

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

700TDKNW18NB-LED930

PROJECT NUMBER

G104941221

REPORT NUMBER

104941221CRT-005

ISSUE DATE

7/14/2022

REVISED DATE

None

TEST DATES

7/11/2022 through 7/14/2022

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104941221CRT-005

MODEL NUMBER(s)

700TDKNW18NB-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

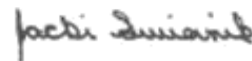
ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

In Charge of Testing:

Reviewer:



Melanie Brittain
Senior Associate Engineer
Lighting Division



Jacki Swiernik
Staff Engineer
Lighting Division

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SAMPLE INFORMATION

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ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	CRT2206301053-005	700TDKNW18NB-LED930	Kenway 18 Pendant	Production	6/30/2022

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700TDKNW18NB-LED930
Product Description:	Kenway 18 Pendant
LED Model No.:	Dilux WW-FLS102T23WW240B-24-UR-3S
Driver Model No.:	MACRON GBLD001
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	901.4	891.9
Input Power (W) @ 120 (Vac)	28.67	28.53
Luminous Efficacy (lm/W)	31.44	31.26
Input Power Factor (I) @ 120 (Vac)	0.963	0.961

Criteria	Results
Input ATHD (%) @ 120 (Vac)	12.64
Correlated Color Temperature (K)	2775
Color Rendering Index - Ra (I)	93.7
Color Rendering Index - R9 (I)	72.0
Duv (I)	-0.0014
Chromaticity Coordinate (x)	0.452
Chromaticity Coordinate (y)	0.405
Chromaticity Coordinate (u')	0.260
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

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PHOTOMETRIC AND ELECTRICAL MEASUREMENTS

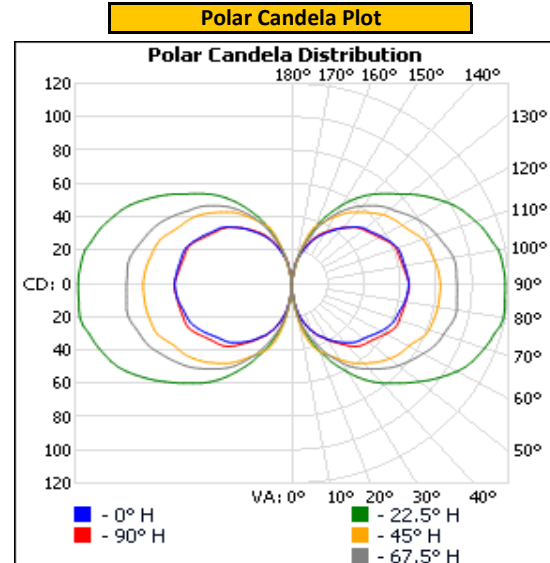
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	120.28	247.6	28.67	0.963

Light Output (lm)	Efficacy (lm/W)
901.4	31.4

LUMINOUS INTENSITY SUMMARY (candela)

Angle (°)	0	22.5	45	67.5	90
0	0	1	1	1	1
5	5	8	9	9	8
10	10	17	22	24	20
15	15	23	32	36	29
20	20	30	42	43	38
25	25	34	52	48	47
30	30	38	61	52	55
35	35	42	71	58	62
40	40	46	78	63	67
45	45	50	85	67	72
50	50	52	92	70	77
55	55	54	99	73	81
60	60	57	106	75	84
65	65	60	110	78	88
70	70	61	114	81	90
75	75	62	116	82	92
80	80	64	119	82	93
85	85	64	118	82	92
90	90	65	118	82	92
95	95	64	118	82	92
100	100	63	116	80	91
105	105	63	112	79	88
110	110	62	109	77	85
115	115	60	104	74	83
120	120	57	98	70	79
125	125	54	91	68	74
130	130	52	84	65	70
135	135	48	76	60	66
140	140	43	70	56	61
145	145	39	62	51	55
150	150	34	54	46	48
155	155	29	44	40	40
160	160	23	33	36	30
165	165	17	22	23	21
170	170	12	9	8	11
175	175	0	2	2	2
180	180	0	0	0	0

Entire luminous intensity matrix found in .IES file



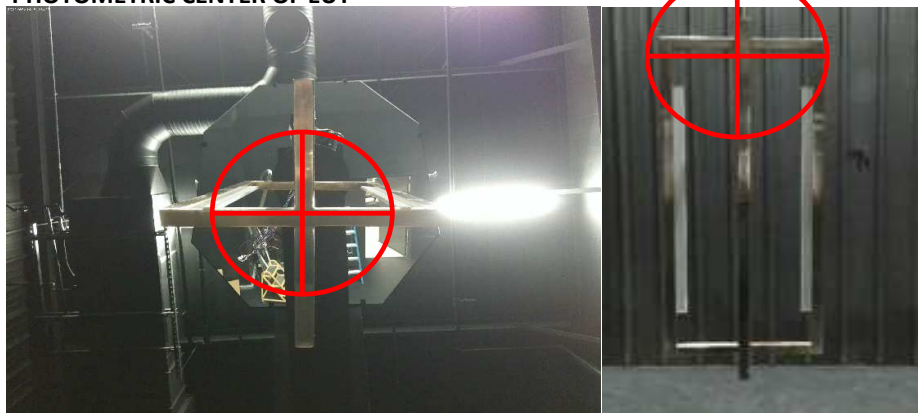
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ORIENTATION AND ALIGNMENT OF EUT

