

IES LM-80 Test Report

Report Issue Date : August 04, 2016 **Report Number :** I-150206-04-K-04
Testing Start Date : April 01, 2015 **Testing Completion Date :** June 26, 2016
Revision Number : 04 **Test Duration :** 9 000 h

Manufacturer Information :

Applicant : Seoul Semiconductor Co., LTD
Address : 97-11, Sandan-ro 163, Danwon-gu, Ansan, Gyeonggi-do, Korea 15429

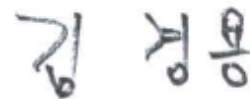
Description of Test Samples :

Classification : LED Package
PKG Name : 3030B
Part Number : SAWxC22B-xx
Drive Current : 150 mA

Test Procedure :

IES LM-80-08 Approved Method for Measuring Lumen Maintenance of LED Light Sources

Tested by



KyungYoung KIM, Research Engineer

Approved by



YoungJoon WON, Laboratory Manager



The above testing certificate is the accredited test result by
Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

Seoul Semiconductor Testing Laboratory

97-11, Sandan-ro 163, Danwon-gu, Ansan, Gyeonggi-do, Korea 15429

Accredited by KOLAS, Republic of KOREA

Applicable Series Model Numbers

This LM-80 report is applicable to the following

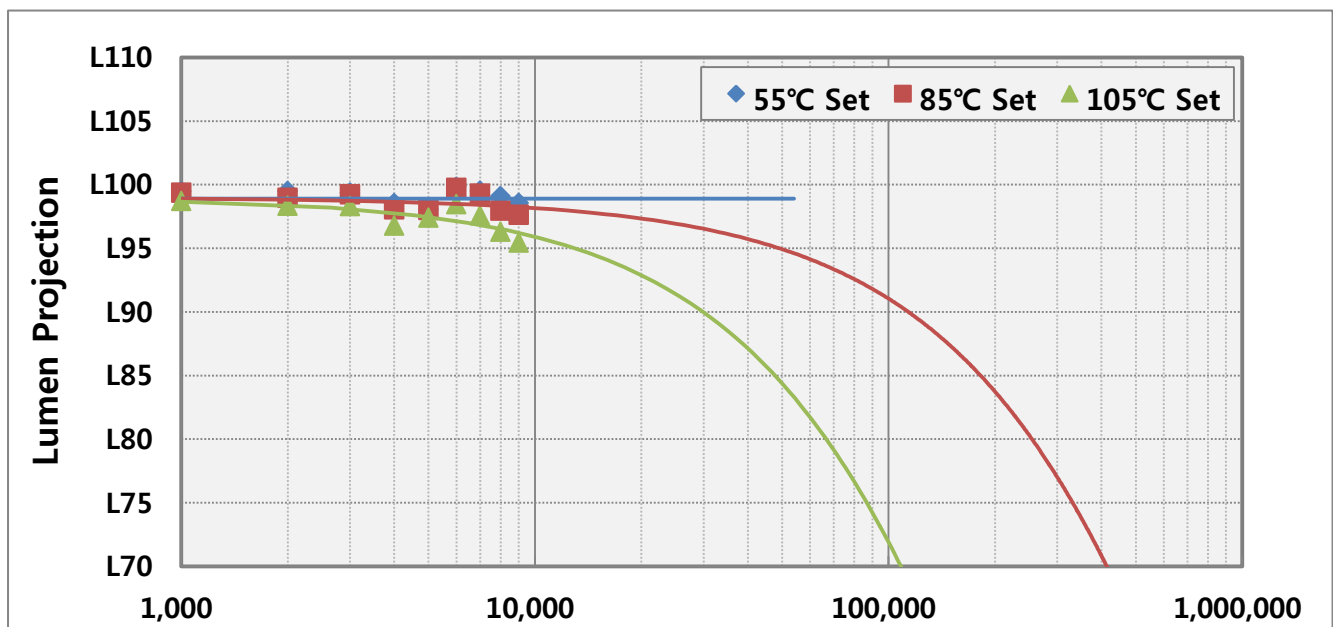
Series	Model Number	Case Temperature	Forward Current	Typical VF	Power	CCT
3030B	SAWxCF2B-xx	55 °C	20 mA	48.0 V	0.96 W	≥2700 K
3030B	SAWxCF2B-xx	85 °C	20 mA	48.0 V	0.96 W	≥2700 K
3030B	SAWxCF2B-xx	105 °C	20 mA	48.0 V	0.96 W	≥2700 K
3030B	SAWxC72B-xx	55 °C	45 mA	21.0 V	0.95 W	≥2700 K
3030B	SAWxC72B-xx	85 °C	45 mA	21.0 V	0.95 W	≥2700 K
3030B	SAWxC72B-xx	105 °C	45 mA	21.0 V	0.95 W	≥2700 K



