IES LM-80 Test Report

Report Issue Date : March 27, 2017
Report Number : I-151012-81-K-05
Testing Start Date : October 22, 2015
Testing Completion Date : December 12, 2016
Revision Number : 05
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 : MJT3528
Part Number : SAWxA32E-xx
Drive Current : 100 mA

Test Procedure :

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

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Tested by

KyungYong KIM, Research Engineer

Approved by

YoungJoon WON, Laboratory Manager

Seoul Semiconductor Testing Laboratory(KT-484) is accredited to ISO/IEC 17025:2005 for the above test procedure by KOLAS, Republic of KOREA which is a signatory to ILAC-MRA.

Seoul Semiconductor Testing Laboratory

97-11, Sandan-ro 163, Danwon-gu, Ansan, Gyeonggi-do, Korea 15429, E-mail: LM80@seoulsemicon.com

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Applicable Series Model Numbers

This LM-80 report is applicable to the following

Series	Model Number	Case Temperature	Forward Current	Typical VF	Power	CCT
MJT3528	SAWxA32E-xx Tested	55/85/105 ℃	100 mA	9.0 V	0.9 W	≥2200 K
	SAWxA42E-xx	55/85/105 ℃	75 mA	12.0 V	0.9 W	≥2200 K
	SAWxA62E-xx	55/85/105 ℃	50 mA	18.0 V	0.9 W	≥2200 K
	SAWxAA2E-xx	55/85/105 ℃	28 mA	32.0 V	0.9 W	≥2200 K

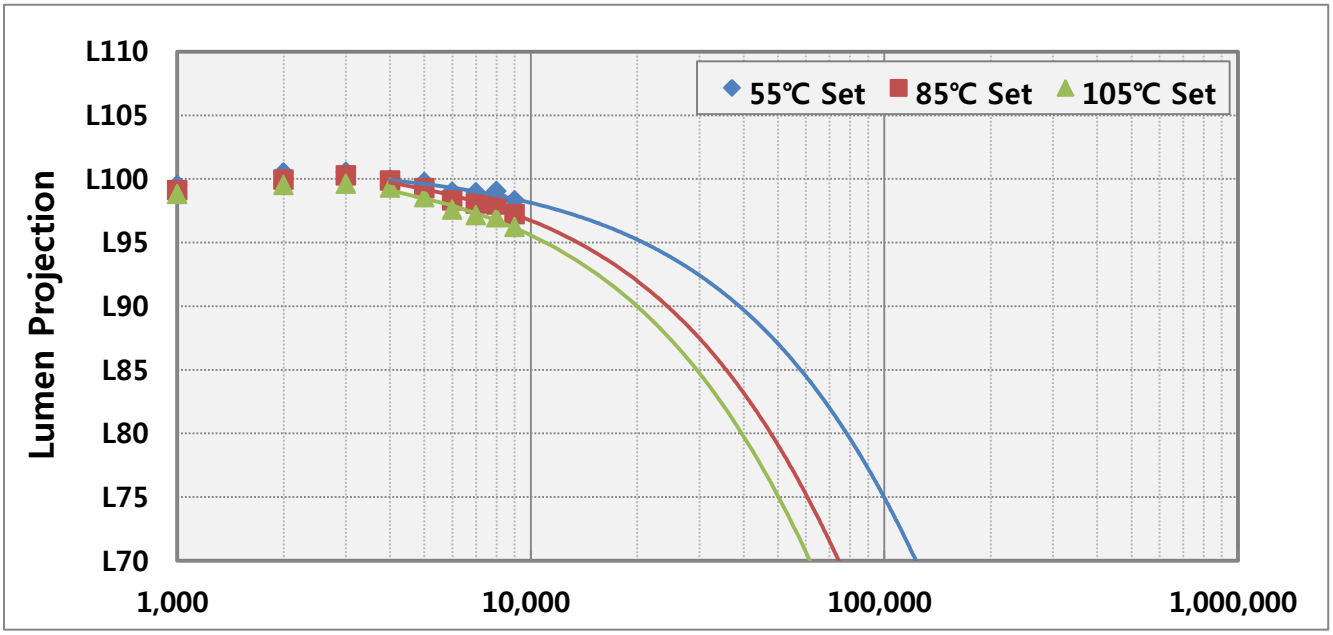
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1. Test Summary

