

# VISUAL COMFORT & COMPANY TEST REPORT

## SCOPE OF WORK

LED Performance Testing

## MODEL NUMBER

700TDKAI1\*\*-LED930

## PROJECT NUMBER

G104349704

## REPORT NUMBER

104349704CHI-006

## ISSUE DATE

8/24/2020

## REVISED DATE

None

## TEST DATES

08/11/2020.

## DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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**REPORT NUMBER**

104349704CHI-006

**MODEL NUMBER(s)**

700TDKAI1\*\*-LED930

**REPORT RENDERED TO:**

VISUAL COMFORT & COMPANY  
7400 LINDER AVE  
SKOKIE, IL 60077

**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-01080748-1.

**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

In Charge of Testing:



Ian Smith  
Engineer  
Lighting Division

Reviewer:



Jeff Davis  
NA Technical Lead  
Lighting Division

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## SAMPLE INFORMATION

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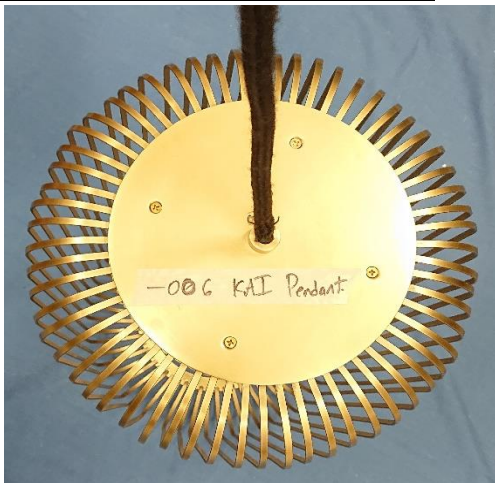
### ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	AH08062020034718	700TDKAI1**-LED930	KAI 1 PENDANT	Production	8/6/2020

### TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	700TDKAI1**-LED930	1

### SAMPLE PHOTOS - TESTED CONFIGURATIONS



## SUMMARY

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### PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700TDKAI1**-LED930
Product Description:	KAI 1 PENDANT
LED Model No.:	CITIZEN CLU028-1203C4-303H5M3-F1
Driver Model No.:	LTF DA12W300C2742-3001-01
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	636.9	637.5
Input Power (W) @ 120VAC (Vac)	12.54	12.50
Lumen Efficacy (lm/W)	50.8	51.0
Input Power Factor (I) @ 120VAC (Vac)	0.988	0.986

Criteria	Results
Input ATHD (%) @ 120VAC (Vac)	11.67
Correlated Color Temperature (K)	3035
Color Rendering Index - Ra (I)	90.5
Color Rendering Index - R9 (I)	48.0
Duv (I)	0.0000
Chromaticity Coordinate (x)	0.434
Chromaticity Coordinate (y)	0.403
Chromaticity Coordinate (u')	0.249
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	700TDKA1**-LED930	NA

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

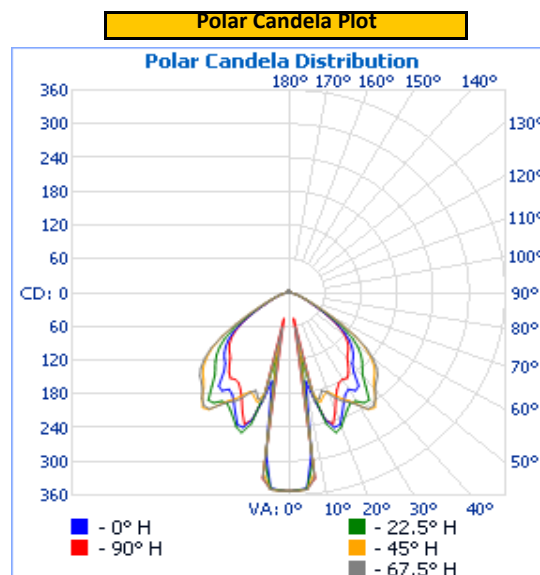
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ( )
Up	120.0	105.8	12.54	0.988

