



OSLON[®] SQUARE

White (CCT 2400K – 5000K)

IES LM-80-08 Lumen and Chromaticity Maintenance Test Report
Successor of OSLON SSL (Test Doc. 100329W9)
IES TM-21-11 Long Term Projection of Lumen Maintenance

Test Documentation No.: 120132W2 – 25 September 2012



OSRAM
Opto Semiconductors

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Document Information

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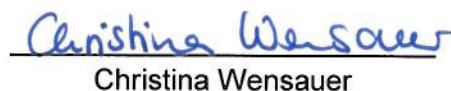
Confirmation

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Disclaimer

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Test Report

1. Number of LED light sources tested

25 randomly selected samples from mass production.

2. Description of LED light sources

Devices tested

- OSLON SQUARE LCW CQAR.EC with CCT 3000 K

This IES LM-80-08 Test Report applies to the following OSLON SQUARE devices

- OSLON SQUARE LCW CQAR.EC with CCT 2400 K – 5000 K
- OSLON SQUARE LCW CQAR.CC with CCT 2400 K – 5000 K
- OSLON SQUARE LCW CQAR.PC with CCT 4000 K – 5000 K
- OSLON SQUARE LUW CQAR (EQW) with CCT 4000 K – 6000 K
- OSLON SQUARE LUW CQAR (Streetwhite) with CCT 5700 K – 6500 K

Successor to OSLON SSL White (CCT 2700K – 5000K) Test Doc. 100329W9.

3. Description of auxiliary equipment

Devices are soldered to metal-core PCB and mounted in a thermal chamber on hot-plates to maintain the desired solder-point temperature. Reliability test boards are removed from the thermal chamber to cool down to room temperature for electrical and optical characterization.

Soldering equipment: Heller 1812 MKIII

Stress equipment: Customized thermal chambers

Electrical Characterization: Keithley 2425-C controlled by customized software

Measurement Equipment: Ulbricht Sphere/Spectrometer: Instrument Systems CAS140CT

4. Operating cycle

The devices are tested at constant solder-point temperature and constant direct current.

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

Boards with devices under test are operated on controlled thermal plates in an oven with controlled environmental conditions according to section 4.4 of LM-80-08. Case temperature T_s is controlled within $-2\text{ }^{\circ}\text{C}$; ambient temperature is controlled within $-5\text{ }^{\circ}\text{C}$ of T_s ; humidity is below 65 % r.H. and airflow is minimized (not forced).

6. Case temperature (test point temperature)

The devices under test are operated at three constant case temperatures of $55\text{ }^{\circ}\text{C}$, $85\text{ }^{\circ}\text{C}$ and $118\text{ }^{\circ}\text{C}$. The test point temperature at device is marked in the isometric view graph on page 5.

7. Drive current of the LED light source during lifetime test

The devices under test are operated at constant forward current. The operating current is listed in the test data tables.

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

Please refer to the test data charts and tables on pages 6 - 9.

9. Lumen maintenance data for each individual LED light source

Please refer to the test data tables on pages 7 - 9.

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

None.

11. LED light source monitoring interval.

Devices were electrically and optically characterized at room temperature at 0 h, 500 h, 1000 h, 2000 h, 3000 h, 4000 h, 5000 h, 6000 h.

12. Photometric measurement uncertainty

Measurement Uncertainty (GUM): 4.8 %

13. Chromaticity shift reported over the measurement time

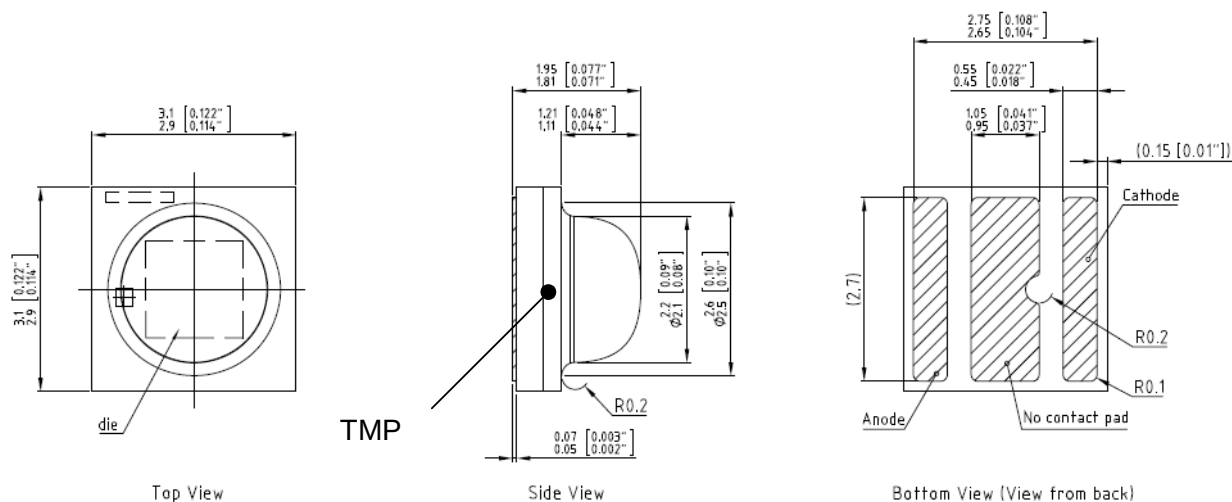
Please refer to the test data tables on pages 7 - 9.

