LM-80-08

TEST AND MEASUREMENT REPORT (6000 HRS)

For

Xicato Inc.

101 Daggett Dr.
San Jose, CA 95134, USA

Model: XCA09803020CCA

Report Type: Original Report	**Product Type:** LED Module
Prepared By	Thomas Tu Test Engineer
Report Number	R1512141-6000Hrs
Report Date	2017-01-31
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1512141-6000Hrs	Original Report	2017-03-31

1 GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The Xicato LED module model XCA09803020CCA is used for light source. The module is built with a metal enclosure (22mm dia. x 3.5mm high) that has sealed silicon aperture (9mm dia.) and a PCB (28.5mm x 23.5mm x 1.5mm for the circuitry. The module is affixed on an aluminum base (44mm dia. x 8.5mm high) for the testing purpose.

The LED module model XCA09803020CCA has the following photometric characteristics:

a) Target Correlated Color Temperature (CCT): 3000K.

b) Total luminous flux: Approximately 2000 lumens.

c) Color Rendering Index (Ra): Above 80.

1.2 Sampling Method

The samples were randomly gathered by the manufacturer and distributed to the BACL Laboratory for testing.

1.3 Number of Samples

A total of 26 LED modules were used for 6000 hours testing which were equally divided for 90ºC and 55ºC elevated temperature stressed test.

1.4 Electrical and Mechanical Description of the EUT

Listed Wattage	Listed Current	LED Type	Overall Dimensions	Manufacturer	Model Number
30W	1.05 A	LED Module	28.5mm (L) x 23.5mm (W) x 5mm (H)	XICATO, Inc.	XCA09803020CCA

1.5 Product Family

The tested product model XCA09803020CCA is constructed as COB (Chip On Board) with one common phosphor layer overlaying all dies. The tested COB and the equivalent Product Family Models described in the Table below satisfy the conditions set forth in Section 3.7 of the ENERGY STAR Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products Sept 9 2011.

Type	Product Family	Module Part Number	Minimum Die Spacing (mm)	Maximum Current (mA)	Maximum Power Density (mW/mm2)
Tested Module	XCA	XCA09803020CCA	0.2	1050	1575
Equivalent Modules	XCA	XCA0980YY07CCQ	0.2	700	1050
		XCA0980YY13CCQ	0.2	700	1050
		XCA0980YY20CCQ	0.2	1050	1575
		XCA0995YY07CCQ	0.2	700	1050
		XCA0995YY13CCQ	0.2	1050	1575
		XCA09V8YY07CCQ	0.2	700	1050
		XCA09V8YY13CCQ	0.2	700	1050
		XCA09V8YY20CCQ	0.2	1050	1575
		XCA09V9YY07CCQ	0.2	700	1050
		XCA09V9YY13CCQ	0.2	1050	1575
		XCA09BTYY07CCQ	0.2	700	1050
		XCA09BTYY13CCQ	0.2	1050	1575
		XCA0990YY07CCQ	0.2	700	1050
		XCA0990YY13CCQ	0.2	1050	1575
	XTM	XTM0980YY07CCQ	0.2	700	1050
		XTM0980YY13CCQ	0.2	700	1050
		XTM0980YY20CCQ	0.2	1050	1575
		XTM0995YY07CCQ	0.2	700	1050
		XTM0995YY13CCQ	0.2	1050	1575
		XTM09V8YY07CCQ	0.2	700	1050
		XTM09V8YY13CCQ	0.2	700	1050
		XTM09V8YY20CCQ	0.2	1050	1575
		XTM09V9YY07CCQ	0.2	700	1050
		XTM09V9YY13CCQ	0.2	1050	1575
		XTM09BTYY07CCQ	0.2	700	1050
		XTM09BTYY13CCQ	0.2	1050	1575
		XTM0990YY07CCQ	0.2	700	1050
		XTM0990YY13CCQ	0.2	1050	1575
	XIM	XIM0980YY07ZZQ	0.2	700	1050
		XIM0980YY13ZZQ	0.2	700	1050
		XIM0980YY20ZZQ	0.2	1050	1575

		XIM0995YY07ZZQ	0.2	700	1050
		XIM0995YY13ZZQ	0.2	1050	1575
		XIM09V8YY07ZZQ	0.2	700	1050
		XIM09V8YY13ZZQ	0.2	700	1050
		XIM09V8YY20ZZQ	0.2	1050	1575
		XIM09V9YY07ZZQ	0.2	700	1050
		XIM09V9YY13ZZQ	0.2	1050	1575
		XIM09BTYY07ZZQ	0.2	700	1050
		XIM09BTYY13ZZQ	0.2	1050	1575
		XIM0990YY07ZZQ	0.2	700	1050
		XIM0990YY13ZZQ	0.2	1050	1575
Key	***Q***	***Revision (A, B, C, etc.)***			
	YY	***27 (2700 K), 30 (3000 K), 35 (3500 K) or 40 (4000 K)***			
	ZZ	***A2 (DALI), A3 (1-10V), A5 (BLE+DALI) or A6 (BLE+1-10V)***			

1.6 Objective

The objective of this test report is to demonstrate the product model XCA09803020CCA meets the requirements for LED module as required by the ENERGY STAR Program Requirements Product Specification for Luminaires (Light Fixtures) Eligibility Criteria Version 2.0.

1.7 Test Method

1.7.1 Standards

The test report is prepared on behalf of XICATO, Inc. in accordance with the following American National Standards, International Commission on Illumination, and Illumination Engineering Society of North America:

- IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
- CIE 15-2004 Colorimetry, 3rd edition.
- ANSI C78.377-2008 Specifications of the Chromaticity of Solid State Lighting Products.
- IESNA LM-78-2007 Approved Method for Total Luminous Flux Measurement of Lamps Using an Integrating Sphere Photometer
- IESNA LM-58-94 Guide to Spectroradiometric Measurements
- CIE 63-1984 Spectroradiometric Measurement of Light Sources
- CIE 13.3-1995 Method of Measuring and Specifying Color Rendering of Light Sources
- IES LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products (Not to include Sec 9.2 and 10.0 for Luminous Intensity)
- IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources

1.7.2 Lumen Maintenance, Test Duration and Interval Measurements

The test duration was 6000 hours with the initial measurement at 0 hour. The interval measurements were at 1000, 2000, 3000, 4000, 5000, and 6000 hours.

1.7.3 Operating Cycle

There was no operating cycle to the tested LED samples. The sample LEDs were turned on continuously for the lumen maintenance test.

1.7.4 Drive Current for Lifetime Test

Each sample was supplied independently by a 30Vdc of typical voltage source and 1.05 Amp of drive current. The power supplies were powered at the regulated 120Vac by the Behlman AC Power Source. The voltage, frequency, and Total Harmonic Distortion of the AC source were monitored and logged by the BMI Data Logger.

1.7.5 Case Temperature Measurement Point

The Case Temperature of each sample under test was controlled to not less than minus 2°C of the test temperature and was measured and logged by the Yokogawa Hybrid Recorder. Type T thermocouple was used and was attached to the “hot spot” located on the side of the LED Module. This hot spot was specified by the manufacturer.

1.7.6 Surrounding Temperature and Humidity

The surrounding air temperature inside each test chamber was maintained to not lower than minus 5°C of the test case temperature. The humidity was maintained to less than 65% RH.

1.7.7 Airflow

The airflow inside each test chamber was maintained in order to avoid thermal stratification and to minimize drafts in the immediate vicinity of the test samples. Airflow was kept to the minimum.

1.7.8 Uncertainty

The photometric measurement was performed by the Labsphere Diode Array DAS-1100 and the 1.5m Everfine Integrating Sphere. The total uncertainty of the light output measurement was estimated, at the 95% confidence level, not to exceed ±3.8% on the scanning range of 390 nm to 760 nm.

1.8 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at the facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2003, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: R-3729, C-4176, G-469, and T-1206. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02).