1. Test Summary

Items	Nominal Case Temperature		
	55 °C	85 °C	105 °C
Number of LED tested	20	20	20
Drive Current	150 mA	150 mA	150 mA
Measurement Current	150 mA	150 mA	150 mA
Test Duration	9 000 h	9 000 h	9 000 h
Actual Case Temperature	≥53.0 °C	≥83.7 °C	≥103.0 °C
Actual Ambient Temperature	≥51.2 °C	≥81.2 °C	≥100.3 °C
Air Flow Velocity	≤0.78 m/s	≤0.48 m/s	≤0.14 m/s
Averaged Initial Luminous Flux	104.6 lm	103.7 lm	103.5 lm
Averaged Initial CCT	2733 K	2748 K	2736 K
Averaged Forward Voltage	6.64 V	6.65 V	6.65 V
Averaged Lumen Maintenance	98.6 %	97.6 %	95.5 %
Averaged Chromacity Shift	0.000 6	0.001 3	0.002 5
α	-8.125E-07	8.370E-07	3.202E-06
B	0.984	0.990	0.990
TM-21 Projection L ₇₀	(419000)	>54000	>54000
TM-21 Projection L ₈₀	(255000)	>54000	>54000
TM-21 Projection L ₉₀	(110000)	>54000	30000

※ The results shown in this certificate refer only to the sample(s) tested unless otherwise stated.
This test report cannot be reproduced, except in full.



2. IES LM-80-08 Test Report Requirement :

Number of LED Light Sources Tested

See the Test Summary

Description of LED Light Sources

See the Description of Test samples at the cover of certificate

Description of auxiliary equipment

Active cooling Test System

Temperature controlling chamber for LED package/array/module consists of the water cooling heat-sink plates to control the case temperature of each device and of the power supply required by LM-80 test conditions.

Measurement System

Photometric measurement tester for LED package/array/module consists of the integrating sphere with temperature controlling system(TEC) and of programmable current source meter.

Operating Cycle

Constant Direct Current (DC)

Ambient Conditions Including Airflow, Temperature and Relative Humidity

Airflow : < 1 m/s

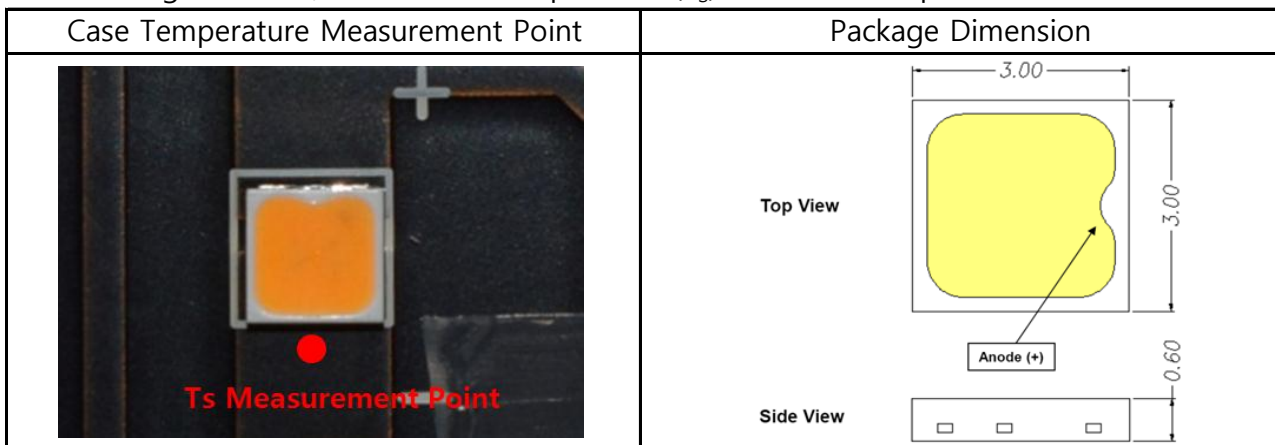
Ambient temperature : ≥ -5 °C of Nominal T_A

(See the Test Summary for actual T_A)

Relative Humidity : $\leq 65\%$ RH

Case Temperature (Test Point Temperature)

See the figure below, for the case temperature (T_C) measurement point and dimension



Drive Current of the LED Light Source During Lifetime Test

See the Test Summary

Initial Luminous Flux and Forward Voltage at Photometric Measurement Current

See the Test Summary

Lumen Maintenance Data for Each Individual LED Light Source Along with Median Value, Standard Deviation, Minimum and Maximum Lumen Maintenance Value for All of the LED Light Sources

