



IES LM-80-08 Test Report

For

Bridgelux Inc.
101 Portola Avenue, Livermore, CA 94551
USA

3V, 60mA LED Chip
Model: BXVN-XXE-11L-3AV

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ18080002a/R2

This report is replaced the old report No. HZ18080002a/R1 dated Nov. 02, 2018

The test data in this report base on the report No. HZ16030047k/R4 dated Feb. 05, 2018 and NO. LM-80
HZ16090030c-R1 dated Feb. 05, 2018

Test specifications:

Date of Receipt	: Jul. 03, 2015
Date of Test	: Jul. 10, 2015 to Nov. 29, 2016
Test item	: 10000 hours Lumen Maintenance, 10000 hours Chromaticity Shift
Reference Standard	: IES LM-80-2008 Approved Method for Measuring Lumen Maintenance of LED Light Source

Review by:

April Zou

Engineer: April Zou
Nov. 08, 2018

Approved by:



Jim Zhang

Manager: Jim Zhang
Nov. 08, 2018

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Test Summary

Model Number: BXVN-XXE-11L-3AV

Rated Ts (°C)	Measured Ts(°C)	Drive Current (A)	Number of LED Light Sources Tested	Average Lumen Maintenance (%) at 10000 hours	Average Chromaticity ($\Delta u'v'$) at 10000 hours
55	53	0.06	25	98.6%	0.0013
85	84	0.06	25	97.5%	0.0017
105	104	0.06	25	97.0%	0.0020

IES LM-80-08 Test Report Requirement:

1. Number of LED Light Sources Tested

See test summary.

2. Description of LED light sources

Device under test is LED package with model number: BXVN-XXE-11L-3AV, Nominal CCT 2700K.

The BXVN-XXE-11L-3AV part number covers all the BXEN & BXVN part numbers as the following series.

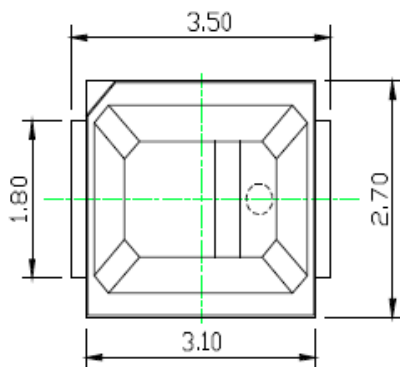
BXE(V)N-(A)(B)-11(C)-3(D) and BXE(V)N-(A)(B)-21(C)-3(D)

(A): CCT variation, can be 1000~10000

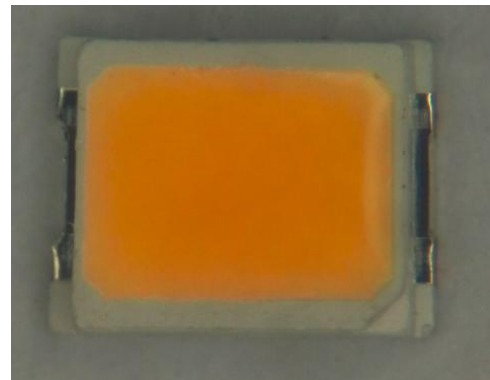
(B): CRI variation, can be S for <70, C for 70, E for 80, G for 90, H for 95.

(C): Power, can be L/M/H

(D): Customer code, can be 0~ZZ



Tolerance: $\pm 0.25\text{mm}$



3. Description of auxiliary equipment

Test Equipment	Model	Calibration Date	Calibration Due Date
Lifetest thermal chamber	NMT 830	Jul. 16, 2016	Jul. 15, 2017
Lifetest thermal chamber	NMT 830	Jul. 17, 2015	Jul. 16, 2016
Lifetest thermal chamber	NMT 830	Jul. 18, 2014	Jul. 17, 2015
Lifetest data recorder	GRAPHTEC GL820	Jul. 16, 2016	Jul. 15, 2017
Lifetest data recorder	GRAPHTEC GL820	Jul. 17, 2015	Jul. 16, 2016
Lifetest data recorder	GRAPHTEC GL820	Jul. 18, 2014	Jul. 17, 2015
Photometric test current source	Itech IT6154	Jul. 16, 2016	Jul. 15, 2017
Photometric test current source	Itech IT6154	Jul. 17, 2015	Jul. 16, 2016
Photometric test current source	Itech IT6154	Jul. 18, 2014	Jul. 17, 2015
Photometric test system	0.5m Integrate Sphere system	Jul. 16, 2016	Jul. 15, 2017
Photometric test system	0.5m Integrate Sphere system	Jul. 17, 2015	Jul. 16, 2016
Photometric test system	0.5m Integrate Sphere system	Jul. 18, 2014	Jul. 17, 2015
Standard Lamp	10W	Jul. 16, 2016	Jul. 15, 2017
Standard Lamp	10W	Sep. 22, 2015	Sep. 21, 2016
Standard Lamp	10W	Sep. 23, 2014	Sep. 22, 2015

4. Operating cycle

LEDs are driven with a constant direct current (DC).

5. Ambient conditions including airflow, temperature, and relative humidity

Ambient Temperature (Ta): See Tables

Humidity: <65%

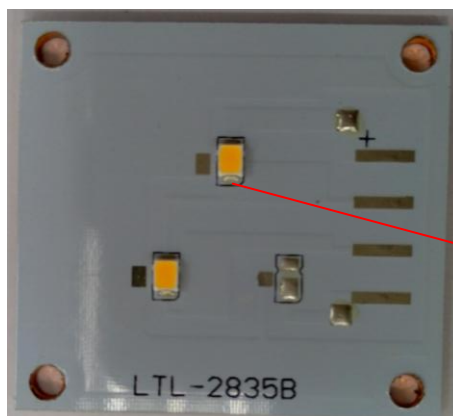
No force air flow

6. Case temperatures (test point temperature)

In all cases, both Ts and Ta meet the IES LM-80-08 limits.