Summary of Testing Conditions

	I	II	III
Case Temperature (Solder Point)	$T_S = 55\text{ °C}$	$T_S = 85\text{ °C}$	$T_S = 118\text{ °C}$
Device Drive Current	$I_F = 500\text{ mA}$	$I_F = 500\text{ mA}$	$I_F = 500\text{ mA}$
Number of Samples	25	25	25
Test Start	14. Dec. 2011	14. Dec. 2011	14. Dec. 2011
Test Duration	6,000 h	6,000 h	6,000 h
Nr. of Failures	0	0	0

Isometric View Graphs and Temperature Measurement Point (TMP)

Device: OSLON SQUARE LxW CQAR.xx

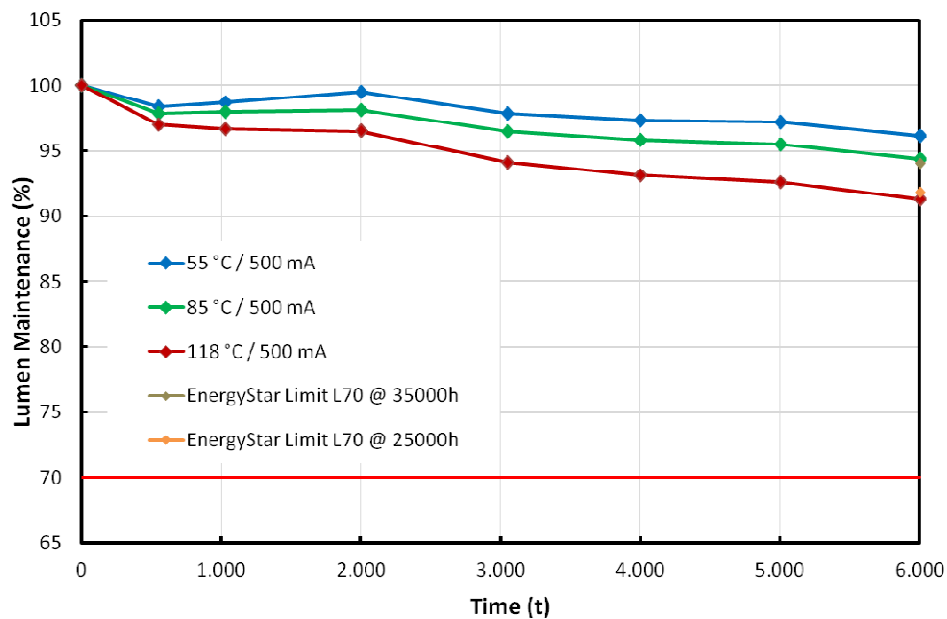


Test Results

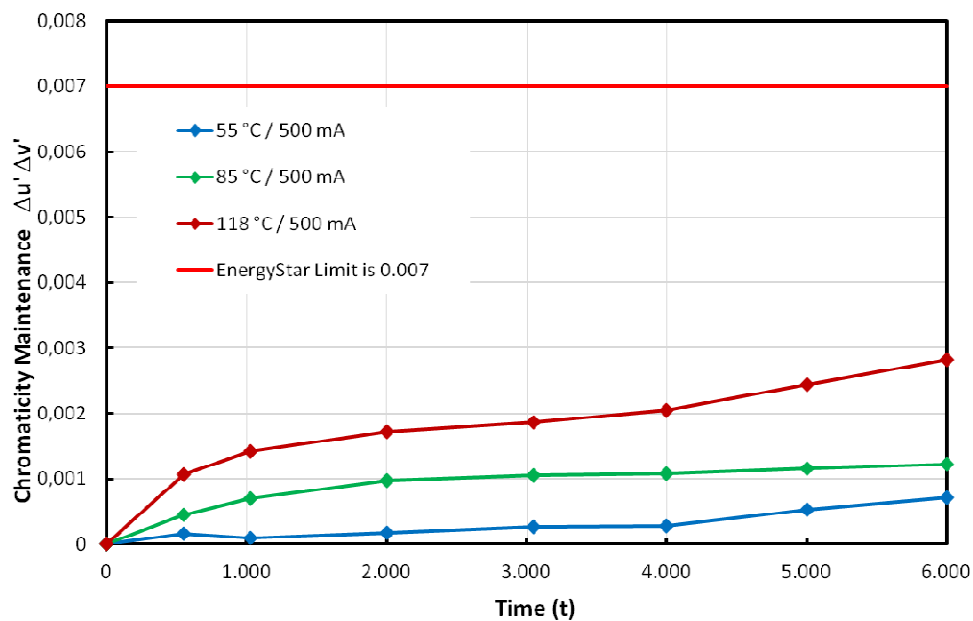
1. Graphic charts

Device: OSLON SQUARE (LCW CQAR.EC)

Lumen Maintenance ($I_F = 500 \text{ mA}$) – Normalized to 0 h



Chromaticity Maintenance $\Delta u' \Delta v'$ ($I_F = 500 \text{ mA}$) – Normalized to 0 h



2. Tables

Device: OSLON SQUARE (LCW CQAR.EC)

Test Condition I: $T_s = 55\text{ }^{\circ}\text{C}$, $I_F = 500\text{ mA}$

Lumen Maintenance ($I_F = 500\text{ mA}$) – Normalized to 0 h

	U_F [V]	Φ_V [lm]	Measurement Time of Lumen Maintenance							
			0 h	549 h	1025 h	2000 h	3049 h	4000 h	5000 h	6000 h
1	3,00	145,40	100,00	98,38	98,70	99,54	97,56	97,14	95,95	95,95
2	3,00	145,30	100,00	98,45	98,77	99,53	97,84	97,42	96,02	96,02
3	3,00	142,90	100,00	98,22	98,53	99,29	97,66	97,23	96,10	96,10
4	3,00	143,90	100,00	98,16	98,54	99,38	97,61	97,18	96,06	96,06
5	3,00	142,60	100,00	98,28	98,60	99,36	97,73	97,23	96,03	96,03
6	3,00	142,30	100,00	98,28	98,60	99,36	97,65	97,22	95,95	95,95
7	3,00	144,10	100,00	98,23	98,55	99,38	97,61	97,26	95,92	95,92
