidity Recorder	iServer	146961	9/3/2020	9/3/2021
7	Labsphere Spectroradiometer	CDS2600	CHI0539	VBUE	VBUE
8	3 Meter Sphere	SPR600	CHI0088	VBUE	VBUE
9	Elgar AC Power Supply	CW1251	146112	VBUE	VBUE
10	Sorenson DC Power Supply	XFR150-8	146846	VBUE	VBUE
11	Yokogawa Power Meter	WT1600	146770	10/1/2020	10/1/2021
12	Extech K Temperature Meter	421502	CHI0476	10/1/2020	10/1/2021

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	700TDFND*-LED930	NA

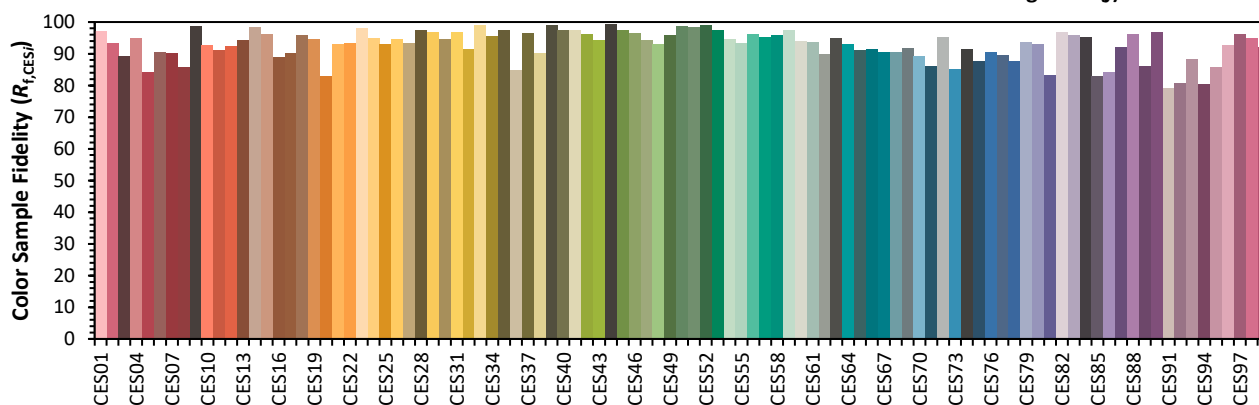
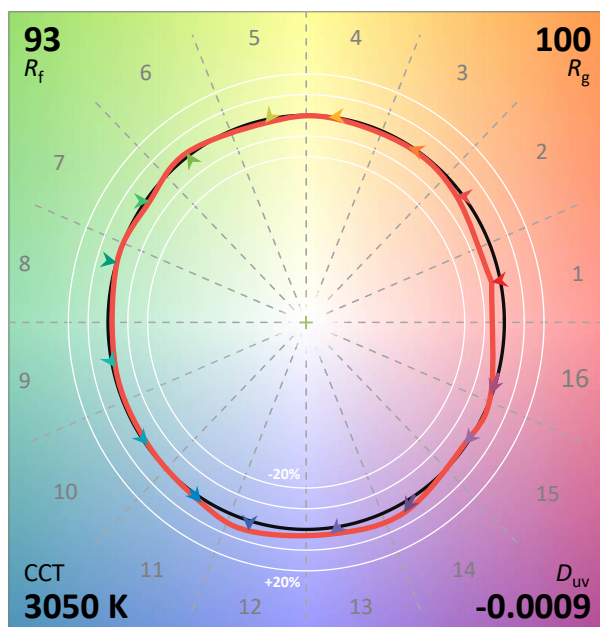
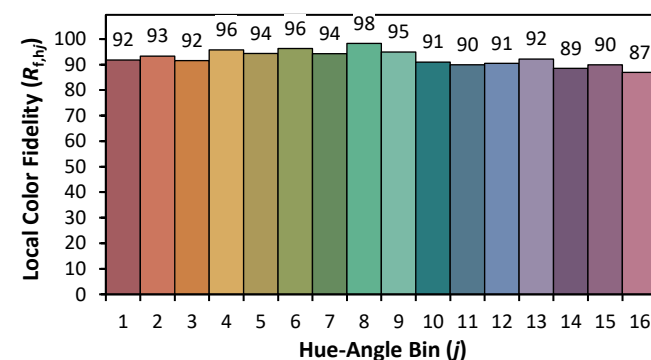
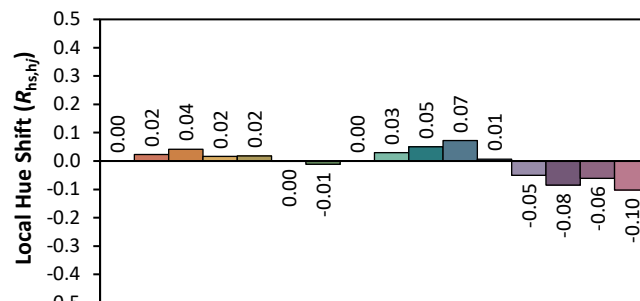
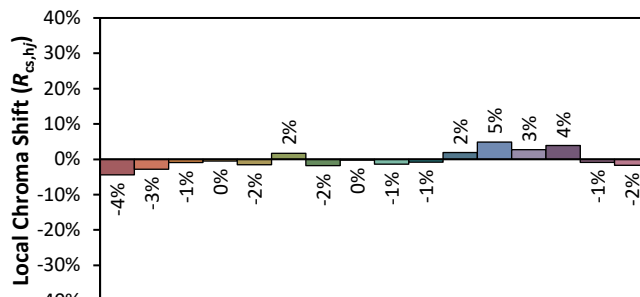
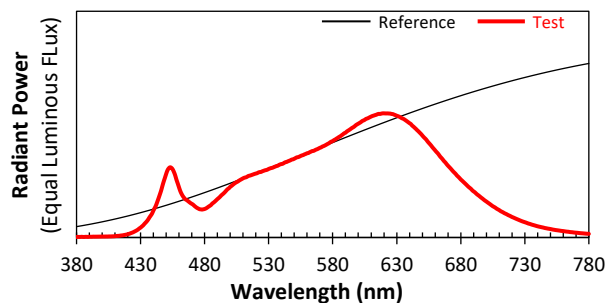
ANSI/IES TM-30-18 Color Rendition Report

Source: User SPD

Manufacturer: VISUAL COMFORT AND COMPANY

Date: 4/8/2021

Model: 700TDFND*-LED930



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

 x 0.4322 y 0.4002 u' 0.2492 v' 0.5191