Items	Nominal Case Temperature		
	55 ℃	85 ℃	105 ℃
Number of LED tested	20	20	20
Drive Current	100 mA	100 mA	100 mA
Measurment Current	100 mA	100 mA	100 mA
Test Duration	9 000 h	9 000 h	9 000 h
Actual Case Temperature	≥53.2 ℃	≥83.3 ℃	≥103.0 ℃
Actual Ambient Temperature	≥52.0 ℃	≥82.6 ℃	≥102.5 ℃
Air Flow Velocity	≤0.77 m/s	≤0.49 m/s	≤0.12 m/s
Averaged Initial Luminous Flux	115.2 lm	115.1 lm	115.1 lm
Averaged Initial CCT	2664 K	2664 K	2659 K
Averaged Forward Voltage	9.61 V	9.59 V	9.60 V
Averaged Lumen Maintenance	98.3 %	97.2 %	96.2 %
Averaged Chromacity Shift	0.000 9	0.001 3	0.002 9
α	2.993E-06	5.032E-06	6.035E-06
B	1.011	1.017	1.015
TM-21 Projection L_{70}	>54000	>54000	>54000
TM-21 Projection L_{80}	>54000	48000	39000
TM-21 Projection L_{90}	39000	24000	20000

※ The results shown in this certificate refer only to the sample(s) tested unless otherwise stated.
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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

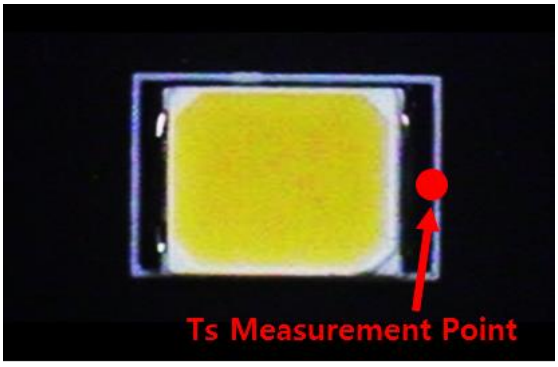
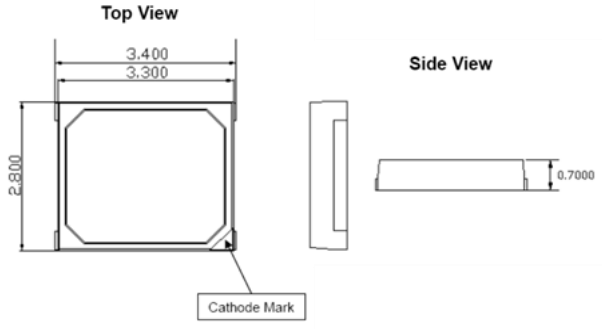
Ambient temperature : ≥ -5 ℃ of Nominal T_A

(See the Test Summary for actual T_A)

Relative Humidity : ≤ 65% RH

Case Temperature (Test Point Temperature)

