

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

700BLT38GB-LED930

PROJECT NUMBER

G104941221

REPORT NUMBER

104941221CRT-001

ISSUE DATE

7/28/2022

REVISED DATE

None

TEST DATES

7/20/2022 through 7/28/2022

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104941221CRT-001

MODEL NUMBER(s)

700BLT38GB-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

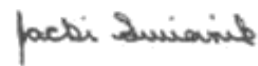
ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

In Charge of Testing:

Reviewer:



Melanie Brittain
Senior Associate Engineer
Lighting Division



Jacki Swiernik
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SAMPLE INFORMATION

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ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	CRT2206301053-027	700BLT38GB-LED930	Belterra 38 Globe Chandelier	Production	6/30/2022

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	700BLT38GB-LED930
Product Description:	Belterra 38 Globe Chandelier
LED Model No.:	SEOUL STW9A12D-E1
Driver Model No.:	LTF DA30W700C2542-3001 (X2)
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	5597.3	5714.9
Input Power (W) @ 120 (Vac)	83.30	83.84
Luminous Efficacy (lm/W)	67.19	68.16
Input Power Factor (I) @ 120 (Vac)	0.995	0.991

Criteria	Results
Input ATHD (%) @ 120 (Vac)	12.32
Correlated Color Temperature (K)	2997
Color Rendering Index - Ra (I)	93.6
Color Rendering Index - R9 (I)	63.1
Duv (I)	-0.0005
Chromaticity Coordinate (x)	0.436
Chromaticity Coordinate (y)	0.403
Chromaticity Coordinate (u')	0.251
Chromaticity Coordinate (v')	0.521

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

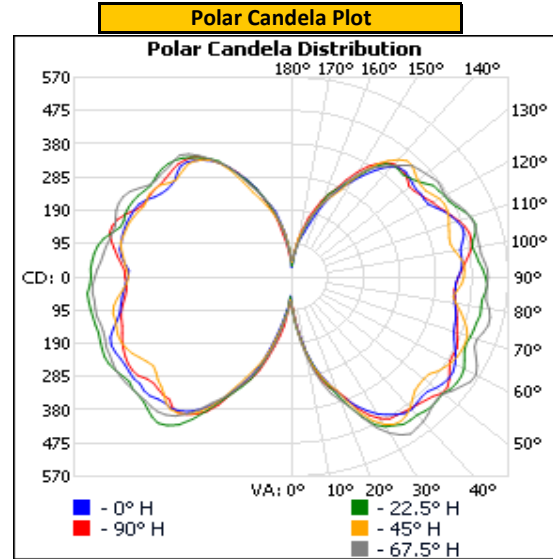
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	120.09	697.4	83.30	0.995

Light Output (lm)	Efficacy (lm/W)
5597.3	67.2

LUMINOUS INTENSITY SUMMARY (candela)

Angle (°)	0	22.5	45	67.5	90
0	74	74	74	74	74
5	130	141	133	135	127
10	213	218	222	230	217
15	286	293	289	314	304
20	349	362	343	373	346
25	407	441	429	444	416
30	452	494	486	514	467
35	480	514	503	547	482
40	493	514	486	539	489
45	484	523	459	523	498
50	494	518	454	520	517
55	505	530	470	545	507
60	497	524	486	560	481
65	474	502	494	535	480
70	454	501	492	519	463
75	447	504	470	535	450
80	436	506	440	528	438
85	433	511	438	514	430
90	439	510	453	517	439
95	450	494	454	509	458
100	451	483	435	502	481
105	469	501	429	503	484
110	464	502	440	500	469
115	443	477	452	485	445
120	415	465	448	467	428
125	415	456	431	472	412
130	415	428	432	460	404
135	425	414	449	450	420
140	412	417	438	415	421
145	367	386	395	383	396
150	313	321	322	331	346
155	260	275	256	265	278
160	194	218	213	211	232
165	132	154	160	162	175
170	99	100	113	92	110
175	43	49	56	57	57
180	48	48	48	48	48

