

<b>TEST REPORT</b> <b>IES LM-80-08 Rev. 00</b> <b>TÜV SÜD Test report for</b> <b>IES Approved Method for Measuring Lumen Maintenance of LED Light Sources</b>	
Report reference No. ....:	70.402.14.970.02
Date of issue .....	2019-11-23
Project handler.....:	Mr. Jimmy
Testing laboratory .....	TÜV SÜD Iberia Certification and Testing
Address .....	Avda. de los Artesanos, 20 28760 Tres Cantos (Madrid)
Testing Procedure .....	<input type="checkbox"/> TMP <input type="checkbox"/> WMT <input type="checkbox"/> SMT <input type="checkbox"/> LTR
Testing location.....:	Avda. de los Artesanos, 20 28760 Tres Cantos (Madrid)
<p>TÜV SÜD Iberia Certification and Testing is an accredited Test Laboratory (A2LA Lab Cert. No.: 3745.01) to IESNA LM-80-08 by A2LA (American Association for Laboratory Accreditation).</p>	<div> Cert. No.: 3745.01</div>
Client .....	SYV ILUMINACION EUROPEA SOCIEDAD LIMITADA
Address .....	Avda San Pablo 28 - 28820 Madrid - Spain
Standard.....:	This TUV SUD test report form is based on the following requirements: IES LM-80-08
TRF originated by. ....:	TUV SUD Product Service GmbH, Mr. Jason Fu
Copyright blank test report .....	<p>This test report is based on the content of the standard (see above). The test report considered selected clauses of the a.m. standard(s) and experience gained with product testing. It was prepared by TUV SUD Product Service GmbH.</p> <p>TUV SUD Group takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.</p>
Test procedure .....	<input type="checkbox"/> TÜV Mark <input checked="" type="checkbox"/> without certification
Non-standard test method.....:	None
National deviations .....	None
Number of pages (Report).....:	18
Number of pages (Attachments) .....	N/A
Compiled by .....	Approved by .....
(+ signature)	Mr. Jimmy (+ signature) Ms. Lucy

Test sample..... :	LED package											
Type of test object .....	Fixed											
Trademark..... :												
Model and/or type reference..... :	Chico 10, Chico 20, Chico 30											
Rating(s) .....	150mA DC											
Manufacturer .....	SYV ILUMINACION EUROPEA SOCIEDAD LIMITADA											
Address..... :	Avda San Pablo 28 - 28820 Madrid - Spain											
Sub-contractors/ tests (clause) .....	N/A											
Name .....	N/A											
Order description..... :	<table border="1"> <tr> <td><input checked="" type="checkbox"/></td> <td>Complete test according to TRF</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Partial test according to manufacturer's specifications</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Preliminary test</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Spot check</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Other:</td> </tr> </table>		<input checked="" type="checkbox"/>	Complete test according to TRF	<input type="checkbox"/>	Partial test according to manufacturer's specifications	<input type="checkbox"/>	Preliminary test	<input type="checkbox"/>	Spot check	<input type="checkbox"/>	Other:
<input checked="" type="checkbox"/>	Complete test according to TRF											
<input type="checkbox"/>	Partial test according to manufacturer's specifications											
<input type="checkbox"/>	Preliminary test											
<input type="checkbox"/>	Spot check											
<input type="checkbox"/>	Other:											
Date of order..... :	2019-11-24											
Date of receipt of test item .....	2019-09-15											
Date(s) of performance of test..... :	2019-09-15 to 2020-09-20											
Test item particulars:												
Type .....	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED array <input type="checkbox"/> LED module											
ANSI target CCT (K) .....	2700K~ 6500K											
Attachments:												
1. Test data table 2. Test Equipment list												

General remarks:

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

The test results presented in this report relate only to the object tested.

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	Model number	Rated CCT (K)
Main model	S-2835WP2W80	2700K
Auxiliary model	S-2835WP2W80	3000K
		3500K
		4000K
		4500K
	S-2835W2W80	5000K
		5700K
		6000K
		6500K

Above models are belong to S-2835 series, they are same construction and dimensions, except the CCT is different.

Main model S-2835WP2W80 with 2700K is chosen as a typical model to perform all tests, according to the requirement of IES LM-80.

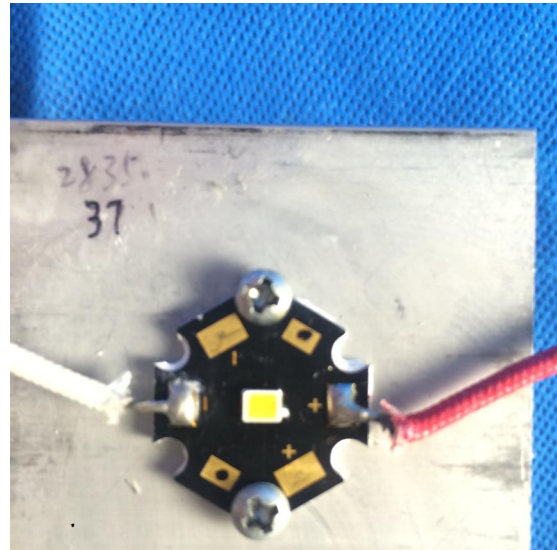
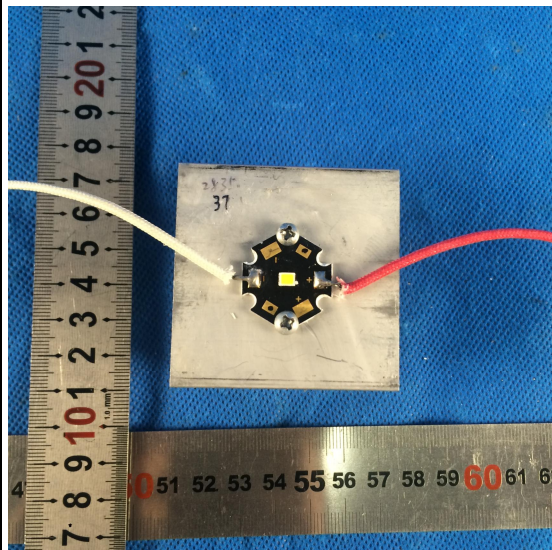
Summary of testing:

- ☐ Deviation(s) found  
☒ No deviations found

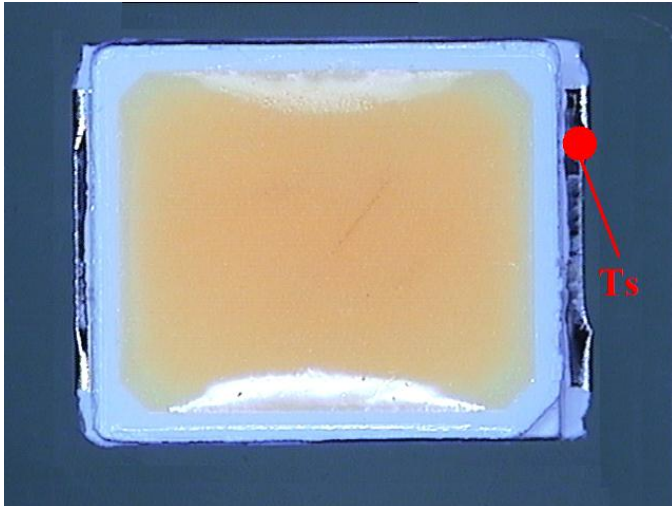
	LM-80 Required Temperature		Manufacturer Specified Temperature
	I. 55°C	II. 85°C	N/A
Number of LED tested	25	25	-
Avg. Lumen maintenance at 6,000 hours	98.23%	95.90%	-
Avg. Chromaticity Shift ( $\Delta u'v'$ ) at 6,000 hours	0.0033	0.0038	-

If additional information is necessary, please provide

Picture of the product:



Picture of Measurement Point of [Ts]:



Characteristic data:

Dimensions(length\*width): 3.5mm\* 2.8mm;

Weight: Not provided;

Mechanical Dimension drawing (Ta=25°C):

Purpose of the product

LED package for general lighting service.

Possible test case verdicts:

- test case does not apply to the test object.....: N(.A.) / not included in the order
- test object does meet the requirement.....: P(ass)
- test object does not meet the requirement .....: F(ail)

Possible suffixes to the verdicts:

- suffix for detailed information for the .....: - C(omment)
- suffix for important information for factory inspection...: - M(anufacturing)

Clause	Requirement + Test	Result - Remark	Verdict
<b>1.0</b>	<b>SCOPE</b>		—
<b>2.0</b>	<b>REFERENCES</b>		—
<b>3.0</b>	<b>DEFINITIONS</b>		—
<b>4.0</b>	<b>AMBIENT AND PHYSICAL CONDITIONS</b>		—
<b>4.1</b>	<b>General</b>		
<b>4.2</b>	<b>LED Unit Marking</b>		P
	Unit can be identified by markings or by labels		P
	The identification method is suitable for testing.		P
<b>4.3</b>	<b>Sample Selection</b>		
	Samples be selected to be sufficiently representative of the overall population being tested.		P
<b>4.4</b>	<b>Environmental Conditions</b>		P
<b>4.4.1</b>	<b>Vibration</b>		—
	Lamps should not be subjected to excessive vibration or shock during life testing.		P
<b>4.4.2</b>	<b>Temperature and Humidity</b>		P
	The three case temperature, Ts, shall be 55°C and 85°C with a third temperature selected by the manufacturer.  Case temperatures shall be controlled to -2°C during life testing. The temperature of the surrounding air should be maintained to within -5°C of the case temperature during testing.	The third temperature specified by manufacture is: <u>85</u> °C	P
	Humidity shall be maintained to less than 65RH.		P
<b>4.4.3</b>	<b>Airflow</b>		P
	Airflow shall be minimized for proper light source.		P
<b>4.4.4</b>	<b>Operating Orientation and LED</b>		P
	The operation orientation for the LED light sources under test should be as specified by the manufacturer.		P
<b>5.0</b>	<b>ELECTRICAL AND THERMAL CONDITIONS</b>		—
<b>5.1</b>	<b>Input Voltage and Current</b>		P
	Input voltage shall conform tot the rated input voltage (rms) and frequency of the driver. When using direct current, dc, ripple voltage shall not exceed 2% of the dc output voltage.		P
<b>5.2</b>	<b>Line Voltage Waveshape</b>		P
	The power supply shall have a voltage waveshape such that the total harmonic distortion does not exceed 3%of the fundamental.		P

Clause	Requirement + Test	Result - Remark	Verdict
<b>5.3</b>	<b>Input Current Regulation</b>		P
	The input current shall be monitored and regulated to within $\pm 3\%$ of the rated rms value during life testing and to $\pm 0.5\%$ of the rated rms value during photometric measurements.		P
<b>5.4</b>	<b>Auxiliary Equipment including Drivers</b>		N/A
	For LED light source external drivers compliant with manufacture's guidance shall be used.		N/A
<b>5.5</b>	<b>Case Temperature</b>		P
	A thermocouple measurement system complying with ASTM E230 Table 1 shall be used to monitor the case temperature. Ts is measured directly on the component a the manufacturer designated case temperature measurement point on the LED unit.		P
<b>6.0</b>	<b>TEST AND MEASUREMENT PROCEDURES</b>		—
<b>6.1</b>	<b>Instrumentation</b>		P
	Total elapsed time uncertainty should be within $\pm 0.5\%$ .		P
<b>6.2</b>	<b>Photometry Measurement</b>	See "Attachment 1"	P
<b>6.3</b>	<b>Photometry Measurement Temperature</b>	See "Attachment 1"	P
	The ambient temperature during lumen and chromaticity measurements shall be set to $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ .		P
<b>7.0</b>	<b>LUMEN MAINTENANCE TESTING METHOD FOR LED LIGHT SOURCES</b>		—
<b>7.1</b>	<b>Lumen Maintenance Testing Duration and Interval</b>	See "Attachment 1"	P
	The unit shall be driven for at least 6000hours with data collection at a minimum of every 1000hours. 10000hours are preferred for the purposes of improved predictive modelling.		P
<b>7.2</b>	<b>Operating Cycle</b>	See "Attachment 1"	P
<b>7.3</b>	<b>Recording Failures</b>	See "Attachment 1"	P
<b>7.4</b>	<b>Chromaticity</b>	See "Attachment 1"	P
<b>8.0</b>	<b>TEST REPORT</b>		—

