

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

700MPTBRCS-LED

PROJECT NUMBER

G104941221

REPORT NUMBER

104941221CRT-031

ISSUE DATE

8/9/2022

REVISED DATE

None

TEST DATES

8/3/2022 through 8/8/2022

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

© 2017 INTERTEK



REPORT NUMBER

104941221CRT-031

MODEL NUMBER(s)

700MPTBRCS-LED

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.

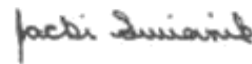
TEST STANDARDS

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

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

SAMPLE INFORMATION

REPORT NO. 104941221CRT-031

ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	CRT2206301053-031	700MPTBRCS-LED	Tibor Pendant	Production	6/30/2022

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

REPORT NO. 104941221CRT-031

PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700MPTBRCS-LED
Product Description:	Tibor Pendant
LED Model No.:	Citizen CLU028
Driver Model No.:	L.T.F. TA60WA12LED65B15-0000
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	417.1	420.6
Input Power (W) @ 120 (Vac)	6.09	6.08
Luminous Efficacy (lm/W)	68.5	69.2
Input Power Factor (I) @ 120 (Vac)	0.892	0.886

Criteria	Results
Input ATHD (%) @ 120 (Vac)	30.0
Correlated Color Temperature (K)	3042
Color Rendering Index - Ra (I)	81.8
Color Rendering Index - R9 (I)	5.4
Duv (I)	0.003
Chromaticity Coordinate (x)	0.438
Chromaticity Coordinate (y)	0.411
Chromaticity Coordinate (u')	0.248
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

REPORT NO. 104941221CRT-031

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS

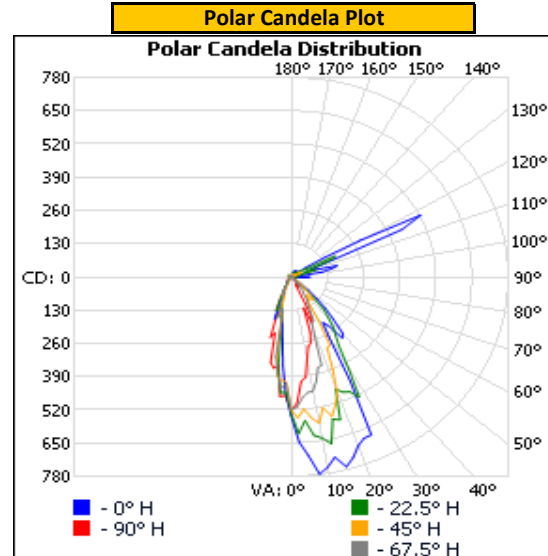
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	120.05	56.9	6.09	0.892

Light Output (lm)	Efficacy (lm/W)
417.1	68.5

LUMINOUS INTENSITY SUMMARY (candela)

Angle (°)	0	22.5	45	67.5	90
0	544	534	521	521	525
5	700	563	517	472	409
10	756	639	581	452	326
15	768	575	565	368	268
20	703	467	483	244	129
25	681	495	305	189	171
30	270	409	196	118	32
35	232	277	112	75	30
40	289	208	119	45	42
45	174	107	94	48	15
50	81	32	50	22	10
55	18	3	29	11	5
60	2	2	4	5	3
65	3	2	0	4	1
70	3	1	0	2	0
75	7	2	0	0	1
80	8	7	1	0	1
85	14	10	1	0	0
90	68	13	2	0	0
95	20	19	3	0	0
100	114	30	6	0	0
105	170	33	9	2	1
110	82	49	13	2	1
115	439	161	34	2	2
120	287	66	41	4	3
125	66	37	14	6	3
130	29	28	13	6	3
135	24	29	12	5	4
140	25	23	10	5	3
145	28	18	11	6	4
150	27	13	10	6	4
155	21	15	9	6	4
160	13	12	7	5	4
165	10	9	6	4	4
170	6	5	4	3	2
175	3	3	2	2	1
180	0	0	0	0	0