1.9 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
BACL	Elevated Temperature Stress Test Chamber	/	/	N/A	N/A
Davis Instrument	Temperature & Humidity Recorder	Perception II	PC40729A05	2015-05-05	2017-05-05
Yokogawa	Hybrid Recorder (60 Channels)	DR230	12C510041	201702-09	2018-02-09
Labsphere	Diode Array	DAS-1100	5795	Within calibration	Within calibration
Everfine	Integrating sphere	1.5m	0111466	Within calibration	Within calibration
Everfine	Power Supply for Standard Lamp and LED Module	WY305	809024	N/A	N/A
Labsphere	Standard Lamp	SLC-1400	J101, K101, L101	2012-02-02	Within manufacturer 50 hours of use
MeanWell	AC-DC Power Adaptor	LPC-60-1050	N/A	N/A	N/A
Fluke	True RMS Multimeter, for Voltage Measurement	287	11820006	2016-04-05	2017-04-05
Fluke	True RMS Multimeter, for Current Measurement	189	89920092	2016-03-31	2017-03-31
BACL	LED Electrical Test fixture	/	/	N/A	N/A
Behlman	AC Power Source	BL+30-1-C1-1	06953	N/A	N/A
BMI	Data Logger	3030A	35558	2016-12-07	2017-12-07

Statement of Traceability: Bay Area Compliance Laboratories Corp. certifies that all calibrations have been performed using suitable standards traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY (NIST).

1.10 Electrical Rating for the Photometric Measurement

Voltage	30 V (typical)
Current	1.000 Amp
Power	30 W

2 SUMMARY OF TEST RESULTS

Data Set	90°C
Number of Samples	13
Failure Observed	0
Test Interval and Test Duration	0h, 1000h, 2000h, 3000h, 4000h, 5000h, 6000h
Average Lumen Maintenance at 6000 hours	97.61%
Average Chromaticity Shift at 6000 hours	0.0009
Reported TM-21 L70 Lifetime	> 33,000 hours

Data Set	55°C
Number of Samples	13
Failure Observed	0
Test Interval and Test Duration	0h, 1000h, 2000h, 3000h, 4000h, 5000h, 6000h
Average Lumen Maintenance at 6000 hours	99.01%
Average Chromaticity Shift at 6000 hours	0.0006
Reported TM-21 L70 Lifetime	> 33,000 hours

3 SUMMARY OF TEST DATA

3.1 Photometric and Electrical Measurements at 0 Hour and 25°C

Sample Serial Number	Forward Voltage (V)	Current (A)	Power (W)	Luminous Flux (Lumens)	Efficacy (Lm/W)	CCT (K)	CRI (Ra)	Chroma x	Chroma y	Chroma u'	Chroma v'
90ºC LED Module											
#334	29.29	1.000	29.29	2087	71.25	2938	85.1	0.4417	0.4063	0.2527	0.5230
#339	29.44	1.000	29.44	2071	70.35	2963	84.8	0.4393	0.4045	0.2519	0.5219
#338	29.59	1.000	29.59	2067	69.85	2970	84.9	0.4386	0.4040	0.2517	0.5216
#344	29.48	1.000	29.48	2076	70.42	2958	84.8	0.4400	0.4053	0.2520	0.5223
#346	29.49	1.000	29.49	2080	70.53	2950	85.0	0.4405	0.4053	0.2523	0.5224
#341	29.59	1.000	29.59	2027	68.50	2976	85.5	0.4380	0.4035	0.2515	0.5213
#336	29.27	1.000	29.27	2062	70.45	2950	85.3	0.4397	0.4038	0.2525	0.5217
#332	29.47	1.000	29.47	2046	69.43	2965	84.9	0.4388	0.4037	0.2519	0.5215
#337	29.12	1.000	29.12	2069	71.05	2964	84.8	0.4389	0.4037	0.2520	0.5215
#328	29.44	1.000	29.44	2072	70.38	2982	85.3	0.4371	0.4024	0.2514	0.5207
#329	29.41	1.000	29.41	2065	70.21	2967	84.8	0.4386	0.4037	0.2518	0.5215
#333	29.59	1.000	29.59	2062	69.69	2988	85.4	0.4369	0.4027	0.2511	0.5208
#343	29.63	1.000	29.63	2051	69.22	2973	84.9	0.4378	0.4027	0.2517	0.5210
Average	29.45	1.000	29.45	2064	70.10	2965	85.0	0.4389	0.4040	0.2519	0.5216
Minimum	29.12	1.000	29.12	2027	68.50	2938	84.8	0.4369	0.4024	0.2511	0.5207
Maximum	29.63	1.000	29.63	2087	71.25	2988	85.5	0.4417	0.4063	0.2527	0.5230
Median	29.47	1.000	29.47	2067	70.35	2965	84.9	0.4388	0.4037	0.2519	0.5215
S.T. Deviation	0.15	0.000	0.15	15.7	0.75	13.7	0.25	0.0013	0.0011	0.0004	0.0006

Sample Serial Number	Forward Voltage (V)	Current (A)	Power (W)	Luminous Flux (Lumens)	Efficacy (Lm/W)	CCT (K)	CRI (Ra)	Chroma x	Chroma y	Chroma u'	Chroma v'
55ºC LED Module											
#353	29.53	1.000	29.53	2070	70.10	2977	85.4	0.4380	0.4036	0.2515	0.5214
#340	29.44	1.000	29.44	2037	69.19	2975	84.7	0.4380	0.4033	0.2516	0.5212
#349	29.39	1.000	29.39	2056	69.96	2979	85.4	0.4374	0.4026	0.2515	0.5209
#350	29.56	1.000	29.56	2080	70.37	2982	85.4	0.4375	0.4031	0.2514	0.5211
#351	29.36	1.000	29.36	2084	70.98	2968	85.0	0.4382	0.4029	0.2519	0.5211
#347	29.49	1.000	29.49	2103	71.31	2953	84.8	0.4407	0.4062	0.2521	0.5228
#327	29.43	1.000	29.43	2075	70.51	2968	84.8	0.4391	0.4047	0.2517	0.5220
#352	29.52	1.000	29.52	2088	70.73	2981	85.5	0.4374	0.4027	0.2515	0.5209
#323	29.48	1.000	29.48	2068	70.15	2938	85.0	0.4419	0.4066	0.2527	0.5231
#345	29.52	1.000	29.52	2048	69.38	2979	85.6	0.4372	0.4023	0.2515	0.5207
#322	29.46	1.000	29.46	2097	71.18	2977	85.6	0.4370	0.4014	0.2518	0.5203
#331	29.36	1.000	29.36	2077	70.74	2932	85.2	0.4422	0.4066	0.2529	0.5232
#326	29.44	1.000	29.44	2059	69.94	2948	84.9	0.4405	0.4050	0.2525	0.5223
Average	29.46	1.000	29.46	2072	70.35	2965	83.9	0.4389	0.4039	0.2519	0.5216
Minimum	29.36	1.000	29.36	2037	69.19	2952	83.6	0.4370	0.4014	0.2514	0.5203
Maximum	29.56	1.000	29.56	2103	71.31	2980	86.3	0.4422	0.4066	0.2529	0.5232
Median	29.46	1.000	29.46	2075	70.37	2962	83.7	0.4380	0.4033	0.2517	0.5212
S.T. Deviation	0.06	0.000	0.06	19.0	0.65	17.3	0.32	0.0018	0.0017	0.0005	0.0009

Environmental Conditions	
Relative Humidity	52% - 61%
Ambient Temperature	23˚C - 24˚C
Photometric Measurement Date(s)	2015-12-21 to 22

