



TEST REPORT

ACCORDING TO IES LM-80-2015

For

Hongli Zhihui Group Co.,Ltd. Guangzhou Branch

Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China

Model: HL-EMC-7070D90W-B2C12-S1-HR3

Report Type: 9000 Hours Test Report		Product Type: LED Package	
Reviewed By:	Pote Wang <i>Pote Wang</i>		
Report Number:	SZ2220810-36298E-EE		
Test Date:	2016-08-26 to 2017-09-06		
Report Date:	2022-08-19		
Approved by:	Blake Zhang / EE Engineer <i>Blake Zhang</i>		
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1 - General Information

1.1 Description of LED Light Sources

Sample Size:

50 PCS samples were received on 2016-08-22. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-EMC-7070D90W-B2C12-S1-HR3
Part Type:	LED Package
#Drive Level:	DC 300mA
#Nominal CCT:	2700K
#Power:	10.8 W
#Average Current Density per LED die:	390.75 mA/mm ²
#Average Power Density per LED die:	1.303 W/mm ²
#CRI:	80
#Die Spacing:	0.2mm

#Family products covered by this report:

According to ENERGY STAR® Requirements for the Use of LM-80 Data, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of ENERGY STAR® Requirements for the Use of LM-80 Data (September 28, 2017)

This report covers the following models:

Model type	Model name	CRI (typ.)	CCT (typ.)	Series	Parallel	Power density (W/mm ²)	Current density per LED die (mA/mm ²)	Current per die (mA)	Distance Between of dies(mm)	Current (mA)
Test model	HL-EMC-7070D46W-B2C12-S1-HR3	80	2700K	12	2	0.221	390.75	150	0.2	300
Multiple model	HL-EMC-7070D90W-B2C12-S1-HR3	80	2700-6500K	12	2	0.221	325.63	150	0.2	300
	HL-EMC-7070D***W-B2C12-S1-HR3-***	80	2700-6500K	12	2	0.221	390.75	150	0.2	300
	HL-EMC-7070D***W-B1C24-S1-HR3	80	2700-6500K	24	1	0.147	344.45	100	0.2	100
	HL-EMC-7070D***W-B1C16-S1-HR3	80	2700-6500K	16	1	0.178	362.33	180	0.2	180

Note:

The model name begins with "HL", such as " HL-EMC-7070D***W-B2C12-S1-HR3-***" , "*" is described in detail as follows :

1. The first "****" is a number from 1 to 999 which stands for the brightness level.
2. The second "****" is the letter, which stands for the customer code.

Note:

1. The applicant Hongli Zhihui Group Co.,Ltd. Guangzhou Branch declare that their products with model HL-EMC-7070D90W-B2C12-S1-HR3 are the same to the products in report#R2DG160822052-10-9000 and is authorized by original applicant to use their test data.
2. All the data in previous report (R2DG160822052-10-9000) is shared in this report.

1.2 Standards Used:

- IESNA LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- ENERGY STAR® Requirements for the Use of LM-80 Data (This standard was not accredited by IAS)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
0.3m integrating sphere	EVERFINE	Diameter 0.3m	1011119	0.3m	2017-03-09	2018-03-09
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	15V/2000mA	2017-03-03	2018-03-03
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2017-03-09	2018-03-09
Standard Light Source	EVERFINE	D062	1011093	3000K	2016-09-13	2017-09-13
Precision digital stabilized DC power supply	EVERFINE	WY605-V110	G115987C J7321114	300VA	2017-03-03	2018-03-03
Multilayer aging machine	BACL	B2-270	20015	25°C~130°C	2017-03-03	2018-03-03
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090005	(50/15A)	2017-03-03	2018-03-03
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090006	(50/15A)	2017-03-03	2018-03-03

1.4 Drive Level

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within ±3% of the specified value of

the manufacturer during maintenance test, and was within $\pm 0.5\%$ during photometric and electrical measurement test.

1.5 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case (TMP_{LED}) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing, TMP_{LED} of the coldest LEDs were maintained at a temperature that was greater than or equal to 2°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°C below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 "Special Limits".

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within $\pm 3\%$ of the specified value of the manufacturer.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, RH $< 65\%$.

1.6 Measurement Uncertainty

The uncertainty of the light output (luminous flux) measurements is $U=1.59\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=21\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=1.7$ ($K=2$), at the 95% confidence level.