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

Case Temperature Measurement Point	Package Dimension
	

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

Chromaticity Shift Over the Measurement Time

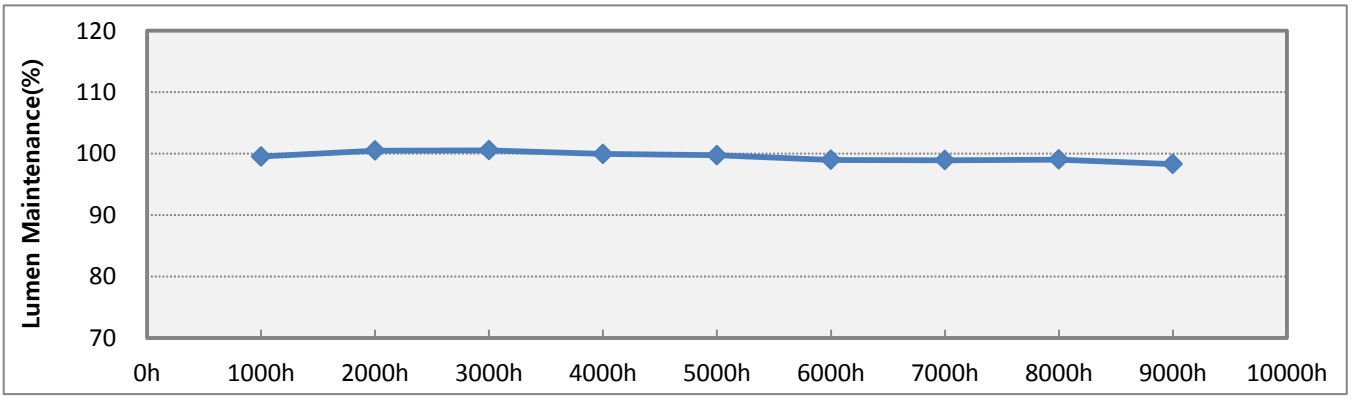
See the table of each data set

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3. 55℃ Data Set

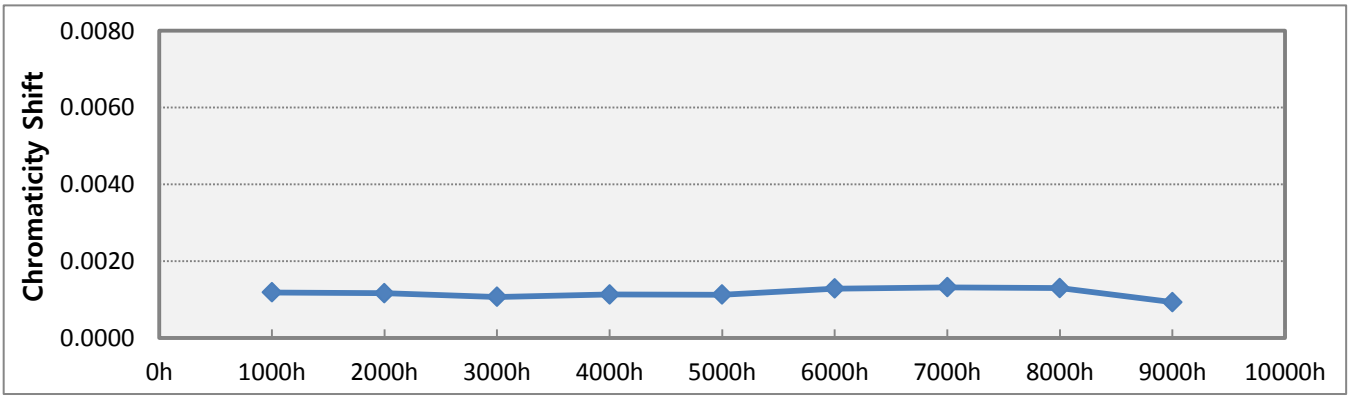
No.	Initial Characteristics			Lumen Maintenance								
	Vf (V)	Flux (lm)	CCT (K)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	9.61	107.56	2628	99.6	101.1	100.3	100.6	100.2	99.2	98.8	97.7	98.4
02	9.60	116.10	2668	99.5	100.4	100.6	100.0	99.9	99.1	99.2	99.1	97.7
03	9.60	114.29	2660	100.1	101.6	100.8	101.2	101.4	99.8	100.6	99.7	99.5
04	9.55	114.02	2643	100.1	101.0	100.7	100.4	100.3	100.1	99.7	100.8	98.8
05	9.58	110.00	2693	98.8	100.0	100.1	98.9	99.3	99.0	98.3	99.0	97.7
06	9.61	113.98	2689	99.1	100.3	100.3	99.8	99.3	99.1	98.7	98.3	98.0
07	9.61	118.17	2723	100.3	100.5	100.5	100.8	100.1	99.8	99.3	99.5	98.4
08	9.61	117.03	2699	99.1	100.1	100.1	100.0	99.5	99.1	98.5	98.5	98.1
09	9.60	117.51	2693	99.2	100.6	100.5	99.6	99.6	98.6	99.3	99.3	98.4
10	9.67	114.16	2653	99.9	100.5	101.2	100.8	99.4	99.2	99.0	99.9	98.0
11	9.56	116.34	2686	98.8	100.3	99.9	98.9	98.4	97.7	98.5	98.1	97.4
12	9.65	116.68	2620	99.4	99.7	101.0	99.3	99.8	98.9	98.2	98.2	98.2
13	9.55	116.19	2634	99.2	99.9	99.7	99.3	99.1	98.7	98.0	99.2	98.2
14	9.62	114.00	2681	99.9	101.1	100.9	100.0	100.7	98.7	99.9	99.3	99.3
15	9.64	115.74	2608	99.9	100.6	100.9	100.3	100.4	99.2	99.1	99.0	98.5
16	9.63	118.20	2727	99.9	100.5	100.8	100.1	99.5	99.1	99.1	99.1	98.4
17	9.68	115.38	2627	99.1	100.8	100.8	99.3	99.3	98.6	98.5	98.3	97.9
18	9.65	113.72	2591	99.5	100.5	101.0	99.6	99.2	98.4	98.6	99.4	98.6
19	9.55	119.46	2707	99.2	99.9	100.0	98.9	98.8	98.3	98.5	98.2	97.6
20	9.56	115.61	2641	100.0	101.0	100.9	101.1	100.4	99.2	99.0	100.1	99.1
Ave.	9.61	115.21	2664	99.5	100.5	100.5	100.0	99.7	99.0	98.9	99.0	98.3
Med.	9.61	115.68	2664	99.5	100.5	100.6	100.0	99.5	99.1	98.9	99.1	98.3
Min.	9.55	107.56	2591	98.8	99.7	99.7	98.9	98.4	97.7	98.0	97.7	97.4
Max.	9.68	119.46	2727	100.3	101.6	101.2	101.2	101.4	100.1	100.6	100.8	99.5
σ	0.04	2.76	39	0.4	0.5	0.4	0.7	0.7	0.6	0.6	0.8	0.5