3.2 1,000 Hour Lumen Maintenance at 25°C

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
90ºC LED Module									
#334	29.16	1.000	2083	99.81	0.4406	0.4063	0.2520	0.5228	0.0007
#339	29.21	1.000	2044	98.70	0.4390	0.4047	0.2516	0.5219	0.0003
#338	29.38	1.000	2043	98.84	0.4379	0.4039	0.2513	0.5215	0.0004
#344	29.27	1.000	2063	99.37	0.4394	0.4055	0.2515	0.5223	0.0005
#346	29.29	1.000	2060	99.04	0.4399	0.4054	0.2519	0.5223	0.0004
#341	29.37	1.000	2037	100.49	0.4378	0.4037	0.2513	0.5214	0.0002
#336	29.07	1.000	2054	99.61	0.4392	0.4037	0.2522	0.5216	0.0003
#332	29.24	1.000	2027	99.07	0.4384	0.4039	0.2516	0.5215	0.0003
#337	28.90	1.000	2051	99.13	0.4386	0.4041	0.2516	0.5216	0.0004
#328	29.29	1.000	2051	98.99	0.4367	0.4027	0.2510	0.5208	0.0004
#329	29.20	1.000	2052	99.37	0.4381	0.4038	0.2514	0.5215	0.0004
#333	29.37	1.000	2033	98.59	0.4367	0.4029	0.2509	0.5209	0.0002
#343	29.43	1.000	2036	99.27	0.4371	0.4028	0.2512	0.5209	0.0005
Average	29.24	1.000	2048.8	99.25	0.4384	0.4041	0.2515	0.5216	0.0004
Minimum	28.90	1.000	2027	98.59	0.4367	0.4027	0.2509	0.5208	0.0002
Maximum	29.43	1.000	2083	100.49	0.4406	0.4063	0.2522	0.5228	0.0007
Median	29.27	1.000	2051	99.13	0.4384	0.4039	0.2515	0.5215	0.0004
S.T. Deviation	0.14	0.000	14.8	0.51	0.0012	0.0011	0.0004	0.0006	0.0001

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
55ºC LED Module									
#353	29.29	1.000	2071	100.05	0.4374	0.4036	0.2511	0.5213	0.0004
#340	29.22	1.000	2037	100.00	0.4374	0.4033	0.2512	0.5211	0.0004
#349	29.15	1.000	2049	99.66	0.4367	0.4026	0.2511	0.5208	0.0005
#350	29.32	1.000	2071	99.57	0.4368	0.4032	0.2509	0.5210	0.0005
#351	29.13	1.000	2074	99.52	0.4374	0.4028	0.2514	0.5210	0.0005
#347	29.28	1.000	2082	99.00	0.4402	0.4062	0.2518	0.5227	0.0003
#327	29.20	1.000	2060	99.28	0.4387	0.4048	0.2514	0.5219	0.0003
#352	29.29	1.000	2082	99.71	0.4369	0.4028	0.2511	0.5209	0.0004
#323	29.28	1.000	2065	99.85	0.4414	0.4067	0.2523	0.5231	0.0004
#345	29.32	1.000	2050	100.10	0.4370	0.4023	0.2514	0.5207	0.0001
#322	29.24	1.000	2096	99.95	0.4362	0.4014	0.2513	0.5202	0.0005
#331	29.15	1.000	2080	100.14	0.4413	0.4066	0.2523	0.5230	0.0006
#326	29.22	1.000	2051	99.61	0.4400	0.4051	0.2521	0.5222	0.0004
Average	29.24	1.000	2067	99.73	0.4383	0.4040	0.2515	0.5215	0.0004
Minimum	29.13	1.000	2037	99.00	0.4362	0.4014	0.2509	0.5202	0.0001
Maximum	29.32	1.000	2096	100.14	0.4414	0.4067	0.2523	0.5231	0.0006
Median	29.24	1.000	2071	99.71	0.4374	0.4033	0.2514	0.5211	0.0004
S.T. Deviation	0.07	0.000	16.7	0.34	0.0018	0.0017	0.0005	0.0010	0.0001

Environmental Conditions	
Relative Humidity	35% - 43%
Ambient Temperature	23°C - 24°C
Photometric Measurement Date(s)	2016-02-18

3.3 2,000 Hour Lumen Maintenance at 25°C

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
90ºC LED Module									
#334	29.05	1.000	2083	99.81	0.4407	0.4065	0.2520	0.5229	0.0007
#339	29.15	1.000	2044	98.70	0.4387	0.4048	0.2514	0.5219	0.0005
#338	29.35	1.000	2040	98.69	0.4377	0.4041	0.2511	0.5215	0.0006
#344	29.20	1.000	2054	98.94	0.4392	0.4056	0.2514	0.5223	0.0006
#346	29.20	1.000	2063	99.18	0.4393	0.4053	0.2516	0.5222	0.0008
#341	29.32	1.000	2029	100.10	0.4377	0.4040	0.2511	0.5215	0.0004
#336	29.01	1.000	2059	99.85	0.4390	0.4040	0.2519	0.5217	0.0005
#332	29.18	1.000	2022	98.83	0.4381	0.4040	0.2514	0.5215	0.0006
#337	28.83	1.000	2042	98.70	0.4387	0.4042	0.2517	0.5217	0.0004
#328	29.12	1.000	2058	99.32	0.4363	0.4026	0.2508	0.5207	0.0006
#329	29.08	1.000	2051	99.32	0.4375	0.4038	0.2511	0.5214	0.0008
#333	29.29	1.000	2037	98.79	0.4361	0.4029	0.2505	0.5208	0.0006
#343	29.29	1.000	2034	99.17	0.4366	0.4028	0.2509	0.5208	0.0008
Average	29.16	1.000	2047	99.18	0.4381	0.4042	0.2513	0.5216	0.0006
Minimum	28.83	1.000	2022	98.69	0.4361	0.4026	0.2505	0.5207	0.0004
Maximum	29.35	1.000	2083	100.10	0.4407	0.4065	0.2520	0.5229	0.0008
Median	29.18	1.000	2044	99.17	0.4381	0.4040	0.2514	0.5215	0.0006
S.T. Deviation	0.14	0.000	16.3	0.48	0.0013	0.0011	0.0004	0.0006	0.0001

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
55ºC LED Module									
#353	29.25	1.000	2069	99.95	0.4374	0.4037	0.2510	0.5213	0.0004
#340	29.16	1.000	2037	100.00	0.4374	0.4035	0.2511	0.5212	0.0005
#349	29.08	1.000	2052	99.81	0.4363	0.4025	0.2508	0.5207	0.0007
#350	29.26	1.000	2068	99.42	0.4367	0.4033	0.2508	0.5210	0.0006
#351	29.08	1.000	2075	99.57	0.4373	0.4030	0.2513	0.5210	0.0006
#347	29.20	1.000	2081	98.95	0.4401	0.4063	0.2517	0.5227	0.0004
#327	29.14	1.000	2056	99.08	0.4385	0.4048	0.2513	0.5219	0.0004
#352	29.24	1.000	2079	99.57	0.4366	0.4029	0.2509	0.5209	0.0006
#323	29.22	1.000	2066	99.90	0.4410	0.4067	0.2521	0.5230	0.0006
#345	29.22	1.000	2055	100.34	0.4364	0.4022	0.2510	0.5206	0.0005
#322	29.15	1.000	2093	99.81	0.4361	0.4015	0.2511	0.5202	0.0006
#331	29.07	1.000	2081	100.19	0.4411	0.4066	0.2522	0.5230	0.0007
#326	29.14	1.000	2050	99.56	0.4400	0.4053	0.2520	0.5223	0.0005
Average	29.17	1.000	2066	99.71	0.4381	0.4040	0.2513	0.5215	0.0006
Minimum	29.07	1.000	2037	98.95	0.4361	0.4015	0.2508	0.5202	0.0004
Maximum	29.26	1.000	2093	100.34	0.4411	0.4067	0.2522	0.5230	0.0007
Median	29.16	1.000	2068	99.81	0.4374	0.4035	0.2511	0.5212	0.0006
S.T. Deviation	0.07	0.000	15.7	0.40	0.0019	0.0017	0.0005	0.0010	0.0001

Environmental Conditions	
Relative Humidity	35% - 42%
Ambient Temperature	23°C - 24°C
Photometric Measurement Date(s)	2016-04-19 to 20