The uncertainty of the temperature is $U=0.8671^{\circ}\text{C}$ ($K=2$), at the 95% confidence level.

1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

1.8 Sample Set

Data Set 1: 85°C, 300mA

Part Number: HL-EMC-7070D90W-B2C12-S1-HR3

Number of Units: 25

Case Temperature: >83°C

Ambient Temperature: >80°C

Life Test Drive Current: 300mA

Measurement Current: 300mA

Data Set 2: 105°C,300mA

Part Number: HL-EMC-7070D90W-B2C12-S1-HR3

Number of Units: 25

Case Temperature: >103°C

Ambient Temperature: >100°C

Life Test Drive Current: 300mA

Measurement Current: 300mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 L ₇₀ Lifetime
1	25	0	1000	9000	>54000 hours
2	25	0	1000	9000	>54000 hours

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000	2000	3000	4000	5000	6000	7000	8000	9000
1	100.22%	99.88%	99.57%	99.32%	99.07%	98.77%	98.49%	98.19%	97.86%
2	100.09%	99.69%	99.35%	99.06%	98.72%	98.37%	98.01%	97.63%	97.27%

Average Color Maintenance

Data Set:	1000	2000	3000	4000	5000	6000	7000	8000	9000
1	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0018	0.0020	0.0024
2	0.0004	0.0007	0.0009	0.0012	0.0015	0.0016	0.0019	0.0023	0.0024

3 - Test Data

3.1 Data Set 1, 85°C, 300mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	1710	100.06	99.59	99.24	99.01	98.89	98.60	98.30	98.01	97.72
2	1712	100.23	99.88	99.59	99.24	98.95	98.42	98.01	97.78	97.43
3	1728	100.29	99.88	99.71	99.59	99.48	99.07	98.61	98.26	97.92
4	1784	100.34	100.06	99.61	99.55	99.22	98.82	98.54	98.21	97.76
5	1727	100.41	100.06	99.59	99.19	98.90	98.84	98.38	98.26	98.03
6	1711	100.18	99.71	99.30	99.18	99.01	98.89	98.83	98.60	98.36
7	1713	100.41	100.12	99.53	99.36	99.07	98.54	98.37	98.13	97.96
8	1766	100.17	99.77	99.66	99.26	99.09	98.75	98.70	98.36	98.07
9	1707	100.12	99.88	99.77	99.36	99.24	98.77	98.59	98.30	97.83
10	1750	100.06	99.77	99.49	99.03	98.80	98.29	97.94	97.77	97.26
11	1693	100.35	100.06	99.59	99.11	98.88	98.70	98.58	98.52	98.05
12	1710	100.29	99.88	99.30	99.12	98.71	98.65	98.25	98.01	97.72
13	1713	100.35	100.23	99.94	99.71	99.42	99.18	98.95	98.42	98.13
14	1758	99.94	99.72	99.43	99.09	98.81	98.58	98.35	98.01	97.72
15	1674	100.42	99.88	99.52	99.40	99.22	98.98	98.69	98.57	98.51
16	1727	100.41	100.06	99.59	99.42	99.36	99.13	98.90	98.38	98.03
17	1750	100.29	99.94	99.71	99.31	98.97	98.57	98.23	97.77	97.37
18	1752	100.06	99.60	99.26	99.09	99.03	98.92	98.63	98.40	98.00
19	1748	99.94	99.54	99.43	99.37	99.03	98.91	98.63	98.34	98.11
20	1714	100.23	100.06	99.94	99.71	99.47	99.12	98.89	98.60	98.13
21	1717	100.17	99.71	99.48	99.24	99.01	98.95	98.43	98.02	97.55
22	1762	100.06	99.94	99.49	99.26	98.98	98.52	98.01	97.62	97.56
23	1720	100.41	100.06	99.83	99.71	99.36	98.78	98.60	98.26	97.85
24	1717	100.06	99.77	99.48	99.36	98.95	98.72	98.43	98.25	97.85
25	1745	100.17	99.89	99.66	99.26	98.97	98.57	98.45	97.99	97.65
Ave.	1728	100.22	99.88	99.57	99.32	99.07	98.77	98.49	98.19	97.86
Med.	1720	100.23	99.88	99.59	99.26	99.01	98.77	98.54	98.26	97.85
st dev	25	0.1509	0.1799	0.1901	0.2079	0.2172	0.2326	0.2737	0.2752	0.2987
Min.	1674	99.94	99.54	99.24	99.01	98.71	98.29	97.94	97.62	97.26
Max.	1784	100.42	100.23	99.94	99.71	99.48	99.18	98.95	98.60	98.51