See the table of each data set

Observation of LED light Sources Failures

No failure observed

LED Light Source Monitoring Interval

See the table of each data set

Photometric Measurement Uncertainty

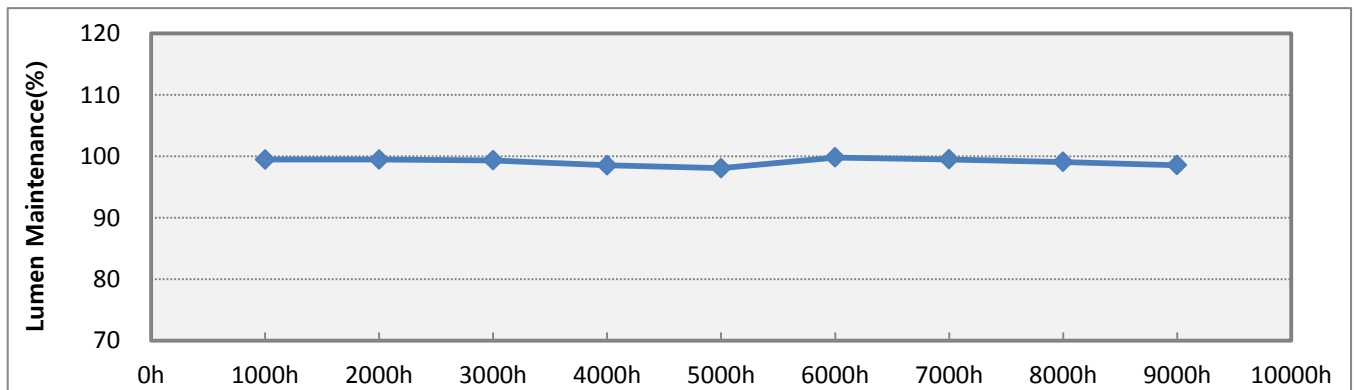
Seoul Semiconduc maintain a tolerance of ± 3.04 % at 95% confidence level ($k = 2$)