3.4 3,000 Hour Lumen Maintenance at 25°C

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
90ºC LED Module									
#334	29.03	1.000	2078	99.57	0.4402	0.4063	0.2517	0.5227	0.0010
#339	29.13	1.000	2037	98.36	0.4387	0.4049	0.2514	0.5220	0.0006
#338	29.31	1.000	2034	98.40	0.4374	0.4039	0.2509	0.5214	0.0008
#344	29.16	1.000	2055	98.99	0.4387	0.4053	0.2512	0.5221	0.0009
#346	29.16	1.000	2058	98.94	0.4393	0.4053	0.2516	0.5222	0.0008
#341	29.29	1.000	2026	99.95	0.4372	0.4037	0.2509	0.5213	0.0006
#336	29.00	1.000	2057	99.76	0.4384	0.4036	0.2517	0.5214	0.0008
#332	29.17	1.000	2014	98.44	0.4377	0.4038	0.2512	0.5214	0.0008
#337	28.81	1.000	2052	99.18	0.4377	0.4038	0.2512	0.5214	0.0008
#328	29.10	1.000	2057	99.28	0.4360	0.4024	0.2507	0.5206	0.0007
#329	29.08	1.000	2051	99.32	0.4372	0.4037	0.2509	0.5213	0.0009
#333	29.29	1.000	2037	98.79	0.4359	0.4028	0.2505	0.5207	0.0007
#343	29.29	1.000	2030	98.98	0.4366	0.4029	0.2509	0.5209	0.0009
Average	29.14	1.000	2045.1	99.07	0.4378	0.4040	0.2511	0.5215	0.0008
Minimum	28.81	1.000	2014	98.36	0.4359	0.4024	0.2505	0.5206	0.0006
Maximum	29.31	1.000	2078	99.95	0.4402	0.4063	0.2517	0.5227	0.0010
Median	29.16	1.000	2051	98.99	0.4377	0.4038	0.2512	0.5214	0.0008
S.T. Deviation	0.14	0.000	17.1	0.51	0.0013	0.0011	0.0004	0.0006	0.0001

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
55ºC LED Module									
#353	29.26	1.000	2075	100.24	0.4371	0.4037	0.2508	0.5213	0.0006
#340	29.18	1.000	2036	99.95	0.4375	0.4036	0.2511	0.5213	0.0005
#349	29.08	1.000	2048	99.61	0.4366	0.4026	0.2510	0.5208	0.0005
#350	29.28	1.000	2067	99.38	0.4365	0.4032	0.2507	0.5210	0.0007
#351	29.08	1.000	2074	99.52	0.4371	0.4028	0.2512	0.5209	0.0007
#347	29.20	1.000	2074	98.62	0.4401	0.4063	0.2517	0.5227	0.0004
#327	29.15	1.000	2061	99.33	0.4382	0.4047	0.2511	0.5218	0.0006
#352	29.25	1.000	2082	99.71	0.4364	0.4028	0.2508	0.5208	0.0007
#323	29.23	1.000	2078	100.48	0.4408	0.4067	0.2519	0.5230	0.0008
#345	29.25	1.000	2056	100.39	0.4363	0.4023	0.2509	0.5206	0.0006
#322	29.17	1.000	2095	99.90	0.4363	0.4016	0.2512	0.5203	0.0005
#331	29.10	1.000	2084	100.34	0.4411	0.4067	0.2521	0.5230	0.0008
#326	29.15	1.000	2049	99.51	0.4399	0.4052	0.2520	0.5223	0.0005
Average	29.18	1.000	2068	99.77	0.4380	0.4040	0.2513	0.5215	0.0006
Minimum	29.08	1.000	2036	98.62	0.4363	0.4016	0.2507	0.5203	0.0004
Maximum	29.28	1.000	2095	100.48	0.4411	0.4067	0.2521	0.5230	0.0008
Median	29.18	1.000	2074	99.71	0.4371	0.4036	0.2511	0.5213	0.0006
S.T. Deviation	0.07	0.000	16.8	0.53	0.0018	0.0017	0.0005	0.0009	0.0001

Environmental Conditions	
Relative Humidity	41% - 48%
Ambient Temperature	24˚C - 25°C
Photometric Measurement Date(s)	2016-06-13 to 14

3.5 ,000 Hour Lumen Maintenance at 25°C

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
90ºC LED Module									
#334	29.03	1.000	2062	98.80	0.4402	0.4064	0.2517	0.5228	0.0010
#339	29.12	1.000	2024	97.73	0.4386	0.4047	0.2514	0.5219	0.0005
#338	29.31	1.000	2013	97.39	0.4376	0.4040	0.2510	0.5215	0.0007
#344	29.17	1.000	2034	97.98	0.4389	0.4055	0.2512	0.5222	0.0008
#346	29.19	1.000	2038	97.98	0.4402	0.4060	0.2518	0.5226	0.0005
#341	29.32	1.000	2011	99.21	0.4373	0.4038	0.2509	0.5213	0.0006
#336	29.01	1.000	2035	98.69	0.4386	0.4038	0.2518	0.5215	0.0007
#332	29.17	1.000	2003	97.90	0.4381	0.4041	0.2513	0.5216	0.0006
#337	28.84	1.000	2031	98.16	0.4388	0.4045	0.2516	0.5218	0.0005
#328	29.13	1.000	2043	98.60	0.4367	0.4030	0.2509	0.5209	0.0005
#329	29.13	1.000	2039	98.74	0.4382	0.4044	0.2512	0.5217	0.0006
#333	29.32	1.000	2013	97.62	0.4361	0.4031	0.2505	0.5209	0.0007
#343	29.32	1.000	2010	98.00	0.4365	0.4029	0.2508	0.5209	0.0009
Average	29.16	1.000	2027.4	98.22	0.4381	0.4043	0.2512	0.5217	0.0007
Minimum	28.84	1.000	2003	97.39	0.4361	0.4029	0.2505	0.5209	0.0005
Maximum	29.32	1.000	2062	99.21	0.4402	0.4064	0.2518	0.5228	0.0010
Median	29.17	1.000	2031	98.00	0.4382	0.4041	0.2512	0.5216	0.0006
S.T. Deviation	0.14	0.000	16.8	0.54	0.0013	0.0011	0.0004	0.0006	0.0002

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
55ºC LED Module									
#353	29.28	1.000	2062	99.61	0.4377	0.4040	0.2511	0.5215	0.0004
#340	29.20	1.000	2029	99.61	0.4373	0.4035	0.2511	0.5212	0.0005
#349	29.12	1.000	2040	99.22	0.4367	0.4028	0.2510	0.5208	0.0005
#350	29.30	1.000	2055	98.80	0.4366	0.4032	0.2507	0.5210	0.0006
#351	29.12	1.000	2072	99.42	0.4372	0.4030	0.2512	0.5210	0.0007
#347	29.25	1.000	2069	98.38	0.4400	0.4063	0.2516	0.5227	0.0005
#327	29.17	1.000	2050	98.80	0.4381	0.4047	0.2511	0.5218	0.0007
#352	29.29	1.000	2067	98.99	0.4366	0.4029	0.2509	0.5209	0.0006
#323	29.25	1.000	2067	99.95	0.4408	0.4068	0.2519	0.5230	0.0008
#345	29.27	1.000	2045	99.85	0.4364	0.4023	0.2510	0.5206	0.0005
#322	29.18	1.000	2084	99.38	0.4363	0.4016	0.2512	0.5203	0.0005
#331	29.11	1.000	2077	100.00	0.4413	0.4067	0.2523	0.5231	0.0006
#326	29.18	1.000	2034	98.79	0.4400	0.4052	0.2521	0.5223	0.0004
Average	29.21	1.000	2057.8	99.29	0.4381	0.4041	0.2513	0.5216	0.0006
Minimum	29.11	1.000	2029	98.38	0.4363	0.4016	0.2507	0.5203	0.0004
Maximum	29.30	1.000	2084	100.00	0.4413	0.4068	0.2523	0.5231	0.0008
Median	29.20	1.000	2062	99.38	0.4373	0.4035	0.2511	0.5212	0.0005
S.T. Deviation	0.07	0.000	17.1	0.51	0.0018	0.0017	0.0005	0.0009	0.0001

Environmental Conditions	
Relative Humidity	45 - 48%
Ambient Temperature	25°C
Photometric Measurement Date(s)	2016-08-01 to 02