TM-21 Projection:

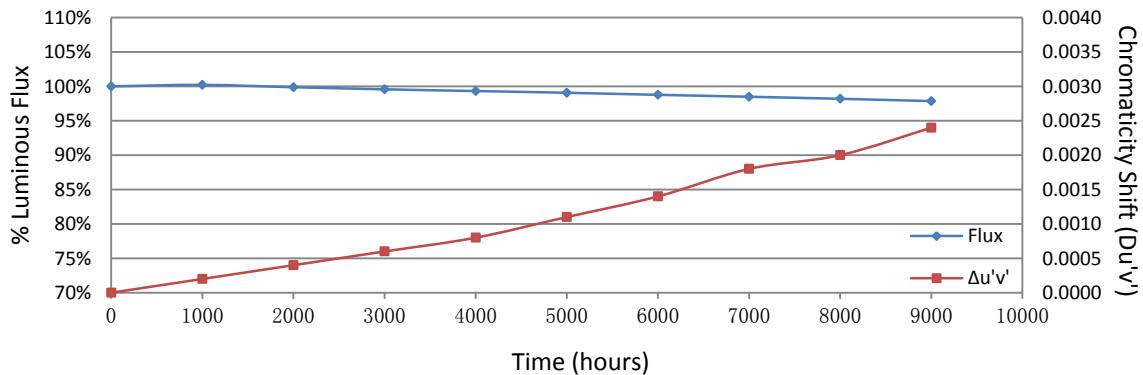
Test Duration: 9000 hours
Failures Observed: 0
α: 2.961E-06
β: 1.005
Reported L₇₀: >54000 hours

3.2 Data Set 1, 85°C, 300mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	35.99	36.08	36.07	36.03	36.13	36.09	35.99	36.11	35.97	36.32
2	36.15	36.26	36.23	36.16	36.34	36.26	36.15	36.27	36.04	36.65
3	36.14	36.16	36.14	36.10	36.20	36.13	36.05	36.17	35.99	36.17
4	36.22	36.17	36.12	36.11	36.13	36.11	36.06	36.15	36.00	36.11
5	36.15	36.18	36.13	36.12	36.14	36.12	36.08	36.08	36.03	36.12
6	35.87	35.89	35.85	35.83	35.85	35.86	35.76	35.82	35.75	35.84
7	36.00	36.07	36.00	36.01	36.03	36.06	35.97	35.99	35.94	36.03
8	36.22	36.19	36.23	36.18	36.19	36.26	36.10	36.13	36.09	36.21
9	36.06	36.06	36.09	36.05	36.05	36.12	35.97	35.97	35.93	36.03
10	36.12	36.14	36.14	36.12	36.11	36.17	36.01	36.10	35.99	36.11
11	36.32	36.38	36.33	36.29	36.28	36.36	36.20	36.27	36.18	36.26
12	36.37	36.41	36.36	36.34	36.36	36.38	36.25	36.30	36.23	36.41
13	36.07	36.13	36.08	36.06	36.10	36.11	36.00	36.06	36.02	36.05
14	36.03	36.06	36.02	35.99	36.06	36.02	35.92	35.95	35.94	35.98
15	36.13	36.21	36.12	36.09	36.17	36.16	36.01	36.07	35.94	36.19
16	36.24	36.29	36.24	36.21	36.27	36.27	36.13	36.19	36.08	36.22
17	36.39	36.44	36.38	36.37	36.42	36.40	36.24	36.28	36.41	36.35
18	36.14	36.20	36.14	36.13	36.15	36.16	36.05	36.09	36.11	36.25
19	36.17	36.18	36.16	36.17	36.18	36.18	36.05	36.09	36.10	36.13
20	36.17	36.20	36.15	36.19	36.22	36.21	36.09	36.13	36.11	36.13
21	36.13	36.18	36.12	36.18	36.23	36.19	36.07	36.04	36.06	36.11
22	36.09	36.11	36.08	36.13	36.17	36.14	36.01	35.97	36.03	36.16
23	35.93	35.96	35.93	35.94	36.05	35.95	35.82	35.83	35.82	36.20
24	36.14	36.17	36.14	36.12	36.21	36.16	36.05	36.08	36.04	36.22
25	36.13	36.20	36.12	36.11	36.20	36.07	36.04	36.08	36.02	36.20
Ave.	36.13	36.17	36.13	36.12	36.17	36.16	36.04	36.09	36.03	36.18
Med.	36.14	36.18	36.13	36.12	36.17	36.16	36.05	36.09	36.03	36.17
st dev	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.12	0.13	0.16
Min.	35.87	35.89	35.85	35.83	35.85	35.86	35.76	35.82	35.75	35.84
Max.	36.39	36.44	36.38	36.37	36.42	36.40	36.25	36.30	36.41	36.65

