



中国认可  
国际互认  
检测  
TESTING  
CNAS L6478



# TEST REPORT

**Reference No.** : WTS16F0859567N  
**Applicant** : Shenzhen Destar Opto-Electronics Co.,LTD  
**Address** : 6th floor, 3 building HanHaiDa 7th Industry park, GongMing YuLv Village, Guangming New district, ShenZhen, Guangdong  
**Manufacturer** : Shenzhen Destar Opto-Electronics Co.,LTD  
**Address** : 6th floor, 3 building HanHaiDa 7th Industry park, GongMing YuLv Village, Guangming New district, ShenZhen, Guangdong  
**Product Name** : SMD2835  
**Model No** : 2N128-AKEAAE-ZJP-1-18  
**Ratings** : 18VDC, 60mA  
**Standards** : IES LM-80-08  
 Approved Method: Measuring Lumen Maintenance of LED Light Source  
**Date of Receipt sample** : 2016-02-15  
**Date of Test** : 2016-02-15 to 2016-11-13  
**Date of Issue** : 2016-12-08  
**Test Report Form No.** : WPL-LM8008A-02A  
**Test Result** : See the attached sheets

**Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

**Waltek Services (Foshan) Co., Ltd.**

Address: No. 13-19, 2/F, 2nd Building, Sunlink International Machinery City, Chencun Town, Shunde District, Foshan, Guangdong, China  
 Tel :+86-757-23811398  
 Fax:+86-757-23811381

Compiled by:

Finn Yu / Project Engineer

Approved by:



Akin Xu / Manager



## 1. Description of Test Samples

Classification: LED Package  
Part Name: SMD2835  
Part Number: 2N128-AKEAAE-ZJP-1-18  
Nominal CCT: 2700K

This report also covers the following Series products:

None

## 2. Standards Used:

- IESNA LM-80-08: IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products(This test method was not accredited by IAS)

## 3. Operating Cycle

The testing facility used by Waltek Services (Foshan) Co., Ltd. is located at No. 13-19, 2/F, 2nd Building, Sunlink International Machinery City, Chencun Town, Shunde District, Foshan, Guangdong, China

## 4. Operating Cycle

Samples are driven with a constant direct current (DC)

## 5. Ambient Conditions

For lumen maintenance test, samples were operated in thermal chambers with minimal ambient airflow. For long term reliability test, the case temperature was controlled by mounting several thermocouples on a sample reliability stress board at the designated thermal measurement point, as shown in Attachment. The ambient temperature  $T_A$  was measured by several thermocouples at a distance of 5 mm above the reliability test board. The relative humidity within chamber was less than 65%.

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

## 6. Photometry Measurement Uncertainty

The uncertainty of the light output measurements is  $U=1.8\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=20\text{K}$  ( $K=2$ ), at the 95% confidence level. This calibration results traceable to the Guangzhou Institute of Measurement and Testing Technology.



## 7. Sample Set

Part Number:	2N128-AKEAAE-ZJP-1-18
Number of Units:	25
Actual Case Temperature( $T_S$ ):	$T_S=54.6^{\circ}\text{C}$
Actual Ambient Temperature( $T_A$ ):	$T_A=53.9^{\circ}\text{C}$
Life Test Drive Current:	$I_F = 60\text{mA}$
Measurement Current:	$I_F = 60\text{mA}$

Part Number:	2N128-AKEAAE-ZJP-1-18
Number of Units:	25
Actual Case Temperature( $T_S$ ):	$T_S=84.1^{\circ}\text{C}$
Actual Ambient Temperature( $T_A$ ):	$T_A=83.4^{\circ}\text{C}$
Life Test Drive Current:	$I_F = 60\text{mA}$
Measurement Current:	$I_F = 60\text{mA}$

Part Number:	2N128-AKEAAE-ZJP-1-18
Number of Units:	25
Actual Case Temperature( $T_S$ ):	$T_S=104.5^{\circ}\text{C}$
Actual Ambient Temperature( $T_A$ ):	$T_A=103.8^{\circ}\text{C}$
Life Test Drive Current:	$I_F = 60\text{mA}$
Measurement Current:	$I_F = 60\text{mA}$

## 8. SUMMARY OF TEST RESULT

Data Set:	Data Set 1, 55°C, 60mA
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	96.69%
Average Chromaticity Shift at 6000 hours ( $\Delta u'v'$ ):	0.0021
Reported TM-21 L 70 Lifetime:	>36000h

Data Set:	Data Set 2, 85°C, 60mA
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	96.26%
Average Chromaticity Shift at 6000 hours ( $\Delta u'v'$ ):	0.0023
Reported TM-21 L 70 Lifetime:	>36000h