Entire luminous intensity matrix found in .IES file



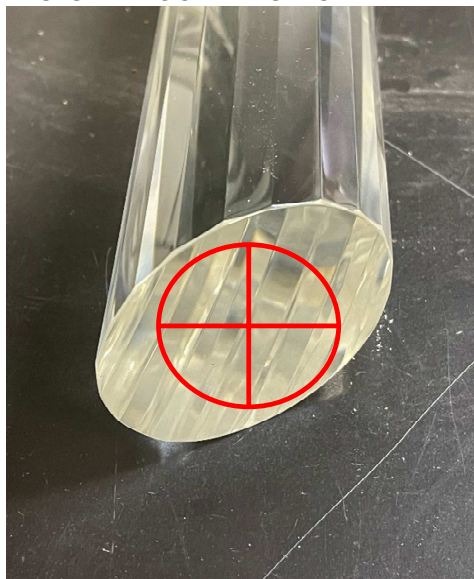
REPORT NO. 104941221CRT-031

ORIENTATION AND ALIGNMENT OF EUT

Luminous Opening		
Length (ft)	Width (ft)	Height (ft)
0.19	0.19	1.00
0°-180° H	90°-270° H	0°-180° V

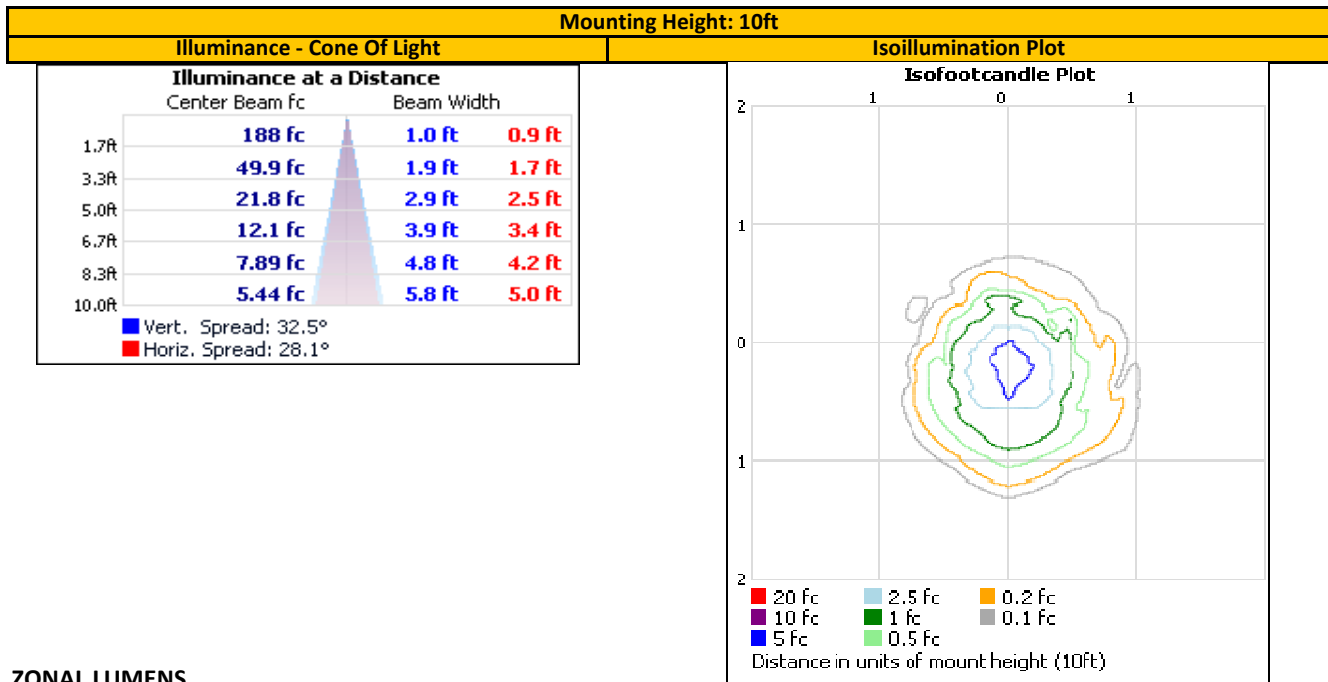
Test Distance (ft)
29.6

PHOTOMETRIC CENTER OF EUT



REPORT NO. 104941221CRT-031

ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary					
Zone	Lumens	Luminaire	Zone	Lumens	Total
0-30	223.3	53.5%	90-100	6.1	1.5%
0-40	278.1	66.7%	100-110	17.7	4.2%
0-60	316.2	75.8%	110-120	38.9	9.3%
