FOR THE SCOPE OF
ACCREDITATION UNDER NVLAP LAB
CODE 100402-0.

REPORT

3933 US ROUTE 11, CORTLAND, NEW YORK 13045

Project No. G101936679 Date: December 29, 2014

REPORT NO. 101936679CRT-020

TEST OF ONE T8 LED 1200MM 6500K, 100-240V

LAMP MODEL NO.: T8-1200-W18-L1600-C65
PART NO.: 98956

RENDERED TO

VERBATIM AMERICAS
1200 W.T. HARRIS BLVD.
CHARLOTTE, NC 28269

TEST: Electrical and Photometric tests as required to the IESNA test standard.

STATEMENT OF LIMITATION: 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 500565507.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

ANSI NEMA ANSLG C78.377: 2012: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number T8-1200-W18-L1600-C65. The sample was received by Intertek on December 19, 2014, in undamaged condition and one sample was tested as received. The sample designation was CRT1412191205-002-4.

DATES OF TESTS: December 25, 2014 through December 29, 2014.

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SUMMARY

Lamp Model No.:	T8-1200-W18-L1600-C65
Part No.:	98956
Description:	T8 LED 1200mm 6500K, 100-240V

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	1623	1607
Total Power (W)	18.71	18.60
Luminaire Efficacy (LPW)	86.75	86.40

Criteria	Result
Power Factor	0.984
Current ATHD %	15.31
Correlated Color Temperature (CCT - K)	6863
Color Rendering Index (CRI - Ra)	87.7
Color Rendering Index (CRI - R9)	40.2
DUV	0.002
Chromaticity Coordinate (x)	0.308
Chromaticity Coordinate (y)	0.316
Chromaticity Coordinate (u')	0.200
Chromaticity Coordinate (v')	0.461

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
LSI High Speed Mirror Goniometer	6440	---	12/16/14	01/16/15	12/25/14
Elgar Power Supply	CW1251	---	VBU	VBU	12/25/14
Yokogawa Power Analyzer	WT210	E464	04/17/14	04/17/15	12/25/14
ExTech Hygro Thermometer	445703	T1357	12/10/14	12/10/15	12/25/14
Fisher Scientific Stopwatch	14-649-9	N1405	08/25/14	08/25/15	12/25/14
M-D Building Products Digital Level	Smart Tool	L112	03/14/14	03/15/15	12/25/14
Yokogawa Power Analyzer	WT1600	E474	03/07/14	03/07/15	12/29/14
LABSPHERE 3M	W/ CDS 1100	N307	VBU	VBU	12/29/14
Fluke Temperature Meter	53 II	T1318	03/21/14	03/21/15	12/29/14
Elgar Power Supply	CW1251	---	VBU	VBU	12/29/14
Extech Hygro-Thermometer	445703	T1355	12/10/14	12/10/15	12/29/14
SORENSEN POWER SUPPLY	XFR 150-8	---	VBU	VBU	12/29/14
NIST Spectral Flux Standard Source	RF1024	---	09/18/10	100 hrs of use	12/29/14

TEST METHODS

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79.

Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere Model CDS 1100 CCD Array Spectroradiometer and Two Meter or Ten Foot Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

Photometric and Electrical Measurements – Distribution Method

A LSI Type C High Speed Model 6440 Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample.

Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

RESULTS OF TEST

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method

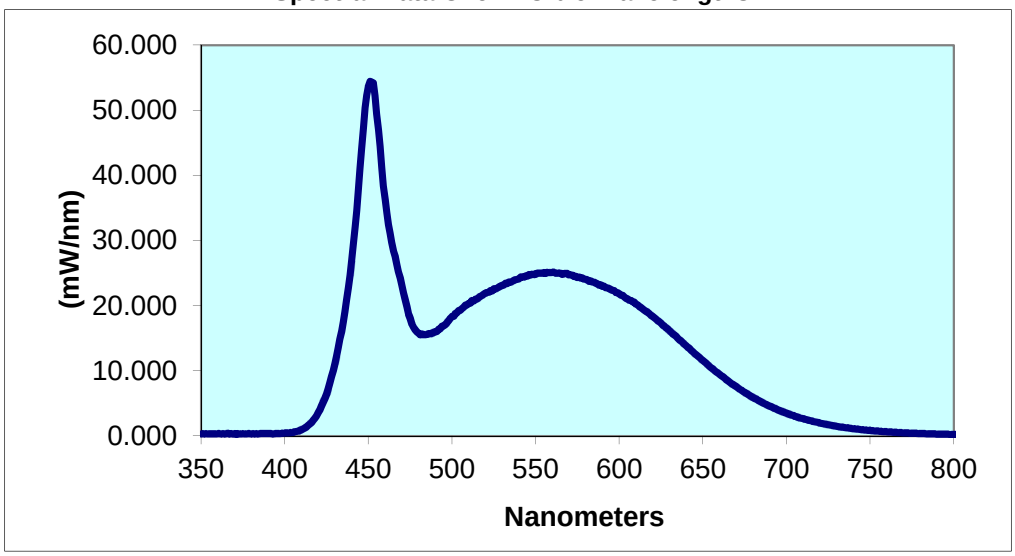
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
CRT1412191205-002-4	UP	120.0	158.4	18.71	0.984	15.31	1623	86.75

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
6863	87.7	40.2	0.002	0.308	0.316	0.200	0.461

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.324	440	26.94	530	23.13	620	18.32	710	2.641
355	0.292	445	41.07	535	23.59	625	17.30	715	2.299
360	0.327	450	53.59	540	24.12	630	16.19	720	1.995
365	0.327	455	49.45	545	24.54	635	15.01	725	1.721
370	0.349	460	36.27	550	24.85	640	13.88	730	1.479
375	0.363	465	28.37	555	25.09	645	12.69	735	1.285
380	0.309	470	23.10	560	25.13	650	11.62	740	1.111
385	0.352	475	18.05	565	24.96	655	10.49	745	0.950
390	0.345	480	15.78	570	24.70	660	9.455	750	0.833
395	0.355	485	15.58	575	24.33	665	8.471	755	0.725
400	0.440	490	15.98	580	24.03	670	7.571	760	0.628
405	0.550	495	16.90	585	23.62	675	6.704	765	0.540
410	0.940	500	18.32	590	22.97	680	5.896	770	0.471
415	1.843	505	19.32	595	22.46	685	5.194	775	0.410
420	3.590	510	20.34	600	21.83	690	4.557	780	0.357
425	6.465	515	21.05	605	21.03	695	4.003		
430	11.11	520	21.91	610	20.27	700	3.501		
435	17.50	525	22.56	615	19.34	705	3.027		

Spectral Data Over Visible Wavelengths



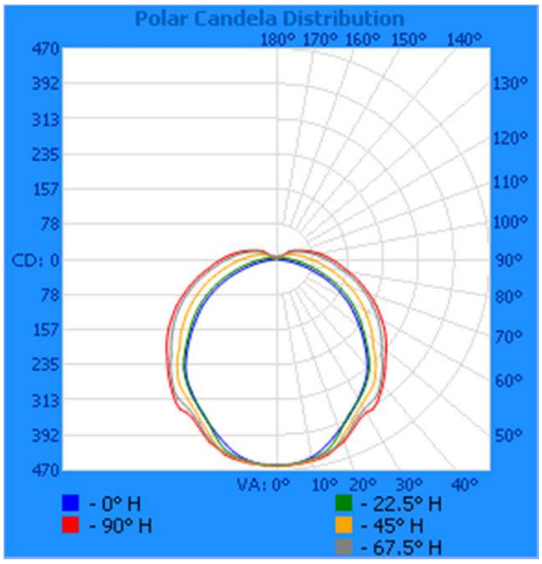
RESULTS OF TEST (cont'd)