Ts Location on cathode



LED_{TEMP}

7. Drive current of the LED light source during Lumen maintenance test.

See tables.

8. Initial luminous flux and forward voltage at photometric measurement current

See tables.

9. Lumen maintenance for data for each individual light source along with median value, standard deviation, minimum and maximum lumen maintenance value for all of the light sources

See tables.

10. Observation of LED light source failures including the failure conditions and time of failure

No failures observed.

11. LED light source monitoring interval

See tables

12. Photometric measurement uncertainty

Flux measurement: 1.06% ($k=2$)

13. Chromaticity shift reported over the measurement time

See tables.

14. Sampling Method/Sample size

IES LM-80 tests require LED samples to be operated at drive current 60mA, three temperatures of 55°C, 85°C and 105°C.

75 pieces of LED samples are selected randomly from different production date of products. These samples are picked to represent a wide parametric distribution.

Test Result:

Model Number: BXVN-XXE-11L-3AV

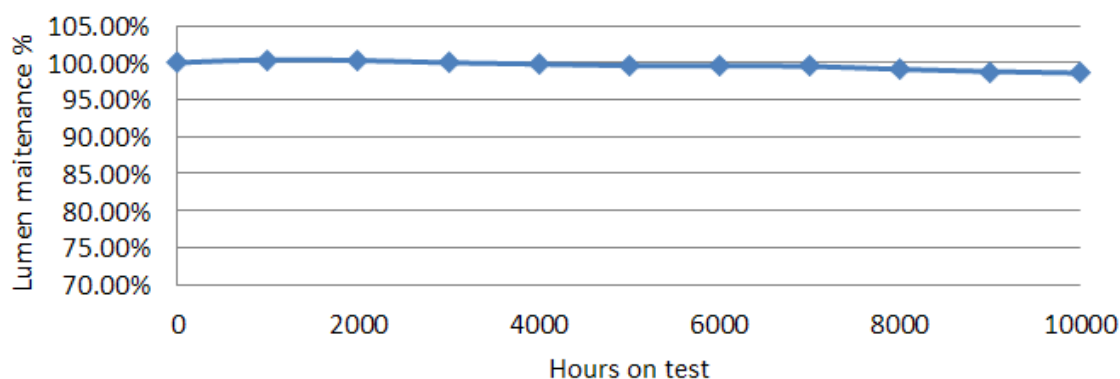
Case temperature: 55°C

Drive current: 0.06 A

Lumen Maintenance Data:

Sample No.	0h		Lumen Maintenance (%)									
	Vf (V)	Flux (lm)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	2.87	22.90	100.2%	100.1%	99.9%	99.9%	99.6%	99.7%	99.8%	99.0%	98.7%	98.6%
2	2.90	23.38	100.3%	100.3%	99.9%	99.9%	99.6%	99.2%	99.5%	99.0%	98.6%	98.4%
3	2.86	23.06	100.2%	100.0%	99.6%	99.6%	99.4%	99.1%	99.5%	99.3%	99.1%	98.9%
4	2.87	22.63	100.2%	100.0%	99.9%	99.5%	99.4%	99.3%	99.5%	99.0%	98.8%	98.5%
5	2.85	23.68	99.7%	99.8%	99.4%	99.4%	99.1%	99.2%	99.5%	98.9%	98.5%	98.4%
6	2.89	22.80	100.3%	100.6%	100.0%	99.8%	99.6%	99.7%	99.6%	98.8%	98.5%	98.2%
7	2.90	23.25	101.5%	101.3%	101.3%	100.9%	100.7%	100.7%	99.3%	98.9%	98.4%	98.3%
8	2.88	22.75	101.8%	101.6%	101.3%	101.3%	100.9%	101.0%	99.4%	98.8%	98.5%	98.4%
9	2.87	23.84	99.9%	99.8%	99.5%	99.6%	99.2%	98.9%	99.7%	99.4%	99.0%	98.9%
10	2.89	23.13	101.2%	100.9%	100.6%	100.3%	100.4%	100.4%	99.8%	99.4%	98.9%	98.6%
11	2.88	23.17	99.6%	99.5%	99.4%	98.9%	98.7%	98.9%	99.7%	99.0%	98.6%	98.3%
12	2.88	23.24	99.5%	99.4%	99.5%	99.0%	99.0%	98.8%	99.6%	99.1%	98.7%	98.5%
13	2.86	22.20	100.0%	99.7%	99.6%	99.0%	98.8%	98.9%	99.3%	99.2%	98.8%	98.6%
14	2.88	23.87	99.8%	99.8%	99.3%	99.2%	99.0%	98.9%	99.8%	99.5%	99.0%	98.9%
15	2.86	22.35	101.4%	101.2%	101.0%	100.9%	100.7%	100.9%	99.3%	98.9%	98.5%	98.2%
16	2.87	22.28	99.9%	100.0%	99.8%	99.4%	99.3%	99.2%	99.4%	99.0%	98.7%	98.4%
17	2.89	22.65	100.6%	100.3%	100.0%	99.9%	99.7%	99.7%	99.6%	99.5%	99.1%	98.8%
18	2.88	22.39	101.4%	101.0%	100.6%	100.2%	100.2%	100.2%	99.5%	98.9%	98.7%	98.6%
19	2.90	22.89	100.5%	100.3%	100.0%	99.9%	99.6%	99.6%	99.7%	99.3%	99.0%	98.9%
20	2.89	22.84	100.3%	100.0%	99.8%	99.6%	99.2%	99.4%	99.4%	99.2%	98.9%	98.8%
21	2.89	22.36	101.8%	100.9%	99.6%	99.2%	100.0%	100.7%	99.8%	99.3%	99.1%	98.9%
22	2.87	22.94	100.3%	100.5%	100.1%	99.6%	98.7%	100.5%	99.5%	98.8%	99.1%	98.8%
23	2.88	23.68	100.5%	99.5%	100.2%	100.3%	98.8%	99.8%	99.5%	99.4%	98.6%	98.4%
24	2.87	23.86	100.4%	101.5%	99.4%	100.4%	99.8%	98.9%	98.8%	98.8%	98.7%	98.3%
25	2.85	23.02	99.6%	99.6%	101.0%	99.7%	100.3%	99.1%	99.6%	99.1%	98.6%	98.5%
Avg	2.88	23.01	100.4%	100.3%	100.0%	99.8%	99.6%	99.6%	99.5%	99.1%	98.8%	98.6%
Max	2.90	23.87	101.8%	101.6%	101.3%	101.3%	100.9%	101.0%	99.8%	99.5%	99.1%	98.9%
Min	2.85	22.20	99.5%	99.4%	99.3%	98.9%	98.7%	98.8%	99.3%	98.8%	98.4%	98.2%