8	3,00	143,10	100,00	98,36	98,75	99,58	97,94	97,45	96,25	96,25
9	3,00	146,50	100,00	98,39	98,78	99,55	97,92	97,50	96,38	96,38
10	3,00	147,00	100,00	98,46	98,85	99,62	98,06	97,51	96,33	96,33
11	3,00	145,70	100,00	98,38	98,77	99,47	97,84	97,42	96,03	96,03
12	3,01	145,60	100,00	98,45	98,77	99,47	97,84	97,35	96,16	96,16
13	3,01	146,20	100,00	98,32	98,57	99,41	97,85	97,29	96,31	96,31
14	3,01	143,40	100,00	98,36	98,68	99,51	97,88	97,45	96,32	96,32
15	3,00	143,80	100,00	98,36	98,68	99,52	97,81	97,32	96,26	96,26
16	3,01	141,80	100,00	98,49	98,88	99,71	98,00	97,57	96,36	96,36
17	3,00	142,00	100,00	98,42	98,74	99,64	97,93	97,43	96,22	96,22
18	3,00	141,40	100,00	98,41	98,73	99,49	97,92	97,35	96,21	96,21
19	3,00	141,70	100,00	98,35	98,59	99,42	97,85	97,28	96,22	96,22
20	3,00	143,30	100,00	98,43	98,82	99,65	97,95	97,59	96,53	96,53
21	3,00	142,80	100,00	98,29	98,60	99,43	97,80	97,30	96,17	96,17
22	3,00	141,60	100,00	98,27	98,80	99,49	97,85	97,42	96,21	96,21
23	3,00	141,70	100,00	98,35	98,73	99,49	97,78	97,28	95,93	95,93
24	3,00	142,20	100,00	98,28	98,60	99,43	97,79	97,29	96,09	96,09
25	3,00	140,30	100,00	98,40	98,79	99,62	97,98	96,97	95,97	95,97
median	3,00	143,10	100,00	98,36	98,73	99,49	97,84	97,32	96,17	96,17
average	3,00	143,46	100,00	98,35	98,70	99,49	97,83	97,34	96,16	96,16
std. dev.	0,00	1,83	0,00	0,08	0,10	0,10	0,13	0,14	0,16	0,16
min.	3,00	140,30	100,00	98,16	98,53	99,29	97,56	96,97	95,92	95,92
max.	3,01	147,00	100,00	98,49	98,88	99,71	98,06	97,59	96,53	96,53