Light Output (lm)	Lumen Efficacy (lm/W)
636.9	50.8

**INTENSITY SUMMARY - CANDELA**

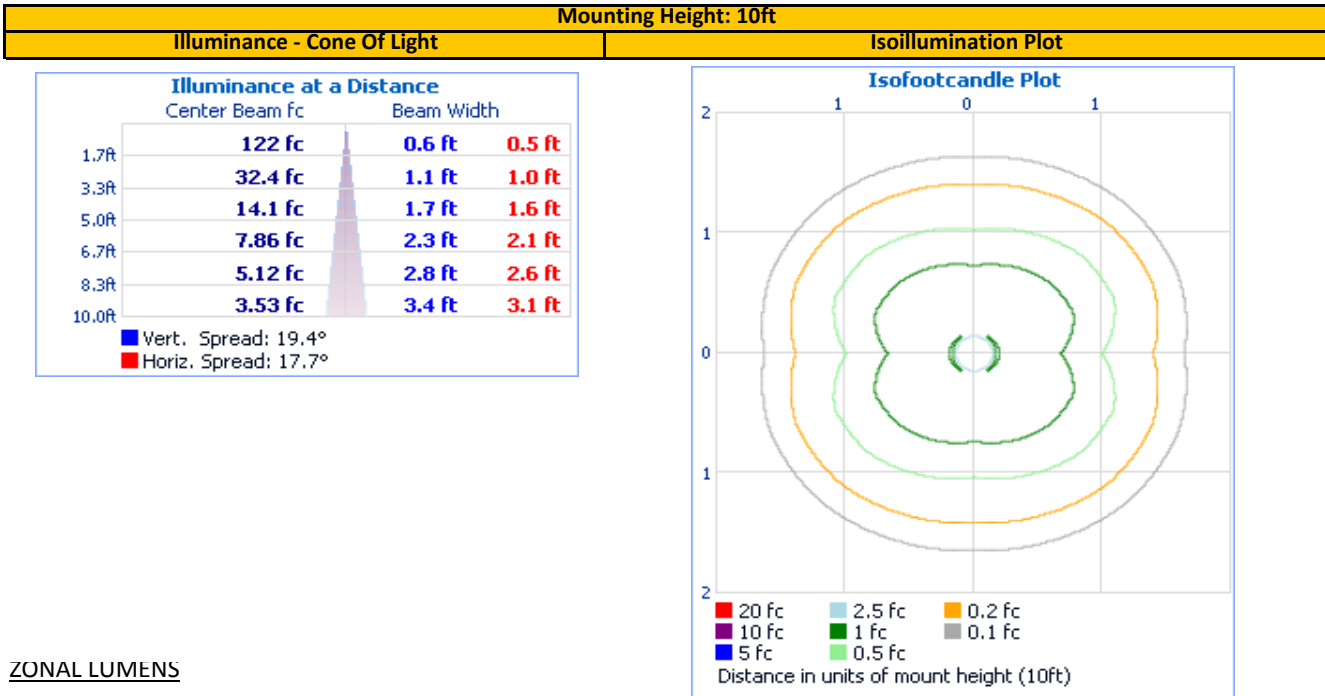
Angle	0	22.5	45	67.5	90
0	353	353	353	353	353
5	349	350	351	352	350
10	160	116	93	63	47
15	233	242	202	195	234
20	250	254	187	189	225
25	216	230	208	213	190
30	198	222	230	231	178
35	203	233	249	246	173
40	164	191	220	223	151
45	151	172	202	209	140
50	131	150	178	183	124
55	99	113	134	136	96
60	60	67	76	76	60
65	35	38	40	40	35
70	21	23	23	23	22
75	13	14	14	14	14
80	8	8	8	8	8
85	4	4	4	4	4
90	2	2	2	2	2
95	1	1	1	1	1
100	1	1	1	1	1
105	1	1	1	1	1
110	1	1	1	1	1
115	1	1	1	1	1
120	1	1	1	1	1
125	2	2	1	2	2
130	2	2	2	2	2
135	2	2	2	2	2
140	2	2	2	2	2
145	2	2	2	2	2
150	3	3	3	3	3
155	3	3	3	3	3
160	3	3	3	3	3
165	4	4	4	4	4
170	5	5	4	5	5
175	1	1	1	1	1
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	182.9	28.7%	90-100	1.5	0.2%
0-40	320.7	50.4%	100-110	1.3	0.2%
0-60	565.0	88.7%	110-120	1.3	0.2%
60-90	60.8	9.5%	120-130	1.3	0.2%
70-100	21.7	3.4%	130-140	1.4	0.2%
90-120	4.1	0.6%	140-150	1.5	0.2%
0-90	625.8	98.3%	150-160	1.4	0.2%
90-180	11.1	1.7%	160-170	1.1	0.2%
0-180	636.9	100.0%	170-180	0.3	0.0%