Lumen Maintenance 55 °C



Model Number: BXVN-XXE-11L-3AV

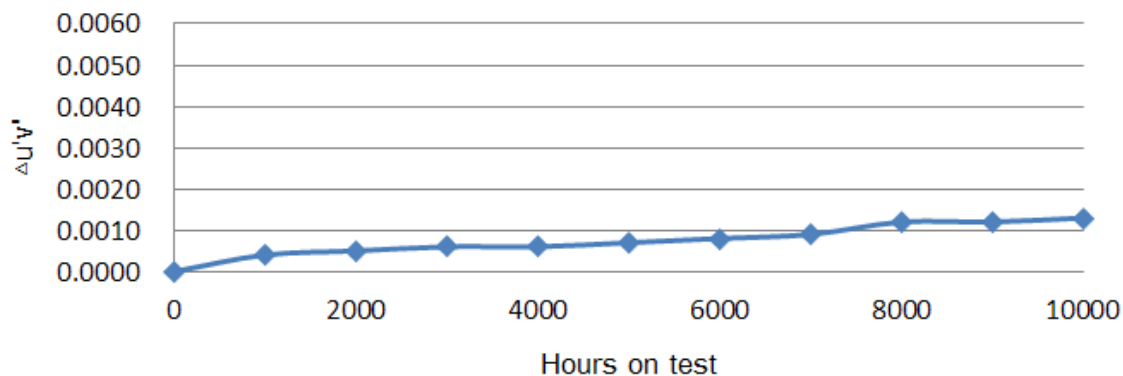
Case temperature: 55°C

Drive current: 0.06 A

Chromaticity Shift Data:

Sample No.	0h			Chromaticity Shift									
	u'	v'	CCT K	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	0.2589	0.5312	2759	0.0007	0.0008	0.0009	0.0007	0.0007	0.0008	0.0005	0.0012	0.0013	0.0013
2	0.2610	0.5302	2721	0.0001	0.0003	0.0004	0.0004	0.0007	0.0007	0.0006	0.0013	0.0013	0.0013
3	0.2602	0.5311	2732	0.0003	0.0003	0.0005	0.0003	0.0006	0.0009	0.0009	0.0013	0.0014	0.0016
4	0.2605	0.5320	2722	0.0004	0.0004	0.0006	0.0006	0.0007	0.0007	0.0007	0.0012	0.0011	0.0011
5	0.2592	0.5307	2754	0.0008	0.0009	0.0008	0.0009	0.0008	0.0012	0.0007	0.0014	0.0012	0.0014
6	0.2586	0.5332	2756	0.0005	0.0006	0.0007	0.0006	0.0006	0.0007	0.0009	0.001	0.0011	0.0014
7	0.2598	0.5305	2744	0.0002	0.0002	0.0003	0.0003	0.0006	0.0009	0.0014	0.0011	0.001	0.0011
8	0.2591	0.5329	2747	0.0003	0.0003	0.0004	0.0005	0.0008	0.0007	0.0006	0.0009	0.0008	0.0011
9	0.2610	0.5310	2716	0.0003	0.0004	0.0007	0.0006	0.0008	0.001	0.001	0.001	0.0011	0.0010
10	0.2607	0.5332	2714	0.0005	0.0005	0.0006	0.0005	0.0006	0.0009	0.0009	0.0012	0.0012	0.0013
11	0.2589	0.5330	2751	0.0003	0.0004	0.0004	0.0006	0.0006	0.0008	0.0012	0.0014	0.0012	0.0013
12	0.2610	0.5321	2712	0.0003	0.0003	0.0006	0.0005	0.0006	0.0006	0.0012	0.0012	0.0011	0.0013
13	0.2597	0.5322	2738	0.0005	0.0006	0.0006	0.0007	0.001	0.001	0.0011	0.0015	0.0015	0.0016
14	0.2591	0.5327	2748	0.0005	0.0004	0.0005	0.0008	0.0008	0.0008	0.0009	0.001	0.0011	0.0011
15	0.2587	0.5322	2759	0.0005	0.0004	0.0005	0.0003	0.0006	0.0007	0.0008	0.0012	0.001	0.0011
16	0.2586	0.5318	2763	0.0004	0.0006	0.0006	0.0006	0.001	0.0008	0.0005	0.0012	0.0011	0.0012
17	0.2593	0.5326	2744	0.0006	0.0006	0.0007	0.0008	0.0008	0.001	0.0007	0.0014	0.0012	0.0013
18	0.2612	0.5307	2714	0.0007	0.0008	0.001	0.0009	0.0009	0.001	0.001	0.001	0.0011	0.0011
19	0.2598	0.5310	2741	0.0008	0.0008	0.0008	0.001	0.0009	0.0009	0.0009	0.001	0.0012	0.0013
20	0.2611	0.5309	2715	0.0004	0.0007	0.0008	0.0007	0.0009	0.0008	0.0011	0.0012	0.0011	0.0011
21	0.2587	0.5329	2756	0.0003	0.0008	0.001	0.0009	0.0007	0.0006	0.001	0.001	0.0013	0.0013
22	0.2597	0.5309	2744	0.0001	0.0004	0.0005	0.0004	0.0008	0.0005	0.0008	0.0014	0.0015	0.0017
23	0.2594	0.5309	2750	0.0005	0.0005	0.0008	0.0008	0.0007	0.0006	0.0009	0.0011	0.0008	0.0009
24	0.2588	0.5320	2758	0.0006	0.0003	0.0004	0.0009	0.0007	0.0006	0.001	0.001	0.0009	0.0010
25	0.2589	0.5323	2754	0.0005	0.0008	0.0006	0.0005	0.0008	0.0006	0.001	0.0014	0.0014	0.0016
Avg	0.2597	0.5318	2740	0.0004	0.0005	0.0006	0.0006	0.0007	0.0008	0.0009	0.0012	0.0012	0.0013
Max	0.2612	0.5332	2763	0.0008	0.0009	0.0010	0.0010	0.0010	0.0012	0.0014	0.0015	0.0015	0.0017
Min	0.2586	0.5302	2712	0.0001	0.0002	0.0003	0.0003	0.0006	0.0006	0.0005	0.0009	0.0008	0.0009