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3. 55℃ Data Set

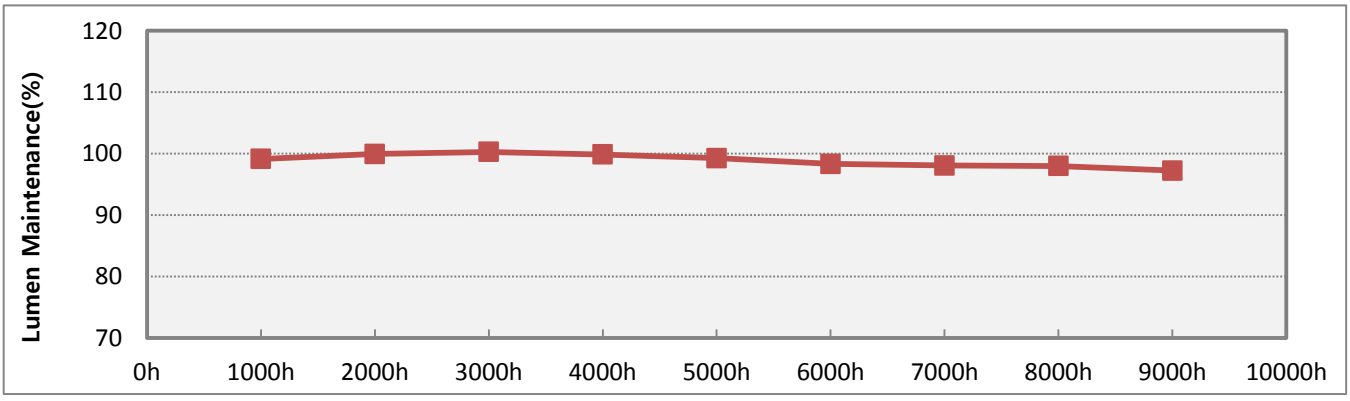
No.	Initial Characteristics		Chromaticity Shift du'v'								
	CIE1976 u'	CIE1976 v'	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	0.2654	0.5310	0.0020	0.0018	0.0015	0.0015	0.0016	0.0018	0.0018	0.0019	0.0013
02	0.2639	0.5283	0.0012	0.0012	0.0011	0.0012	0.0012	0.0013	0.0013	0.0012	0.0010
03	0.2640	0.5301	0.0020	0.0017	0.0016	0.0015	0.0015	0.0016	0.0016	0.0016	0.0012
04	0.2647	0.5307	0.0008	0.0009	0.0008	0.0008	0.0008	0.0010	0.0010	0.0009	0.0007
05	0.2629	0.5269	0.0017	0.0016	0.0014	0.0014	0.0014	0.0015	0.0015	0.0014	0.0010
06	0.2627	0.5288	0.0010	0.0014	0.0013	0.0013	0.0012	0.0013	0.0014	0.0014	0.0009
07	0.2616	0.5260	0.0009	0.0009	0.0008	0.0009	0.0008	0.0009	0.0009	0.0009	0.0006
08	0.2626	0.5272	0.0012	0.0011	0.0011	0.0011	0.0012	0.0014	0.0015	0.0015	0.0011
09	0.2625	0.5292	0.0009	0.0008	0.0007	0.0007	0.0007	0.0011	0.0009	0.0009	0.0005
10	0.2641	0.5312	0.0012	0.0012	0.0011	0.0013	0.0014	0.0015	0.0016	0.0015	0.0013
11	0.2628	0.5292	0.0012	0.0011	0.0010	0.0011	0.0012	0.0014	0.0014	0.0014	0.0009
12	0.2657	0.5315	0.0011	0.0011	0.0009	0.0010	0.0010	0.0011	0.0012	0.0012	0.0008
13	0.2652	0.5306	0.0014	0.0013	0.0012	0.0013	0.0012	0.0014	0.0015	0.0013	0.0010
14	0.2632	0.5285	0.0010	0.0009	0.0009	0.0010	0.0009	0.0012	0.0011	0.0011	0.0009
15	0.2660	0.5331	0.0010	0.0010	0.0009	0.0011	0.0010	0.0012	0.0013	0.0013	0.0010
16	0.2612	0.5275	0.0009	0.0009	0.0008	0.0008	0.0008	0.0010	0.0010	0.0010	0.0006
17	0.2657	0.5297	0.0013	0.0012	0.0012	0.0013	0.0013	0.0014	0.0014	0.0014	0.0010
18	0.2668	0.5340	0.0008	0.0009	0.0008	0.0009	0.0009	0.0011	0.0011	0.0011	0.0009
19	0.2619	0.5289	0.0011	0.0011	0.0010	0.0011	0.0011	0.0013	0.0013	0.0014	0.0010
20	0.2645	0.5320	0.0012	0.0012	0.0011	0.0013	0.0012	0.0013	0.0014	0.0014	0.0011
Ave.	0.2639	0.5297	0.0012	0.0012	0.0011	0.0011	0.0011	0.0013	0.0013	0.0013	0.0009
Med.	0.2639	0.5294	0.0011	0.0011	0.0011	0.0011	0.0012	0.0013	0.0014	0.0014	0.0010
Min.	0.2612	0.5260	0.0008	0.0008	0.0007	0.0007	0.0007	0.0009	0.0009	0.0009	0.0005
Max.	0.2668	0.5340	0.0020	0.0018	0.0016	0.0015	0.0016	0.0018	0.0018	0.0019	0.0013
σ	0.0016	0.0021	0.0003	0.0003	0.0002	0.0002	0.0003	0.0002	0.0002	0.0003	0.0002