Attachment 1 Test Data

**General conditions for testing and measurement**

<b>Data Set 1:</b>	
Required Temperature: (°C)	55
Actual Case Temperature [T <sub>s</sub> ]: (°C)	53.9
Actual Ambient Temperature [T <sub>A</sub> ]: (°C)	53.5
Rated Drive Current:(mA)	150
Actual Drive Current [I <sub>F</sub> ]: (mA)	150
Air Flow:	0.3 m/s
Comments / Failures observed:	N/A

<b>Data Set 2:</b>	
Required Temperature: (°C)	85
Actual Case Temperature [T <sub>s</sub> ]: (°C)	83.8
Actual Ambient Temperature [T <sub>A</sub> ]: (°C)	82.5
Rated Drive Current:(mA)	150
Actual Drive Current [I <sub>F</sub> ]: (mA)	150
Air Flow:	0.3 m/s
Comments / Failures observed:	N/A





Attachment 1 Test Data

		Data Set 1: Luminous flux for each test point									55°C – LM80 Required temperature					
No.	Sample #	Initial (0 hour)			Luminous flux (Unit: lm)						Lumen maintenance (%)					
		IF (mA)	VF(V)	Flux(lm)	1000 hours	2000 hours	3000 hours	4000 hours	5000 hours	6000 hours	1000 hours	2000 hours	3000 hours	4000 hours	5000 hours	6000 hours
1	1	150.00	6.150	83.80	83.55	83.82	83.31	81.94	80.55	80.16	99.70%	100.02%	99.41%	97.78%	96.12%	95.65%
2	2	150.00	6.320	80.92	83.89	84.05	83.25	81.91	80.37	79.60	103.68%	103.87%	102.89%	101.23%	99.33%	98.37%
3	3	150.00	6.320	77.23	81.14	81.88	81.71	80.26	79.43	79.10	105.06%	106.02%	105.80%	103.92%	102.85%	102.42%
4	4	150.00	6.240	80.23	81.12	80.88	81.59	80.03	79.02	78.87	101.11%	100.81%	101.70%	99.75%	98.49%	98.31%
5	5	150.00	6.260	81.23	83.61	83.53	81.04	79.82	78.27	77.86	102.93%	102.83%	99.77%	98.26%	96.36%	95.85%
6	6	150.00	6.230	76.58	77.07	78.37	77.54	76.14	75.16	74.93	100.65%	102.34%	101.26%	99.43%	98.15%	97.85%
7	7	150.00	6.170	79.93	83.89	84.56	82.93	81.30	79.92	79.69	104.96%	105.79%	103.75%	101.72%	99.99%	99.70%
8	8	150.00	6.150	82.44	83.80	83.37	83.52	81.96	80.97	80.44	101.65%	101.13%	101.31%	99.42%	98.22%	97.58%
9	9	150.00	6.220	81.15	80.15	80.31	80.97	80.10	78.75	78.50	98.76%	98.96%	99.78%	98.70%	97.04%	96.73%
10	10	150.00	6.190	73.53	80.32	79.90	79.25	78.37	77.16	76.64	109.23%	108.66%	107.78%	106.58%	104.94%	104.23%
11	11	150.00	6.170	83.11	84.35	85.43	84.65	83.06	81.63	80.96	101.49%	102.79%	101.85%	99.94%	98.22%	97.41%
12	12	150.00	6.270	78.08	78.19	78.64	79.37	78.20	76.85	76.47	100.14%	100.72%	101.65%	100.15%	98.43%	97.94%
13	13	150.00	6.170	75.98	81.00	81.47	80.61	79.19	78.07	77.87	106.61%	107.23%	106.10%	104.23%	102.76%	102.49%
14	14	150.00	6.150	83.45	82.46	82.63	81.27	79.90	78.99	78.88	98.82%	99.02%	97.39%	95.75%	94.66%	94.53%
15	15	150.00	6.160	75.92	77.22	77.94	79.63	78.46	76.98	76.77	101.71%	102.65%	104.88%	103.34%	101.39%	101.11%
16	16	150.00	6.200	81.75	79.73	80.04	80.36	78.97	78.09	77.91	97.53%	97.91%	98.30%	96.60%	95.52%	95.30%
17	17	150.00	6.190	80.70	80.80	80.82	83.42	82.57	81.26	81.10	100.12%	100.15%	103.37%	102.32%	100.69%	100.50%
18	18	150.00	6.190	85.03	84.60	84.96	84.01	82.65	81.16	81.02	99.49%	99.92%	98.80%	97.20%	95.45%	95.28%
19	19	150.00	6.260	86.93	83.61	83.53	83.43	83.23	82.13	82.10	96.18%	96.09%	95.97%	95.74%	94.48%	94.44%
20	20	150.00	6.220	83.87	80.67	81.67	81.40	80.08	79.13	78.97	96.19%	97.38%	97.06%	95.48%	94.35%	94.16%
21	21	150.00	6.210	73.32	79.17	80.60	79.14	77.74	76.67	76.15	107.97%	109.92%	107.93%	106.02%	104.56%	103.86%
22	22	150.00	6.200	80.95	77.88	79.50	81.27	80.33	79.23	79.11	96.20%	98.21%	100.39%	99.23%	97.87%	97.72%
23	23	150.00	6.160	75.57	83.74	84.88	83.09	81.81	80.30	79.57	110.81%	112.32%	109.95%	108.25%	106.26%	105.29%
24	24	150.00	6.170	83.38	82.92	83.07	80.95	79.57	79.05	78.98	99.45%	99.63%	97.09%	95.44%	94.81%	94.73%
25	25	150.00	6.220	80.23	79.25	78.78	77.62	76.31	75.84	75.62	98.78%	98.19%	96.75%	95.11%	94.53%	94.25%