**INTEGRATING SPHERE TESTING**

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

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

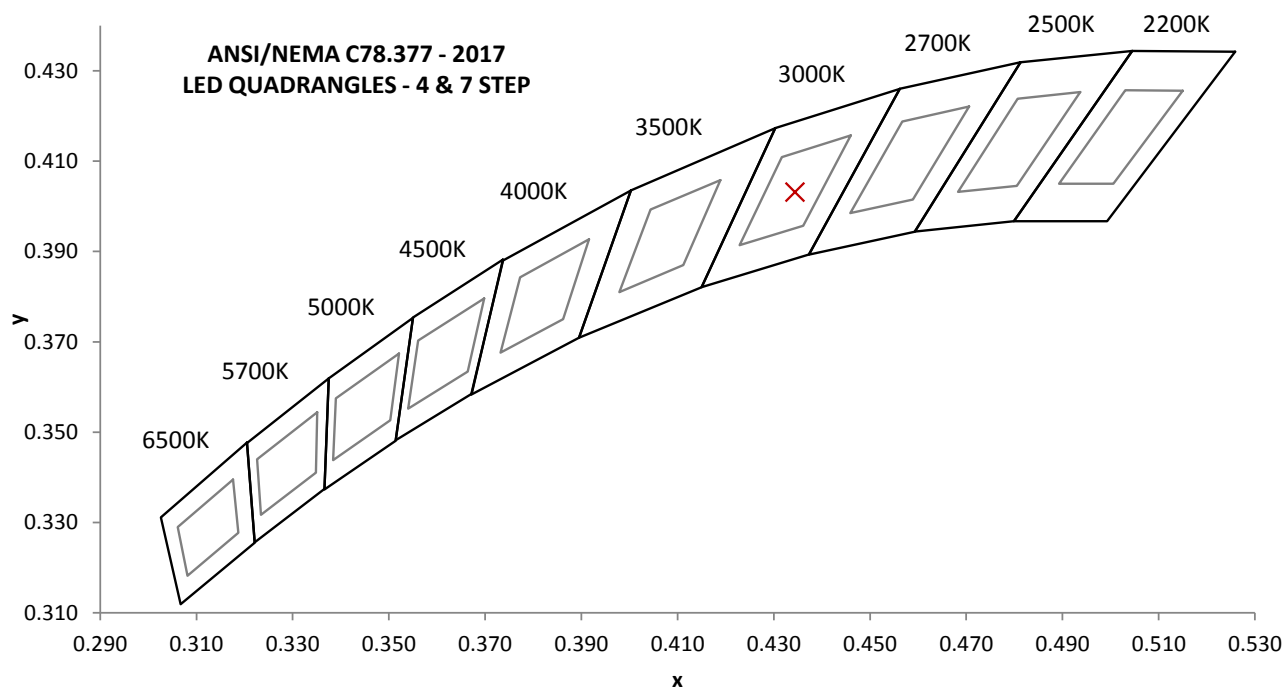
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ( )	Input ATHD (%)
120.01	105.6	12.50	0.986	11.67

Measured at 120.01(Vac)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra ( )	CRI - R9 ( )
637.5	51.0	3035	90.5	48.0

Duv ( )	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
0.0000	0.434	0.403	0.249	0.521