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3. 85℃ Data Set

No.	Initial Characteristics			Lumen Maintenance								
	Vf (V)	Flux (lm)	CCT (K)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	9.62	110.97	2624	99.7	100.2	100.7	100.5	100.1	98.5	98.6	98.6	97.6
02	9.59	113.72	2674	98.9	99.4	100.4	99.3	100.0	98.4	98.3	98.3	97.7
03	9.58	115.19	2646	99.8	99.7	100.1	99.7	99.4	97.8	97.5	97.4	96.6
04	9.55	117.87	2688	98.8	99.3	100.5	100.1	99.1	97.6	98.2	97.0	96.2
05	9.61	113.70	2596	100.1	100.6	101.0	100.6	100.3	98.3	98.3	98.6	97.0
06	9.56	118.01	2674	98.6	99.6	99.4	99.0	98.5	98.2	97.0	96.9	96.4
07	9.56	114.19	2663	99.6	101.2	100.9	101.0	99.9	99.7	99.6	99.3	98.3
08	9.56	111.47	2629	98.6	99.4	100.4	99.4	99.0	98.2	98.2	98.3	97.5
09	9.64	111.21	2638	99.1	100.3	99.9	99.3	99.1	97.7	97.5	97.6	95.7
10	9.62	117.77	2683	99.4	99.7	100.6	99.3	99.1	97.7	97.5	97.7	97.1
11	9.62	117.71	2667	98.8	99.5	99.9	99.4	98.8	98.8	98.2	98.0	98.1
12	9.57	116.33	2663	100.1	100.7	101.1	100.5	99.6	99.3	98.3	98.4	97.5
13	9.57	117.71	2715	99.4	101.0	100.2	100.3	99.2	98.5	98.0	98.9	98.0
14	9.68	109.55	2753	98.9	99.4	100.1	99.9	99.2	98.1	97.4	97.3	96.4
15	9.55	116.09	2652	98.9	100.3	100.3	99.5	99.1	98.4	98.3	97.8	97.1
16	9.55	116.42	2610	99.4	100.3	100.7	100.5	99.7	98.3	98.4	97.8	97.3
17	9.54	116.53	2643	99.5	99.8	100.0	100.6	99.4	98.2	98.1	97.7	97.0
18	9.64	117.55	2705	98.2	99.4	99.0	99.3	98.1	98.3	97.8	97.2	97.9
19	9.59	117.81	2672	98.1	99.5	100.1	98.9	98.8	98.1	97.6	98.0	97.0
20	9.60	112.43	2685	98.6	99.6	100.2	99.9	99.3	98.5	98.4	98.8	98.0
Ave.	9.59	115.11	2664	99.1	99.9	100.3	99.9	99.3	98.3	98.1	98.0	97.2
Med.	9.58	116.21	2665	99.0	99.7	100.2	99.8	99.2	98.3	98.2	97.9	97.2
Min.	9.54	109.55	2596	98.1	99.3	99.0	98.9	98.1	97.6	97.0	96.9	95.7
Max.	9.68	118.01	2753	100.1	101.2	101.1	101.0	100.3	99.7	99.6	99.3	98.3
σ	0.04	2.76	37	0.6	0.6	0.5	0.6	0.5	0.5	0.6	0.7	0.7