3.3 Data Set 1, 85°C, 300mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)								
				0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs
1	0.2598	0.5232	2776	0.0000	0.0003	0.0004	0.0009	0.0009	0.0016	0.0016	0.0019	0.0020
2	0.2590	0.5251	2785	0.0002	0.0004	0.0004	0.0006	0.0009	0.0016	0.0015	0.0023	0.0020
3	0.2588	0.5227	2799	0.0002	0.0004	0.0006	0.0008	0.0014	0.0019	0.0020	0.0025	0.0026
4	0.2599	0.5250	2765	0.0004	0.0005	0.0007	0.0013	0.0015	0.0017	0.0026	0.0028	0.0032
5	0.2591	0.5264	2777	0.0001	0.0004	0.0005	0.0007	0.0011	0.0012	0.0018	0.0022	0.0027
6	0.2599	0.5250	2765	0.0001	0.0003	0.0008	0.0009	0.0012	0.0016	0.0018	0.0021	0.0028
7	0.2590	0.5237	2790	0.0001	0.0004	0.0006	0.0008	0.0011	0.0015	0.0018	0.0020	0.0026
8	0.2594	0.5237	2781	0.0004	0.0002	0.0006	0.0009	0.0010	0.0015	0.0019	0.0021	0.0027
9	0.2595	0.5229	2784	0.0003	0.0000	0.0005	0.0007	0.0009	0.0014	0.0020	0.0022	0.0026
10	0.2598	0.5233	2775	0.0002	0.0003	0.0005	0.0009	0.0010	0.0015	0.0017	0.0021	0.0026
11	0.2600	0.5269	2755	0.0001	0.0004	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0027
12	0.2603	0.5273	2746	0.0000	0.0004	0.0005	0.0007	0.0010	0.0013	0.0016	0.0018	0.0022
13	0.2594	0.5229	2787	0.0003	0.0005	0.0007	0.0007	0.0009	0.0013	0.0016	0.0016	0.0025
14	0.2593	0.5234	2786	0.0001	0.0005	0.0006	0.0006	0.0013	0.0013	0.0018	0.0017	0.0024
15	0.2596	0.5270	2762	0.0000	0.0005	0.0006	0.0006	0.0011	0.0016	0.0018	0.0025	0.0024
16	0.2595	0.5249	2774	0.0001	0.0005	0.0009	0.0006	0.0010	0.0015	0.0017	0.0021	0.0024
17	0.2603	0.5277	2744	0.0001	0.0005	0.0008	0.0010	0.0011	0.0014	0.0018	0.0013	0.0021
18	0.2598	0.5246	2769	0.0001	0.0004	0.0005	0.0008	0.0010	0.0013	0.0016	0.0015	0.0019
19	0.2596	0.5257	2769	0.0001	0.0006	0.0006	0.0010	0.0011	0.0014	0.0018	0.0019	0.0022
20	0.2595	0.5231	2782	0.0001	0.0006	0.0003	0.0008	0.0010	0.0013	0.0017	0.0019	0.0023
21	0.2592	0.5250	2779	0.0002	0.0005	0.0003	0.0005	0.0009	0.0009	0.0017	0.0019	0.0022
22	0.2592	0.5246	2782	0.0001	0.0006	0.0003	0.0008	0.0010	0.0012	0.0019	0.0020	0.0022
23	0.2591	0.5253	2781	0.0002	0.0006	0.0005	0.0006	0.0011	0.0013	0.0018	0.0022	0.0021
24	0.2605	0.5252	2751	0.0001	0.0005	0.0006	0.0007	0.0011	0.0013	0.0017	0.0021	0.0021
25	0.2599	0.5255	2762	0.0001	0.0004	0.0005	0.0007	0.0012	0.0012	0.0015	0.0020	0.0021
Ave.	0.2596	0.5248	2773	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0018	0.0020	0.0024
Med.	0.2595	0.5250	2776	0.0001	0.0004	0.0006	0.0008	0.0011	0.0014	0.0018	0.0020	0.0024
st dev	0.0004	0.0015	14	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
Min.	0.2588	0.5227	2744	0.0000	0.0000	0.0003	0.0005	0.0009	0.0009	0.0015	0.0013	0.0019
Max.	0.2605	0.5277	2799	0.0004	0.0006	0.0009	0.0013	0.0015	0.0019	0.0026	0.0028	0.0032