Chromaticity Shift at 55 °C



Model Number: BXVN-XXE-11L-3AV

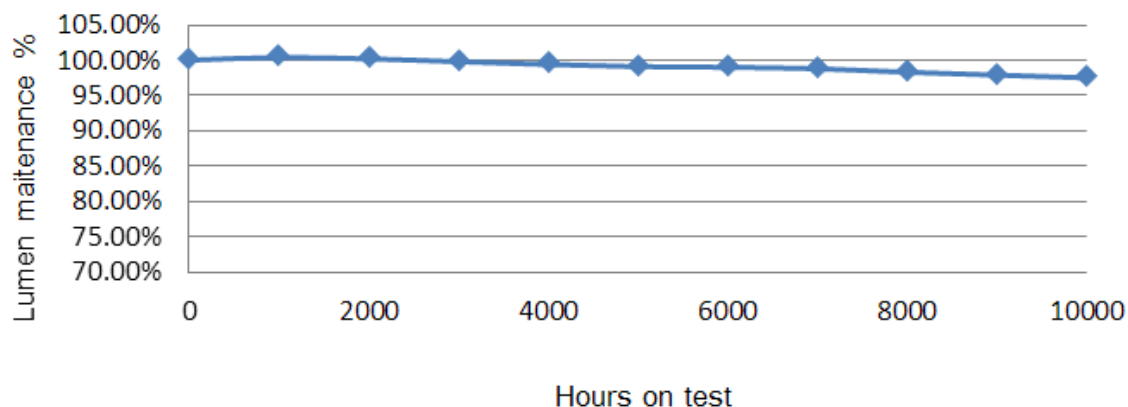
Case temperature: 85°C

Drive current: 0.06 A

Lumen Maintenance Data:

Sample No.	0h		Lumen Maintenance (%)									
	Vf (V)	Flux (lm)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	2.89	22.50	100.2%	99.7%	99.3%	99.1%	98.7%	98.8%	98.9%	98.0%	97.6%	97.4%
2	2.85	22.94	100.3%	100.1%	99.9%	99.3%	99.0%	98.9%	98.6%	98.0%	97.7%	97.5%
3	2.89	22.64	99.9%	99.9%	99.5%	98.9%	98.6%	98.5%	99.0%	98.0%	97.6%	97.1%
4	2.90	23.73	99.5%	99.7%	99.0%	98.8%	98.7%	98.2%	98.9%	98.6%	98.3%	97.9%
5	2.88	23.66	99.6%	99.9%	99.6%	98.9%	98.6%	98.4%	98.9%	98.3%	98.0%	97.5%
6	2.88	23.67	100.4%	100.4%	99.8%	99.6%	99.1%	99.2%	98.9%	98.7%	98.4%	97.9%
7	2.88	23.75	101.8%	101.3%	101.0%	100.9%	100.3%	100.0%	99.0%	98.7%	98.5%	97.9%
8	2.87	23.40	101.7%	101.6%	101.5%	100.7%	100.7%	100.5%	98.8%	98.1%	97.6%	97.1%
9	2.86	23.51	99.8%	99.8%	99.1%	98.8%	98.3%	98.4%	99.0%	97.8%	97.6%	97.1%
10	2.88	22.51	100.9%	100.6%	100.1%	100.0%	99.9%	99.8%	98.6%	98.6%	98.2%	97.8%
11	2.89	23.26	99.6%	99.4%	99.3%	98.5%	98.1%	98.0%	99.0%	98.4%	97.9%	97.7%
12	2.90	22.98	99.9%	99.5%	99.0%	98.6%	98.2%	98.1%	99.0%	98.3%	98.0%	97.7%
13	2.87	23.28	99.6%	99.4%	99.4%	98.7%	98.5%	98.2%	98.6%	98.3%	97.9%	97.6%
14	2.89	22.38	100.0%	99.7%	99.4%	99.1%	99.0%	99.0%	99.0%	98.2%	97.9%	97.7%
15	2.86	23.38	101.9%	101.3%	101.1%	100.8%	100.6%	100.3%	98.9%	98.4%	98.1%	97.5%
16	2.90	23.74	100.4%	100.1%	99.8%	99.4%	98.8%	98.5%	98.7%	98.5%	98.2%	97.9%
17	2.89	23.25	100.7%	100.7%	100.3%	99.7%	99.3%	99.1%	98.6%	97.9%	97.7%	97.3%
18	2.87	23.68	101.2%	101.1%	100.6%	100.2%	99.8%	99.8%	98.6%	97.9%	97.5%	97.1%
19	2.88	23.00	100.7%	100.5%	99.8%	99.4%	99.2%	99.2%	98.7%	98.5%	98.0%	97.8%
20	2.87	23.45	99.9%	99.9%	99.1%	98.8%	98.9%	98.6%	99.0%	98.4%	98.2%	97.8%
21	2.89	22.8	100.9%	100.4%	100.0%	99.7%	98.4%	99.9%	98.8%	97.8%	98.5%	98.0%
22	2.88	23.35	100.5%	100.0%	100.2%	99.6%	98.9%	98.4%	99.0%	98.2%	97.6%	97.2%
23	2.88	22.99	100.2%	100.4%	99.4%	99.0%	99.2%	99.8%	98.9%	98.1%	97.9%	97.7%
24	2.89	22.63	100.7%	100.3%	100.1%	99.6%	99.1%	98.6%	98.8%	98.6%	97.6%	97.1%
25	2.88	23.31	100.2%	99.7%	99.8%	99.2%	100.6%	98.6%	98.7%	98.3%	97.7%	97.4%
Avg	2.88	23.19	100.4%	100.2%	99.8%	99.4%	99.1%	99.0%	98.8%	98.3%	97.9%	97.5%
Max	2.90	23.75	101.9%	101.6%	101.5%	100.9%	100.7%	100.5%	99.0%	98.7%	98.5%	98.0%
Min	2.85	22.38	99.5%	99.4%	99.0%	98.5%	98.1%	98.0%	98.6%	97.8%	97.5%	97.1%