Chromaticity Maintenance $\Delta u' \Delta v'$ ($I_F = 500\text{ mA}$) – Normalized to 0 h

	CCT [K]	u'	v'	Measurement Time of Color Shift Δu'Δv'							
		0 h	0 h	0 h	0 h	549 h	1025 h	2000 h	3049 h	4000 h	5000 h
1	2964	0,253	0,518	0,0000	0,0001	0,0000	0,0002	0,0003	0,0003	0,0005	0,0007
2	2938	0,254	0,519	0,0000	0,0002	0,0002	0,0002	0,0002	0,0002	0,0006	0,0007
3	2971	0,253	0,518	0,0000	0,0001	0,0001	0,0002	0,0002	0,0003	0,0005	0,0007
4	2990	0,252	0,517	0,0000	0,0002	0,0002	0,0002	0,0002	0,0003	0,0005	0,0006
5	2955	0,253	0,518	0,0000	0,0002	0,0001	0,0001	0,0003	0,0003	0,0006	0,0007
6	2933	0,254	0,519	0,0000	0,0002	0,0001	0,0002	0,0002	0,0002	0,0005	0,0007
7	3038	0,250	0,518	0,0000	0,0002	0,0001	0,0001	0,0002	0,0002	0,0004	0,0007
8	3011	0,251	0,518	0,0000	0,0002	0,0002	0,0003	0,0003	0,0004	0,0005	0,0006
9	3002	0,251	0,518	0,0000	0,0001	0,0001	0,0002	0,0004	0,0003	0,0006	0,0007
10	3001	0,251	0,519	0,0000	0,0002	0,0001	0,0003	0,0004	0,0003	0,0006	0,0008
11	2969	0,252	0,519	0,0000	0,0002	0,0001	0,0001	0,0002	0,0002	0,0005	0,0006
12	2936	0,253	0,520	0,0000	0,0001	0,0001	0,0001	0,0002	0,0004	0,0005	0,0008
13	3034	0,250	0,516	0,0000	0,0002	0,0001	0,0001	0,0002	0,0002	0,0005	0,0006
14	2966	0,253	0,518	0,0000	0,0002	0,0001	0,0002	0,0003	0,0003	0,0006	0,0008
15	3048	0,250	0,516	0,0000	0,0002	0,0001	0,0001	0,0003	0,0003	0,0005	0,0008
16	2984	0,253	0,515	0,0000	0,0002	0,0002	0,0002	0,0003	0,0004	0,0006	0,0007
17	2961	0,253	0,519	0,0000	0,0002	0,0001	0,0001	0,0003	0,0003	0,0006	0,0008
18	2923	0,254	0,519	0,0000	0,0002	0,0001	0,0001	0,0002	0,0003	0,0004	0,0007
19	2943	0,254	0,518	0,0000	0,0001	0,0000	0,0002	0,0003	0,0003	0,0005	0,0005
20	2974	0,253	0,518	0,0000	0,0001	0,0000	0,0001	0,0002	0,0002	0,0004	0,0007
21	2944	0,253	0,519	0,0000	0,0002	0,0000	0,0001	0,0002	0,0002	0,0005	0,0007
22	2962	0,253	0,518	0,0000	0,0002	0,0001	0,0001	0,0003	0,0004	0,0006	0,0008
23	2947	0,253	0,519	0,0000	0,0002	0,0001	0,0001	0,0003	0,0002	0,0005	0,0007
24	2952	0,253	0,519	0,0000	0,0001	0,0001	0,0002	0,0003	0,0004	0,0006	0,0008
25	2931	0,254	0,518	0,0000	0,0002	0,0001	0,0001	0,0002	0,0003	0,0004	0,0006
median	2964	0,253	0,518	0,0000	0,0002	0,0001	0,0001	0,0003	0,0003	0,0005	0,0007
average	2971	0,252	0,518	0,0000	0,0002	0,0001	0,0002	0,0003	0,0003	0,0005	0,0007
std. dev.	35	0,001	0,001	0,0000	0,0000	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001
min.	2923	0,250	0,515	0,0000	0,0001	0,0000	0,0001	0,0002	0,0002	0,0004	0,0005
max.	3048	0,254	0,520	0,0000	0,0002	0,0002	0,0003	0,0004	0,0004	0,0006	0,0008