Attachment 1 Test Data

Mean	-	-	80.21	81.37	81.79	81.41	80.16	79.00	78.69	101.57%	102.10%	101.64%	100.06%	98.62%	98.23%
Median	-	-	80.92	81.12	81.67	81.27	80.08	79.05	78.97	100.65%	100.81%	101.31%	99.43%	98.22%	97.72%
$\delta$	-	-	3.60	2.38	2.27	1.95461	1.97	1.85	1.84	4.00%	4.17%	3.83%	3.73%	3.54%	3.38%
Min.	-	-	73.32	77.07	77.94	77.54	76.14	75.16	74.93	96.18%	96.09%	95.97%	95.11%	94.35%	94.16%
Max.	-	-	86.93	84.60	85.43	84.65	83.23	82.13	82.10	110.81%	112.32%	109.95%	108.25%	106.26%	105.29%

*(Note: It's optional according to client's requirement)*



Attachment 1 Test Data

Data Set 1: Chromaticity Shift ( $\Delta u'v'$ )																55°C – LM80 Required temperature					
No.	Sample #	Initial (0 hour)		$u' v'$												Chromaticity Shift ( $\Delta u'v'$ )					
		$u'$	$v'$	$u'$ (1000h)	$v'$ (1000h)	$u'$ (2000h)	$v'$ (2000h)	$u'$ (3000h)	$v'$ (3000h)	$u'$ (4000h)	$v'$ (4000h)	$u'$ (5000h)	$v'$ (5000h)	$u'$ (6000h)	$v'$ (6000h)	1000 hours	2000 hours	3000 hours	4000 hours	5000 hours	6000 hours
1	1	0.2636	0.5297	0.2630	0.5300	0.2645	0.5327	0.2597	0.5304	0.2596	0.5302	0.2598	0.5300	0.2599	0.5298	0.0007	0.0031	0.0040	0.0040	0.0038	0.0037
2	2	0.2623	0.5294	0.2621	0.5300	0.2635	0.5326	0.2612	0.5307	0.2614	0.5308	0.2613	0.5308	0.2615	0.5307	0.0006	0.0034	0.0017	0.0017	0.0017	0.0015
3	3	0.2621	0.5289	0.2621	0.5294	0.2638	0.5301	0.2594	0.5298	0.2592	0.5299	0.2593	0.5299	0.2594	0.5299	0.0005	0.0021	0.0028	0.0031	0.0030	0.0029
4	4	0.2608	0.5280	0.2608	0.5288	0.2626	0.5315	0.2583	0.5293	0.2583	0.5292	0.2583	0.5291	0.2583	0.5292	0.0008	0.0039	0.0028	0.0028	0.0027	0.0028
5	5	0.2641	0.5300	0.2636	0.5305	0.2654	0.5330	0.2609	0.5311	0.2610	0.5308	0.2608	0.5308	0.2610	0.5308	0.0007	0.0033	0.0034	0.0032	0.0034	0.0032
6	6	0.2619	0.5301	0.2616	0.5304	0.2635	0.5334	0.2594	0.5311	0.2593	0.5311	0.2590	0.5312	0.2589	0.5311	0.0004	0.0037	0.0027	0.0028	0.0031	0.0032
7	7	0.2621	0.5292	0.2616	0.5297	0.2636	0.5325	0.2600	0.5313	0.2598	0.5312	0.2600	0.5310	0.2602	0.5311	0.0007	0.0036	0.0030	0.0030	0.0028	0.0027
8	8	0.2623	0.5290	0.2621	0.5298	0.2639	0.5325	0.2591	0.5301	0.2591	0.5302	0.2590	0.5301	0.2589	0.5300	0.0008	0.0038	0.0034	0.0034	0.0035	0.0035
9	9	0.2623	0.5296	0.2613	0.5299	0.2635	0.5327	0.2588	0.5304	0.2590	0.5302	0.2588	0.5303	0.2586	0.5303	0.0010	0.0033	0.0036	0.0034	0.0036	0.0038
10	10	0.2641	0.5292	0.2634	0.5296	0.2652	0.5325	0.2622	0.5314	0.2623	0.5315	0.2623	0.5315	0.2623	0.5316	0.0008	0.0035	0.0029	0.0029	0.0029	0.0030
11	11	0.2621	0.5294	0.2616	0.5299	0.2635	0.5326	0.2591	0.5304	0.2589	0.5302	0.2589	0.5299	0.2588	0.5300	0.0007	0.0035	0.0032	0.0033	0.0032	0.0034
12	12	0.2614	0.5283	0.2604	0.5283	0.2623	0.5311	0.2581	0.5290	0.2582	0.5289	0.2579	0.5287	0.2579	0.5284	0.0010	0.0029	0.0034	0.0033	0.0035	0.0035
13	13	0.2621	0.5290	0.2613	0.5293	0.2634	0.5322	0.2589	0.5297	0.2586	0.5298	0.2587	0.5299	0.2585	0.5297	0.0009	0.0035	0.0033	0.0036	0.0035	0.0037
14	14	0.2636	0.5310	0.2633	0.5313	0.2650	0.5340	0.2610	0.5320	0.2611	0.5321	0.2613	0.5318	0.2614	0.5319	0.0004	0.0033	0.0028	0.0027	0.0024	0.0024
15	15	0.2624	0.5305	0.2619	0.5307	0.2636	0.5336	0.2589	0.5315	0.2588	0.5317	0.2586	0.5318	0.2585	0.5320	0.0005	0.0033	0.0036	0.0038	0.0040	0.0042
16	16	0.2626	0.5293	0.2615	0.5294	0.2635	0.5322	0.2598	0.5309	0.2599	0.5306	0.2598	0.5304	0.2598	0.5303	0.0011	0.0030	0.0032	0.0030	0.0030	0.0030
17	17	0.2623	0.5293	0.2617	0.5297	0.2636	0.5324	0.2602	0.5311	0.2603	0.5313	0.2604	0.5313	0.2602	0.5313	0.0007	0.0034	0.0028	0.0028	0.0028	0.0029
18	18	0.2618	0.5281	0.2618	0.5286	0.2632	0.5317	0.2587	0.5291	0.2584	0.5289	0.2586	0.5286	0.2586	0.5283	0.0005	0.0039	0.0033	0.0035	0.0032	0.0032
19	19	0.2618	0.5293	0.2609	0.5295	0.2625	0.5323	0.2587	0.5304	0.2586	0.5301	0.2587	0.5301	0.2586	0.5302	0.0009	0.0031	0.0033	0.0033	0.0032	0.0033
20	20	0.2628	0.5311	0.2626	0.5315	0.2643	0.5341	0.2600	0.5322	0.2601	0.5323	0.2600	0.5324	0.2602	0.5321	0.0004	0.0034	0.0030	0.0030	0.0031	0.0028
21	21	0.2628	0.5298	0.2620	0.5298	0.2635	0.5325	0.2595	0.5303	0.2594	0.5302	0.2595	0.5303	0.2596	0.5301	0.0008	0.0028	0.0033	0.0034	0.0033	0.0032
22	22	0.2639	0.5308	0.2619	0.5303	0.2638	0.5333	0.2596	0.5305	0.2593	0.5303	0.2593	0.5303	0.2593	0.5305	0.0021	0.0025	0.0043	0.0046	0.0046	0.0046
23	23	0.2622	0.5300	0.2617	0.5304	0.2633	0.5330	0.2590	0.5308	0.2588	0.5308	0.2586	0.5307	0.2586	0.5309	0.0006	0.0032	0.0033	0.0035	0.0037	0.0037
24	24	0.2638	0.5300	0.2636	0.5304	0.2653	0.5332	0.2602	0.5304	0.2602	0.5304	0.2604	0.5305	0.2605	0.5303	0.0004	0.0035	0.0036	0.0036	0.0034	0.0033
25	25	0.2628	0.5297	0.2624	0.5303	0.2642	0.5330	0.2597	0.5307	0.2595	0.5307	0.2592	0.5304	0.2589	0.5306	0.0007	0.0036	0.0033	0.0034	0.0037	0.0040