Chromaticity Shift Over the Measurement Time

See the table of each data set

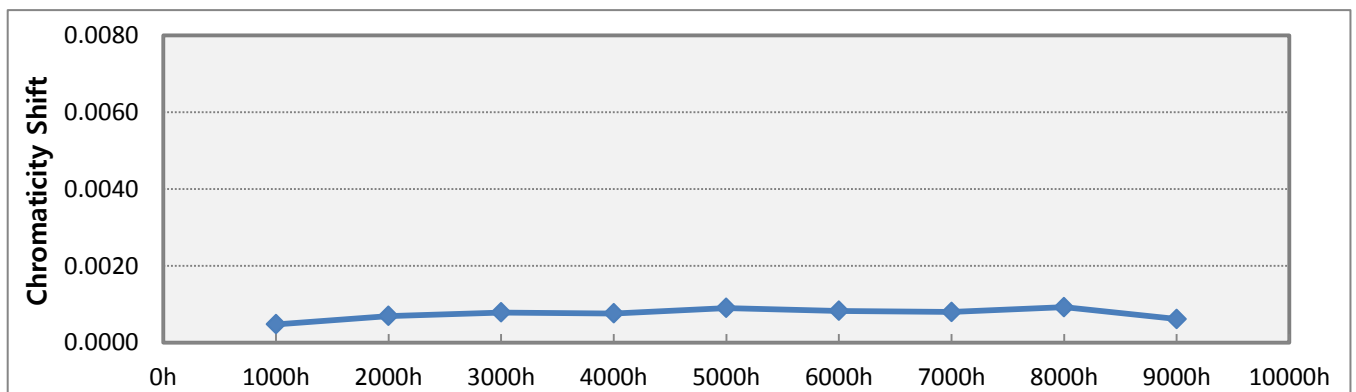
3. 55°C Data Set

No.	Initial Characteristics			Lumen Maintenance								
	V _f (V)	Flux (lm)	CCT (K)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	6.67	98.10	2739	99.1	99.1	98.7	97.4	97.5	99.4	99.1	98.0	97.7
02	6.49	104.43	2715	98.7	98.8	98.8	98.3	97.4	98.7	98.7	97.8	97.2
03	6.62	105.29	2717	99.1	99.5	99.3	99.0	98.6	99.8	99.7	99.6	98.4
04	6.58	107.31	2720	99.1	99.3	99.5	98.7	98.0	99.6	99.6	99.0	99.0
05	6.58	105.81	2694	100.1	100.3	100.2	99.5	98.5	100.4	100.0	99.6	99.0
06	6.68	103.08	2700	99.8	99.8	99.7	99.6	98.5	101.3	100.2	100.0	99.2
07	6.66	95.99	2746	101.1	101.1	101.0	100.2	99.1	100.7	100.5	100.4	100.7
08	6.68	104.15	2792	98.0	97.9	98.4	97.0	96.8	99.1	98.5	97.9	96.9
09	6.53	106.46	2725	99.9	99.4	99.3	98.0	98.0	99.4	99.4	99.0	98.7
10	6.73	107.03	2722	100.1	100.1	99.3	98.3	98.4	100.2	100.0	100.4	98.7
11	6.66	108.07	2700	98.9	99.6	98.9	98.2	97.5	99.1	98.8	98.3	98.0
12	6.71	106.85	2773	99.5	99.1	99.3	98.5	97.8	100.3	99.3	99.6	99.0
13	6.52	101.12	2706	99.5	99.8	99.7	99.2	98.3	99.9	99.5	99.4	98.6
14	6.55	104.62	2709	98.5	98.7	98.7	97.3	96.8	98.5	99.2	97.7	97.7
15	6.56	105.38	2722	99.8	99.3	99.2	98.1	98.1	100.1	99.9	99.2	98.5
16	6.67	107.80	2745	99.1	99.1	98.8	98.6	98.1	100.4	99.7	98.5	98.2
17	6.74	107.57	2725	100.0	99.8	99.3	99.0	98.1	99.7	99.1	99.0	98.4
18	6.73	106.25	2735	99.2	99.3	99.6	98.0	98.1	99.7	99.1	98.7	98.4
19	6.66	105.29	2804	99.9	100.4	99.8	99.0	98.4	100.2	100.0	100.1	100.0
20	6.66	101.10	2774	99.9	99.5	100.1	99.2	99.2	99.9	100.0	99.5	98.8
Ave.	6.64	104.59	2733	99.5	99.5	99.4	98.5	98.1	99.8	99.5	99.1	98.6
Med.	6.66	105.34	2723	99.5	99.4	99.3	98.6	98.1	99.8	99.6	99.1	98.5
Min.	6.49	95.99	2694	98.0	97.9	98.4	97.0	96.8	98.5	98.5	97.7	96.9
Max.	6.74	108.07	2804	101.1	101.1	101.0	100.2	99.2	101.3	100.5	100.4	100.7
σ	0.08	3.26	31	0.7	0.7	0.6	0.8	0.6	0.7	0.5	0.8	0.9