Entire luminous intensity matrix found in .IES file



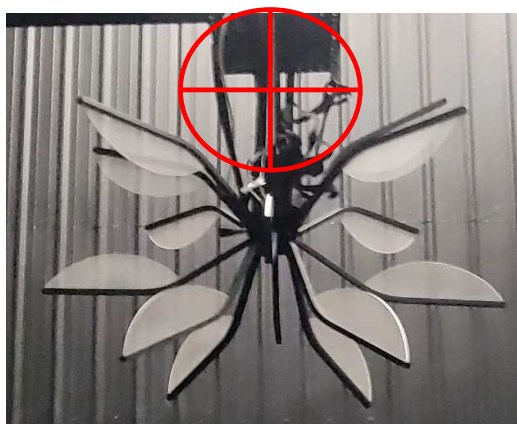
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ORIENTATION AND ALIGNMENT OF EUT

Luminous Opening		
Length (ft)	Width (ft)	Height (ft)
3.17	3.17	2.33
0°-180° H	90°-270° H	0°-180° V

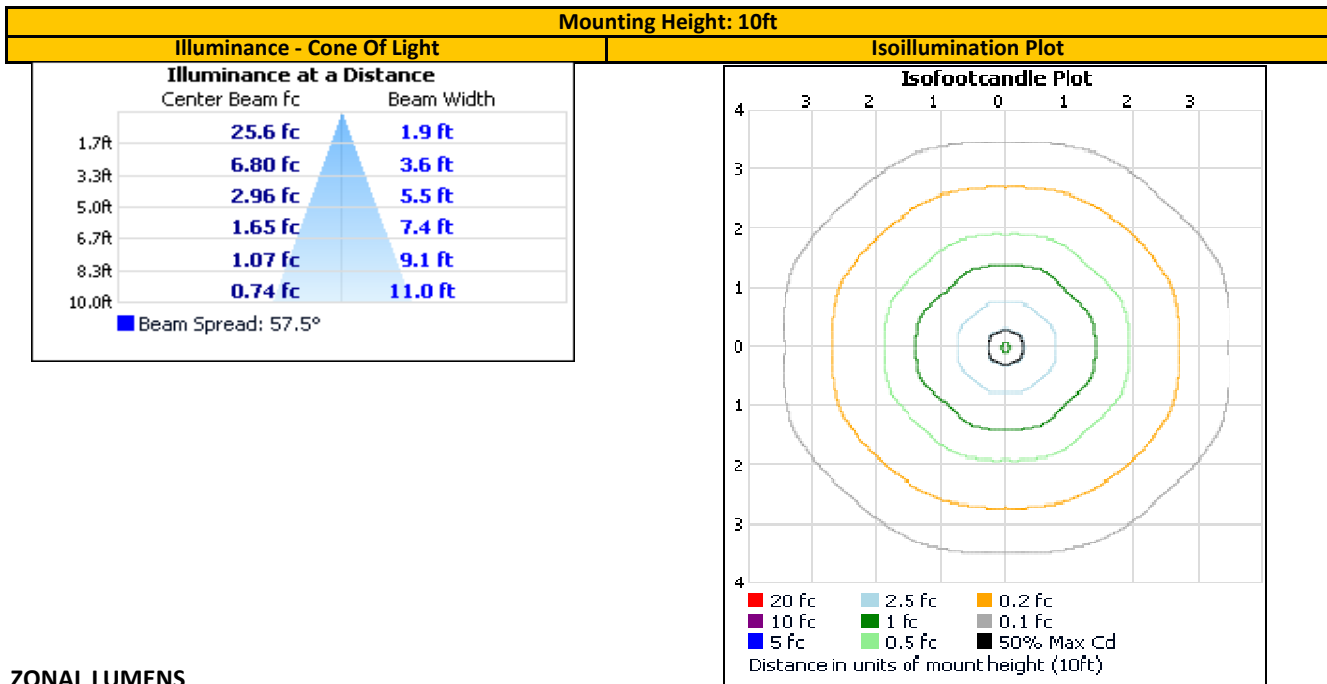
Test Distance (ft)
29.6

PHOTOMETRIC CENTER OF EUT



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ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary											
Zone	Lumens	Luminaire	Zone	Lumens	Total	Zone	Lumens	Total			
	0-30	272.9		4.9%	0-10		13.2	0.2%	90-100	516.3	9.2%
	0-40	580.0		10.4%	10-20		75.9	1.4%	100-110	496.8	8.9%