Lumen Maintenance 85 °C



Model Number: BXVN-XXE-11L-3AV

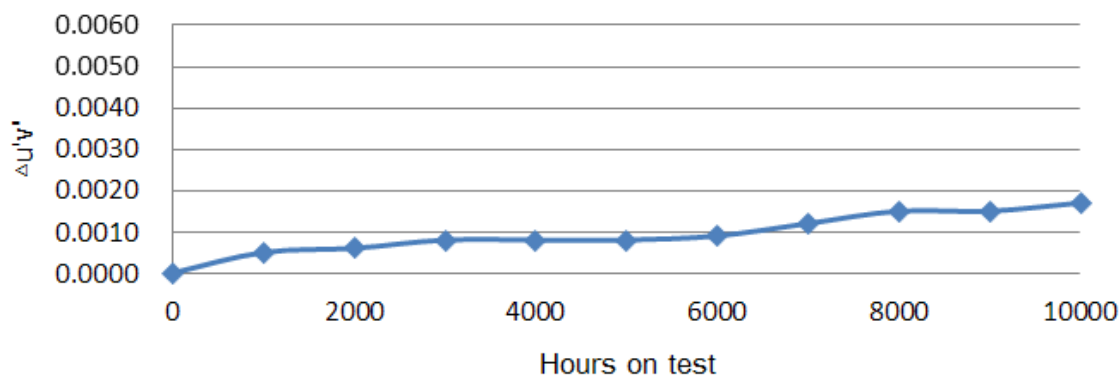
Case temperature: 85°C

Drive current: 0.06 A

Chromaticity Shift Data:

Sample No.	0h			Chromaticity Shift									
	u'	v'	CCT K	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	0.2586	0.5314	2765	0.0004	0.0006	0.001	0.0011	0.001	0.0009	0.0012	0.0012	0.0013	0.0015
2	0.2599	0.5318	2736	0.0003	0.0005	0.0008	0.001	0.0008	0.001	0.0012	0.0016	0.0016	0.0019
3	0.2602	0.5323	2728	0.0005	0.0007	0.0011	0.0009	0.0009	0.0007	0.0012	0.0015	0.0017	0.0022
4	0.2614	0.5323	2703	0.0005	0.0006	0.0007	0.0006	0.0008	0.001	0.0013	0.0016	0.0017	0.0021
5	0.2609	0.5303	2721	0.0008	0.0005	0.0009	0.0009	0.001	0.001	0.0013	0.0015	0.0016	0.0020
6	0.2601	0.5332	2727	0.0002	0.0004	0.0004	0.0006	0.0007	0.0007	0.0009	0.0014	0.0015	0.0016
7	0.2600	0.5316	2734	0.0003	0.0005	0.0005	0.0006	0.0008	0.0008	0.0008	0.0017	0.0017	0.0021
8	0.2582	0.5308	2775	0.0006	0.0006	0.0007	0.0007	0.0009	0.001	0.0011	0.0014	0.0013	0.0015
9	0.2611	0.5325	2709	0.0006	0.0008	0.0008	0.0008	0.0008	0.0008	0.001	0.0013	0.0013	0.0015
10	0.2587	0.5330	2755	0.0006	0.0007	0.001	0.001	0.001	0.001	0.0013	0.0016	0.0015	0.0019
11	0.2608	0.5330	2713	0.0002	0.0003	0.0005	0.0006	0.0006	0.0008	0.0012	0.0011	0.0011	0.0013
12	0.2590	0.5302	2761	0.0006	0.0008	0.001	0.0009	0.0008	0.0008	0.0012	0.0017	0.0016	0.0020
13	0.2603	0.5311	2730	0.0008	0.0008	0.0006	0.0006	0.0007	0.0009	0.001	0.0017	0.0018	0.0020
14	0.2586	0.5312	2765	0.0001	0.0003	0.0007	0.0007	0.0007	0.0006	0.0013	0.0015	0.0015	0.0018
15	0.2581	0.5333	2767	0.0003	0.0005	0.0006	0.0009	0.001	0.0009	0.0011	0.0013	0.0011	0.0012
16	0.2584	0.5310	2770	0.0008	0.0011	0.001	0.0012	0.0011	0.0011	0.0014	0.0011	0.0012	0.0013
17	0.2586	0.5309	2767	0.0003	0.0005	0.0007	0.0007	0.0008	0.0011	0.0014	0.0011	0.0013	0.0014
18	0.2586	0.5321	2761	0.0007	0.0007	0.0008	0.0008	0.0009	0.0011	0.001	0.0013	0.0013	0.0016
19	0.2619	0.5307	2699	0.0007	0.0009	0.001	0.001	0.0012	0.001	0.0013	0.0016	0.0014	0.0015
20	0.2608	0.5309	2721	0.0005	0.0005	0.0008	0.001	0.001	0.001	0.001	0.0014	0.0015	0.0017
21	0.2588	0.5305	2764	0.0003	0.0006	0.0008	0.0011	0.0008	0.0007	0.0013	0.0016	0.0014	0.0015
22	0.2589	0.5319	2756	0.0002	0.0006	0.0008	0.0007	0.0006	0.0007	0.0013	0.0013	0.0016	0.0019
23	0.2617	0.5325	2696	0.0003	0.0004	0.0006	0.0011	0.0007	0.0009	0.0008	0.0017	0.0017	0.0019
24	0.2586	0.5313	2765	0.0005	0.001	0.0006	0.0007	0.0007	0.001	0.001	0.0016	0.0015	0.0017
25	0.2611	0.5308	2715	0.0005	0.0005	0.0009	0.001	0.0008	0.001	0.0012	0.0017	0.0014	0.0018
Avg	0.2596	0.5318	2740	0.0005	0.0006	0.0008	0.0008	0.0008	0.0009	0.0012	0.0015	0.0015	0.0017
Max	0.2619	0.5333	2775	0.0008	0.0011	0.0011	0.0012	0.0012	0.0011	0.0014	0.0017	0.0018	0.0022
Min	0.2581	0.5302	2696	0.0001	0.0003	0.0004	0.0006	0.0006	0.0006	0.0008	0.0011	0.0011	0.0012