Data Set:	Data Set 3, 105°C, 60mA
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	95.42%
Average Chromaticity Shift at 6000 hours ( $\Delta u'v'$ ):	0.0026
Reported TM-21 L 70 Lifetime:	>36000h

**Data sheet 1:**

<b>Driver current</b>	<b>60(mA)</b>	<b>Target Case temperature</b>	<b>55°C</b>
<b>Measurement current</b>	<b>60(mA)</b>	<b>Actual case temperature</b>	<b>54.6°C</b>

<b>Lumen Maintenance:</b>								
S/N	TLF(lm)	V <sub>F</sub> (V)	Lumen Maintenance(%)					
	Initial(Ohr)		1000h	2000h	3000h	4000h	5000h	6000h
A01	108.0	17.95	100.02	99.62	99.00	98.28	97.40	96.33
A02	109.1	17.94	99.91	99.52	99.01	98.34	97.53	96.39
A03	110.5	18.00	99.96	99.73	99.27	98.60	97.54	96.46
A04	110.9	18.01	100.01	99.74	99.34	98.82	97.90	96.80
A05	109.8	18.00	99.99	99.60	99.11	98.49	97.62	96.63
A06	109.6	18.01	100.01	99.62	99.09	98.68	97.79	96.28
A07	109.7	18.01	99.90	99.49	99.02	98.35	97.36	96.30
A08	111.1	18.02	100.02	99.63	99.14	98.55	97.69	96.71
A09	109.5	18.00	100.02	99.62	99.12	98.52	97.65	96.64
A10	112.0	17.98	100.02	99.61	99.10	98.50	97.60	96.58
A11	111.8	17.95	100.02	99.61	99.09	98.61	97.84	96.79
A12	113.0	17.98	100.02	99.60	99.07	98.43	97.76	96.83
A13	109.9	18.00	99.90	99.75	99.47	99.02	98.51	97.88
A14	109.6	18.01	100.07	99.81	99.56	99.25	98.82	98.04
A15	108.2	17.99	99.96	99.57	99.01	98.34	97.35	96.22
A16	112.5	18.00	100.02	99.74	99.33	98.75	98.05	97.00
A17	108.3	18.01	100.06	99.75	99.37	98.86	97.76	96.84
A18	110.8	17.97	99.98	99.77	99.40	98.69	97.87	96.89
A19	110.8	17.98	100.02	99.76	99.37	98.65	97.80	96.80
A20	107.9	17.94	100.06	99.74	99.12	98.59	97.50	96.40
A21	110.1	18.00	100.02	99.79	99.29	98.67	97.83	96.67
A22	112.1	17.99	99.96	99.80	99.44	98.82	98.11	97.02
A23	109.1	18.01	99.92	99.75	99.33	98.55	97.64	96.31
A24	112.8	18.00	99.97	99.75	99.26	98.43	97.25	95.90
A25	108.0	17.94	100.02	99.61	99.07	98.41	97.55	96.47
<b>Avg</b>	<b>110.2</b>	<b>17.99</b>	<b>99.99</b>	<b>99.68</b>	<b>99.22</b>	<b>98.61</b>	<b>97.75</b>	<b>96.69</b>
Max	113.0	18.02	100.07	99.81	99.56	99.25	98.82	98.04
Min	107.9	17.94	99.90	99.49	99.00	98.28	97.25	95.90
Med	109.9	18.00	100.02	99.73	99.14	98.59	97.69	96.64
Std. dev	1.6	0.03	0.05	0.09	0.17	0.23	0.35	0.47

**Note: TLF= Total Luminous Flux**

**TM-21 Projection:**

Test Duration	6000h
Failures Observed	0
$\alpha$	6.646E-06
$\beta$	1.010
Calculated L <sub>70</sub>	55000h
Reported L <sub>70</sub>	>36000h