Device: OSLON SQUARE (LCW CQAR.EC)

Test Condition II: $T_S = 85\text{ }^{\circ}\text{C}$, $I_F = 500\text{ mA}$

Lumen Maintenance ($I_F = 500\text{ mA}$) – Normalized to 0 h

	U_F [V] Φ_V [lm]		Measurement Time of Lumen Maintenance							
	0 h	0 h	0 h	549 h	1025 h	2000 h	3049 h	4000 h	5000 h	6000 h
1	3,01	146,10	100,00	97,63	97,68	97,88	96,14	95,58	94,13	94,13
2	3,01	145,10	100,00	97,76	97,87	98,07	96,39	95,90	94,30	94,30
3	3,01	144,40	100,00	97,96	98,00	98,19	96,58	95,74	94,21	94,21
4	3,01	142,00	100,00	97,93	98,03	98,28	96,59	96,02	94,75	94,75
5	3,01	142,50	100,00	98,07	98,18	98,36	96,74	96,11	94,70	94,70
6	3,02	141,60	100,00	97,78	97,89	98,06	96,44	95,66	94,18	94,18
7	3,02	142,50	100,00	97,93	97,97	98,08	96,46	95,75	94,28	94,28
8	3,02	142,60	100,00	97,93	98,04	98,15	96,54	95,90	94,42	94,42
9	3,02	143,10	100,00	97,94	97,98	98,16	96,62	95,91	94,44	94,44
10	3,02	143,60	100,00	97,88	98,05	98,39	96,63	96,06	94,73	94,73
11	3,02	141,90	100,00	97,93	98,03	98,28	96,52	95,88	94,47	94,47
12	3,02	140,90	100,00	98,41	98,51	98,69	96,99	96,28	94,79	94,79
13	3,02	143,10	100,00	97,87	97,91	98,09	96,41	95,70	94,16	94,16
14	3,02	144,60	100,00	97,48	97,58	97,92	96,10	95,54	94,22	94,22
15	3,02	144,80	100,00	97,89	98,00	98,06	96,45	95,68	94,43	94,43
16	3,02	144,60	100,00	97,89	98,07	98,06	96,51	95,82	94,35	94,35
17	3,01	145,00	100,00	97,69	97,87	97,85	96,25	95,62	94,09	94,09
18	3,01	143,30	100,00	97,53	97,63	97,74	96,13	95,57	94,38	94,38
19	3,01	142,00	100,00	97,65	97,75	97,78	96,17	95,46	94,12	94,12
20	3,02	140,30	100,00	97,48	97,65	97,74	96,20	95,55	94,06	94,06
21	3,02	143,50	100,00	97,46	97,50	97,68	96,07	95,51	94,18	94,18
22	3,02	143,30	100,00	97,87	98,05	97,96	96,48	95,78	94,31	94,31
23	3,02	142,70	100,00	97,87	98,04	98,08	96,40	95,76	94,22	94,22
24	3,02	142,70	100,00	98,08	98,32	98,37	96,82	96,18	94,57	94,57
25	3,02	142,90	100,00	98,01	98,25	98,30	96,68	96,05	94,43	94,43
median	3,02	143,10	100,00	97,88	98,00	98,08	96,46	95,76	94,31	94,31
average	3,02	143,16	100,00	97,84	97,95	98,09	96,45	95,80	94,36	94,36
std. dev.	0,00	1,39	0,00	0,22	0,24	0,24	0,24	0,22	0,22	0,22
min.	3,01	140,30	100,00	97,46	97,50	97,68	96,07	95,46	94,06	94,06
max.	3,02	146,10	100,00	98,41	98,51	98,69	96,99	96,28	94,79	94,79

Chromaticity Maintenance $\Delta u' \Delta v'$ ($I_F = 500\text{ mA}$) – Normalized to 0 h