Chromaticity Shift at 85 °C



Model Number: BXVN-XXE-11L-3AV

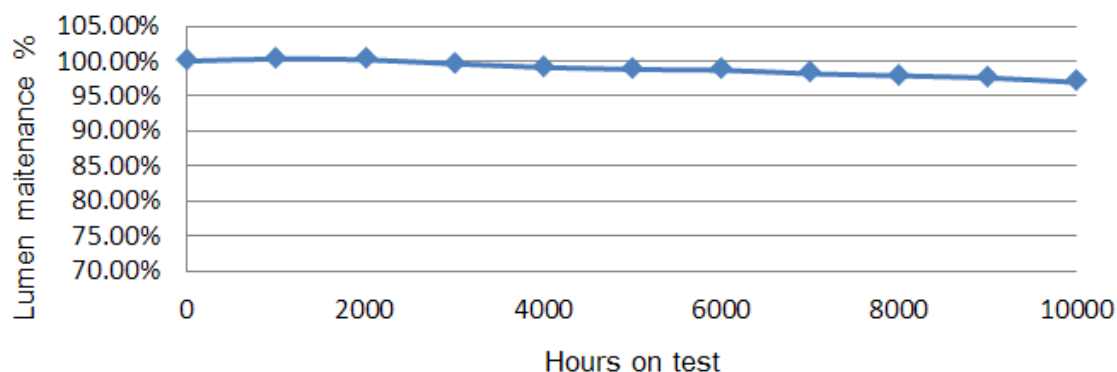
Case temperature: 105°C

Drive current: 0.06 A

Lumen Maintenance Data:

Sample No.	0h		Lumen Maintenance (%)									
	Vf (V)	Flux (lm)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	2.90	23.85	100.2%	100.0%	99.3%	98.7%	98.5%	98.4%	97.8%	97.3%	97.0%	96.5%
2	2.89	21.71	100.4%	100.1%	99.6%	99.0%	98.7%	98.6%	98.3%	97.8%	97.4%	96.7%
3	2.89	21.37	100.0%	99.9%	99.1%	98.5%	98.3%	98.1%	97.6%	97.3%	97.0%	96.2%
4	2.89	23.55	99.9%	99.6%	98.9%	98.5%	98.3%	98.1%	97.7%	97.2%	97.0%	96.4%
5	2.92	24.78	99.7%	99.5%	99.1%	98.5%	98.2%	98.0%	97.6%	97.3%	97.1%	96.4%
6	2.89	23.12	100.4%	100.2%	99.8%	99.3%	99.0%	98.8%	98.4%	98.1%	97.7%	96.8%
7	2.87	21.27	101.5%	101.3%	100.8%	100.4%	100.0%	99.9%	99.4%	99.2%	98.9%	98.6%
8	2.87	20.97	101.7%	101.6%	101.0%	100.5%	100.3%	100.1%	99.6%	99.2%	98.8%	98.6%
9	2.87	24.00	99.9%	99.7%	99.0%	98.4%	98.2%	98.1%	97.6%	97.2%	96.9%	96.3%
10	2.85	24.15	101.1%	100.8%	100.4%	99.7%	99.5%	99.4%	99.1%	98.8%	98.6%	97.8%
11	2.89	24.61	99.4%	99.2%	98.6%	98.0%	97.8%	97.7%	97.3%	96.9%	96.6%	95.7%
12	2.90	24.98	99.6%	99.4%	98.9%	98.4%	98.2%	98.0%	97.7%	97.4%	97.2%	96.5%
13	2.85	24.57	99.8%	99.6%	98.9%	98.5%	98.3%	98.2%	97.9%	97.5%	97.2%	96.8%
14	2.87	21.29	99.8%	99.8%	99.3%	98.8%	98.7%	98.6%	98.0%	97.7%	97.4%	96.7%
15	2.87	24.49	101.4%	101.3%	100.7%	100.3%	100.1%	99.9%	99.3%	99.0%	98.6%	98.3%
16	2.88	23.06	100.0%	99.9%	99.4%	98.9%	98.6%	98.4%	98.0%	97.8%	97.4%	96.9%
17	2.87	23.67	100.4%	100.3%	99.8%	99.4%	99.0%	98.8%	98.4%	97.9%	97.7%	97.3%
18	2.90	22.81	101.2%	100.9%	100.3%	99.9%	99.7%	99.6%	99.1%	98.7%	98.3%	97.8%
19	2.91	23.41	100.3%	100.2%	99.6%	99.1%	98.9%	98.8%	98.2%	97.8%	97.5%	96.7%
20	2.89	24.13	100.1%	99.9%	99.2%	98.6%	98.4%	98.2%	97.9%	97.6%	97.3%	96.6%
21	2.91	23.5	100.5%	100.0%	99.8%	99.2%	99.6%	98.4%	98.2%	98.6%	98.1%	95.9%
22	2.9	21.89	100.1%	99.2%	99.5%	99.4%	99.1%	99.2%	98.4%	98.2%	98.1%	97.9%
23	2.85	24.06	100.2%	100.0%	100.7%	99.3%	98.6%	97.9%	97.2%	98.1%	98.5%	98.4%
24	2.89	22.45	99.5%	101.3%	100.5%	100.3%	98.0%	98.5%	97.9%	97.1%	96.9%	96.6%
25	2.86	24.75	101.1%	101.2%	98.6%	98.2%	99.0%	99.3%	99.3%	97.5%	96.9%	97.7%
Avg	2.88	23.30	100.3%	100.2%	99.6%	99.1%	98.8%	98.7%	98.2%	97.9%	97.6%	97.0%
Max	2.92	24.98	101.7%	101.6%	101.0%	100.5%	100.3%	100.1%	99.6%	99.2%	98.9%	98.6%
Min	2.85	20.97	99.4%	99.2%	98.6%	98.0%	97.8%	97.7%	97.3%	96.9%	96.6%	95.7%