<b>Chromaticity Shift(<math>\Delta u'v'</math>):</b>									
S/N	Initial(Ohr)		CCT (K)	1000h	2000h	3000h	4000h	5000h	6000h
	CIEu'	CIEv'							
A01	0.2573	0.5316	2791	0.0003	0.0006	0.0010	0.0014	0.0017	0.0021
A02	0.2576	0.5305	2790	0.0003	0.0006	0.0010	0.0014	0.0017	0.0021
A03	0.2608	0.5306	2721	0.0004	0.0006	0.0010	0.0014	0.0017	0.0021
A04	0.2595	0.5315	2745	0.0003	0.0005	0.0009	0.0013	0.0016	0.0020
A05	0.2597	0.5304	2745	0.0003	0.0006	0.0009	0.0013	0.0016	0.0021
A06	0.2595	0.5315	2746	0.0004	0.0006	0.0009	0.0013	0.0017	0.0021
A07	0.2609	0.5306	2721	0.0003	0.0006	0.0009	0.0012	0.0016	0.0021
A08	0.2578	0.5319	2779	0.0003	0.0006	0.0009	0.0012	0.0016	0.0020
A09	0.2595	0.5314	2746	0.0005	0.0007	0.0010	0.0014	0.0018	0.0022
A10	0.2570	0.5310	2800	0.0004	0.0006	0.0010	0.0013	0.0017	0.0022
A11	0.2597	0.5304	2746	0.0004	0.0006	0.0009	0.0012	0.0016	0.0021
A12	0.2564	0.5301	2817	0.0004	0.0006	0.0009	0.0013	0.0016	0.0021
A13	0.2609	0.5307	2720	0.0003	0.0005	0.0008	0.0012	0.0015	0.0019
A14	0.2595	0.5314	2746	0.0004	0.0006	0.0009	0.0013	0.0017	0.0021
A15	0.2564	0.5300	2819	0.0003	0.0006	0.0008	0.0012	0.0015	0.0021
A16	0.2571	0.5311	2798	0.0004	0.0006	0.0008	0.0012	0.0016	0.0021
A17	0.2579	0.5320	2777	0.0003	0.0005	0.0007	0.0011	0.0015	0.0020
A18	0.2575	0.5304	2791	0.0004	0.0006	0.0008	0.0012	0.0015	0.0020
A19	0.2570	0.5310	2801	0.0004	0.0006	0.0008	0.0013	0.0016	0.0021
A20	0.2573	0.5315	2791	0.0004	0.0006	0.0008	0.0012	0.0016	0.0020
A21	0.2597	0.5304	2745	0.0004	0.0005	0.0008	0.0012	0.0016	0.0020
A22	0.2570	0.5310	2800	0.0004	0.0005	0.0008	0.0012	0.0016	0.0020
A23	0.2578	0.5319	2778	0.0004	0.0006	0.0008	0.0012	0.0016	0.0021
A24	0.2564	0.5300	2818	0.0004	0.0005	0.0008	0.0012	0.0015	0.0020
A25	0.2573	0.5315	2791	0.0004	0.0006	0.0008	0.0012	0.0016	0.0021
<b>Avg</b>	<b>0.2583</b>	<b>0.5310</b>	<b>2773</b>	<b>0.0004</b>	<b>0.0006</b>	<b>0.0009</b>	<b>0.0013</b>	<b>0.0016</b>	<b>0.0021</b>
Max	0.2609	0.5320	2819	0.0005	0.0007	0.0010	0.0014	0.0018	0.0022
Min	0.2564	0.5300	2720	0.0003	0.0005	0.0007	0.0011	0.0015	0.0019
Med	0.2578	0.5310	2779	0.0004	0.0006	0.0009	0.0012	0.0016	0.0021
Std. dev	0.0015	0.0006	32	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

**Data sheet 2:**

<b>Driver current</b>	<b>60(mA)</b>	<b>Target Case temperature</b>	<b>85°C</b>
<b>Measurement current</b>	<b>60(mA)</b>	<b>Actual case temperature</b>	<b>84.1°C</b>