Attachment 1 Test Data

Mean	0.2626	0.5295	0.2620	0.5299	0.2638	0.5326	0.2596	0.5306	0.2596	0.5305	0.2595	0.5305	0.2595	0.5304	0.0008	0.0033	0.0032	0.0032	0.0032	0.0033
Median	0.2623	0.5294	0.2619	0.5299	0.2636	0.5326	0.2595	0.5305	0.2593	0.5304	0.2593	0.5304	0.2593	0.5303	0.0007	0.0034	0.0033	0.0033	0.0032	0.0032
$\delta$	0.0009	0.0008	0.0009	0.0007	0.0008	0.0009	0.0010	0.0008	0.0010	0.0009	0.0011	0.0009	0.0011	0.0010	0.0003	0.0004	0.0005	0.0005	0.0006	0.0006
Min.	0.2608	0.5280	0.2604	0.5283	0.2623	0.5301	0.2581	0.5290	0.2582	0.5289	0.2579	0.5286	0.2579	0.5283	0.0004	0.0021	0.0017	0.0017	0.0017	0.0015
Max.	0.2641	0.5311	0.2636	0.5315	0.2654	0.5341	0.2622	0.5322	0.2623	0.5323	0.2623	0.5324	0.2623	0.5321	0.0021	0.0039	0.0043	0.0046	0.0046	0.0046