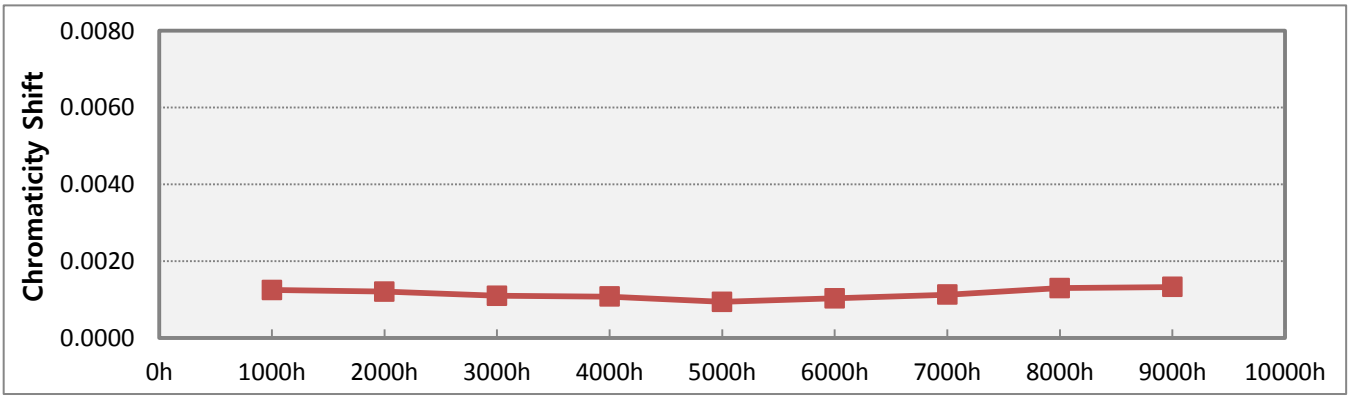


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3. 85℃ Data Set

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	0.2654	0.5320	0.0015	0.0014	0.0012	0.0011	0.0011	0.0012	0.0012	0.0014	0.0012
02	0.2630	0.5312	0.0014	0.0014	0.0012	0.0010	0.0009	0.0008	0.0009	0.0010	0.0010
03	0.2645	0.5311	0.0009	0.0011	0.0012	0.0010	0.0010	0.0010	0.0012	0.0014	0.0014
04	0.2627	0.5290	0.0014	0.0013	0.0011	0.0011	0.0010	0.0011	0.0012	0.0014	0.0014
05	0.2670	0.5314	0.0020	0.0016	0.0014	0.0012	0.0012	0.0013	0.0015	0.0016	0.0013
06	0.2634	0.5292	0.0015	0.0013	0.0012	0.0011	0.0011	0.0011	0.0014	0.0016	0.0015
07	0.2637	0.5303	0.0015	0.0013	0.0011	0.0011	0.0009	0.0012	0.0013	0.0015	0.0013
08	0.2654	0.5303	0.0018	0.0015	0.0013	0.0013	0.0014	0.0014	0.0015	0.0016	0.0016
09	0.2649	0.5306	0.0014	0.0014	0.0012	0.0011	0.0009	0.0010	0.0012	0.0015	0.0015
10	0.2629	0.5298	0.0012	0.0011	0.0010	0.0010	0.0009	0.0011	0.0013	0.0014	0.0013
11	0.2639	0.5284	0.0010	0.0009	0.0009	0.0009	0.0008	0.0009	0.0008	0.0010	0.0013
12	0.2641	0.5282	0.0010	0.0010	0.0010	0.0010	0.0008	0.0009	0.0010	0.0012	0.0013
13	0.2617	0.5279	0.0011	0.0012	0.0010	0.0012	0.0011	0.0011	0.0012	0.0013	0.0014
14	0.2608	0.5234	0.0010	0.0011	0.0011	0.0012	0.0009	0.0010	0.0010	0.0012	0.0014
15	0.2643	0.5306	0.0009	0.0010	0.0009	0.0009	0.0007	0.0008	0.0009	0.0010	0.0011
16	0.2661	0.5322	0.0011	0.0011	0.0010	0.0010	0.0008	0.0010	0.0011	0.0013	0.0013
17	0.2644	0.5324	0.0012	0.0011	0.0010	0.0012	0.0009	0.0010	0.0011	0.0013	0.0014
18	0.2625	0.5260	0.0011	0.0011	0.0010	0.0011	0.0008	0.0009	0.0009	0.0010	0.0013
19	0.2636	0.5288	0.0010	0.0009	0.0009	0.0008	0.0007	0.0008	0.0008	0.0009	0.0011
20	0.2629	0.5291	0.0010	0.0011	0.0010	0.0011	0.0008	0.0009	0.0010	0.0012	0.0013
Ave.	0.2639	0.5296	0.0012	0.0012	0.0011	0.0011	0.0009	0.0010	0.0011	0.0013	0.0013
Med.	0.2638	0.5300	0.0011	0.0011	0.0011	0.0011	0.0009	0.0010	0.0012	0.0013	0.0013
Min.	0.2608	0.5234	0.0009	0.0009	0.0009	0.0008	0.0007	0.0008	0.0008	0.0009	0.0010
Max.	0.2670	0.5324	0.0020	0.0016	0.0014	0.0013	0.0014	0.0014	0.0015	0.0016	0.0016
σ	0.0015	0.0022	0.0003	0.0002	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001