	0-60	1,419.2		25.4%	20-30		183.8	3.3%	110-120	458.7	8.2%
	60-90	1,540.5		27.5%	30-40		307.1	5.5%	120-130	394.9	7.1%
	70-100	1,556.5		27.8%	40-50		387.5	6.9%	130-140	331.4	5.9%
	90-120	1,471.8		26.3%	50-60		451.7	8.1%	140-150	245.1	4.4%
	0-90	2,959.7		52.9%	60-70		500.4	8.9%	150-160	134.0	2.4%
	90-180	2,637.6		47.1%	70-80		519.7	9.3%	160-170	51.7	0.9%
	0-180	5,597.3		100.0%	80-90		520.4	9.3%	170-180	8.7	0.2%

INTEGRATING SPHERE TESTING

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PHOTOMETRIC, RADIOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS

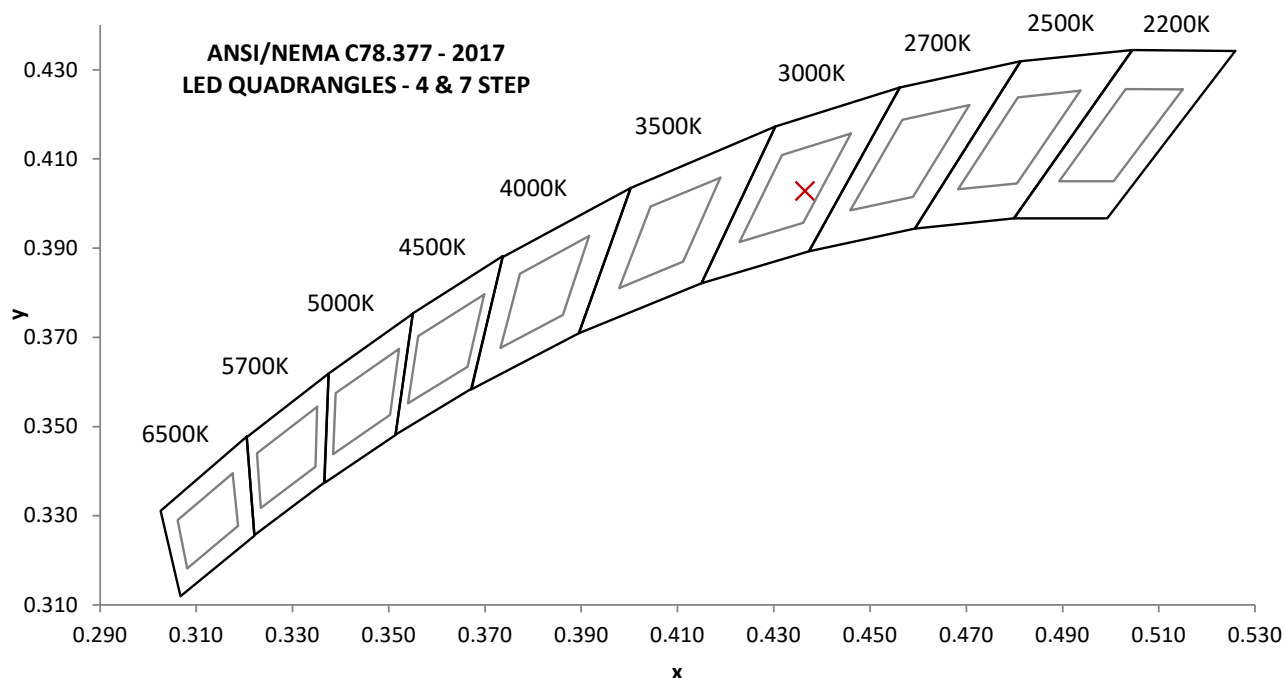
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.03	704.9	83.84	0.991	12.32