Attachment 1 Test Data

		Data Set 2: Luminous flux for each test point									85°C – LM80 Required temperature					
No.	Sample #	Initial (0 hour)			Luminous flux (Unit: lm)						Lumen maintenance (%)					
		IF (lm)	VF(V)	Flux (lm)	1000 hours	2000 hours	3000 hours	4000 hours	5000 hours	6000 hours	1000 hours	2000 hours	3000 hours	4000 hours	5000 hours	6000 hours
1	1	150.00	6.520	80.37	80.29	80.11	79.09	78.28	77.48	76.73	99.90%	99.68%	98.41%	97.40%	96.40%	95.47%
2	2	150.00	6.320	81.73	78.84	80.59	80.23	79.31	78.40	77.81	96.46%	98.60%	98.16%	97.04%	95.92%	95.20%
3	3	150.00	6.210	80.30	78.27	78.88	81.24	80.12	79.01	78.50	97.48%	98.24%	101.18%	99.78%	98.40%	97.76%
4	4	150.00	6.230	80.60	79.07	78.44	81.36	79.92	78.51	77.74	98.10%	97.32%	100.94%	99.16%	97.41%	96.45%
5	5	150.00	6.230	79.61	77.54	79.40	80.52	79.16	77.82	77.15	97.39%	99.73%	101.14%	99.43%	97.75%	96.91%
6	6	150.00	6.320	82.02	78.96	80.60	83.24	82.41	81.58	80.94	96.27%	98.27%	101.48%	100.47%	99.46%	98.68%
7	7	150.00	6.150	79.83	80.25	78.07	79.13	78.01	76.90	76.28	100.52%	97.79%	99.12%	97.72%	96.33%	95.55%
8	8	150.00	6.220	80.25	79.12	80.05	80.54	79.11	77.70	77.50	98.60%	99.76%	100.37%	98.59%	96.83%	96.58%
9	9	150.00	6.330	78.90	77.79	78.56	78.86	77.63	76.42	75.96	98.59%	99.57%	99.95%	98.39%	96.86%	96.27%
10	10	150.00	6.320	81.12	78.84	80.59	80.23	79.31	78.40	77.81	97.19%	99.35%	98.90%	97.77%	96.65%	95.92%
11	11	150.00	6.180	83.14	81.86	79.53	83.01	82.00	81.00	80.83	98.46%	95.66%	99.84%	98.63%	97.42%	97.22%
12	12	150.00	6.400	79.54	78.63	75.49	81.04	80.02	79.01	78.65	98.85%	94.90%	101.88%	100.60%	99.33%	98.88%
13	13	150.00	6.370	79.13	78.84	78.81	78.55	77.05	75.58	75.00	99.63%	99.59%	99.26%	97.37%	95.51%	94.78%
14	14	150.00	6.270	80.67	79.68	78.44	79.03	77.61	76.21	76.14	98.78%	97.24%	97.97%	96.21%	94.47%	94.39%
15	15	150.00	6.320	79.28	77.87	79.05	78.60	77.16	75.75	75.03	98.22%	99.71%	99.14%	97.32%	95.54%	94.64%
16	16	150.00	6.330	83.07	79.62	81.69	80.99	79.99	78.99	78.84	95.85%	98.34%	97.49%	96.29%	95.09%	94.91%
17	17	150.00	6.300	81.73	78.93	76.84	80.97	79.89	78.81	78.18	96.58%	94.02%	99.08%	97.75%	96.43%	95.66%
18	18	150.00	6.200	82.88	81.31	81.70	80.87	79.62	78.38	78.17	98.10%	98.57%	97.57%	96.06%	94.57%	94.31%
19	19	150.00	6.370	79.11	78.32	78.58	78.01	76.57	75.15	75.02	99.00%	99.33%	98.61%	96.79%	95.00%	94.83%
20	20	150.00	6.220	83.81	83.52	82.61	83.55	81.88	80.24	79.50	99.65%	98.57%	99.69%	97.70%	95.74%	94.86%
21	21	150.00	6.400	78.97	78.68	78.22	78.48	77.20	75.94	75.35	99.64%	99.06%	99.38%	97.76%	96.17%	95.42%
22	22	150.00	6.220	80.66	79.14	78.66	79.04	78.18	77.33	76.72	98.11%	97.52%	97.99%	96.92%	95.87%	95.11%
23	23	150.00	6.400	79.48	79.07	79.84	79.44	78.51	77.59	77.45	99.49%	100.46%	99.95%	98.78%	97.63%	97.45%
24	24	150.00	6.400	79.29	78.30	78.59	78.26	77.34	76.42	76.26	98.75%	99.11%	98.70%	97.54%	96.38%	96.18%
25	25	150.00	6.320	80.71	77.87	79.05	78.60	77.16	76.75	75.95	96.49%	97.95%	97.39%	95.61%	95.10%	94.11%



Attachment 1 Test Data

Mean	-	-	80.65	79.22	79.30	80.12	78.94	77.81	77.34	98.24%	98.33%	99.34%	97.88%	96.49%	95.90%
Median	-	-	80.37	78.93	79.05	80.23	79.11	77.70	77.45	98.46%	98.57%	99.14%	97.72%	96.38%	95.55%
$\delta$	-	-	1.45	1.37	1.53	1.58	1.62	1.65	1.65	1.26%	1.57%	1.29%	1.32%	1.33%	1.32%
Min.	-	-	78.90	77.54	75.49	78.01	76.57	75.15	75.00	95.85%	94.02%	97.39%	95.61%	94.47%	94.11%
Max.	-	-	83.81	83.52	82.61	83.55	82.41	81.58	80.94	100.52%	100.46%	101.88%	100.60%	99.46%	98.88%