Luminous Opening		
Length (ft)	Width (ft)	Height (ft)
0.60	0.60	1.42
0°-180° H	90°-270° H	0°-180° V

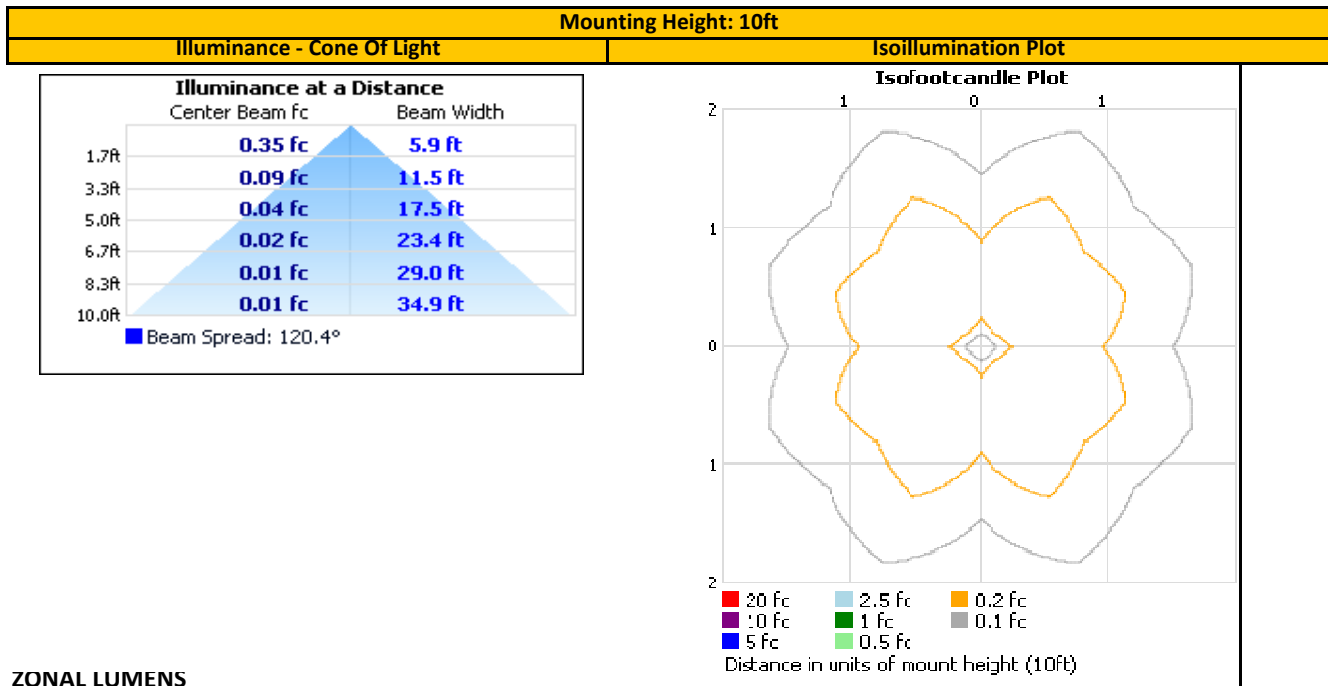
Test Distance (ft)
29.6

PHOTOMETRIC CENTER OF EUT



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ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary																																																																																																			
<table><tr><th>Zone</th><th>Lumens</th><th>Luminaire</th></tr><tr><td>0-30</td><td>31.0</td><td>3.4%</td></tr><tr><td>0-40</td><td>67.7</td><td>7.5%</td></tr><tr><td>0-60</td><td>190.2</td><td>21.1%</td></tr><tr><td>60-90</td><td>274.4</td><td>30.4%</td></tr><tr><td>70-100</td><td>287.4</td><td>31.9%</td></tr><tr><td>90-120</td><td>266.4</td><td>29.6%</td></tr><tr><td>0-90</td><td>464.7</td><td>51.6%</td></tr><tr><td>90-180</td><td>436.7</td><td>48.4%</td></tr><tr><td>0-180</td><td>901.4</td><td>100.0%</td></tr></table>			Zone	Lumens	Luminaire	0-30	31.0	3.4%	0-40	67.7	7.5%	0-60	190.2	21.1%	60-90	274.4	30.4%	70-100	287.4	31.9%	90-120	266.4	29.6%	0-90	464.7	51.6%	90-180	436.7	48.4%	0-180	901.4	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>1.2</td><td>0.1%</td><td>90-100</td><td>96.7</td><td>10.7%</td></tr><tr><td>10-20</td><td>8.8</td><td>1.0%</td><td>100-110</td><td>90.5</td><td>10.0%</td></tr><tr><td>20-30</td><td>21.0</td><td>2.3%</td><td>110-120</td><td>79.3</td><td>8.8%</td></tr><tr><td>30-40</td><td>36.7</td><td>4.1%</td><td>120-130</td><td>64.4</td><td>7.1%</td></tr><tr><td>40-50</td><td>53.3</td><td>5.9%</td><td>130-140</td><td>48.6</td><td>5.4%</td></tr><tr><td>50-60</td><td>69.2</td><td>7.7%</td><td>140-150</td><td>32.7</td><td>3.6%</td></tr><tr><td>60-70</td><td>83.7</td><td>9.3%</td><td>150-160</td><td>18.0</td><td>2.0%</td></tr><tr><td>70-80</td><td>93.3</td><td>10.3%</td><td>160-170</td><td>6.3</td><td>0.7%</td></tr><tr><td>80-90</td><td>97.5</td><td>10.8%</td><td>170-180</td><td>0.4</td><td>0.0%</td></tr></table>							Zone	Lumens	Total	Zone	Lumens	Total	0-10	1.2	0.1%	90-100	96.7	10.7%	10-20	8.8	1.0%	100-110	90.5	10.0%	20-30	21.0	2.3%	110-120	79.3	8.8%	30-40	36.7	4.1%	120-130	64.4	7.1%	40-50	53.3	5.9%	130-140	48.6	5.4%	50-60	69.2	7.7%	140-150	32.7	3.6%	60-70	83.7	9.3%	150-160	18.0	2.0%	70-80	93.3	10.3%	160-170	6.3	0.7%	80-90	97.5	10.8%	170-180	0.4	0.0%
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INTEGRATING SPHERE TESTING

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PHOTOMETRIC, RADIOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS

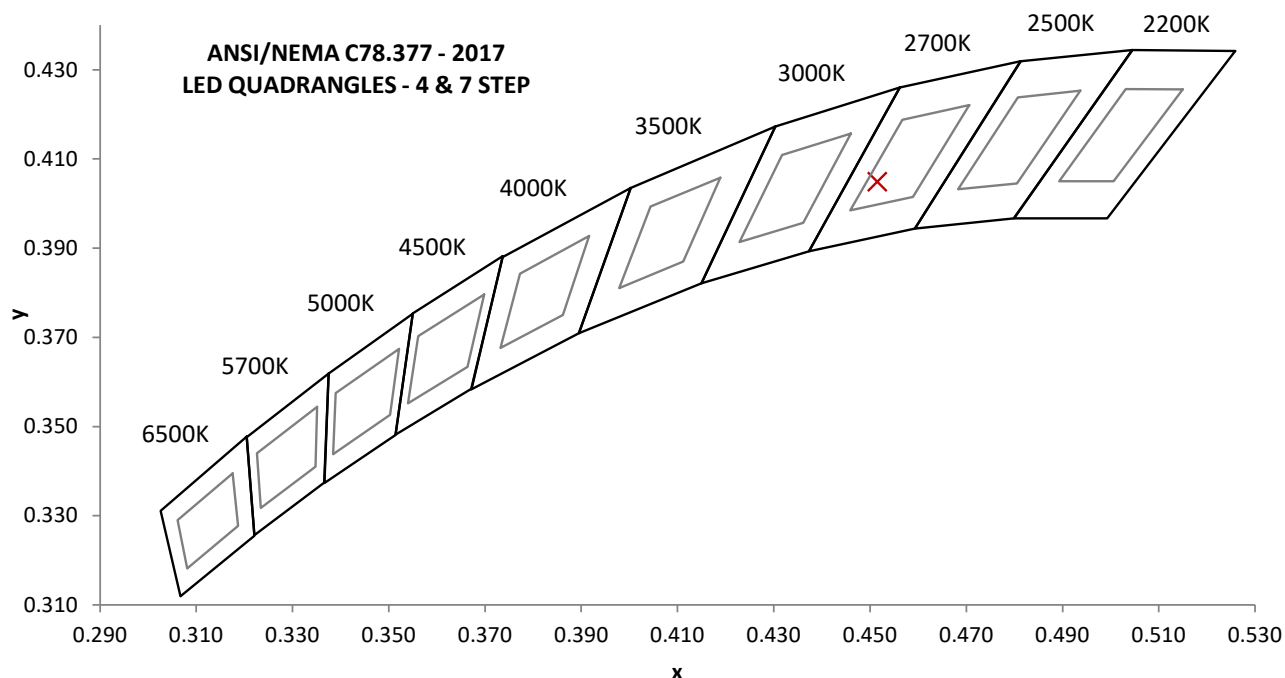
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.08	247.1	28.53	0.961	12.64