Lumen Maintenance 105 °C



Model Number: BXVN-XXE-11L-3AV

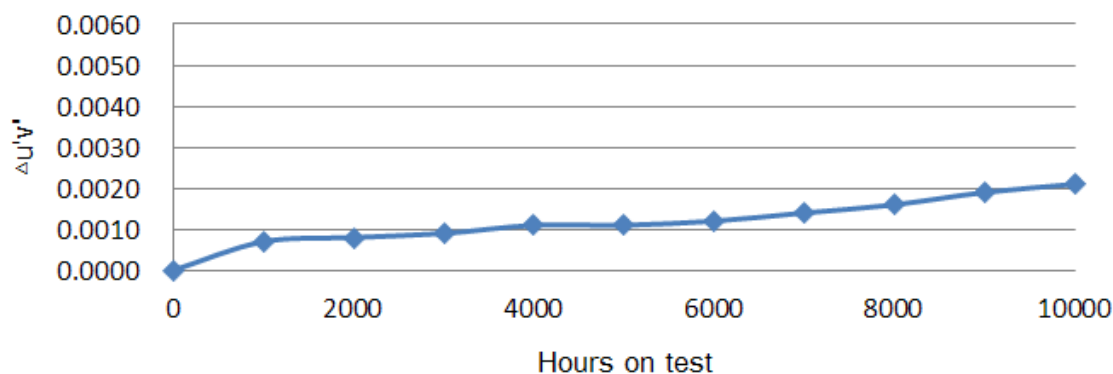
Case temperature: 105°C

Drive current: 0.06 A

Chromaticity Shift Data:

Sample No.	0h			Chromaticity Shift									
	u'	v'	CCT K	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	0.2591	0.5313	2755	0.0009	0.0009	0.0013	0.0015	0.0017	0.0016	0.0018	0.002	0.0023	0.0027
2	0.2608	0.5343	2708	0.0013	0.0016	0.0017	0.0016	0.0017	0.0019	0.002	0.0023	0.0026	0.0026
3	0.2598	0.5308	2743	0.0006	0.0006	0.0005	0.0011	0.001	0.0011	0.0012	0.0015	0.0018	0.0022
4	0.2605	0.5326	2721	0.001	0.0013	0.0011	0.0014	0.0012	0.0015	0.0015	0.0017	0.002	0.0023
5	0.2574	0.5311	2791	0.0009	0.001	0.0008	0.0012	0.0011	0.0011	0.0015	0.0018	0.0021	0.0021
6	0.2596	0.5295	2752	0.0008	0.001	0.0012	0.0013	0.0012	0.0015	0.0015	0.0018	0.0021	0.0021
7	0.2614	0.5326	2701	0.0006	0.0005	0.0006	0.0006	0.0008	0.0009	0.0012	0.0015	0.0018	0.0019
8	0.2606	0.5324	2719	0.0007	0.0006	0.0008	0.0008	0.0011	0.0013	0.0012	0.0014	0.0017	0.0016
9	0.2632	0.5315	2670	0.001	0.0011	0.0011	0.0012	0.0011	0.001	0.0014	0.0016	0.0019	0.0022
10	0.2602	0.5335	2723	0.0001	0.0001	0.0002	0.0005	0.0004	0.0006	0.0006	0.0009	0.0011	0.0013
11	0.2606	0.5297	2730	0.0009	0.0007	0.0005	0.0011	0.001	0.001	0.0014	0.0016	0.0018	0.0021
12	0.2589	0.5331	2751	0.0007	0.0009	0.0007	0.0011	0.0012	0.0015	0.0014	0.0017	0.002	0.002
13	0.2613	0.5318	2706	0.0008	0.001	0.0008	0.0012	0.0011	0.0013	0.0015	0.0018	0.0021	0.0025
14	0.2597	0.5335	2733	0.0009	0.0009	0.0008	0.0007	0.0008	0.0008	0.0012	0.0015	0.0018	0.0017
15	0.2585	0.5334	2757	0.0004	0.0003	0.0004	0.0006	0.0006	0.001	0.0009	0.0012	0.0014	0.0017
16	0.2612	0.5328	2705	0.0007	0.0008	0.0012	0.0013	0.0013	0.0017	0.0016	0.0019	0.0022	0.0025
17	0.2604	0.5314	2727	0.0006	0.0007	0.0006	0.0008	0.0009	0.001	0.0011	0.0014	0.0017	0.0017
18	0.2611	0.5312	2714	0.0002	0.0002	0.0005	0.0009	0.0008	0.0012	0.0012	0.0015	0.0018	0.0017
19	0.2583	0.5320	2768	0.001	0.0009	0.0013	0.0014	0.0011	0.0013	0.0016	0.0018	0.0021	0.0023
20	0.2583	0.5305	2774	0.0006	0.0011	0.0011	0.0014	0.0014	0.0015	0.0016	0.0018	0.0021	0.0022
21	0.2631	0.5330	2666	0.0004	0.0011	0.0005	0.001	0.0009	0.0008	0.0014	0.0019	0.0017	0.002
22	0.2631	0.5318	2671	0.0006	0.0009	0.0011	0.0005	0.0016	0.0007	0.001	0.001	0.002	0.0015
23	0.2605	0.5305	2729	0.0009	0.0009	0.0007	0.0011	0.0017	0.0015	0.0018	0.0011	0.0013	0.0018
24	0.2586	0.5306	2768	0.0009	0.0016	0.0014	0.0006	0.0013	0.0016	0.0016	0.0019	0.0026	0.0021
25	0.2602	0.5302	2736	0.0007	0.0004	0.0016	0.0014	0.0005	0.0012	0.0009	0.0009	0.0019	0.0015
Avg	0.2603	0.5318	2729	0.0007	0.0008	0.0009	0.0011	0.0011	0.0012	0.0014	0.0016	0.0019	0.0020
Max	0.2632	0.5343	2791	0.0013	0.0016	0.0017	0.0016	0.0017	0.0019	0.0020	0.0023	0.0026	0.0027
Min	0.2574	0.5295	2666	0.0001	0.0001	0.0002	0.0005	0.0004	0.0006	0.0006	0.0009	0.0011	0.0013