<b>Lumen Maintenance:</b>								
S/N	TLF(lm)	V <sub>F</sub> (V)	Lumen Maintenance(%)					
	Initial(0hr)		1000h	2000h	3000h	4000h	5000h	6000h
B01	111.9	18.08	99.80	99.35	98.69	97.93	97.01	95.91
B02	113.3	17.98	99.69	99.25	98.70	97.99	97.14	95.96
B03	107.9	17.97	99.74	99.47	98.95	98.25	97.15	96.03
B04	108.3	18.01	99.79	99.47	99.03	98.46	97.51	96.37
B05	108.8	17.99	99.77	99.33	98.80	98.13	97.23	96.20
B06	110.0	17.99	99.79	99.35	98.78	98.33	97.40	95.86
B07	111.4	17.98	99.68	99.22	98.71	98.00	96.98	95.88
B08	110.5	17.98	99.79	99.36	98.83	98.20	97.30	96.28
B09	112.2	17.95	99.79	99.35	98.81	98.17	97.26	96.22
B10	113.3	18.00	99.79	99.35	98.79	98.14	97.21	96.15
B11	111.7	18.02	99.79	99.34	98.77	98.25	97.44	96.36
B12	110.7	17.99	99.79	99.33	98.76	98.08	97.37	96.40
B13	108.3	18.02	99.67	99.48	99.15	98.66	98.11	97.44
B14	111.3	18.00	99.85	99.54	99.24	98.89	98.42	97.60
B15	109.2	18.06	99.74	99.31	98.70	97.99	96.96	95.80
B16	107.0	18.00	99.80	99.47	99.02	98.39	97.65	96.57
B17	108.8	17.96	99.84	99.49	99.05	98.51	97.36	96.41
B18	108.0	17.98	99.75	99.50	99.09	98.33	97.47	96.46
B19	112.3	17.96	99.80	99.49	99.06	98.29	97.41	96.37
B20	108.8	17.89	99.84	99.47	98.81	98.24	97.11	95.98
B21	109.6	17.98	99.80	99.52	98.98	98.32	97.44	96.24
B22	112.6	17.99	99.74	99.53	99.13	98.46	97.72	96.59
B23	110.3	17.72	99.70	99.48	99.02	98.19	97.24	95.89
B24	109.9	17.96	99.75	99.48	98.95	98.08	96.87	95.49
B25	111.6	18.07	99.80	99.34	98.76	98.06	97.16	96.05
<b>Avg</b>	<b>110.3</b>	<b>17.98</b>	<b>99.77</b>	<b>99.41</b>	<b>98.90</b>	<b>98.25</b>	<b>97.36</b>	<b>96.26</b>
Max	113.3	18.08	99.85	99.54	99.24	98.89	98.42	97.60
Min	107.0	17.72	99.67	99.22	98.69	97.93	96.87	95.49
Med	110.3	17.99	99.79	99.47	98.83	98.24	97.30	96.22
Std. dev	1.8	0.07	0.05	0.09	0.16	0.22	0.35	0.46

**TM-21 Projection:**

Test Duration	6000h
Failures Observed	0
$\alpha$	7.091E-06
$\beta$	1.008
Calculated L <sub>70</sub>	51000h
Reported L <sub>70</sub>	>36000h



<b>Chromaticity Shift(<math>\Delta u'v'</math>):</b>									
S/N	Initial(Ohr)		CCT (K)	1000h	2000h	3000h	4000h	5000h	6000h
	CIEu'	CIEv'							
B01	0.2592	0.5326	2746	0.0004	0.0007	0.0011	0.0015	0.0018	0.0023
B02	0.2583	0.5317	2770	0.0004	0.0007	0.0011	0.0015	0.0018	0.0023
B03	0.2604	0.5311	2727	0.0004	0.0007	0.0011	0.0015	0.0018	0.0023
B04	0.2621	0.5314	2692	0.0004	0.0006	0.0010	0.0014	0.0017	0.0022
B05	0.2583	0.5317	2770	0.0004	0.0007	0.0010	0.0014	0.0018	0.0023
B06	0.2605	0.5311	2727	0.0004	0.0007	0.0011	0.0015	0.0018	0.0023
B07	0.2602	0.5308	2733	0.0004	0.0007	0.0010	0.0014	0.0018	0.0022
B08	0.2597	0.5313	2741	0.0004	0.0007	0.0010	0.0014	0.0018	0.0022
B09	0.2587	0.5320	2760	0.0005	0.0008	0.0011	0.0016	0.0020	0.0024
B10	0.2583	0.5317	2770	0.0005	0.0008	0.0011	0.0015	0.0019	0.0024
B11	0.2578	0.5313	2782	0.0005	0.0008	0.0012	0.0016	0.0019	0.0024
B12	0.2598	0.5314	2740	0.0005	0.0007	0.0011	0.0015	0.0018	0.0023
B13	0.2621	0.5314	2692	0.0005	0.0007	0.0011	0.0015	0.0019	0.0023
B14	0.2602	0.5308	2733	0.0005	0.0007	0.0010	0.0014	0.0018	0.0023
B15	0.2592	0.5325	2747	0.0005	0.0007	0.0011	0.0016	0.0019	0.0024
B16	0.2623	0.5316	2688	0.0005	0.0008	0.0012	0.0016	0.0020	0.0024
B17	0.2582	0.5317	2771	0.0005	0.0007	0.0011	0.0015	0.0019	0.0024
B18	0.2605	0.5312	2726	0.0005	0.0007	0.0011	0.0015	0.0019	0.0023
B19	0.2587	0.5320	2759	0.0005	0.0008	0.0012	0.0016	0.0020	0.0024
B20	0.2583	0.5317	2770	0.0005	0.0007	0.0011	0.0014	0.0019	0.0023
B21	0.2603	0.5309	2732	0.0004	0.0006	0.0010	0.0014	0.0018	0.0022
B22	0.2588	0.5321	2758	0.0005	0.0007	0.0011	0.0015	0.0019	0.0023
B23	0.2597	0.5313	2741	0.0005	0.0007	0.0011	0.0014	0.0018	0.0023
B24	0.2587	0.5320	2760	0.0004	0.0006	0.0010	0.0014	0.0018	0.0022
B25	0.2592	0.5326	2747	0.0005	0.0006	0.0011	0.0014	0.0018	0.0023
<b>Avg</b>	<b>0.2596</b>	<b>0.5316</b>	<b>2743</b>	<b>0.0005</b>	<b>0.0007</b>	<b>0.0011</b>	<b>0.0015</b>	<b>0.0019</b>	<b>0.0023</b>
Max	0.2623	0.5326	2782	0.0005	0.0008	0.0012	0.0016	0.0020	0.0024
Min	0.2578	0.5308	2688	0.0004	0.0006	0.0010	0.0014	0.0017	0.0022
Med	0.2592	0.5316	2746	0.0005	0.0007	0.0011	0.0015	0.0018	0.0023
Std. dev	0.0013	0.0005	26	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