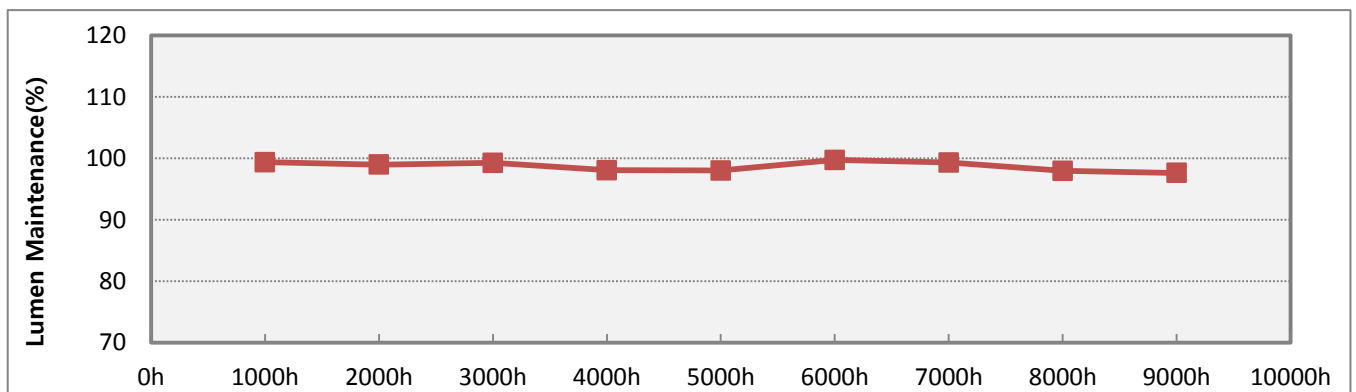
3. 55°C Data Set

No.	Initial Characteristics		Chromaticity Shift du'v'								
	CIE1976 u'	CIE1976 v'	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	0.2611	0.5251	0.0002	0.0005	0.0006	0.0006	0.0007	0.0007	0.0007	0.0008	0.0006
02	0.2618	0.5272	0.0006	0.0008	0.0009	0.0009	0.0011	0.0011	0.0011	0.0013	0.0009
03	0.2619	0.5261	0.0007	0.0009	0.0010	0.0009	0.0010	0.0009	0.0009	0.0010	0.0008
04	0.2615	0.5275	0.0007	0.0009	0.0009	0.0008	0.0009	0.0008	0.0007	0.0008	0.0005
05	0.2626	0.5283	0.0003	0.0006	0.0006	0.0005	0.0007	0.0006	0.0006	0.0007	0.0004
06	0.2626	0.5269	0.0005	0.0006	0.0009	0.0008	0.0009	0.0009	0.0007	0.0008	0.0005
07	0.2609	0.5245	0.0005	0.0007	0.0009	0.0009	0.0009	0.0008	0.0008	0.0009	0.0006
08	0.2589	0.5238	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0007	0.0009	0.0007
09	0.2615	0.5264	0.0003	0.0007	0.0009	0.0009	0.0015	0.0013	0.0010	0.0011	0.0008
10	0.2617	0.5259	0.0002	0.0005	0.0005	0.0005	0.0007	0.0007	0.0008	0.0012	0.0007
11	0.2626	0.5268	0.0005	0.0006	0.0006	0.0006	0.0007	0.0007	0.0006	0.0007	0.0005
12	0.2599	0.5233	0.0004	0.0006	0.0011	0.0010	0.0010	0.0010	0.0008	0.0010	0.0007
13	0.2624	0.5263	0.0007	0.0008	0.0009	0.0007	0.0008	0.0006	0.0008	0.0009	0.0004
14	0.2620	0.5277	0.0005	0.0006	0.0007	0.0007	0.0011	0.0009	0.0009	0.0010	0.0007
15	0.2616	0.5267	0.0003	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0005
16	0.2606	0.5264	0.0005	0.0010	0.0011	0.0010	0.0011	0.0010	0.0009	0.0010	0.0006
17	0.2614	0.5270	0.0002	0.0008	0.0008	0.0007	0.0009	0.0008	0.0008	0.0009	0.0005
18	0.2615	0.5241	0.0007	0.0008	0.0008	0.0008	0.0009	0.0008	0.0007	0.0008	0.0004
19	0.2583	0.5240	0.0003	0.0005	0.0006	0.0006	0.0007	0.0008	0.0008	0.0010	0.0010
20	0.2597	0.5240	0.0005	0.0007	0.0007	0.0008	0.0009	0.0007	0.0008	0.0008	0.0006
Ave.	0.2612	0.5259	0.0005	0.0007	0.0008	0.0008	0.0009	0.0008	0.0008	0.0009	0.0006
Med.	0.2615	0.5263	0.0005	0.0007	0.0008	0.0008	0.0009	0.0008	0.0008	0.0009	0.0006
Min.	0.2583	0.5233	0.0002	0.0005	0.0005	0.0005	0.0007	0.0006	0.0006	0.0007	0.0004
Max.	0.2626	0.5283	0.0008	0.0010	0.0011	0.0010	0.0015	0.0013	0.0011	0.0013	0.0010
σ	0.0012	0.0015	0.0002	0.0001	0.0002	0.0001	0.0002	0.0002	0.0001	0.0002	0.0002