3.4 Data Set 2, 105°C, 300mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	1743	100.17	99.66	99.37	99.14	98.85	98.45	98.16	97.82	97.48
27	1753	100.23	99.66	99.54	99.20	98.92	98.29	98.17	97.95	97.60
28	1771	100.06	99.55	99.38	99.15	99.04	98.64	98.25	97.68	97.57
29	1751	100.17	99.71	99.60	99.20	98.63	98.34	98.06	97.54	97.26
30	1735	100.23	99.83	99.77	99.48	99.31	98.85	98.73	98.50	98.04
31	1743	99.77	99.54	98.91	98.57	98.34	98.05	97.71	97.19	97.07
32	1733	100.23	100.06	99.77	99.60	99.25	98.67	98.04	97.86	97.58
33	1741	100.06	99.83	99.71	99.43	98.91	98.62	98.28	97.82	97.42
34	1734	100.17	99.88	99.83	99.54	99.19	98.79	98.56	98.10	97.81
35	1710	100.23	99.65	99.06	98.89	98.36	98.30	97.89	97.60	97.08
36	1723	100.06	99.54	98.96	98.72	98.26	97.74	97.16	96.98	96.75
37	1729	99.94	99.48	99.25	98.90	98.67	98.32	98.09	97.63	97.34
38	1716	99.88	99.65	99.18	99.01	98.60	98.02	97.61	97.09	96.91
39	1759	100.06	99.49	99.15	98.81	98.41	97.84	97.50	97.27	97.04
40	1704	99.82	99.41	98.83	98.47	98.12	98.00	97.83	97.24	96.77
41	1719	100.17	99.71	99.42	98.95	98.78	98.72	98.14	97.73	97.27
42	1715	100.29	99.88	99.71	99.24	98.72	98.31	97.73	97.32	96.85
43	1676	100.30	99.76	99.34	99.22	98.75	98.45	98.15	97.97	97.43
44	1744	100.06	99.77	99.20	98.97	98.68	98.28	98.17	97.94	97.65
45	1708	100.18	99.77	99.59	99.41	99.30	99.24	99.00	98.77	98.30
46	1703	99.88	99.65	99.00	98.65	98.47	98.41	97.77	97.36	96.71
47	1787	100.22	99.72	99.50	99.16	98.71	98.55	98.10	97.59	97.09
48	1681	100.24	99.88	99.41	99.11	98.63	98.16	97.92	97.32	96.97
49	1728	99.83	99.48	99.19	98.90	98.55	98.09	97.57	97.16	96.93
50	1749	100.11	99.66	99.09	98.80	98.51	98.00	97.66	97.26	96.86
Ave.	1730	100.09	99.69	99.35	99.06	98.72	98.37	98.01	97.63	97.27
Med.	1733	100.17	99.66	99.37	99.11	98.68	98.32	98.06	97.60	97.26
st dev	26	0.1572	0.1560	0.2924	0.3017	0.3221	0.3468	0.3992	0.4354	0.4161
Min.	1676	99.77	99.41	98.83	98.47	98.12	97.74	97.16	96.98	96.71
Max.	1787	100.30	100.06	99.83	99.60	99.31	99.24	99.00	98.77	98.30

TM-21 Projection:

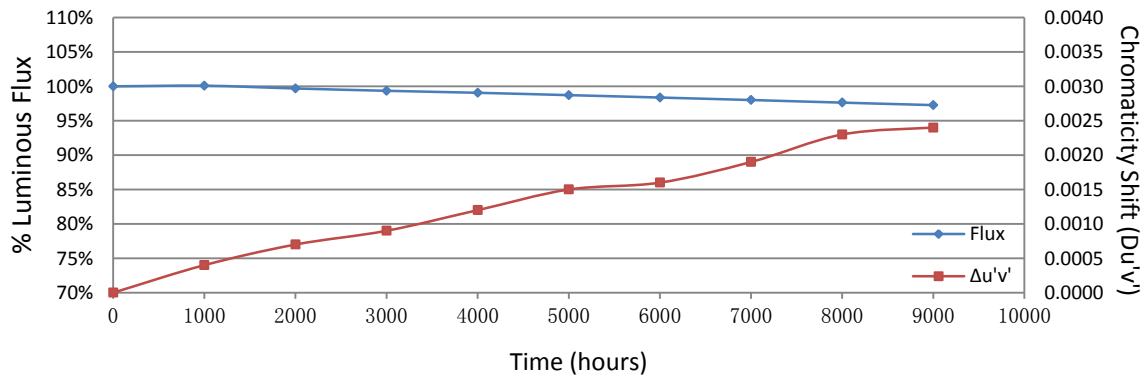
Test Duration: 9000 hours
Failures Observed: 0
 α : 3.661E-06
 β : 1.005
Reported L₇₀: >54000 hours

3.5 Data Set 2, 105°C, 300mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	36.19	36.16	36.16	36.17	36.12	36.14	36.05	36.01	36.02	36.11
27	36.24	36.21	36.32	36.23	36.16	36.20	36.08	36.05	36.06	36.08
28	35.92	35.91	35.92	35.92	35.87	35.89	35.75	35.78	35.87	35.82
29	36.16	36.17	36.14	36.16	36.16	36.14	36.14	36.06	36.12	36.06
30	36.06	36.11	36.07	36.09	36.08	36.02	36.00	36.00	36.06	35.97
31	36.07	36.09	36.06	36.05	36.09	36.07	36.00	36.01	35.96	35.99
32	36.19	36.22	36.20	36.17	36.19	36.20	36.14	36.12	36.11	36.13
33	36.21	36.23	36.18	36.20	36.22	36.20	36.15	36.15	36.15	35.96
34	35.96	35.99	35.95	35.97	36.01	35.99	35.94	35.93	35.94	35.81
35	35.82	35.90	35.79	35.81	35.85	35.83	35.93	35.72	35.74	35.79
36	36.19	36.24	36.16	36.18	36.13	36.20	36.25	36.11	36.11	36.25
37	36.03	36.06	36.00	36.01	36.00	36.06	36.04	35.97	35.96	36.11
38	36.38	36.42	36.37	36.38	36.38	36.38	36.34	36.31	36.26	36.46
39	36.09	36.11	36.07	36.10	36.09	36.09	36.14	36.01	35.99	36.08
40	36.13	36.09	36.13	36.13	36.12	36.13	36.18	36.08	36.09	36.14
41	35.98	36.00	36.00	36.01	36.00	36.01	36.00	35.94	35.92	36.01
42	36.20	36.22	36.21	36.20	36.23	36.18	36.16	36.09	36.14	36.17
43	35.74	35.75	35.74	35.70	35.75	35.72	35.76	35.62	35.63	35.74
44	36.08	36.10	36.06	36.06	36.11	36.09	36.11	35.99	36.00	36.11
45	36.24	36.26	36.23	36.24	36.29	36.28	36.28	36.17	36.19	36.30
46	36.32	36.36	36.32	36.29	36.35	36.37	36.33	36.22	36.18	36.33
47	36.25	36.19	36.13	36.13	36.16	36.17	36.15	36.03	36.04	36.13
48	36.20	36.29	36.27	36.26	36.29	36.29	36.24	36.18	36.14	36.24
49	36.02	36.06	36.01	36.07	36.08	36.09	35.99	35.95	35.93	36.02
50	36.03	36.07	35.98	36.11	36.07	36.04	35.98	36.00	35.92	35.99
Ave.	36.11	36.13	36.10	36.11	36.11	36.11	36.09	36.02	36.02	36.07
Med.	36.13	36.11	36.13	36.13	36.12	36.13	36.11	36.01	36.04	36.08
st dev	0.15	0.15	0.16	0.15	0.15	0.15	0.15	0.15	0.14	0.17
Min.	35.74	35.75	35.74	35.70	35.75	35.72	35.75	35.62	35.63	35.74
Max.	36.38	36.42	36.37	36.38	36.38	36.38	36.34	36.31	36.26	36.46