**Data sheet 3:**

<b>Driver current</b>	<b>60(mA)</b>	<b>Target Case temperature</b>	<b>105°C</b>
<b>Measurement current</b>	<b>60(mA)</b>	<b>Actual case temperature</b>	<b>104.5°C</b>

<b>Lumen Maintenance:</b>								
S/N	TLF(lm)	V <sub>F</sub> (V)	Lumen Maintenance(%)					
	Initial(0hr)		1000h	2000h	3000h	4000h	5000h	6000h
C01	108.8	17.95	99.27	98.67	97.95	97.14	96.23	95.08
C02	108.6	18.00	99.15	98.57	97.97	97.21	96.35	95.13
C03	108.8	18.00	99.20	98.78	98.22	97.46	96.37	95.20
C04	112.4	18.02	99.26	98.78	98.29	97.67	96.72	95.54
C05	114.7	18.02	99.23	98.65	98.06	97.35	96.44	95.36
C06	111.4	17.99	99.25	98.67	98.05	97.54	96.61	95.02
C07	111.2	18.01	99.15	98.54	97.98	97.21	96.19	95.05
C08	112.9	18.00	99.26	98.68	98.09	97.41	96.52	95.45
C09	110.3	18.01	99.26	98.67	98.07	97.39	96.47	95.38
C10	108.7	17.97	99.26	98.66	98.06	97.36	96.42	95.32
C11	109.2	18.00	99.26	98.65	98.04	97.47	96.66	95.53
C12	111.2	18.00	99.26	98.65	98.02	97.30	96.58	95.56
C13	108.8	17.96	99.14	98.80	98.42	97.87	97.33	96.60
C14	111.9	17.99	99.31	98.86	98.50	98.11	97.63	96.76
C15	108.7	18.01	99.20	98.62	97.96	97.20	96.18	94.96
C16	110.4	18.01	99.26	98.78	98.28	97.61	96.87	95.73
C17	112.8	17.97	99.30	98.80	98.32	97.72	96.58	95.57
C18	110.2	18.00	99.22	98.82	98.35	97.55	96.69	95.63
C19	110.8	18.00	99.26	98.81	98.32	97.51	96.62	95.53
C20	111.3	18.01	99.30	98.79	98.07	97.45	96.33	95.14
C21	113.4	18.01	99.26	98.84	98.24	97.53	96.65	95.40
C22	114.7	18.00	99.21	98.84	98.39	97.67	96.93	95.75
C23	108.8	17.96	99.17	98.79	98.28	97.41	96.46	95.05
C24	111.1	18.22	99.21	98.80	98.21	97.30	96.08	94.65
C25	108.7	17.96	99.26	98.66	98.03	97.27	96.38	95.21
<b>Avg</b>	<b>110.8</b>	<b>18.00</b>	<b>99.24</b>	<b>98.73</b>	<b>98.17</b>	<b>97.47</b>	<b>96.57</b>	<b>95.42</b>
Max	114.7	18.22	99.31	98.86	98.50	98.11	97.63	96.76
Min	108.6	17.95	99.14	98.54	97.95	97.14	96.08	94.65
Med	110.8	18.00	99.26	98.78	98.09	97.45	96.52	95.38
Std. dev	1.9	0.05	0.05	0.09	0.16	0.22	0.35	0.46

**TM-21 Projection:**

Test Duration	6000h
Failures Observed	0
$\alpha$	7.708E-06
$\beta$	1.003
Calculated L <sub>70</sub>	47000h
Reported L <sub>70</sub>	>36000h