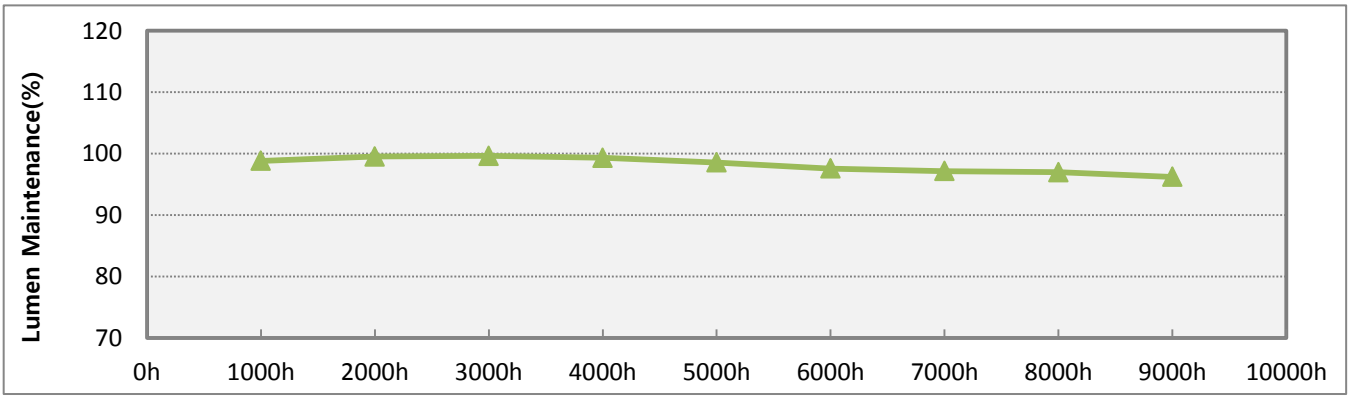
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3. 105℃ Data Set

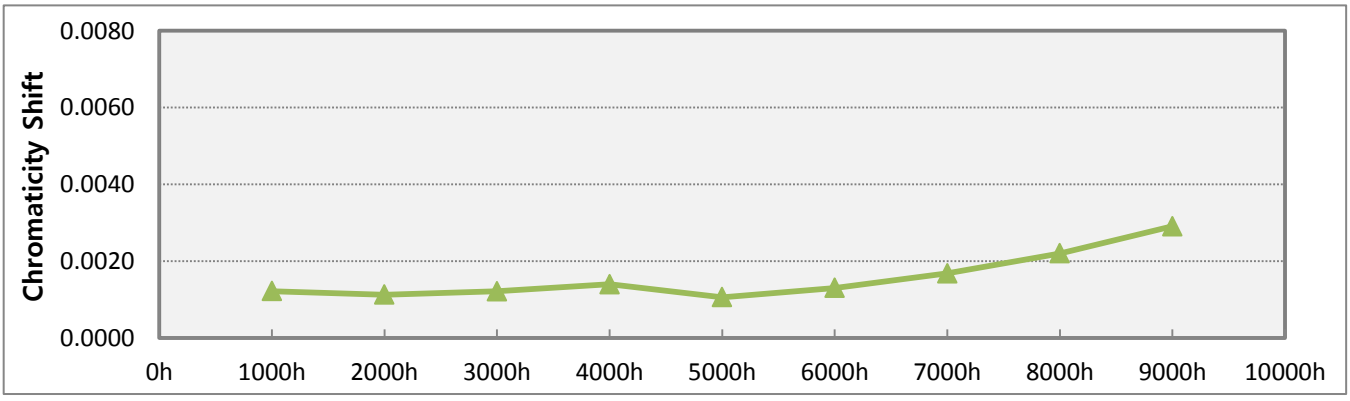
No.	Initial Characteristics			Lumen Maintenance								
	Vf (V)	Flux (lm)	CCT (K)	1000 h	2000 h	3000 h	4000 h	5000 h	6000 h	7000 h	8000 h	9000 h
01	9.73	109.44	2640	100.4	101.1	101.3	101.2	100.7	99.5	98.1	98.3	98.8
02	9.57	116.34	2666	98.7	99.2	99.7	99.0	98.6	97.4	97.0	96.7	97.1
03	9.54	115.31	2607	98.1	99.9	99.0	99.8	98.1	97.8	97.2	97.1	96.7
04	9.54	116.64	2640	98.7	99.3	100.2	99.4	98.8	97.6	97.4	97.8	97.0
05	9.55	118.07	2700	99.9	99.8	100.6	99.7	98.8	97.9	97.5	97.1	96.5
06	9.55	117.41	2720	99.5	99.1	99.1	99.0	98.8	97.4	97.7	96.9	96.5
07	9.62	110.68	2655	98.0	98.5	99.3	98.8	97.6	97.2	97.5	97.0	95.3
08	9.66	113.49	2617	98.0	98.0	98.5	97.6	97.7	96.0	95.3	96.2	95.3
09	9.64	115.35	2662	97.9	98.9	98.8	99.2	98.0	97.2	97.1	96.8	95.8
10	9.56	116.19	2642	98.8	99.7	100.1	99.9	98.5	97.4	97.9	97.2	96.1
11	9.62	114.82	2654	98.8	99.9	99.5	99.3	98.9	97.9	97.6	97.5	97.4
12	9.61	115.63	2653	98.3	99.6	99.0	98.6	98.3	96.1	94.9	93.2	90.2
13	9.74	109.40	2605	98.7	99.4	99.1	98.4	98.6	97.0	95.1	95.5	94.4
14	9.60	116.06	2641	99.6	99.5	100.1	99.4	98.6	98.0	97.0	97.7	96.9
15	9.59	117.76	2638	98.5	99.6	99.6	99.0	97.9	96.6	96.3	95.7	94.2
16	9.59	116.09	2631	99.3	100.1	100.1	99.5	98.7	98.2	97.9	98.1	97.5
17	9.57	119.13	2747	98.9	100.1	99.6	99.8	98.6	98.3	97.1	96.8	96.3
18	9.57	117.88	2709	98.6	100.3	99.8	99.0	98.5	98.2	97.3	98.0	97.4
19	9.58	113.70	2622	99.3	99.6	100.0	100.6	99.6	98.3	98.8	98.5	98.0
20	9.63	113.04	2727	98.7	99.1	98.8	98.9	97.9	97.5	98.3	97.2	96.9
Ave.	9.60	115.12	2659	98.8	99.5	99.6	99.3	98.6	97.6	97.2	97.0	96.2
Med.	9.59	115.84	2648	98.7	99.6	99.6	99.2	98.6	97.5	97.3	97.1	96.6
Min.	9.54	109.40	2605	97.9	98.0	98.5	97.6	97.6	96.0	94.9	93.2	90.2
Max.	9.74	119.13	2747	100.4	101.1	101.3	101.2	100.7	99.5	98.8	98.5	98.8
σ	0.06	2.77	41	0.7	0.7	0.7	0.8	0.7	0.8	1.0	1.2	1.8