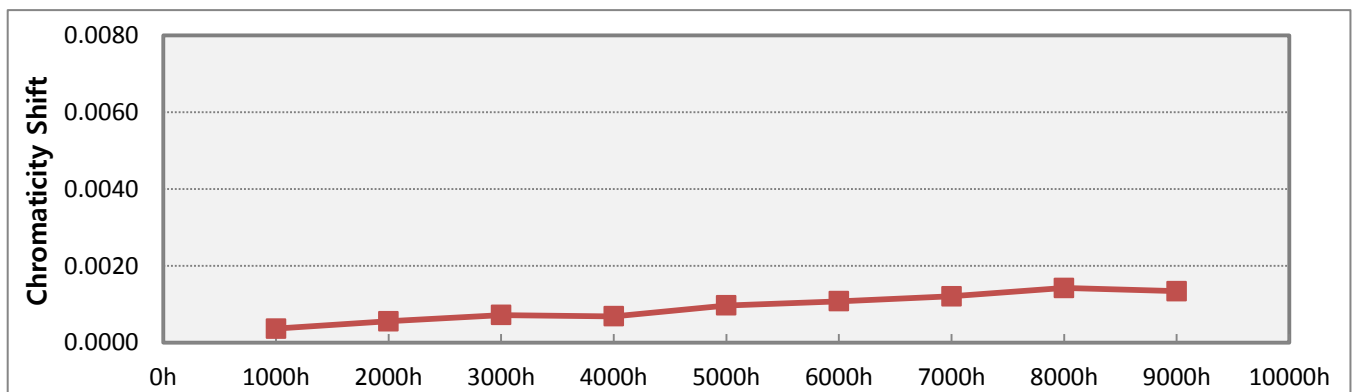
3. 85°C Data Set

No.	Initial Characteristics			Lumen Maintenance								
	V _f (V)	Flux (lm)	CCT (K)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	6.51	97.33	2758	99.3	99.4	99.5	98.0	97.8	99.5	99.3	97.9	96.3
02	6.54	102.05	2712	99.3	99.3	99.1	98.4	97.5	98.7	98.6	97.4	96.6
03	6.77	103.64	2771	99.4	99.4	99.6	98.0	97.9	100.6	99.1	97.9	97.7
04	6.67	106.33	2786	100.2	99.2	99.5	98.2	98.8	99.5	100.1	98.1	97.7
05	6.63	104.75	2731	99.2	98.8	98.7	97.5	97.5	99.0	99.0	97.4	97.2
06	6.55	104.85	2723	98.8	99.0	98.8	97.9	97.5	99.0	98.8	98.1	97.8
07	6.61	99.91	2767	100.2	100.5	100.2	99.0	98.1	101.0	100.5	99.0	99.1
08	6.65	96.37	2737	100.3	98.9	100.5	99.1	99.3	100.2	100.4	99.0	98.7
09	6.57	102.08	2758	98.7	98.4	98.6	97.0	96.7	98.6	98.2	97.1	95.9
10	6.66	105.12	2661	99.7	98.2	98.5	98.1	98.0	99.5	98.4	98.2	97.4
11	6.74	105.84	2762	99.1	98.8	99.7	97.9	98.2	100.3	99.9	98.5	98.7
12	6.59	106.38	2739	99.3	99.4	99.1	99.3	98.7	100.4	99.4	98.0	98.4
13	6.67	106.17	2783	99.3	98.9	98.8	97.7	98.0	100.2	99.0	98.1	98.2
14	6.68	103.18	2727	99.7	99.2	100.1	98.9	98.4	100.6	99.0	97.7	97.5
15	6.73	101.92	2752	98.8	98.6	99.0	97.8	98.2	98.7	99.6	97.3	97.1
16	6.69	105.12	2731	99.0	98.1	99.1	96.9	96.9	99.6	98.3	97.0	96.9
17	6.72	106.40	2817	98.9	98.7	99.0	97.8	97.8	100.1	99.5	97.9	97.8
18	6.75	106.90	2733	99.0	98.6	98.5	97.5	98.0	99.5	99.8	97.3	97.3
19	6.64	104.54	2751	99.6	99.1	99.0	98.5	98.7	100.0	99.7	99.0	98.0
20	6.66	104.94	2763	99.7	98.9	99.8	98.0	98.4	99.7	99.5	98.3	98.1
Ave.	6.65	103.69	2748	99.4	99.0	99.3	98.1	98.0	99.7	99.3	97.9	97.6
Med.	6.66	104.80	2752	99.3	98.9	99.1	98.0	98.0	99.7	99.3	98.0	97.7
Min.	6.51	96.37	2661	98.7	98.1	98.5	96.9	96.7	98.6	98.2	97.0	95.9
Max.	6.77	106.90	2817	100.3	100.5	100.5	99.3	99.3	101.0	100.5	99.0	99.1
σ	0.07	2.98	32	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.6	0.8



