

REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G104160086

Date: November 26, 2019

REPORT NO. 104160086LAX-019

TEST OF ONE LED LUMINAIRE

MODEL NO. BOLT-LED35-HO-SAL
LED MODEL NO. LUMILEDS 2835E 9V
DRIVER MODEL NO. OSRAM OTI 50W G2

RENDERED TO

PRUDENTIAL LIGHTING
1774 E 21ST STREET
LOS ANGELES, CA 90058

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.

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

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-01019626-1.

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

UL 1598-2009: Underwriters Laboratories Inc. Standard for Safety - Luminaires

DESCRIPTION OF SAMPLE: The client submitted one prototype sample of model number BOLT-LED35-HO-SAL. The sample was received by Intertek on November 21, 2019, in undamaged condition and one sample was tested as received. The sample designation was LAN1911211331-001.

DATES OF TESTS: November 24, 2019 through November 25, 2019.

SUMMARY

Model No.:	BOLT-LED35-HO-SAL
Description:	LED Luminaire

Criteria	Result
	Goniometer
Total Lumen Output (Lumens)	5759
Total Power (W)	49.52
Luminaire Efficacy (LPW)	116.3

Criteria	Result
Maximum In-Situ Source Temperature Point (°C)	76.6
Maximum In-Situ Driver Case Temperature (°C)	70.6

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Goniophotometer	6440T	000943	VBU	VBU	11/24/19
AC Source	CW1251P	000944	VBU	VBU	11/24/19
Power Analyzer	WT210	000945	10/02/19	10/02/20	11/24/19
Tape Measure	33-428	001491	VBU	VBU	11/24/19
Magnetic Level	581-9	001610	10/11/19	10/11/20	11/24/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	11/24/19
Thermometer	DPI8-C24	001782	10/15/19	10/15/20	11/24/19
AC Source	CW1251P-V	001334	VBU	VBU	11/25/19
Power Meter	WT330	001322	10/02/19	10/02/20	11/25/19
Thermometer	52 Series II	001018	01/21/19	01/21/20	11/25/19
True RMS Multimeter	87	000322	11/27/18	11/27/19	11/25/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	11/25/19

TEST METHODS

Seasoning in Sample Orientation – LED Products

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

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.

In-Situ Maximum Measured Power Supply Case and LED Source Point Temperature

Power supply case and/or LED source operating temperature measurements were taken on one test sample per model with a thermocouple and Fluke 87 temperature meter. The SSL sample was allowed to reach thermal equilibrium for seven and a half hours before measurements were taken. Power supply or source temperature measurements were measured at the TMPPS or TS point as indicated by the included diagram in accordance with manufacturers declared hot spot location, or at a hot spot location found with a thermal camera when no diagram from the manufacturer is given. The maximum temperature was recorded for the sample. A simulated ceiling or other enclosure may be used in accordance to UL 1598 or UL 153 as applicable.

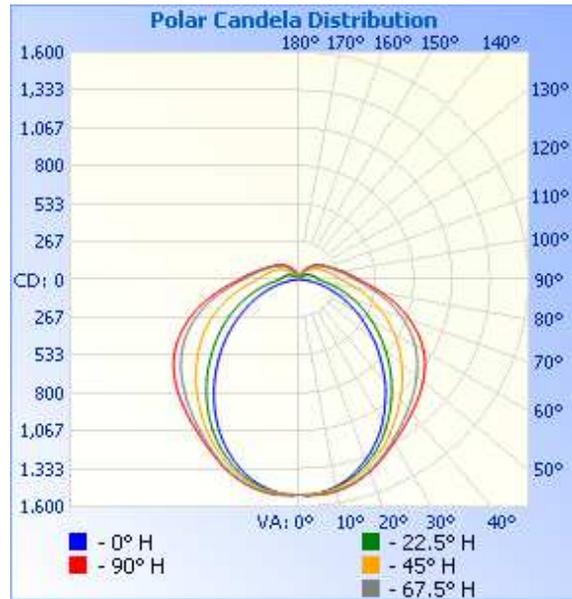
RESULTS OF TEST (cont'd)

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 (LPW)
LAN1911211331-001	Up	120.0	417.5	49.52	0.988	5759	116.3

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	1517	1517	1517	1517	1517
5	1513	1512	1510	1521	1523
10	1480	1486	1493	1509	1513
15	1426	1442	1458	1479	1486
20	1353	1380	1406	1432	1441
25	1264	1302	1339	1373	1385
30	1164	1210	1261	1308	1326
35	1048	1110	1180	1245	1273
40	933	1006	1099	1187	1224
45	809	898	1018	1130	1178
50	692	792	936	1071	1128
55	574	686	853	1008	1072
60	467	587	770	935	1003
65	362	492	685	853	919
70	268	402	598	761	820
75	180	317	511	662	715
80	103	240	426	561	605
85	38	175	349	468	503
90	0	136	292	392	419
95	0	124	261	341	361
100	0	112	233	299	314
105	0	102	208	263	275
110	0	89	186	233	243
115	0	76	167	209	218
120	0	66	150	189	198
125	0	58	130	170	179
130	0	50	111	151	160
135	0	43	95	130	140
140	0	37	81	109	119
145	0	31	68	91	101
150	0	26	55	76	83
155	0	22	43	60	66
160	0	19	34	45	47
165	0	15	25	32	34
170	0	12	18	22	14
175	0	10	12	12	0