Attachment 1 Test Data

Data Set 2: Chromaticity Shift ( $\Delta u'v'$ )																85°C – LM80 Required temperature					
No.	Sample #	Initial (0 hour)		$u' v'$												Chromaticity Shift ( $\Delta u'v'$ )					
		$u'$	$v'$	$u'$ (1000h)	$v'$ (1000h)	$u'$ (2000h)	$v'$ (2000h)	$u'$ (3000h)	$v'$ (3000h)	$u'$ (4000h)	$v'$ (4000h)	$u'$ (5000h)	$v'$ (5000h)	$u'$ (6000h)	$v'$ (6000h)	1000 hours	2000 hours	3000 hours	4000 hours	5000 hours	6000 hours
1	1	0.2618	0.5300	0.2617	0.5309	0.2592	0.5326	0.2601	0.5334	0.2602	0.5334	0.2604	0.5334	0.2606	0.5331	0.0009	0.0037	0.0038	0.0038	0.0037	0.0033
2	2	0.2633	0.5304	0.2632	0.5306	0.2606	0.5323	0.2608	0.5328	0.2607	0.5328	0.2608	0.5327	0.2609	0.5325	0.0002	0.0033	0.0035	0.0035	0.0034	0.0032
3	3	0.2638	0.5297	0.2636	0.5301	0.2612	0.5319	0.2608	0.5320	0.2607	0.5318	0.2607	0.5319	0.2608	0.5318	0.0004	0.0034	0.0038	0.0037	0.0038	0.0037
4	4	0.2623	0.5290	0.2626	0.5293	0.2647	0.5310	0.2603	0.5321	0.2601	0.5318	0.2600	0.5320	0.2599	0.5318	0.0004	0.0031	0.0037	0.0036	0.0038	0.0037
5	5	0.2629	0.5286	0.2624	0.5287	0.2601	0.5315	0.2596	0.5315	0.2596	0.5313	0.2594	0.5312	0.2594	0.5313	0.0005	0.0040	0.0044	0.0043	0.0044	0.0044
6	6	0.2617	0.5290	0.2636	0.5302	0.2604	0.5321	0.2590	0.5319	0.2596	0.5317	0.2598	0.5314	0.2598	0.5314	0.0022	0.0034	0.0040	0.0034	0.0031	0.0031
7	7	0.2645	0.5305	0.2641	0.5311	0.2618	0.5330	0.2631	0.5329	0.2632	0.5327	0.2633	0.5327	0.2635	0.5329	0.0007	0.0037	0.0028	0.0026	0.0025	0.0026
8	8	0.2620	0.5298	0.2618	0.5303	0.2590	0.5318	0.2597	0.5319	0.2596	0.5318	0.2595	0.5318	0.2594	0.5316	0.0005	0.0036	0.0031	0.0031	0.0032	0.0032
9	9	0.2618	0.5290	0.2631	0.5293	0.2585	0.5302	0.2582	0.5305	0.2584	0.5306	0.2586	0.5304	0.2586	0.5301	0.0013	0.0035	0.0039	0.0038	0.0035	0.0034
10	10	0.2621	0.5284	0.2619	0.5290	0.2590	0.5308	0.2580	0.5303	0.2579	0.5301	0.2576	0.5299	0.2573	0.5299	0.0006	0.0039	0.0045	0.0045	0.0047	0.0050
11	11	0.2633	0.5304	0.2630	0.5310	0.2579	0.5329	0.2578	0.5296	0.2579	0.5295	0.2576	0.5297	0.2577	0.5296	0.0007	0.0060	0.0056	0.0055	0.0057	0.0057
12	12	0.2640	0.5304	0.2643	0.5311	0.2613	0.5325	0.2611	0.5326	0.2613	0.5325	0.2614	0.5324	0.2615	0.5324	0.0008	0.0034	0.0036	0.0034	0.0033	0.0032
13	13	0.2631	0.5305	0.2619	0.5290	0.2602	0.5326	0.2602	0.5326	0.2602	0.5328	0.2599	0.5328	0.2598	0.5327	0.0019	0.0036	0.0036	0.0037	0.0039	0.0040
14	14	0.2623	0.5298	0.2630	0.5303	0.2600	0.5320	0.2606	0.5338	0.2606	0.5339	0.2606	0.5337	0.2607	0.5336	0.0009	0.0032	0.0043	0.0044	0.0043	0.0041
15	15	0.2630	0.5294	0.2629	0.5300	0.2601	0.5316	0.2588	0.5300	0.2588	0.5297	0.2586	0.5295	0.2585	0.5294	0.0006	0.0036	0.0042	0.0042	0.0044	0.0045
16	16	0.2632	0.5298	0.2631	0.5301	0.2602	0.5316	0.2634	0.5336	0.2632	0.5333	0.2629	0.5331	0.2626	0.5328	0.0003	0.0035	0.0038	0.0035	0.0033	0.0031
17	17	0.2628	0.5294	0.2629	0.5298	0.2607	0.5320	0.2600	0.5323	0.2600	0.5324	0.2601	0.5321	0.2601	0.5320	0.0004	0.0033	0.0040	0.0041	0.0038	0.0037
18	18	0.2621	0.5299	0.2624	0.5303	0.2596	0.5323	0.2624	0.5336	0.2622	0.5335	0.2621	0.5333	0.2622	0.5330	0.0005	0.0035	0.0037	0.0036	0.0034	0.0031
19	19	0.2625	0.5287	0.2626	0.5292	0.2596	0.5302	0.2599	0.5309	0.2601	0.5308	0.2602	0.5305	0.2601	0.5306	0.0005	0.0033	0.0034	0.0032	0.0029	0.0031
20	20	0.2616	0.5299	0.2619	0.5303	0.2582	0.5316	0.2581	0.5318	0.2581	0.5319	0.2580	0.5321	0.2580	0.5322	0.0005	0.0038	0.0040	0.0040	0.0042	0.0043
21	21	0.2631	0.5296	0.2628	0.5303	0.2603	0.5318	0.2599	0.5348	0.2604	0.5346	0.2604	0.5347	0.2606	0.5345	0.0008	0.0036	0.0061	0.0057	0.0058	0.0055
22	22	0.2630	0.5291	0.2624	0.5295	0.2600	0.5311	0.2597	0.5313	0.2599	0.5314	0.2598	0.5312	0.2595	0.5309	0.0007	0.0036	0.0040	0.0039	0.0038	0.0039
23	23	0.2630	0.5293	0.2631	0.5298	0.2606	0.5313	0.2599	0.5314	0.2597	0.5314	0.2598	0.5313	0.2599	0.5310	0.0005	0.0031	0.0037	0.0039	0.0038	0.0035