3.6 5,000 Hour Lumen Maintenance at 25°C

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
90ºC LED Module									
#334	29.13	1.000	2046	98.04	0.4404	0.4064	0.2518	0.5228	0.0009
#339	29.25	1.000	2011	97.10	0.4383	0.4047	0.2512	0.5218	0.0007
#338	29.42	1.000	1990	96.27	0.4375	0.4040	0.2510	0.5214	0.0007
#344	29.29	1.000	2026	97.59	0.4387	0.4053	0.2512	0.5221	0.0009
#346	29.28	1.000	2025	97.36	0.4391	0.4052	0.2515	0.5221	0.0009
#341	29.45	1.000	2005	98.91	0.4371	0.4038	0.2508	0.5213	0.0007
#336	29.16	1.000	2033	98.59	0.4383	0.4038	0.2516	0.5215	0.0009
#332	29.34	1.000	1983	96.92	0.4382	0.4041	0.2514	0.5216	0.0006
#337	28.96	1.000	2026	97.92	0.4378	0.4038	0.2512	0.5214	0.0008
#328	29.27	1.000	2025	97.73	0.4361	0.4025	0.2507	0.5206	0.0007
#329	29.27	1.000	2010	97.34	0.4384	0.4042	0.2515	0.5217	0.0004
#333	29.46	1.000	1988	96.41	0.4359	0.4028	0.2505	0.5207	0.0007
#343	29.46	1.000	1985	96.78	0.4364	0.4027	0.2508	0.5208	0.0009
Average	29.29	1.000	2011.8	97.46	0.4379	0.4041	0.2512	0.5215	0.0008
Minimum	28.96	1.000	1983	96.27	0.4359	0.4025	0.2505	0.5206	0.0004
Maximum	29.46	1.000	2046	98.91	0.4404	0.4064	0.2518	0.5228	0.0009
Median	29.28	1.000	2011	97.36	0.4382	0.4040	0.2512	0.5215	0.0007
S.T. Deviation	0.15	0.000	20.4	0.79	0.0013	0.0011	0.0004	0.0006	0.0002

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
55ºC LED Module									
#353	29.42	1.000	2052	99.13	0.4374	0.4037	0.2510	0.5213	0.0004
#340	29.34	1.000	2018	99.07	0.4372	0.4034	0.2510	0.5212	0.0006
#349	29.26	1.000	2036	99.03	0.4362	0.4024	0.2508	0.5206	0.0007
#350	29.43	1.000	2044	98.27	0.4368	0.4033	0.2508	0.5211	0.0005
#351	29.25	1.000	2062	98.94	0.4373	0.4029	0.2513	0.5210	0.0006
#347	29.39	1.000	2059	97.91	0.4399	0.4063	0.2515	0.5227	0.0006
#327	29.34	1.000	2039	98.27	0.4381	0.4047	0.2511	0.5218	0.0007
#352	29.44	1.000	2058	98.56	0.4363	0.4028	0.2507	0.5208	0.0008
#323	29.39	1.000	2057	99.47	0.4408	0.4067	0.2519	0.5230	0.0008
#345	29.42	1.000	2035	99.37	0.4365	0.4023	0.2511	0.5206	0.0005
#322	29.32	1.000	2077	99.05	0.4359	0.4014	0.2511	0.5202	0.0007
#331	29.25	1.000	2071	99.71	0.4409	0.4066	0.2520	0.5230	0.0009
#326	29.32	1.000	2025	98.35	0.4397	0.4051	0.2519	0.5222	0.0006
Average	29.35	1.000	2048.7	98.85	0.4379	0.4040	0.2513	0.5215	0.0006
Minimum	29.25	1.000	2018	97.91	0.4359	0.4014	0.2507	0.5202	0.0004
Maximum	29.44	1.000	2077	99.71	0.4409	0.4067	0.2520	0.5230	0.0009
Median	29.34	1.000	2052	99.03	0.4373	0.4034	0.2511	0.5212	0.0006
S.T. Deviation	0.07	0.000	17.6	0.54	0.0018	0.0018	0.0005	0.0010	0.0001

Environmental Conditions	
Relative Humidity	44% - 49%
Ambient Temperature	23˚C - 24°C
Photometric Measurement Date(s)	2016-10-13 to 14

3.7 6,000 Hour Lumen Maintenance at 25°C

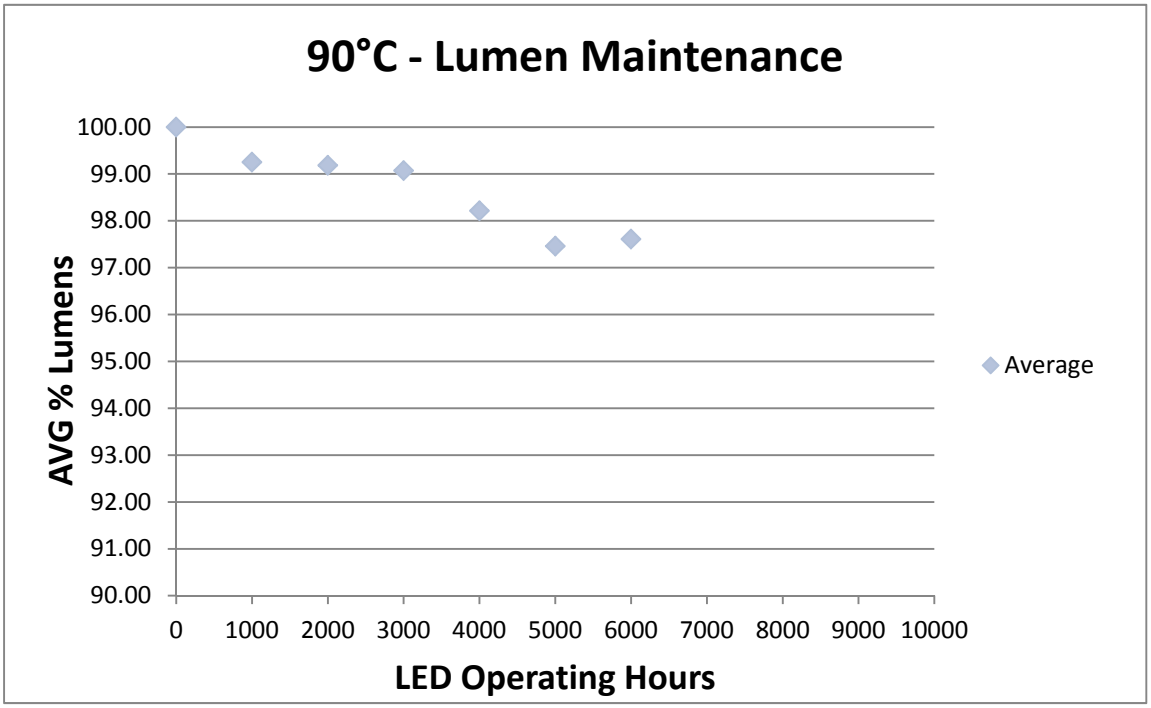
Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
90ºC LED Module									
#334	29.29	1.000	2044	97.94	0.4403	0.4064	0.2517	0.5228	0.0010
#339	29.37	1.000	2011	97.10	0.4382	0.4047	0.2511	0.5218	0.0008
#338	29.56	1.000	1996	96.57	0.4373	0.4040	0.2508	0.5214	0.0009
#344	29.42	1.000	2029	97.74	0.4386	0.4054	0.2511	0.5222	0.0010
#346	29.40	1.000	2031	97.64	0.4389	0.4051	0.2514	0.5221	0.0010
#341	29.56	1.000	1991	98.22	0.4370	0.4038	0.2507	0.5213	0.0008
#336	29.25	1.000	2037	98.79	0.4382	0.4036	0.2516	0.5214	0.0009
#332	29.42	1.000	1986	97.07	0.4376	0.4039	0.2511	0.5214	0.0009
#337	29.05	1.000	2029	98.07	0.4375	0.4037	0.2511	0.5213	0.0009
#328	29.32	1.000	2019	97.44	0.4358	0.4024	0.2506	0.5206	0.0009
#329	29.38	1.000	2045	99.03	0.4368	0.4036	0.2507	0.5212	0.0012
#333	29.58	1.000	1987	96.36	0.4358	0.4027	0.2504	0.5207	0.0007
#343	29.57	1.000	1989	96.98	0.4362	0.4027	0.2507	0.5207	0.0011
Average	29.40	1.000	2014.9	97.61	0.4376	0.4040	0.2510	0.5214	0.0009
Minimum	29.05	1.000	1986	96.36	0.4358	0.4024	0.2504	0.5206	0.0007
Maximum	29.58	1.000	2045	99.03	0.4403	0.4064	0.2517	0.5228	0.0012
Median	29.40	1.000	2019	97.64	0.4375	0.4038	0.2511	0.5214	0.0009
S.T. Deviation	0.15	0.000	22.6	0.80	0.0013	0.0011	0.0004	0.0006	0.0001