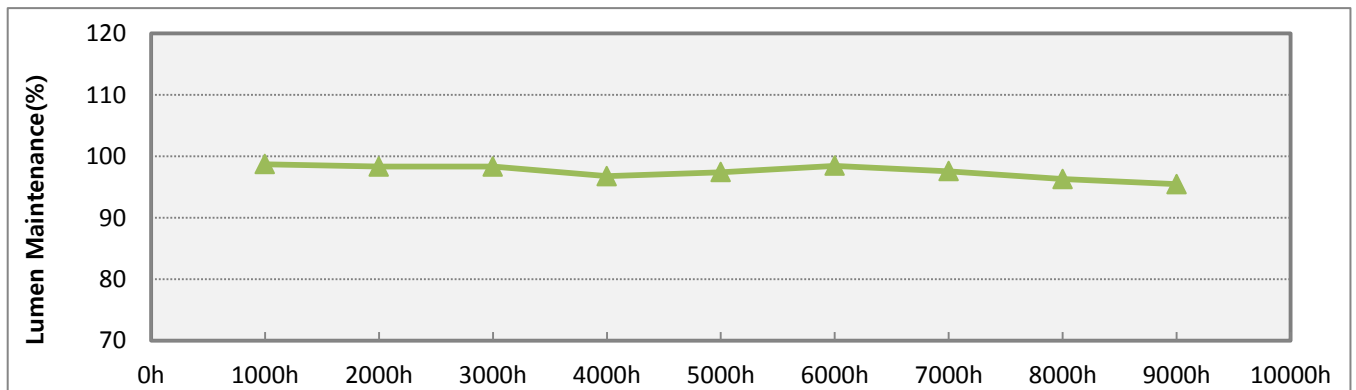
3. 85°C Data Set

No.	Initial Characteristics		Chromaticity Shift du'v'								
	CIE1976 u'	CIE1976 v'	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	0.2602	0.5250	0.0003	0.0005	0.0006	0.0007	0.0008	0.0008	0.0010	0.0011	0.0008
02	0.2622	0.5259	0.0003	0.0005	0.0005	0.0007	0.0008	0.0009	0.0010	0.0013	0.0012
03	0.2600	0.5231	0.0003	0.0006	0.0008	0.0008	0.0011	0.0015	0.0014	0.0017	0.0018
04	0.2592	0.5238	0.0002	0.0004	0.0006	0.0005	0.0012	0.0011	0.0017	0.0018	0.0019
05	0.2611	0.5267	0.0004	0.0006	0.0008	0.0006	0.0008	0.0009	0.0010	0.0010	0.0009
06	0.2614	0.5276	0.0006	0.0005	0.0006	0.0005	0.0007	0.0007	0.0008	0.0011	0.0010
07	0.2596	0.5259	0.0003	0.0005	0.0007	0.0006	0.0010	0.0013	0.0014	0.0015	0.0015
08	0.2607	0.5274	0.0003	0.0007	0.0008	0.0005	0.0009	0.0007	0.0009	0.0013	0.0010
09	0.2600	0.5259	0.0005	0.0007	0.0009	0.0009	0.0010	0.0010	0.0010	0.0013	0.0010
10	0.2642	0.5284	0.0002	0.0008	0.0010	0.0011	0.0013	0.0013	0.0012	0.0016	0.0014
11	0.2602	0.5242	0.0003	0.0004	0.0007	0.0005	0.0008	0.0011	0.0012	0.0013	0.0013
12	0.2609	0.5260	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0022
13	0.2593	0.5236	0.0003	0.0004	0.0006	0.0005	0.0009	0.0012	0.0012	0.0015	0.0015
14	0.2614	0.5266	0.0004	0.0006	0.0010	0.0009	0.0011	0.0013	0.0012	0.0014	0.0013
15	0.2608	0.5237	0.0006	0.0006	0.0008	0.0007	0.0011	0.0009	0.0014	0.0014	0.0013
16	0.2614	0.5253	0.0004	0.0006	0.0007	0.0006	0.0007	0.0011	0.0010	0.0012	0.0014
17	0.2584	0.5212	0.0004	0.0005	0.0007	0.0006	0.0010	0.0013	0.0014	0.0015	0.0015
18	0.2610	0.5269	0.0004	0.0006	0.0007	0.0006	0.0010	0.0010	0.0013	0.0012	0.0010
19	0.2602	0.5265	0.0003	0.0005	0.0006	0.0006	0.0010	0.0011	0.0012	0.0016	0.0012
20	0.2601	0.5244	0.0005	0.0006	0.0008	0.0007	0.0011	0.0011	0.0014	0.0017	0.0018
Ave.	0.2606	0.5254	0.0004	0.0006	0.0007	0.0007	0.0010	0.0011	0.0012	0.0014	0.0013
Med.	0.2605	0.5259	0.0003	0.0006	0.0007	0.0006	0.0010	0.0011	0.0012	0.0014	0.0013
Min.	0.2584	0.5212	0.0002	0.0004	0.0005	0.0005	0.0007	0.0007	0.0008	0.0010	0.0008
Max.	0.2642	0.5284	0.0006	0.0008	0.0010	0.0011	0.0013	0.0015	0.0017	0.0018	0.0022
σ	0.0012	0.0018	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0004



3. 105°C Data Set

No.	Initial Characteristics			Lumen Maintenance								
	V _f (V)	Flux (lm)	CCT (K)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	6.65	96.65	2682	98.3	98.2	98.1	96.5	97.2	98.2	97.3	96.0	94.5
02	6.51	101.35	2777	99.0	98.8	98.3	96.6	97.0	98.2	97.6	96.2	95.2
03	6.66	103.90	2690	99.3	98.3	98.8	97.0	97.0	98.7	97.2	96.1	95.2
04	6.78	106.24	2706	98.2	97.7	97.4	96.3	96.8	98.2	96.9	95.7	95.5
05	6.62	105.20	2755	98.8	98.5	98.4	97.3	97.7	99.0	98.0	97.2	96.4
06	6.69	104.71	2748	99.1	98.3	99.0	97.6	98.0	98.6	97.8	97.0	95.9
07	6.57	102.75	2746	99.0	98.4	98.3	97.1	96.9	98.6	97.6	96.1	95.0
08	6.76	97.13	2744	99.6	98.8	99.0	97.5	99.0	98.8	98.8	97.0	94.8
09	6.75	101.31	2687	97.8	97.9	98.1	96.0	97.0	97.9	97.0	96.7	95.5
10	6.70	104.41	2807	99.3	98.5	98.5	96.8	98.1	98.8	97.6	96.3	95.7
11	6.62	104.96	2756	98.7	98.2	98.3	96.8	96.9	98.0	97.1	95.8	95.6
12	6.61	106.69	2724	98.9	98.2	98.1	96.9	97.4	98.0	97.0	95.8	95.7
13	6.56	107.30	2730	98.8	98.7	98.2	96.5	97.1	98.5	97.8	96.0	96.0
14	6.63	104.74	2738	98.9	98.3	98.8	97.1	97.8	99.2	98.4	96.7	96.4
15	6.75	103.48	2759	99.2	98.5	99.6	97.0	97.5	99.0	97.7	96.8	96.4
16	6.69	100.50	2786	97.9	98.3	98.2	95.6	96.7	97.6	97.9	96.0	94.2
17	6.52	104.84	2728	98.3	98.3	97.6	96.9	96.9	98.8	97.4	96.5	95.1
18	6.73	107.15	2768	98.3	98.4	97.4	96.3	97.3	97.8	96.9	95.4	95.1
19	6.56	105.19	2708	98.6	98.1	98.2	97.3	98.1	99.2	97.8	96.7	96.1
20	6.65	102.22	2675	98.4	98.3	98.0	96.4	97.8	97.9	97.6	95.9	94.9
Ave.	6.65	103.54	2736	98.7	98.3	98.3	96.8	97.4	98.4	97.6	96.3	95.5
Med.	6.65	104.56	2741	98.8	98.3	98.3	96.8	97.3	98.6	97.6	96.2	95.5
Min.	6.51	96.65	2675	97.8	97.7	97.4	95.6	96.7	97.6	96.9	95.4	94.2
Max.	6.78	107.30	2807	99.6	98.8	99.6	97.6	99.0	99.2	98.8	97.2	96.4
σ	0.08	2.97	36	0.5	0.3	0.5	0.5	0.6	0.5	0.5	0.5	0.6