Measured at 120.08(Vac)

Light Output (lm)	Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
891.9	31.3	2775	93.7	72.0

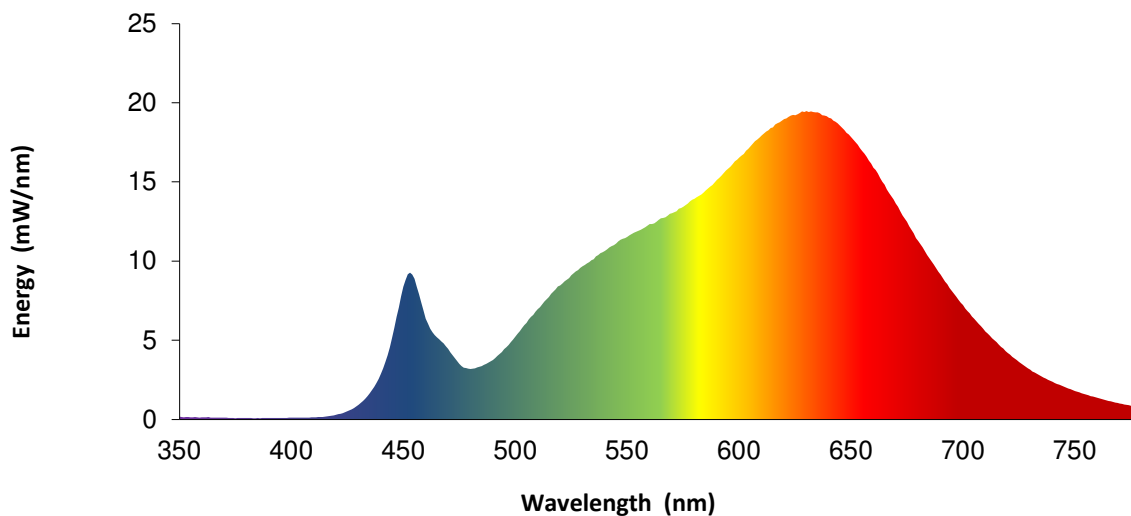
Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
-0.0014	0.452	0.405	0.260	0.524



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SPECTRAL POWER DISTRIBUTION

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.2		460	6.4		570	13.0		680	11.3
355	0.1		465	5.2		575	13.4		685	10.2
360	0.1		470	4.5		580	13.9		690	9.1
365	0.1		475	3.5		585	14.5		695	8.1
370	0.1		480	3.2		590	15.1		700	7.2
375	0.1		485	3.4		595	15.8		705	6.4
380	0.1		490	3.8		600	16.5		710	5.5
385	0.1		495	4.4		605	17.2		715	4.9
390	0.1		500	5.2		610	17.9		720	4.2
395	0.1		505	6.1		615	18.4		725	3.6
400	0.1		510	7.0		620	19.0		730	3.1
405	0.1		515	7.7		625	19.2		735	2.7
410	0.1		520	8.5		630	19.5		740	2.4
415	0.2		525	9.1		635	19.4		745	2.1
420	0.3		530	9.7		640	19.0		750	1.8
425	0.5		535	10.1		645	18.6		755	1.6
430	0.9		540	10.6		650	17.8		760	1.4
435	1.7		545	11.1		655	16.9		765	1.2
440	2.9		550	11.5		660	15.9		770	1.0
445	5.2		555	11.9		665	14.8		775	0.9
450	8.4		560	12.3		670	13.6		780	0.7
455	8.9		565	12.7		675	12.5		---	---



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-005

#	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	Fluke Multimeter	87V	M145	3/25/2022	3/25/2023
7	Current Monitor	411	A197	8/26/2021	8/26/2024
8	3M Integrating Sphere Spectrometer System	CDS 2600	L231	7/1/2022	10/1/2022
9	Fisher Scientific Stopwatch	14-649-9	N1132	3/24/2022	3/24/2023
10	LSI High Speed Mirror Goniophotometer	6440	---	6/30/2022	9/30/2022
11	Elgar AC Power Supply	CW1251	---	VBU	VBU
12	Yokogawa Power Analyzer	WT210	307-E464	6/21/2022	6/21/2023
13	Traceable Hygrothermometer	4800	L204	2/21/2022	2/21/2023
14	Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
15	Omega Thermometer	DPi8-C24	M263	3/1/2022	3/1/2023
16	Bosch Distance Laser	Pro GLM 20	L210	3/21/2022	3/15/2023
17	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