Sample Serial Number	Forward Voltage (V)	Current (A)	Luminous Flux (Lumens)	% Lumens	Chroma x	Chroma y	Chroma u'	Chroma v'	Δ u'v'
55ºC LED Module									
#353	29.55	1.000	2051	99.08	0.4376	0.4040	0.2510	0.5215	0.0004
#340	29.45	1.000	2024	99.36	0.4371	0.4034	0.2510	0.5211	0.0006
#349	29.36	1.000	2042	99.32	0.4366	0.4027	0.2509	0.5208	0.0006
#350	29.55	1.000	2043	98.22	0.4367	0.4033	0.2508	0.5210	0.0006
#351	29.36	1.000	2068	99.23	0.4370	0.4029	0.2511	0.5209	0.0008
#347	29.50	1.000	2064	98.15	0.4398	0.4062	0.2515	0.5226	0.0006
#327	29.42	1.000	2042	98.41	0.4381	0.4047	0.2511	0.5218	0.0007
#352	29.56	1.000	2057	98.52	0.4368	0.4030	0.2509	0.5209	0.0005
#323	29.49	1.000	2058	99.52	0.4411	0.4069	0.2520	0.5231	0.0006
#345	29.53	1.000	2040	99.61	0.4362	0.4023	0.2509	0.5206	0.0007
#322	29.42	1.000	2081	99.24	0.4359	0.4015	0.2510	0.5202	0.0008
#331	29.36	1.000	2075	99.90	0.4413	0.4068	0.2522	0.5231	0.0007
#326	29.42	1.000	2029	98.54	0.4397	0.4052	0.2519	0.5222	0.0006
Average	29.46	1.000	2051.8	99.01	0.4380	0.4041	0.2513	0.5215	0.0006
Minimum	29.36	1.000	2024	98.15	0.4359	0.4015	0.2508	0.5202	0.0004
Maximum	29.56	1.000	2081	99.90	0.4413	0.4069	0.2522	0.5231	0.0008
Median	29.45	1.000	2051	99.23	0.4371	0.4034	0.2510	0.5211	0.0006
S.T. Deviation	0.08	0.000	17.2	0.57	0.0019	0.0018	0.0005	0.0010	0.0001

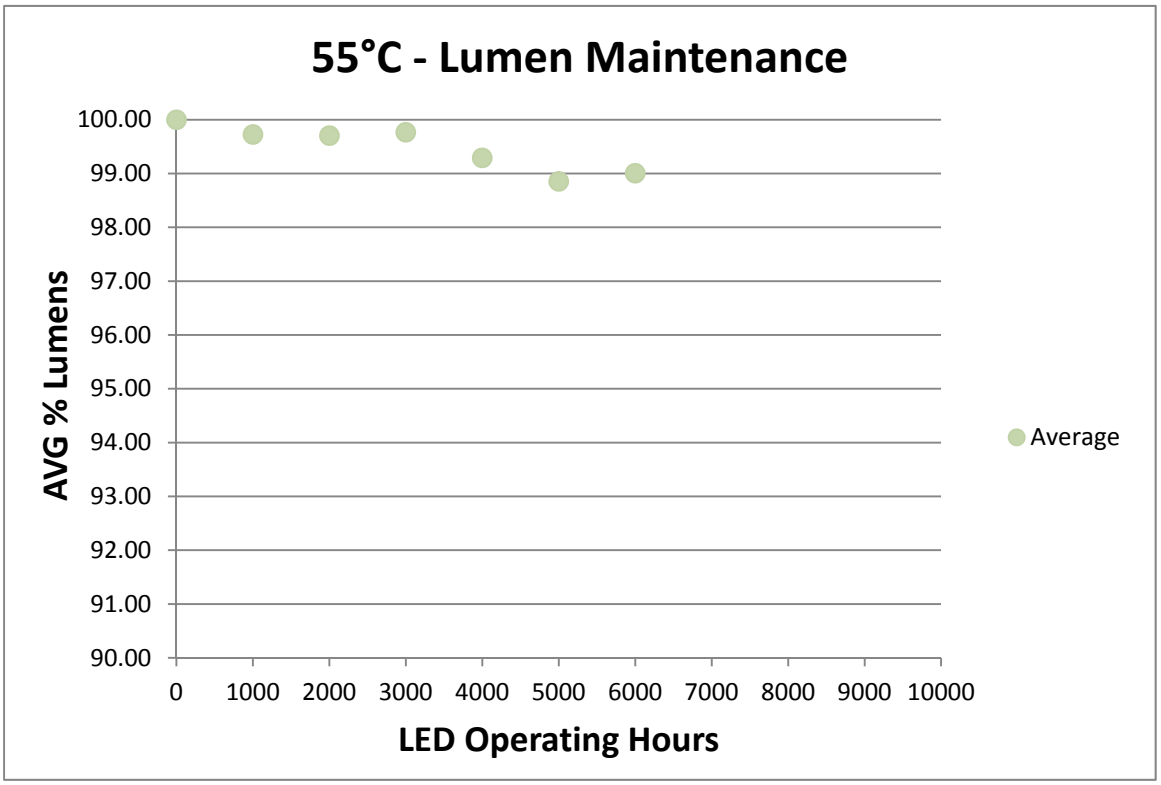
Environmental Conditions	
Relative Humidity	39% - 43%
Ambient Temperature	23˚C
Photometric Measurement Date(s)	2016-12-12 to 13