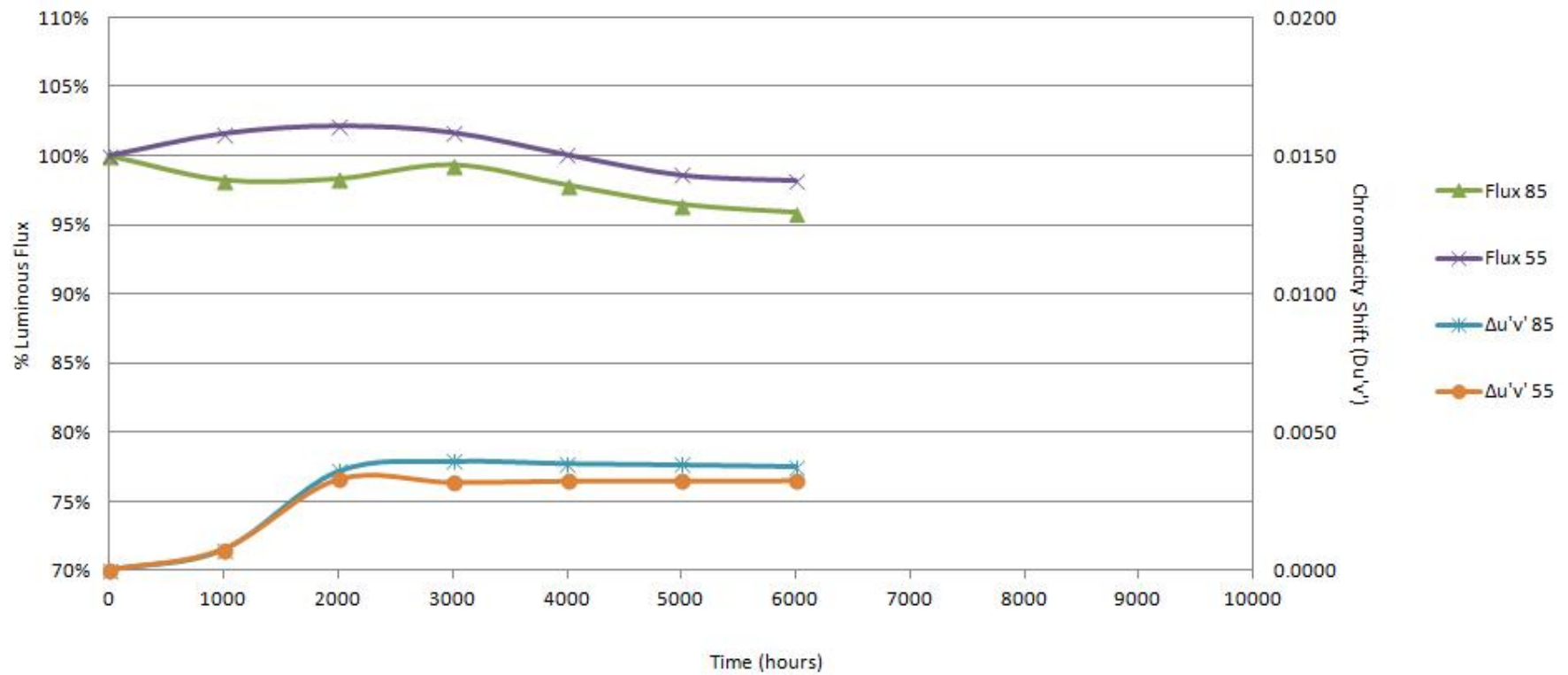


Attachment 1 Test Data

24	24	0.2633	0.5297	0.2633	0.5304	0.2610	0.5321	0.2610	0.5325	0.2607	0.5328	0.2608	0.5327	0.2607	0.5328	0.0007	0.0033	0.0036	0.0040	0.0039	0.0040
25	25	0.2622	0.5294	0.2617	0.5301	0.2594	0.5319	0.2592	0.5323	0.2594	0.5320	0.2595	0.5317	0.2596	0.5315	0.0009	0.0038	0.0042	0.0038	0.0035	0.0033
Mean		0.2627	0.5296	0.2628	0.5300	0.2601	0.5318	0.2601	0.5321	0.2601	0.5320	0.2601	0.5319	0.2601	0.5318	0.0007	0.0036	0.0040	0.0039	0.0038	0.0038
Median		0.2629	0.5297	0.2629	0.5301	0.2601	0.5319	0.2599	0.5321	0.2601	0.5319	0.2600	0.5320	0.2599	0.5318	0.0006	0.0035	0.0038	0.0038	0.0038	0.0037
$\bar{\sigma}$		0.0008	0.0006	0.0007	0.0007	0.0013	0.0007	0.0014	0.0013	0.0014	0.0013	0.0014	0.0013	0.0015	0.0013	0.0005	0.0005	0.0007	0.0007	0.0008	0.0008
Min.		0.2616	0.5284	0.2617	0.5287	0.2579	0.5302	0.2578	0.5296	0.2579	0.5295	0.2576	0.5295	0.2573	0.5294	0.0002	0.0031	0.0028	0.0026	0.0025	0.0026
Max.		0.2645	0.5305	0.2643	0.5311	0.2647	0.5330	0.2634	0.5348	0.2632	0.5346	0.2633	0.5347	0.2635	0.5345	0.0022	0.0060	0.0061	0.0057	0.0058	0.0057



Attachment 1 Test Data



Attachment 2 Test Equipment List

Equipment	ID No.	Model	Brand/Manufacturer	Calibration due date
Programmable Test Power For LEDS	S1207715d-YQ	LED300E	Everfine	May-18-2024
Power Analyser	S1004526-YQ	WT210	YOKOGAWA	May-18-2024
Integrating sphere	S1004508-YQ	Sensing	PR-110B	May-18-2024
Calibration lamp	S1108625-YQ	D204BH	Everfine	May-18-2024
High and Low Temperature Chamber	S1402834-YQ	EL-04KA	Espec	May-18-2024
Hybrid Recorder	S1004507-YQ	34792A	Agilent (USA)	May-18-2024