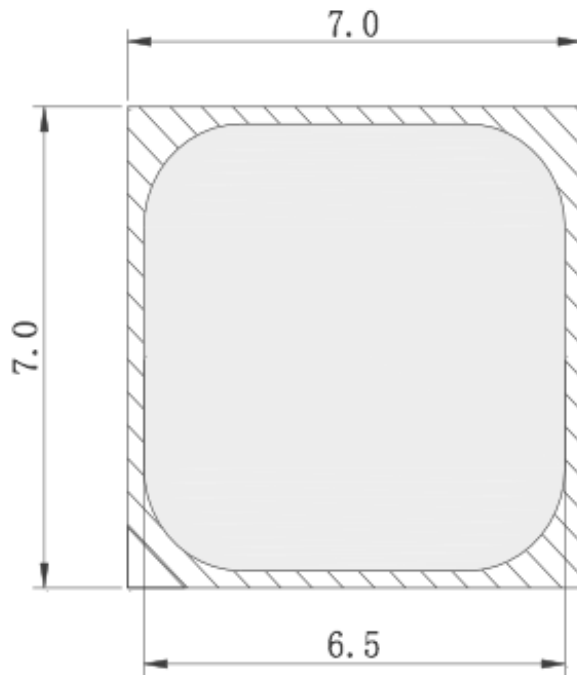
3.6 Data Set 2, 105°C, 300mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)								
				0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs
26	0.2590	0.5228	2794	0.0005	0.0006	0.0005	0.0011	0.0014	0.0017	0.0020	0.0024	0.0022
27	0.2598	0.5262	2762	0.0006	0.0006	0.0004	0.0009	0.0014	0.0016	0.0018	0.0022	0.0023
28	0.2600	0.5254	2761	0.0004	0.0008	0.0008	0.0009	0.0016	0.0019	0.0018	0.0021	0.0024
29	0.2596	0.5239	2776	0.0005	0.0009	0.0008	0.0009	0.0015	0.0013	0.0019	0.0021	0.0026
30	0.2597	0.5259	2765	0.0003	0.0007	0.0009	0.0008	0.0014	0.0014	0.0017	0.0017	0.0022
31	0.2594	0.5248	2777	0.0004	0.0007	0.0011	0.0010	0.0015	0.0016	0.0019	0.0024	0.0023
32	0.2587	0.5234	2798	0.0003	0.0007	0.0010	0.0013	0.0013	0.0014	0.0017	0.0021	0.0021
33	0.2588	0.5222	2803	0.0005	0.0009	0.0012	0.0014	0.0015	0.0016	0.0019	0.0024	0.0008
34	0.2593	0.5233	2785	0.0004	0.0006	0.0009	0.0011	0.0013	0.0013	0.0017	0.0021	0.0011
35	0.2590	0.5252	2783	0.0001	0.0007	0.0009	0.0011	0.0014	0.0016	0.0018	0.0022	0.0021
36	0.2593	0.5225	2790	0.0002	0.0008	0.0011	0.0016	0.0013	0.0018	0.0017	0.0022	0.0017
37	0.2598	0.5234	2775	0.0002	0.0007	0.0011	0.0015	0.0015	0.0015	0.0018	0.0024	0.0023
38	0.2599	0.5273	2755	0.0003	0.0006	0.0009	0.0013	0.0014	0.0016	0.0017	0.0023	0.0023
39	0.2594	0.5233	2783	0.0003	0.0008	0.0009	0.0013	0.0017	0.0014	0.0018	0.0022	0.0026
40	0.2586	0.5244	2797	0.0007	0.0008	0.0009	0.0012	0.0015	0.0013	0.0017	0.0021	0.0027
41	0.2593	0.5229	2788	0.0003	0.0007	0.0008	0.0009	0.0013	0.0013	0.0015	0.0022	0.0025
42	0.2598	0.5237	2774	0.0004	0.0007	0.0009	0.0013	0.0018	0.0020	0.0021	0.0024	0.0030
43	0.2591	0.5262	2777	0.0003	0.0008	0.0011	0.0014	0.0016	0.0014	0.0018	0.0024	0.0027
44	0.2590	0.5221	2799	0.0004	0.0008	0.0010	0.0012	0.0014	0.0019	0.0019	0.0024	0.0026
45	0.2590	0.5225	2796	0.0004	0.0007	0.0009	0.0012	0.0015	0.0018	0.0020	0.0025	0.0027
46	0.2595	0.5269	2766	0.0003	0.0006	0.0010	0.0011	0.0012	0.0017	0.0020	0.0023	0.0025
47	0.2592	0.5235	2788	0.0009	0.0011	0.0015	0.0020	0.0021	0.0025	0.0030	0.0029	0.0032
48	0.2594	0.5243	2780	0.0002	0.0004	0.0008	0.0012	0.0013	0.0019	0.0020	0.0023	0.0026
49	0.2590	0.5248	2785	0.0004	0.0008	0.0009	0.0013	0.0013	0.0020	0.0022	0.0023	0.0026
50	0.2594	0.5235	2782	0.0002	0.0008	0.0005	0.0011	0.0013	0.0017	0.0020	0.0024	0.0029
Ave.	0.2593	0.5242	2782	0.0004	0.0007	0.0009	0.0012	0.0015	0.0016	0.0019	0.0023	0.0024
Med.	0.2593	0.5237	2783	0.0004	0.0007	0.0009	0.0012	0.0014	0.0016	0.0018	0.0023	0.0025
st dev	0.0004	0.0015	13	0.0002	0.0001	0.0002	0.0003	0.0002	0.0003	0.0003	0.0002	0.0005
Min.	0.2586	0.5221	2755	0.0001	0.0004	0.0004	0.0008	0.0012	0.0013	0.0015	0.0017	0.0008
Max.	0.2600	0.5273	2803	0.0009	0.0011	0.0015	0.0020	0.0021	0.0025	0.0030	0.0029	0.0032