4 Lumen Maintenance and Chromaticity Shift

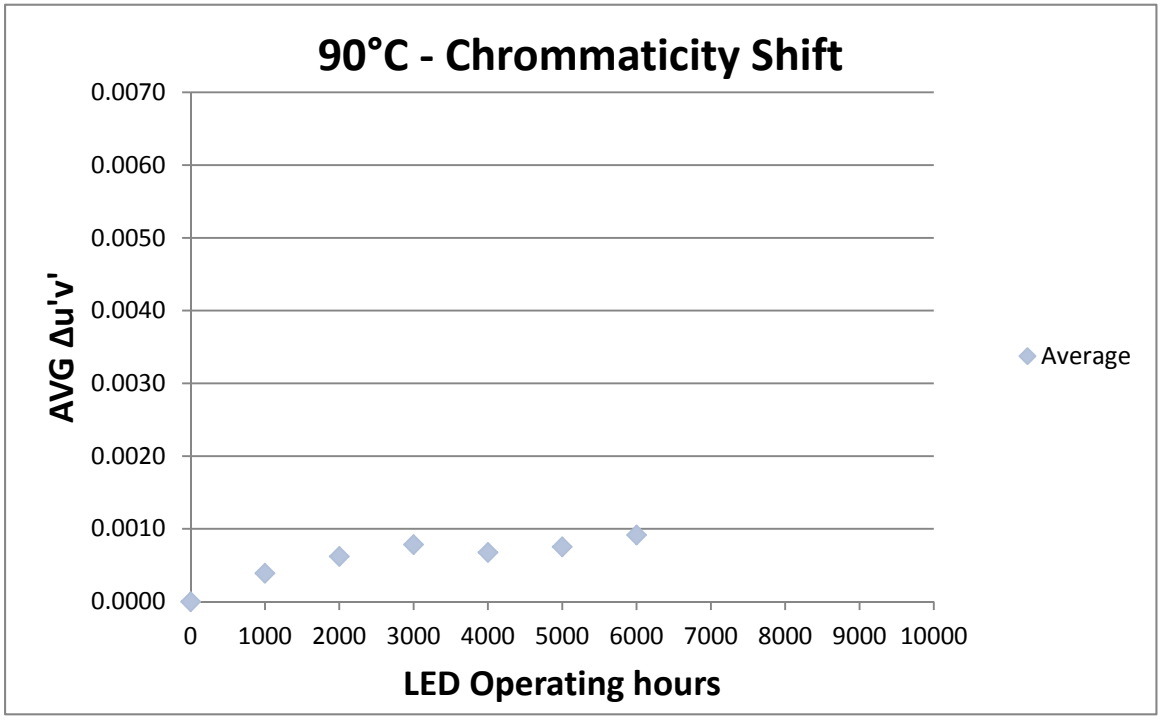
4.1 Lumen Maintenance - 90°C



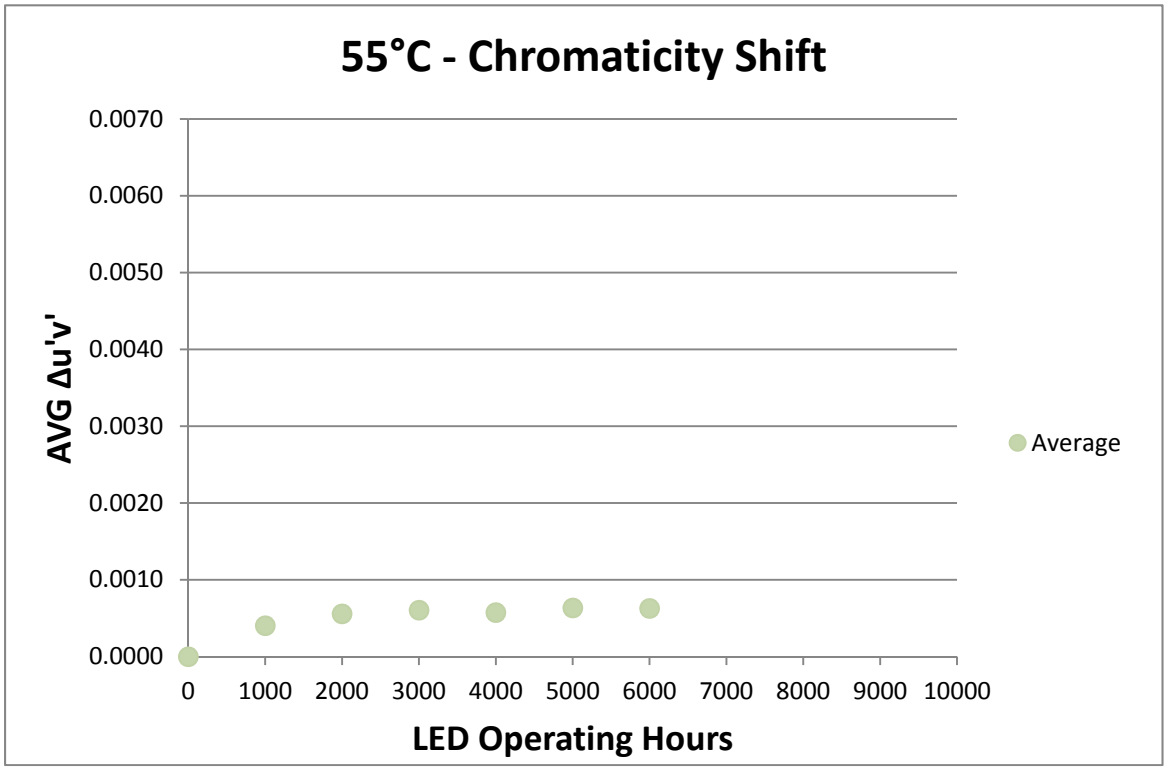
4.2 Lumen Maintenance - 55°C



4.3 Chromaticity Shift - 90°C



4.4 Chromaticity Shift - 55°C



5 LM-21 Lumen Maintenance Projection

TM-21 Inputs

Instructions
Yellow fields are completed by the user. Fields not used should be left blank. Cyan fields are calculated based on user entries. First, enter a description of the LED light source tested. Then complete the fields labeled "LM-80 Testing Details". Test duration must be at least 6,000 hours. If only one case temperature data set is to be used (no interpolation), complete only "Tested case temperature 1". For only two case temperature data sets, complete 1 and 2. Next, further to the right, in the corresponding box(es) for each tested case temperature, enter the test data along with the time (in hours) at which each measurement was taken. Data entered must be normalized then averaged measured data (per TM-21 sections 5.2.1 and 5.2.2). If case temperatures have different test durations, enter data up to the lowest of the test durations for all of the case temperatures. Enter drive current, *in-situ* temperature data and the percentage of initial lumens to project to in the fields labeled "*In-Situ* Inputs". Results can be tailored to estimate lumen maintenance at a specific time by entering a value (t) in the yellow field. A complete TM-21 report will appear on the next tab

LM-80 Test Inputs

Description of LED Light Source Tested (manufacturer, model, catalog number)
Manufacturer: XICATO; Model: XCA09803020CCA

LM-80 Testing Details	
Total number of units tested per case temperature	13
Number of failures:	0
Number of units measured:	13
Test duration (hours):	6000
Tested drive current (mA):	1000
Tested case temperature 1 (T_c, °C):	90
Tested case temperature 2 (T_c, °C):	55
Tested case temperature 3 (T_c, °C):	

Test Data for 90°C Case Temperature		Test Data for 55°C Case Temperature		Tested Case Temperature 3	
Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
0	100.00%	0	100.00%		
1000	99.25%	1000	99.73%		
2000	99.18%	2000	99.71%		
3000	99.07%	3000	99.77%		
4000	98.22%	4000	99.29%		
5000	97.46%	5000	98.85%		
6000	97.61%	6000	99.01%		

In-Situ Inputs

Drive current for each LED package/array/module (mA):	1000
In-situ case temperature (T_c, °C):	70
Percentage of initial lumens to project to (e.g. for L_{70}, enter 70):	70

Results

Time (t) at which to estimate lumen maintenance (hours):	6,000
Lumen maintenance at time (t) (%):	98.36%
Reported L70 (hours):	>33000

Calculations:

Minimum Case Temperature ($T_{s,1}$) for Extrapolation (K):	328.15
α_1	0.0000
B_1	1.0006
Maximum Case Temperature ($T_{s,2}$) for Extrapolation (K):	363.15
α_2	0.0000
B_2	0.9989
E_a/k_b	2612.80
k_b (eV/K)	8.6173E-05
E_a (eV)	2.2515E-01
A	0.0055
B_0	0.9998
In Situ Case Temperature ($T_{s,i}$) (K):	343.15
α_i	0.0000
Reported L70 (hrs):	>33000

Table 1: Report at each LM-80 Test Condition					
Case Temperature 1		Case Temperature 2		Case Temperature 3	
Temperature (°C):	90	Temperature (°C):	55	Temperature (°C):	
Temperature (°K):	363.15	Temperature (°K):	328.15	Temperature (°K):	
α:	4.13E-06	α:	1.92E-06	α:	
B:	1.00	B:	1.00	B:	
Reported L70 (hrs):	>33000	Reported L70 (hrs):	>33000	Reported L70 (hrs):	

Table 2: Report for Interpolation (based on in-situ temperature)

$T_{s,1}$ (°C)	55.00
$T_{s,1}$ (K)	328.15
α_1	1.9154E-06
B_1	1.0006
$T_{s,2}$ (°C)	90.00
$T_{s,2}$ (K)	363.15
α_2	4.1260E-06
B_2	0.9989
E_a/k_b	2.61E+03
A	0.0055
B_0	0.9998
$T_{s,i}$ (°C)	70
$T_{s,i}$ (K)	343.15
α_i	2.7128E-06

TM-21 Report

Table 1: Report at each LM-80 Test Condition

Description of LED Light Source Tested (manufacturer, model, catalog number)	Manufacturer: XICATO; Model: XCA09803020CCA				
Test Condition 1 - 90°C Case Temp		**Test Condition 2 - 55'C Case Temp**			
Sample size	13	Sample size	13	Sample size	-
Number of failures	0	Number of failures	0	Number of failures	-
DUT drive current used in the test (mA)	1000	DUT drive current used in the test (mA)	1000	DUT drive current used in the test (mA)	-
Test duration (hours)	6,000	Test duration (hours)	6,000	Test duration (hours)	-
Test duration used for projection (hour to hour)	1,000 - 6,000	Test duration used for projection (hour to hour)	1,000 - 6,000	Test duration used for projection (hour to hour)	-
Tested case temperature (°C)	90	Tested case temperature (°C)	55	Tested case temperature (°C)	-
α	4.126E-06	α	1.915E-06	α	-
B	0.999	B	1.001	B	-
Reported L70(6k) (hours)	>33000	Reported L70(6k) (hours)	>33000	Reported L70(6k) (hours)	-