	CCT [K]		u'	v'	Measurement Time of Color Shift $\Delta u' \Delta v'$							
	0 h	0 h	0 h	0 h	0 h	549 h	1025 h	2000 h	3049 h	4000 h	5000 h	6000 h
1	2979	0,253	0,519	0,0000	0,0004	0,0007	0,0009	0,0010	0,0011	0,0011	0,0011	0,0012
2	2995	0,253	0,518	0,0000	0,0005	0,0008	0,0010	0,0010	0,0011	0,0011	0,0011	0,0012
3	2961	0,254	0,520	0,0000	0,0005	0,0007	0,0010	0,0011	0,0011	0,0012	0,0012	0,0013
4	3000	0,255	0,519	0,0000	0,0004	0,0007	0,0010	0,0010	0,0011	0,0011	0,0013	0,0013
5	3003	0,253	0,520	0,0000	0,0005	0,0008	0,0010	0,0011	0,0012	0,0012	0,0013	0,0013
6	2947	0,254	0,519	0,0000	0,0004	0,0007	0,0008	0,0009	0,0010	0,0011	0,0011	0,0011
7	2990	0,252	0,519	0,0000	0,0004	0,0007	0,0010	0,0010	0,0011	0,0011	0,0011	0,0013
8	2971	0,252	0,519	0,0000	0,0005	0,0007	0,0010	0,0011	0,0011	0,0011	0,0011	0,0013
9	2934	0,251	0,517	0,0000	0,0005	0,0008	0,0010	0,0011	0,0012	0,0012	0,0012	0,0012
10	2934	0,252	0,517	0,0000	0,0004	0,0006	0,0009	0,0010	0,0011	0,0011	0,0011	0,0013
11	3008	0,255	0,518	0,0000	0,0003	0,0006	0,0009	0,0009	0,0010	0,0011	0,0011	0,0012
12	3000	0,253	0,516	0,0000	0,0005	0,0008	0,0011	0,0012	0,0013	0,0013	0,0013	0,0015
13	2947	0,253	0,520	0,0000	0,0005	0,0007	0,0010	0,0011	0,0011	0,0012	0,0012	0,0013
14	2961	0,253	0,519	0,0000	0,0004	0,0006	0,0009	0,0010	0,0011	0,0012	0,0012	0,0013
15	2971	0,253	0,517	0,0000	0,0004	0,0007	0,0009	0,0010	0,0010	0,0011	0,0011	0,0012
16	2969	0,253	0,518	0,0000	0,0004	0,0007	0,0010	0,0010	0,0011	0,0012	0,0012	0,0012
17	2947	0,253	0,518	0,0000	0,0004	0,0006	0,0009	0,0009	0,0010	0,0011	0,0011	0,0011
18	2970	0,253	0,519	0,0000	0,0004	0,0006	0,0009	0,0009	0,0010	0,0012	0,0012	0,0012
19	2972	0,253	0,518	0,0000	0,0004	0,0006	0,0009	0,0010	0,0011	0,0011	0,0011	0,0012
20	3006	0,253	0,515	0,0000	0,0004	0,0007	0,0010	0,0010	0,0012	0,0013	0,0013	0,0013
21	2997	0,252	0,518	0,0000	0,0004	0,0007	0,0010	0,0010	0,0011	0,0012	0,0012	0,0012
22	2995	0,252	0,518	0,0000	0,0004	0,0007	0,0009	0,0010	0,0010	0,0011	0,0011	0,0011
23	2967	0,253	0,519	0,0000	0,0005	0,0007	0,0010	0,0010	0,0012	0,0012	0,0012	0,0013
24	3008	0,252	0,516	0,0000	0,0004	0,0006	0,0010	0,0010	0,0011	0,0011	0,0011	0,0012
25	3001	0,252	0,518	0,0000	0,0005	0,0006	0,0009	0,0010	0,0011	0,0011	0,0011	0,0012
median	2972	0,253	0,518	0,0000	0,0004	0,0007	0,0010	0,0010	0,0011	0,0011	0,0011	0,0012
average	2977	0,253	0,518	0,0000	0,0005	0,0007	0,0010	0,0010	0,0011	0,0012	0,0012	0,0012
std. dev.	24	0,001	0,001	0,0000	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001
min.	2934	0,251	0,515	0,0000	0,0003	0,0006	0,0008	0,0009	0,0010	0,0011	0,0011	0,0011
max.	3008	0,255	0,520	0,0000	0,0005	0,0008	0,0011	0,0012	0,0013	0,0013	0,0013	0,0015