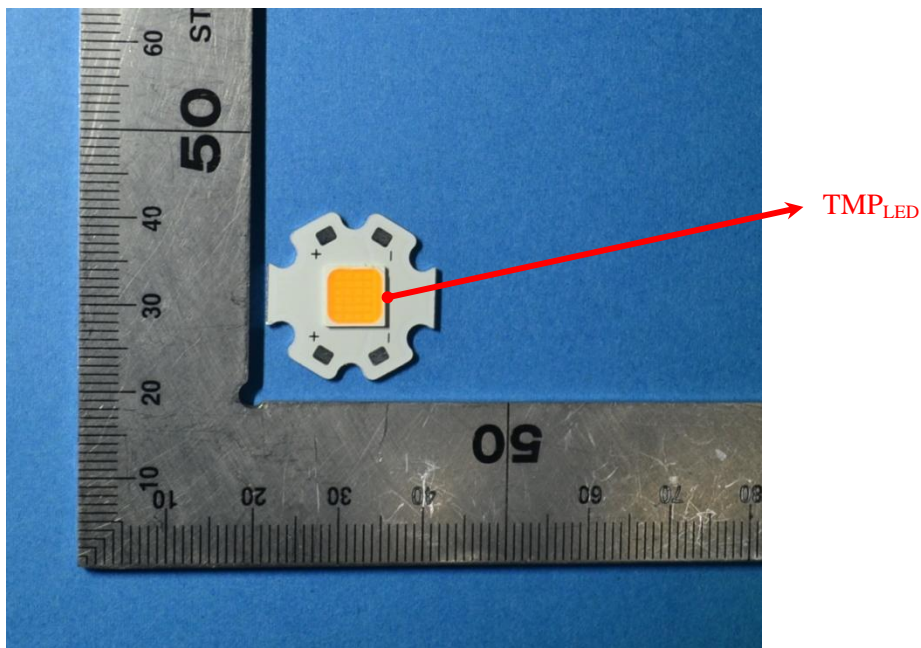
4 - EUT Photo

4.1 #Mechanical Dimensions



All dimensions are in millimeter

4.2 EUT Photo



Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor $K=2$ with the 95% confidence interval.
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*****END OF REPORT*****