60-90	5.7	1.4%	120-130	15.4	3.7%
70-100	10.6	2.5%	130-140	7.5	1.8%
90-120	62.6	15.0%	140-150	5.1	1.2%
0-90	321.9	77.2%	150-160	3.2	0.8%
90-180	95.1	22.8%	160-170	1.2	0.3%
0-180	417.1	100.0%	170-180	0.2	0.0%

INTEGRATING SPHERE TESTING

REPORT NO. 104941221CRT-031

PHOTOMETRIC, RADIOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS

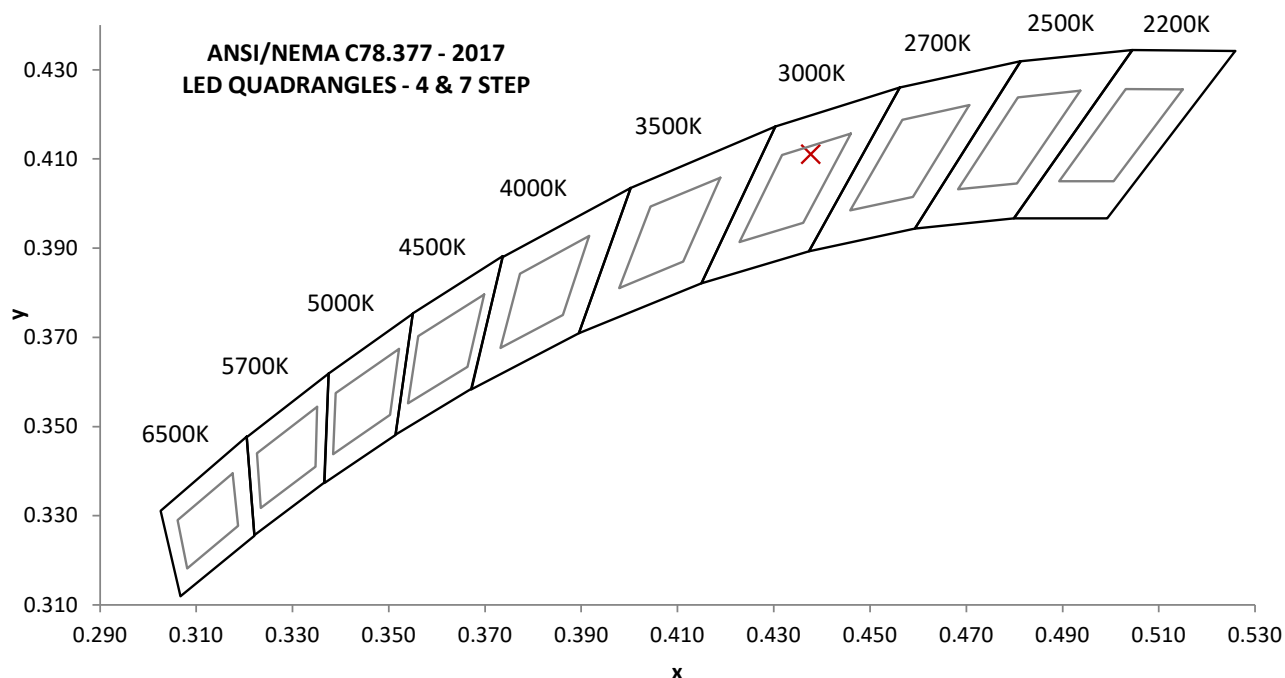
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.04	57.2	6.08	0.886	30.0

Measured at 120.04(Vac)

Light Output (lm)	Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
420.6	69.2	3042	81.8	5.4