Device: OSLON SQUARE (LCW CQAR.EC)

Test Condition III: $T_s = 118\text{ }^{\circ}\text{C}$, $I_F = 500\text{ mA}$

Lumen Maintenance ($I_F = 500\text{ mA}$) – Normalized to 0 h

	U_F [V] Φ_V [lm]		Measurement Time of Lumen Maintenance							
	0 h	0 h	0 h	549 h	1025 h	2000 h	3049 h	4000 h	5000 h	6000 h
1	3,03	146,10	100,00	96,75	96,44	96,22	93,81	92,85	91,01	91,01
2	3,03	146,90	100,00	96,90	96,46	96,04	93,64	92,61	90,98	90,98
3	3,03	146,10	100,00	97,02	96,58	96,15	93,74	92,64	90,94	90,94
4	3,02	145,50	100,00	96,46	96,50	96,27	93,93	92,89	91,04	91,04
5	3,02	144,30	100,00	97,06	96,82	96,72	94,50	93,31	91,59	91,59
6	3,02	142,90	100,00	97,10	96,78	96,53	94,17	93,11	91,38	91,38
7	3,02	142,50	100,00	97,02	96,64	96,30	93,87	92,88	91,08	91,08
8	3,03	142,10	100,00	97,16	96,84	96,64	94,20	93,21	91,40	91,40
9	3,03	143,10	100,00	96,90	96,58	96,25	93,89	92,91	90,97	90,97
10	3,03	142,90	100,00	96,96	96,57	96,39	94,03	93,04	91,03	91,03
11	3,02	143,60	100,00	97,11	96,80	96,62	94,33	93,07	91,35	91,35
12	3,02	144,10	100,00	96,92	96,53	96,29	93,87	92,75	90,96	90,96
13	3,02	146,90	100,00	96,90	96,60	96,45	93,85	93,02	91,25	91,25
14	3,02	147,20	100,00	97,11	96,67	96,39	93,93	92,83	91,00	91,00
15	3,00	145,40	100,00	97,14	96,91	96,96	94,61	93,78	92,13	92,13
16	3,01	143,30	100,00	97,11	96,65	96,54	94,11	93,13	91,47	91,47
17	3,01	142,10	100,00	96,95	96,63	96,50	94,06	93,14	91,26	91,26
18	3,01	142,70	100,00	96,96	96,64	96,45	94,02	93,03	91,09	91,09
19	3,01	143,50	100,00	96,97	96,66	96,55	94,19	93,21	91,20	91,20
20	3,01	144,70	100,00	97,00	96,69	96,73	94,38	93,54	91,89	91,89
21	3,01	144,30	100,00	96,99	96,61	96,57	94,15	93,25	91,52	91,52
22	3,01	142,90	100,00	97,73	97,34	97,24	94,80	93,88	92,07	92,07
23	3,00	143,40	100,00	96,97	96,66	96,47	94,12	93,20	91,34	91,34
24	3,00	143,50	100,00	97,18	96,87	96,69	94,33	93,28	91,27	91,27
25	3,00	143,90	100,00	96,98	96,60	96,56	94,14	93,09	91,02	91,02
median	3,02	143,60	100,00	96,99	96,64	96,50	94,11	93,09	91,25	91,25
average	3,02	144,16	100,00	97,01	96,68	96,50	94,11	93,11	91,29	91,29
std. dev.	0,01	1,54	0,00	0,21	0,18	0,26	0,28	0,31	0,34	0,34
min.	3,00	142,10	100,00	96,46	96,44	96,04	93,64	92,61	90,94	90,94
max.	3,03	147,20	100,00	97,73	97,34	97,24	94,80	93,88	92,13	92,13

Chromaticity Maintenance $\Delta u' \Delta v'$ ($I_F = 500\text{ mA}$) – Normalized to 0 h