3. 105°C Data Set

No.	Initial Characteristics		Chromaticity Shift du'v'								
	CIE1976 u'	CIE1976 v'	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	0.2631	0.5290	0.0007	0.0007	0.0009	0.0009	0.0011	0.0016	0.0018	0.0021	0.0020
02	0.2595	0.5240	0.0003	0.0007	0.0008	0.0009	0.0011	0.0016	0.0020	0.0023	0.0023
03	0.2627	0.5286	0.0004	0.0010	0.0012	0.0011	0.0013	0.0017	0.0017	0.0020	0.0019
04	0.2626	0.5256	0.0008	0.0010	0.0013	0.0013	0.0014	0.0018	0.0021	0.0024	0.0026
05	0.2604	0.5249	0.0002	0.0006	0.0008	0.0010	0.0012	0.0017	0.0020	0.0024	0.0024
06	0.2606	0.5253	0.0002	0.0007	0.0011	0.0012	0.0014	0.0017	0.0021	0.0026	0.0026
07	0.2606	0.5260	0.0004	0.0007	0.0008	0.0009	0.0014	0.0019	0.0022	0.0025	0.0025
08	0.2608	0.5252	0.0007	0.0009	0.0011	0.0010	0.0014	0.0016	0.0021	0.0024	0.0023
09	0.2631	0.5278	0.0006	0.0009	0.0012	0.0011	0.0014	0.0016	0.0019	0.0025	0.0025
10	0.2584	0.5228	0.0002	0.0008	0.0010	0.0012	0.0018	0.0021	0.0024	0.0029	0.0029
11	0.2603	0.5251	0.0002	0.0006	0.0009	0.0011	0.0014	0.0020	0.0025	0.0030	0.0032
12	0.2616	0.5261	0.0003	0.0007	0.0009	0.0011	0.0015	0.0019	0.0023	0.0028	0.0029
13	0.2614	0.5258	0.0002	0.0008	0.0010	0.0010	0.0014	0.0021	0.0027	0.0029	0.0031
14	0.2609	0.5261	0.0003	0.0007	0.0010	0.0010	0.0013	0.0017	0.0021	0.0023	0.0024
15	0.2605	0.5235	0.0003	0.0007	0.0012	0.0011	0.0014	0.0020	0.0022	0.0027	0.0027
16	0.2592	0.5234	0.0003	0.0009	0.0012	0.0010	0.0014	0.0018	0.0026	0.0028	0.0028
17	0.2613	0.5264	0.0003	0.0007	0.0008	0.0011	0.0012	0.0018	0.0019	0.0023	0.0022
18	0.2598	0.5247	0.0003	0.0008	0.0009	0.0011	0.0017	0.0021	0.0026	0.0029	0.0030
19	0.2622	0.5269	0.0003	0.0006	0.0009	0.0011	0.0015	0.0019	0.0022	0.0026	0.0025
20	0.2636	0.5281	0.0003	0.0006	0.0008	0.0008	0.0013	0.0015	0.0020	0.0022	0.0021
Ave.	0.2611	0.5258	0.0004	0.0007	0.0010	0.0011	0.0014	0.0018	0.0022	0.0025	0.0025
Med.	0.2609	0.5257	0.0003	0.0007	0.0010	0.0011	0.0014	0.0018	0.0021	0.0025	0.0025
Min.	0.2584	0.5228	0.0002	0.0006	0.0008	0.0008	0.0011	0.0015	0.0017	0.0020	0.0019
Max.	0.2636	0.5290	0.0008	0.0010	0.0013	0.0013	0.0018	0.0021	0.0027	0.0030	0.0032
σ	0.0014	0.0017	0.0002	0.0001	0.0002	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004