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3. 105℃ 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	0.2647	0.5314	0.0012	0.0009	0.0011	0.0016	0.0006	0.0009	0.0013	0.0017	0.0028
02	0.2636	0.5302	0.0014	0.0012	0.0012	0.0013	0.0010	0.0011	0.0014	0.0018	0.0027
03	0.2662	0.5324	0.0013	0.0011	0.0011	0.0014	0.0009	0.0012	0.0015	0.0020	0.0027
04	0.2647	0.5315	0.0022	0.0017	0.0016	0.0016	0.0012	0.0012	0.0013	0.0016	0.0021
05	0.2624	0.5278	0.0018	0.0014	0.0014	0.0015	0.0011	0.0012	0.0016	0.0021	0.0028
06	0.2614	0.5280	0.0013	0.0011	0.0012	0.0015	0.0011	0.0013	0.0018	0.0023	0.0030
07	0.2643	0.5295	0.0016	0.0013	0.0013	0.0013	0.0011	0.0011	0.0015	0.0022	0.0027
08	0.2661	0.5300	0.0011	0.0010	0.0011	0.0012	0.0009	0.0009	0.0013	0.0017	0.0022
09	0.2640	0.5294	0.0010	0.0010	0.0010	0.0014	0.0009	0.0013	0.0019	0.0024	0.0031
10	0.2649	0.5297	0.0012	0.0012	0.0014	0.0017	0.0013	0.0015	0.0020	0.0024	0.0030
11	0.2643	0.5299	0.0011	0.0012	0.0012	0.0014	0.0012	0.0015	0.0019	0.0025	0.0035
12	0.2646	0.5287	0.0011	0.0012	0.0012	0.0014	0.0015	0.0019	0.0023	0.0031	0.0033
13	0.2664	0.5318	0.0010	0.0011	0.0012	0.0014	0.0013	0.0017	0.0021	0.0027	0.0032
14	0.2648	0.5304	0.0011	0.0010	0.0012	0.0013	0.0010	0.0014	0.0019	0.0027	0.0035
15	0.2650	0.5304	0.0010	0.0010	0.0012	0.0013	0.0009	0.0013	0.0018	0.0024	0.0033
16	0.2654	0.5303	0.0011	0.0010	0.0011	0.0012	0.0009	0.0012	0.0016	0.0022	0.0030
17	0.2602	0.5274	0.0009	0.0011	0.0012	0.0015	0.0011	0.0016	0.0018	0.0024	0.0034
18	0.2620	0.5278	0.0009	0.0011	0.0011	0.0012	0.0009	0.0011	0.0011	0.0017	0.0022
19	0.2656	0.5315	0.0010	0.0009	0.0011	0.0014	0.0011	0.0012	0.0017	0.0022	0.0029
20	0.2613	0.5271	0.0011	0.0012	0.0012	0.0014	0.0010	0.0012	0.0017	0.0020	0.0029
Ave.	0.2641	0.5298	0.0012	0.0011	0.0012	0.0014	0.0011	0.0013	0.0017	0.0022	0.0029
Med.	0.2646	0.5300	0.0011	0.0011	0.0012	0.0014	0.0010	0.0012	0.0017	0.0022	0.0029
Min.	0.2602	0.5271	0.0009	0.0009	0.0010	0.0012	0.0006	0.0009	0.0011	0.0016	0.0021
Max.	0.2664	0.5324	0.0022	0.0017	0.0016	0.0017	0.0015	0.0019	0.0023	0.0031	0.0035
σ	0.0018	0.0016	0.0003	0.0002	0.0001	0.0001	0.0002	0.0003	0.0003	0.0004	0.0004



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