RESULTS OF TEST (cont'd)

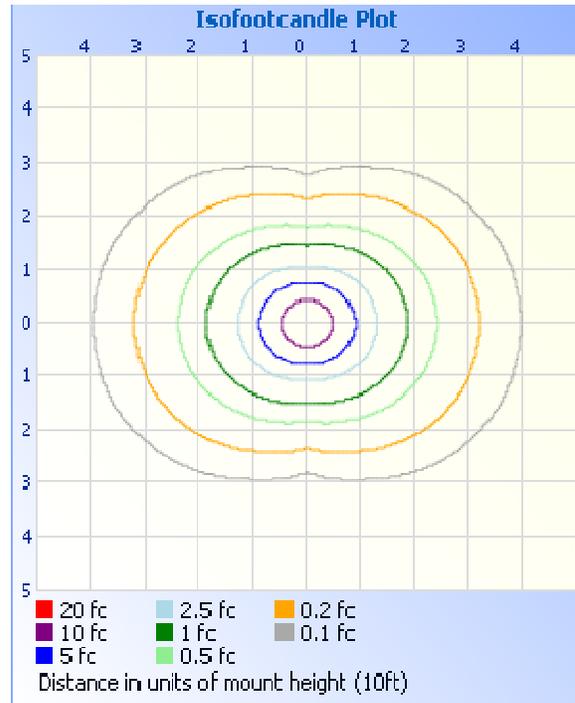
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	1170	20.3
0-40	1906	33.1
0-60	3441	59.7
60-90	1524	26.5
0-90	4965	86.2
90-180	794.0	13.8
0-180	5759	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	144.0	2.5
10-20	411.4	7.1
20-30	614.8	10.7
30-40	735.6	12.8
40-50	780.2	13.5
50-60	754.7	13.1
60-70	662.1	11.5
70-80	513.0	8.9
80-90	349.0	6.1
90-100	248.4	4.3
100-110	188.5	3.3
110-120	139.4	2.4
120-130	97.8	1.7
130-140	61.9	1.1
140-150	34.4	0.6
150-160	16.7	0.3
160-170	6.0	0.1
170-180	0.9	0.0

Zonal Lumen Summary and Percentages at 25°C

Spacing Criterion (0-180)	1.16
Spacing Criterion (90-270)	1.32
Spacing Criterion (Diagonal)	1.38

RESULTS OF TEST (cont'd)

In-Situ Maximum Measured LED Source Temperature

Manufacturer Supplied Documentation:

PART NUMBER	FORWARD VOLTAGE ⁽¹⁾ (V _f)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE ⁽²⁾ (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L128-xxxxEC3500001	8.7	9.1	9.9	-3.0 to -6.0	15
L128-xxxxEC35000B1	8.7	9.3	9.9	-3.0 to -6.0	15

125°C for L128-xxxxEC35000x1
125°C for L128-xxxxEB3500001
115°C for L128-xxxxEA3500001
125°C for L128-xxxxCx35000x1
125°C for L128-xxxxHA35000x1

LED Junction Temperature⁽¹⁾ (DC & Pulse)



Maximum Junction Temperature from LED specification (T_j) = 125°C
Thermal Resistance Formula from LED specification = 15°C/W
Maximum Forward Voltage (V_f) from LED specification = 9.9V
Measured LED Current = 27.1mA
Calculated LED Wattage = V_f x Measured LED Current = 0.268W
Maximum Source Temperature (T_s) = T_j – (LED Wattage x Thermal Resistance) = 121°C

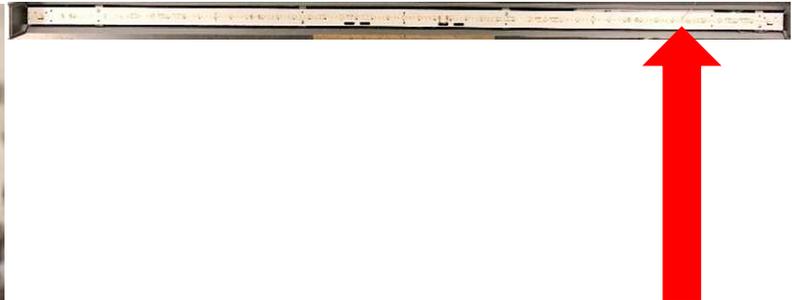
Maximum Measured Manufacturer Designated Source Temperature

Sample No.	Maximum Measured Source Temperature (°C)	Location	Maximum Rated Source Temperature (°C)
LAN1911211331-001	76.6	Per specs above	121.0

LED In-Situ Picture – T_s



LED In-Situ Picture – T_s Location



RESULTS OF TEST (cont'd)

In-Situ Maximum Measured Power Supply Case Temperature

Manufacturer Supplied Documentation:

Case Temperature (Tc) 85°C Max, 75°C – 5 Year Warranty ¹⁾



Sample No.	Maximum Measured Source Temperature (°C)	Location	Maximum Rated Source Temperature (°C)
LAN1911211331-001	70.6	Per specs above	85.0

Driver In-Situ Picture – Ts Location



PICTURES (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:

Handwritten signature of Erik Linares in black ink.

Erik Linares
Associate Engineer
Lighting Division

Attachment: None

Report Reviewed By:

Handwritten signature of Vladimir Kozak in black ink.

Vladimir Kozak
Engineering Supervisor
Lighting Division