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Distribution Method

Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
CRT1412191205-002-4	LINEAR	120.1	157.2	18.60	0.985	1607	86.40

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	460	460	460	460	460
5	458	457	459	457	459
10	448	452	454	452	456
15	428	439	446	446	449
20	404	409	422	427	433
25	383	380	396	403	410
30	360	362	375	386	395
35	339	342	360	378	388
40	312	318	339	357	364
45	277	285	308	330	339
50	242	250	277	304	316
55	209	221	251	280	293
60	176	191	224	256	267
65	141	158	197	231	242
70	104	125	169	204	215
75	68	94	142	178	188
80	36	68	117	151	163
85	11	48	96	129	141
90	1	32	78	110	122
95	1	22	64	93	104
100	1	14	51	78	88
105	1	8	39	64	73
110	1	5	30	51	59
115	1	4	22	41	48
120	0	3	7	32	38
125	1	2	8	6	12
130	1	2	7	4	3
135	1	1	5	11	6
140	1	1	4	8	10
145	1	1	3	5	6
150	1	1	2	3	4
155	1	1	2	2	3
160	1	1	1	2	2
165	1	1	1	1	1
170	1	1	1	1	1
175	1	1	1	1	1
180	1	1	1	1	1

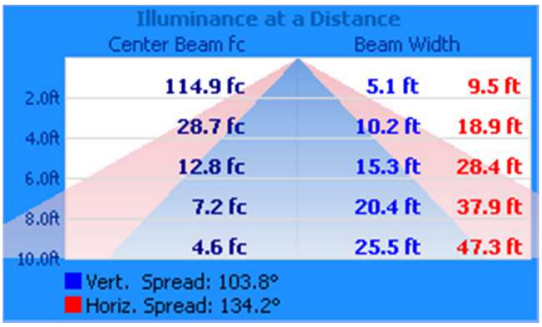


RESULTS OF TEST (cont'd)

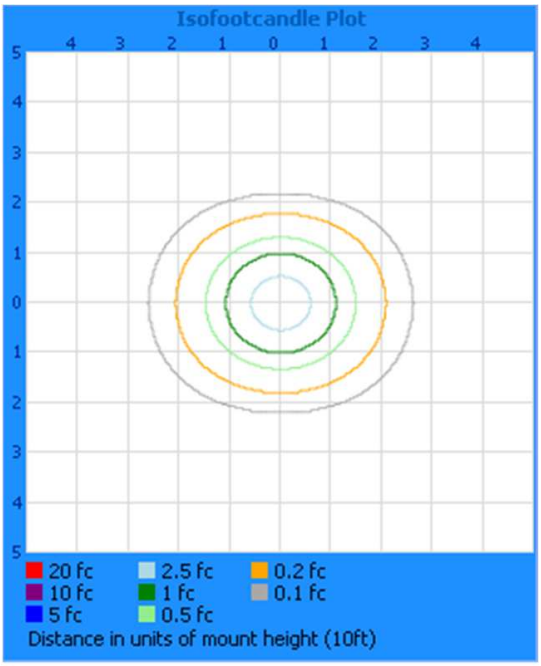
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	349.8	21.8
0-40	574.8	35.8
0-60	1037	64.5
60-90	431.7	26.9
0-90	1468	91.4
90-180	138.8	8.6
0-180	1607	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	43.5	2.7
10-20	124.1	7.7
20-30	182.2	11.3
30-40	225.1	14.0
40-50	237.4	14.8
50-60	224.4	14.0
60-70	192.2	12.0
70-80	143.5	8.9
80-90	96.0	6.0
90-100	63.5	4.0
100-110	39.7	2.5
110-120	22.0	1.4
120-130	6.7	0.4
130-140	3.5	0.2
140-150	2.1	0.1
150-160	0.8	0.0
160-170	0.3	0.0
170-180	0.1	0.0

PICTURE (not to scale)

CONCLUSION

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:

Melanie Brittain

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Report Reviewed By:

Jacki Swiernik

Jacki Swiernik
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Attachment: None