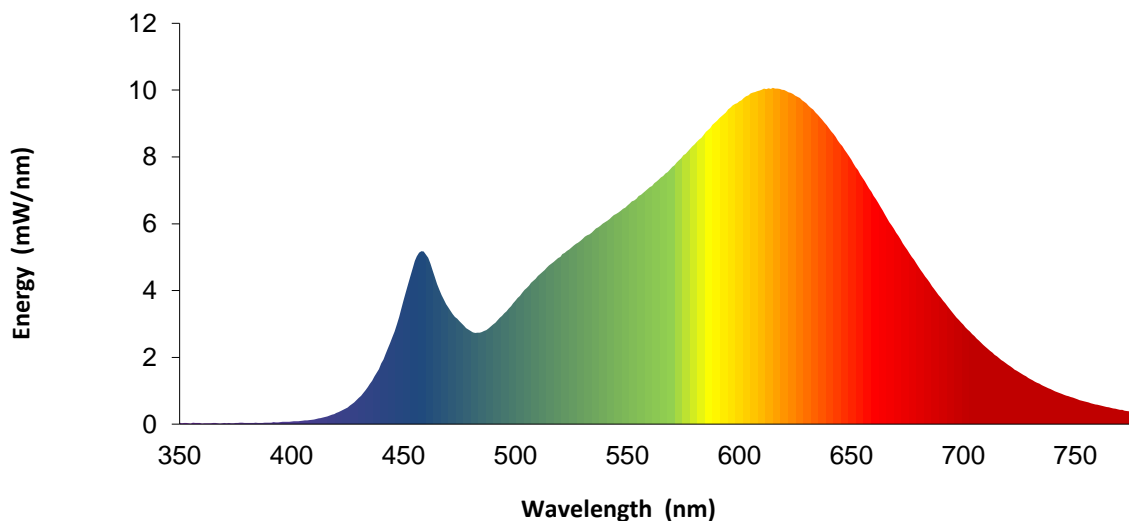


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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.0		460	5.1		570	7.7		680	4.7
355	0.0		465	4.2		575	8.0		685	4.2
360	0.0		470	3.5		580	8.4		690	3.8
365	0.0		475	3.1		585	8.7		695	3.4
370	0.0		480	2.8		590	9.1		700	3.0
375	0.0		485	2.8		595	9.4		705	2.6
380	0.0		490	3.0		600	9.7		710	2.3
385	0.0		495	3.3		605	9.9		715	2.0
390	0.0		500	3.7		610	10.0		720	1.8
395	0.1		505	4.1		615	10.1		725	1.6
400	0.1		510	4.4		620	10.0		730	1.3
405	0.1		515	4.7		625	9.8		735	1.2
410	0.1		520	5.0		630	9.6		740	1.0
415	0.2		525	5.3		635	9.3		745	0.9
420	0.3		530	5.5		640	8.9		750	0.8
425	0.5		535	5.8		645	8.4		755	0.7
430	0.8		540	6.0		650	7.9		760	0.6
435	1.2		545	6.3		655	7.4		765	0.5
440	1.8		550	6.5		660	6.8		770	0.4
445	2.6		555	6.8		665	6.3		775	0.4
450	3.7		560	7.1		670	5.7		780	0.3
455	4.9		565	7.4		675	5.2		---	---

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	10/3/2019	10/3/2020
3	LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU
4	Newport Thermohygrometer	iServer	146957	12/2/2019	12/2/2020
5	Pacific AC Power Supply	118-ACX	CHI0153	VBU	VBU
6	Newport Humidity Recorder	iServer	CHI0456	10/11/2019	10/11/2020
7	Labsphere Spectroradiometer	CDS2600	CHI0539	VBU	VBU
8	3 Meter Sphere	SPR600	CHI0088	VBU	VBU
9	Elgar AC Power Supply	CW1251	146112	VBU	VBU
10	Sorenson DC Power Supply	XFR150-8	146846	VBU	VBU
11	Yokogawa Power Meter	WT1600	146769	4/6/2020	4/6/2021
12	Extech K Temperature Meter	421502	CHI0476	10/1/2019	10/1/2020
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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
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