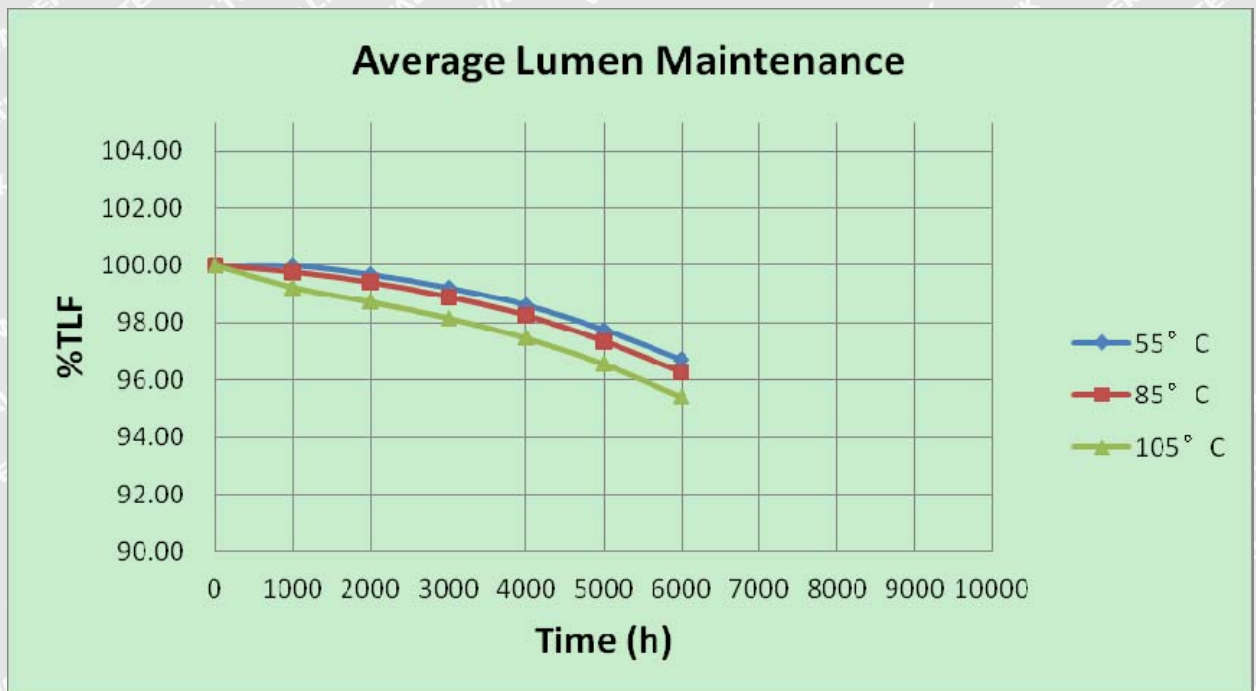
<b>Chromaticity Shift(<math>\Delta u'v'</math>):</b>									
S/N	Initial(Ohr)		CCT (K)	1000h	2000h	3000h	4000h	5000h	6000h
	CIEu'	CIEv'							
C01	0.2589	0.5308	2762	0.0006	0.0008	0.0012	0.0017	0.0021	0.0026
C02	0.2606	0.5315	2723	0.0005	0.0008	0.0011	0.0016	0.0019	0.0026
C03	0.2608	0.5305	2723	0.0006	0.0008	0.0012	0.0017	0.0020	0.0027
C04	0.2587	0.5321	2760	0.0005	0.0007	0.0010	0.0015	0.0018	0.0025
C05	0.2568	0.5315	2801	0.0005	0.0007	0.0011	0.0016	0.0021	0.0027
C06	0.2596	0.5324	2739	0.0005	0.0008	0.0011	0.0016	0.0020	0.0026
C07	0.2586	0.5319	2762	0.0005	0.0008	0.0011	0.0015	0.0020	0.0024
C08	0.2569	0.5317	2799	0.0005	0.0008	0.0011	0.0015	0.0019	0.0025
C09	0.2609	0.5308	2720	0.0006	0.0009	0.0012	0.0016	0.0021	0.0027
C10	0.2588	0.5307	2762	0.0006	0.0009	0.0012	0.0016	0.0021	0.0028
C11	0.2581	0.5307	2779	0.0006	0.0009	0.0013	0.0017	0.0022	0.0028
C12	0.2596	0.5324	2740	0.0006	0.0008	0.0013	0.0016	0.0021	0.0026
C13	0.2607	0.5305	2724	0.0005	0.0008	0.0012	0.0016	0.0021	0.0027
C14	0.2610	0.5309	2717	0.0005	0.0008	0.0011	0.0016	0.0019	0.0026
C15	0.2606	0.5315	2723	0.0006	0.0009	0.0014	0.0018	0.0022	0.0028
C16	0.2609	0.5308	2719	0.0006	0.0008	0.0013	0.0017	0.0021	0.0027
C17	0.2597	0.5325	2738	0.0007	0.0009	0.0014	0.0019	0.0023	0.0028
C18	0.2608	0.5308	2721	0.0006	0.0008	0.0013	0.0017	0.0021	0.0026
C19	0.2579	0.5305	2783	0.0006	0.0008	0.0012	0.0017	0.0021	0.0028
C20	0.2607	0.5316	2721	0.0006	0.0007	0.0011	0.0016	0.0019	0.0026
C21	0.2586	0.5319	2762	0.0005	0.0007	0.0010	0.0015	0.0019	0.0024
C22	0.2568	0.5315	2802	0.0006	0.0008	0.0012	0.0016	0.0020	0.0025
C23	0.2607	0.5306	2723	0.0005	0.0007	0.0011	0.0016	0.0019	0.0025
C24	0.2580	0.5306	2782	0.0005	0.0007	0.0010	0.0015	0.0018	0.0026
C25	0.2588	0.5308	2762	0.0005	0.0007	0.0011	0.0015	0.0019	0.0025
<b>Avg</b>	<b>0.2593</b>	<b>0.5313</b>	<b>2750</b>	<b>0.0006</b>	<b>0.0008</b>	<b>0.0012</b>	<b>0.0016</b>	<b>0.0020</b>	<b>0.0026</b>
Max	0.2610	0.5325	2802	0.0007	0.0009	0.0014	0.0019	0.0023	0.0028
Min	0.2568	0.5305	2717	0.0005	0.0007	0.0010	0.0015	0.0018	0.0024
Med	0.2596	0.5309	2740	0.0006	0.0008	0.0012	0.0016	0.0020	0.0026
Std. dev	0.0014	0.0007	29	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001