	CCT [K]	u'	v'	Measurement Time of Color Shift $\Delta u' \Delta v'$								
	0 h	0 h	0 h	0 h	549 h	1025 h	2000 h	3049 h	4000 h	5000 h	6000 h	
1	3023	0.252	0.516	0.0000	0.0011	0.0013	0.0016	0.0019	0.0020	0.0025	0.0030	
2	3043	0.252	0.516	0.0000	0.0010	0.0013	0.0016	0.0018	0.0021	0.0024	0.0029	
3	3001	0.253	0.517	0.0000	0.0011	0.0014	0.0017	0.0019	0.0020	0.0025	0.0029	
4	2979	0.254	0.518	0.0000	0.0010	0.0014	0.0017	0.0019	0.0021	0.0025	0.0029	
5	3002	0.252	0.519	0.0000	0.0010	0.0013	0.0017	0.0019	0.0020	0.0025	0.0030	
6	2973	0.254	0.519	0.0000	0.0011	0.0015	0.0018	0.0020	0.0021	0.0026	0.0029	
7	2974	0.254	0.519	0.0000	0.0010	0.0014	0.0017	0.0019	0.0022	0.0025	0.0029	
8	3008	0.252	0.520	0.0000	0.0010	0.0013	0.0017	0.0019	0.0020	0.0025	0.0029	
9	3004	0.252	0.519	0.0000	0.0011	0.0014	0.0017	0.0018	0.0021	0.0025	0.0029	
10	3039	0.252	0.516	0.0000	0.0010	0.0013	0.0016	0.0018	0.0020	0.0025	0.0030	
11	2994	0.253	0.519	0.0000	0.0010	0.0013	0.0017	0.0018	0.0020	0.0024	0.0029	
12	3008	0.252	0.520	0.0000	0.0011	0.0014	0.0017	0.0018	0.0021	0.0025	0.0028	
13	3031	0.251	0.519	0.0000	0.0009	0.0013	0.0016	0.0018	0.0019	0.0023	0.0027	
14	3018	0.252	0.519	0.0000	0.0010	0.0014	0.0017	0.0018	0.0019	0.0023	0.0027	
15	3057	0.250	0.519	0.0000	0.0010	0.0014	0.0017	0.0019	0.0021	0.0024	0.0028	
16	3035	0.252	0.517	0.0000	0.0010	0.0014	0.0017	0.0018	0.0020	0.0023	0.0027	
17	3011	0.253	0.516	0.0000	0.0011	0.0015	0.0018	0.0019	0.0021	0.0025	0.0027	
18	3011	0.252	0.519	0.0000	0.0010	0.0014	0.0017	0.0018	0.0020	0.0023	0.0027	
19	3029	0.251	0.519	0.0000	0.0010	0.0014	0.0017	0.0018	0.0020	0.0024	0.0027	
20	3045	0.251	0.517	0.0000	0.0011	0.0014	0.0018	0.0019	0.0022	0.0025	0.0027	
21	3022	0.252	0.519	0.0000	0.0011	0.0014	0.0018	0.0019	0.0021	0.0024	0.0027	
22	3035	0.251	0.520	0.0000	0.0012	0.0015	0.0018	0.0019	0.0021	0.0024	0.0028	
23	3010	0.252	0.520	0.0000	0.0010	0.0014	0.0017	0.0018	0.0021	0.0024	0.0028	
24	3036	0.251	0.519	0.0000	0.0011	0.0013	0.0016	0.0018	0.0021	0.0025	0.0030	
25	3036	0.251	0.520	0.0000	0.0011	0.0014	0.0017	0.0017	0.0020	0.0023	0.0027	
median	3018	0.252	0.519	0.0000	0.0010	0.0014	0.0017	0.0018	0.0021	0.0025	0.0028	
average	3017	0.252	0.518	0.0000	0.0011	0.0014	0.0017	0.0019	0.0020	0.0024	0.0028	
std. dev.	22	0.001	0.001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
min.	2973	0.250	0.516	0.0000	0.0009	0.0013	0.0016	0.0017	0.0019	0.0023	0.0027	
max.	3057	0.254	0.520	0.0000	0.0012	0.0015	0.0018	0.0020	0.0022	0.0026	0.0030	

----- End of the accredited section of the report -----

Lumen Maintenance Projection (IES TM-21-11)

For Information Only!

Description of LED light source tested	OSLON SQUARE (LCW CQAR.EC)
LED drive current used in the test	500mA
Test duration	6,000 hours
Test duration used for projection	1,000 hours to 6,000 hours

	I	II	III
Case Temperature (solder-point)	$T_S = 55^\circ\text{C}$	$T_S = 85^\circ\text{C}$	$T_S = 118^\circ\text{C}$
Sample size	25	25	25
α	5.923E-06	7,841E-06	1,209E-05
B	9.983E-01	9,905E-01	9.811E-01
Projected L70	59,932	44,103	27,927
Reported L70	> 36,000	> 36,000	27,927

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