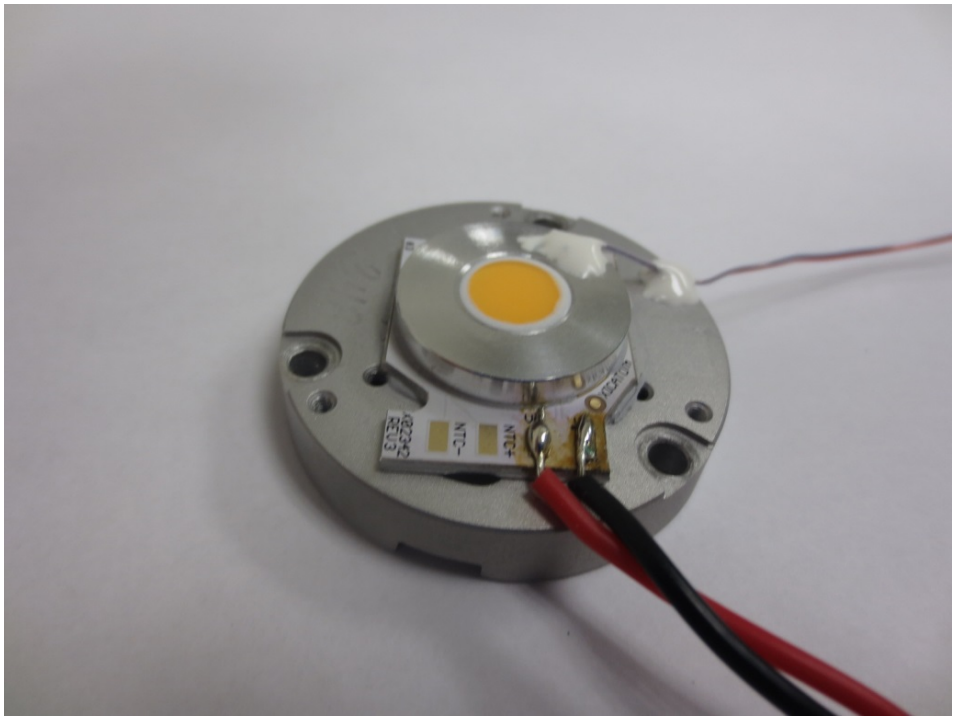
Table 2: Interpolation Report (projection based on *in-situ* temperature entered)

$T_{s,1}$ (°C)	55.00
$T_{s,1}$ (K)	328.15
α_1	1.915E-06
B_1	1.001
$T_{s,2}$ (°C)	90.00
$T_{s,2}$ (K)	363.15
α_2	4.126E-06
B_2	0.999
E_a/k_b	2.61E+03
A	5.498E-03
B_0	1.000
$T_{s,i}$ (°C)	70.00
$T_{s,i}$ (K)	343.15
α_i	2.713E-06
Reported L70(6k) at 70°C (hours)	>33000

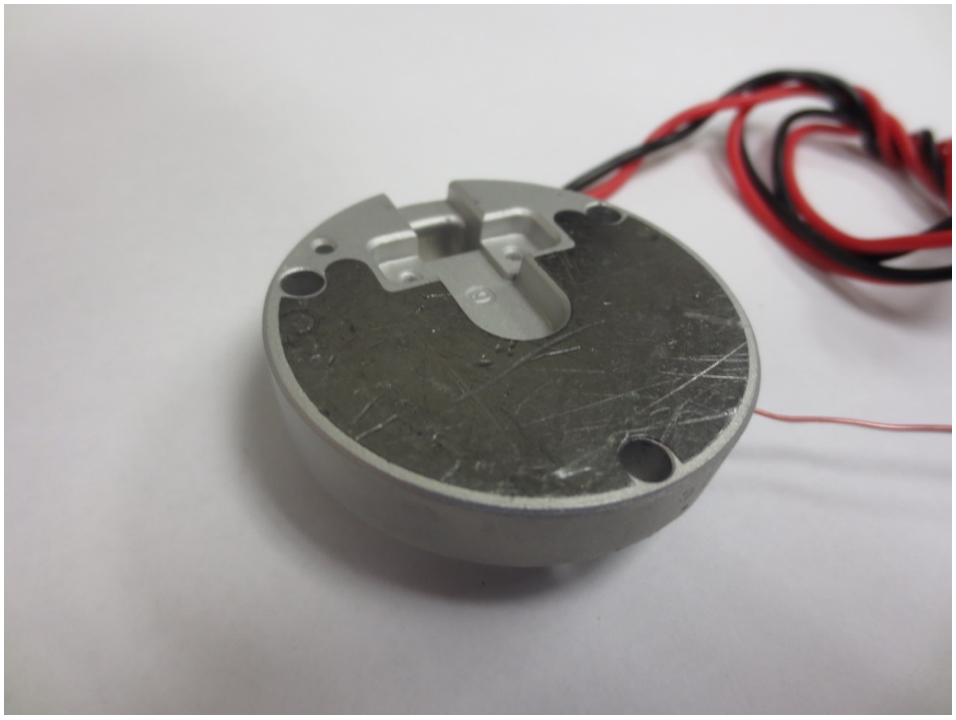
Report Generated By: Thomas Tu	Notes: In-situ Temperature = 70C
Company: Bay Area Compliance Laboratory Corp.	
Date: 03/20/2017	

6 Photographs

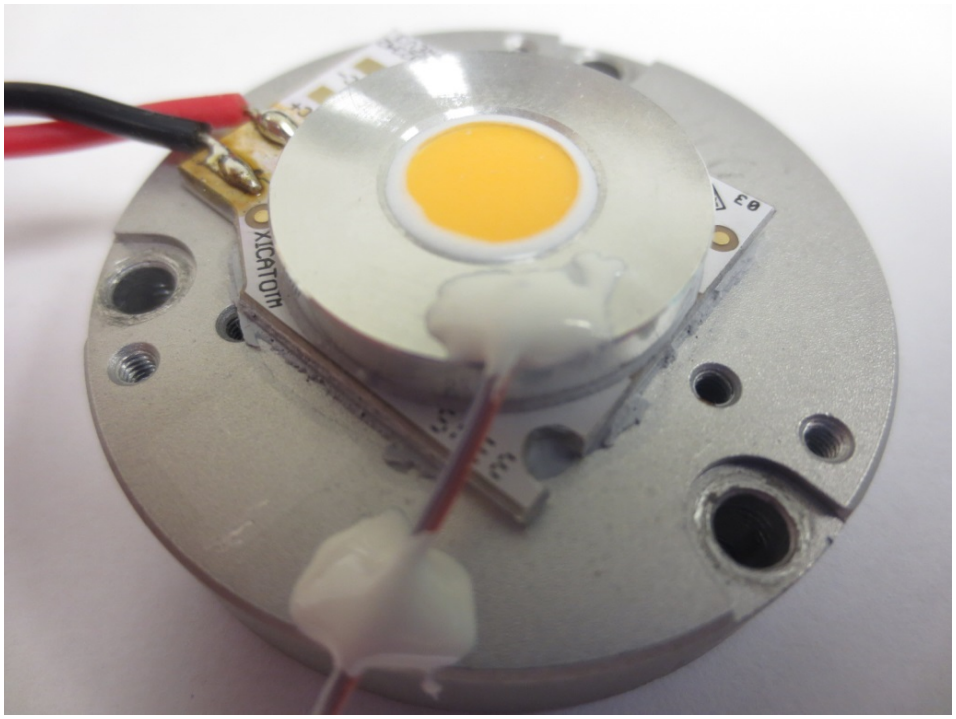
6.1 EUT – Top and Side View



6.2 EUT – Bottom and Side View,



6.3 EUT – Temperature Measurement Point



- End of Report -