### Test result:

#### Data Summary of Lumen and Color Maintenance:

Temp.	TLF(lm)	VF(V)	Luminous Maintenance(%)					
	Initial(0hr)		1000h	2000h	3000h	4000h	5000h	6000h
55°C (Avg)	110.2	17.99	99.99	99.68	99.22	98.61	97.75	96.69
85°C (Avg)	110.3	17.98	99.77	99.41	98.90	98.25	97.36	96.26
105°C (Avg)	110.8	18.00	99.24	98.73	98.17	97.47	96.57	95.42



Average Lumen Maintenance diagram



Temp.	CIEu'	CIEv'	CCT	Chromaticity Shift( $\Delta u'v'$ )					
	Initial(0hr)			1000h	2000h	3000h	4000h	5000h	6000h
55°C (Avg)	0.2583	0.5310	2773	0.0004	0.0006	0.0009	0.0013	0.0016	0.0021
85°C (Avg)	0.2596	0.5316	2743	0.0005	0.0007	0.0011	0.0015	0.0019	0.0023
105°C (Avg)	0.2593	0.5313	2750	0.0006	0.0008	0.0012	0.0016	0.0020	0.0026



Average Color Maintenance diagram

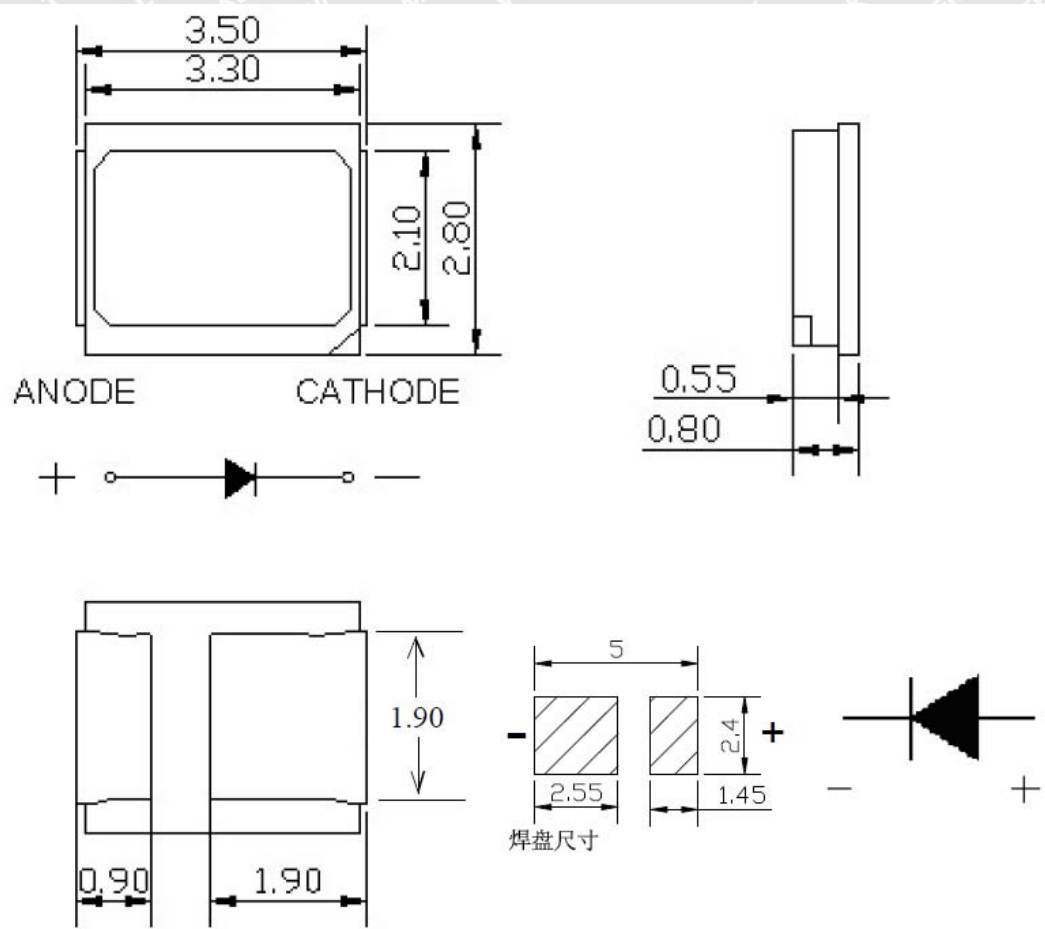
# WALTEK

**Attachment 1: Equipment List**

<b>Equipment</b>	<b>Model</b>	<b>Calibration due date</b>
The LED accelerated aging and longevity test system	EVERFINE LT-200A	2017-11-09
Temperature & Humidity Datalogger	Testo 608-H1	2017-03-10
High accuracy array spectroradio meter	EVERFINE HAAS-2000-VIS-V1	2017-03-10
Standard light source	EVERFINE D204	2017-03-10
DC power supply	EVERFINE WY12010	2017-03-10
Caliper	MITUTOYO CD-6"CS	2017-03-10



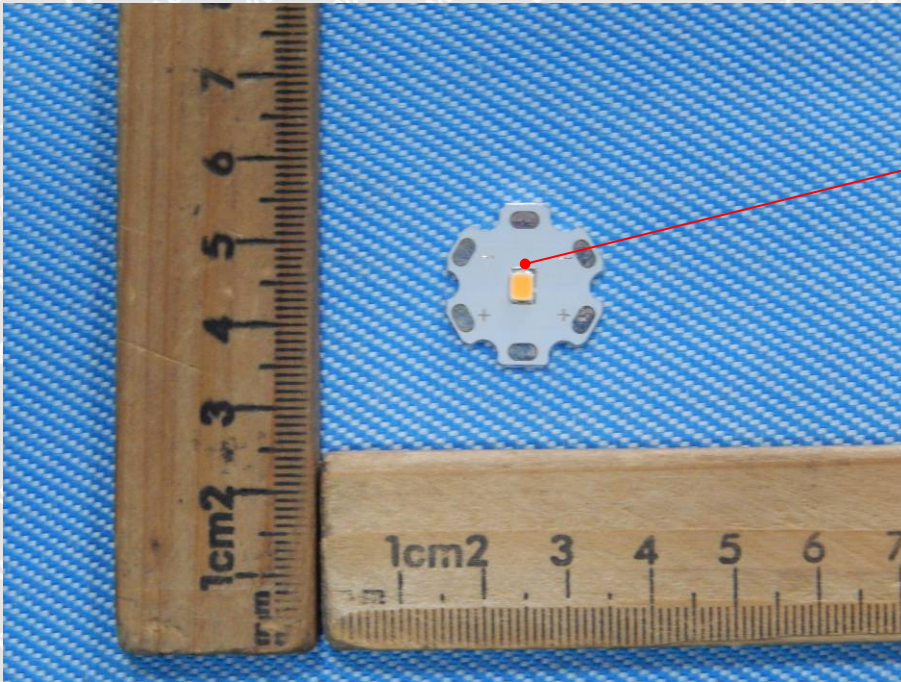
# WALTEK

**Attachment 2: Photo document****Dimension:****Note:**

All dimensions in mm.

Tolerances unless mentioned is  $\pm 0.1$  mm.

# WALTEK



→ TMP<sub>LED</sub>

===== End of Report =====



# WALTEK