Chromaticity Shift at 105 °C



TM-21 Report:

Table 1: Report at each LM-80 Test Condition					
Description of LED Light Source Tested (manufacturer, model, catalog number)		Bridgelux Inc. Model Number: BXVN-XXE-11L-3AV Drive current: 0.06 A			
Test Condition 1 - 55°C Case Temp		Test Condition 2 - 85°C Case Temp		Test Condition 1 - 105°C Case Temp	
Sample size	25	Sample size	25	Sample size	25
Number of failures	0	Number of failures	0	Number of failures	0
DUT drive current used in the test (mA)	60	DUT drive current used in the test (mA)	60	DUT drive current used in the test (mA)	60
Test duration (hours)	10,000	Test duration (hours)	10,000	Test duration (hours)	10,000
Test duration used for projection (hour to hour)	5,000 - 10,000	Test duration used for projection (hour to hour)	5,000 - 10,000	Test duration used for projection (hour to hour)	5,000 - 10,000
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	105
α	2.25E-06	α	3.43E-06	α	3.79E-06
B	1.01	B	1.01	B	1.01
Calculated L70(10k) (hours)	163000	Calculated L70(10k) (hours)	107000	Calculated L70(10k) (hours)	96000
Reported L70(10k) (hours)	>60000	Reported L70(10k) (hours)	>60000	Reported L70(10k) (hours)	>60000

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200960-0

Leading Testing Laboratories

Hangzhou City
China

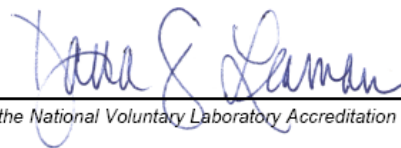
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listed on the Scope of Accreditation, for:*

Energy Efficient Lighting Products

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2016-11-30 through 2017-12-31

Effective Dates



For the National Voluntary Laboratory Accreditation Program

United States Department of Commerce
National Institute of Standards and Technology



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Leading Testing Laboratories

Hangzhou
China

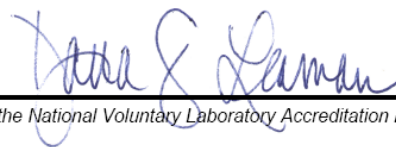
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2015-12-07 through 2016-12-31

Effective Dates



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United States Department of Commerce
National Institute of Standards and Technology



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Leading Testing Laboratories

Hangzhou
China

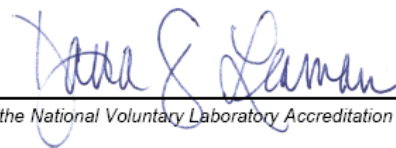
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2015-01-01 through 2015-12-31

Effective Dates



For the National Voluntary Laboratory Accreditation Program

NVLAP[®] National Voluntary Laboratory Accreditation Program

ENERGY EFFICIENT LIGHTING PRODUCTS

NVLAP LAB CODE 200960-

22/S24	ANSI C62.41.2:2002	IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000V and Less) AC Power Circuits
22/S28	IEC 62301:2011	Household Electrical Appliances - Measurement of Standby Power

SSL Life Tests

<u>Code</u>	<u>Designation</u>	<u>Description</u>
22/S08	IES LM-80:2008	Solid State Lighting Luminaires - Lumen Maintenance
22/S08a	IES LM-80:2015	Solid State Lighting Luminaires - Lumen Maintenance
22/S14	EPA Integral LED Lamps v. 1.4 (Appendix E)	ENERGY STAR [®] Elevated Temperature Testing for Integral LED Lamps
22/S18	EPA Lamps v. 1.0	Ambient Temperature Life Testing
22/S19	EPA Lamps v. 1.0	Elevated Temperature Life Testing
22/S25	IES LM-84:2014	Approved Method for Measuring Luminous Flux and Color Maintenance of LED Lamps, Light Engines, and Luminaires

End of the Report

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