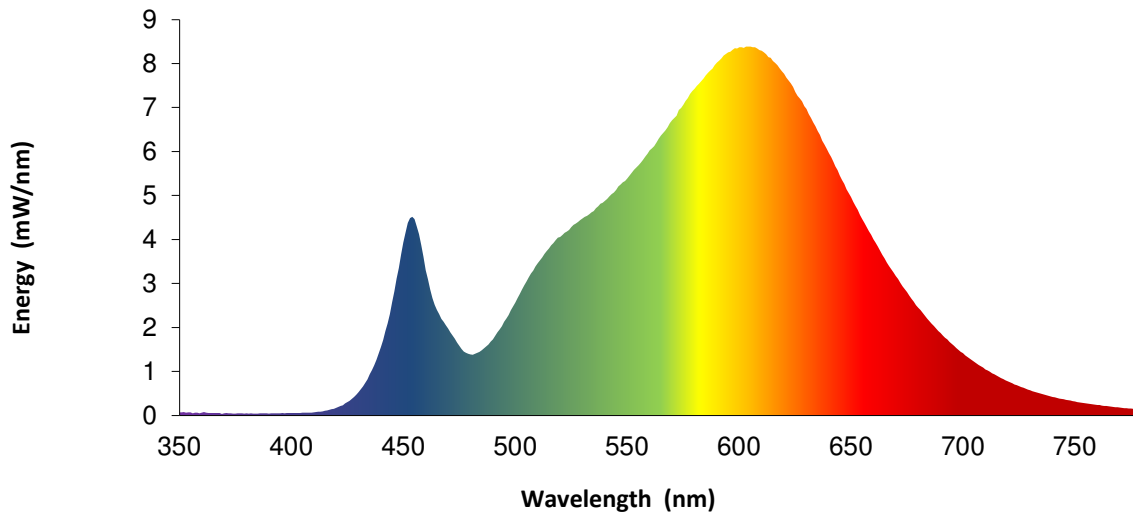
Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
0.0026	0.438	0.411	0.248	0.524



REPORT NO. 104941221CRT-031

SPECTRAL POWER DISTRIBUTION

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.1		460	3.3		570	6.7		680	2.5
355	0.1		465	2.4		575	7.1		685	2.1
360	0.1		470	2.0		580	7.4		690	1.9
365	0.1		475	1.6		585	7.7		695	1.6
370	0.1		480	1.4		590	8.0		700	1.4
375	0.0		485	1.5		595	8.3		705	1.2
380	0.0		490	1.7		600	8.4		710	1.0
385	0.0		495	2.1		605	8.4		715	0.9
390	0.0		500	2.6		610	8.3		720	0.8
395	0.0		505	3.0		615	8.1		725	0.7
400	0.1		510	3.5		620	7.8		730	0.6
405	0.1		515	3.8		625	7.3		735	0.5
410	0.1		520	4.1		630	7.0		740	0.4
415	0.1		525	4.3		635	6.5		745	0.4
420	0.2		530	4.5		640	6.0		750	0.3
425	0.3		535	4.6		645	5.5		755	0.3
430	0.5		540	4.9		650	5.0		760	0.2
435	0.9		545	5.1		655	4.5		765	0.2
440	1.6		550	5.4		660	4.0		770	0.2
445	2.6		555	5.7		665	3.6		775	0.2
450	3.9		560	6.0		670	3.2		780	0.1
455	4.5		565	6.4		675	2.8		---	---



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-031

#	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	Current Monitor	411	A197	8/26/2021	8/26/2024
7	3M Integrating Sphere Spectrometer System	CDS 2600	L231	7/1/2022	10/1/2022
8	LSI High Speed Mirror Goniophotometer	6440	---	7/5/2022	9/30/2022
9	Elgar AC Power Supply	CW1251	---	VBU	VBU
10	Yokogawa Power Analyzer	WT210	307-E464	6/21/2022	6/21/2023
11	Traceable Hygrothermometer	4800	L204	2/21/2022	2/21/2023
12	Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
13	Omega Thermometer	DPi8-C24	M263	3/1/2022	3/1/2023
14	Multi Channel Spectroradiometer	OL 770	O230	6/1/2022	9/1/2022
15	Bosch Distance Laser	Pro GLM 20	L210	3/21/2022	3/15/2023
16	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	---	---	---
---	---	---	---	---
---	---	---	---	---

ANNEX A - TM-30 CALCULATIONS

REPORT NO. 104941221CRT-031

TM-30 REPORT