Measured at 120.03(Vac)

Light Output (lm)	Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
5714.9	68.2	2997	93.6	63.1

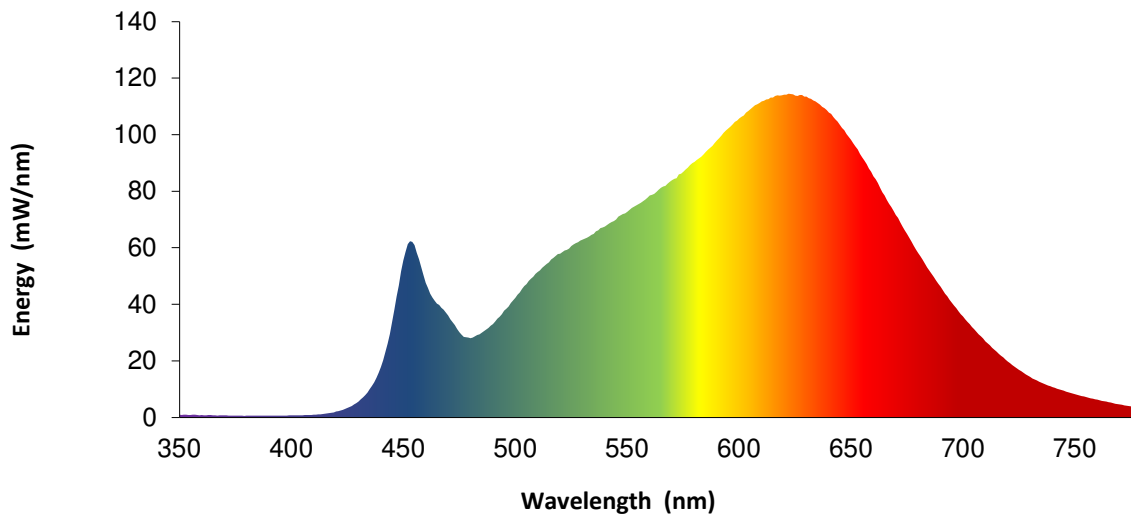
Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
-0.0005	0.436	0.403	0.251	0.521



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SPECTRAL POWER DISTRIBUTION

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	1.0		460	47.6		570	84.0		680	58.2
355	0.9		465	40.3		575	86.9		685	51.9
360	0.9		470	36.1		580	90.4		690	46.2
365	0.8		475	30.2		585	93.9		695	40.6
370	0.8		480	28.1		590	98.0		700	35.7
375	0.7		485	29.9		595	102.1		705	31.2
380	0.6		490	33.0		600	105.7		710	26.9
385	0.6		495	37.7		605	109.0		715	23.3
390	0.6		500	42.3		610	111.8		720	19.8
395	0.7		505	47.2		615	113.1		725	16.9
400	0.7		510	51.4		620	114.2		730	14.3
405	0.8		515	54.9		625	113.8		735	12.3
410	0.9		520	57.9		630	113.5		740	10.7
415	1.3		525	60.6		635	111.2		745	9.4
420	2.1		530	62.9		640	107.8		750	8.2
425	3.4		535	64.9		645	103.5		755	7.2
430	5.7		540	67.5		650	98.2		760	6.3
435	10.0		545	70.1		655	91.9		765	5.4
440	17.8		550	72.7		660	85.3		770	4.6
445	33.8		555	75.4		665	78.5		775	3.9
450	55.5		560	78.5		670	71.6		780	3.3
455	60.9		565	81.2		675	65.0		---	---



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	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	---	6/30/2022	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	Bosch Distance Laser	Pro GLM 20	L210	3/21/2022	3/15/2023
15	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

