



DLC V4.1 TEST REPORT

Applicant's name: P.Q.L., Inc.

Address: 2285 Ward Avenue / Simi Valley, CA 93065

Brand Name.....: Superior Life®

Report No......: BTR66.181.16.0028.13

Product Name.....: WALLPACK FIXTURE

Basic Model: 83367, 83368

Tested by
(printed name and signature): David Zhang 

Title: **Test Engineer**

Approved by
(printed name and signature): Steven Huo 

Title: **Approved Signatory**

Date of issue: Apr 17, 2017

Testing Laboratory Name: BEST Test Service Shenzhen Co., Ltd.

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Accreditation: DLC/Lighting Facts/UL/ETL/ELI/CEC/EPA/DOE
NVLAP Testing Lab Code: 200770-0

Test specification

Standard: DLC V4.1

Test procedure: DLC Test Procedure

Non-standard test method: No

Test Report Form No.: BEST_DLC-V4.1

TRF originator.....: BEST Test Service Shenzhen Co., Ltd. Mr Tseng

Master TRF: BEST_DLC V4.1.doc

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Product description:	
Sample received date	Apr 10, 2017
Sample Quantity	1 pcs per model
Model Number	83367, 83368
Rating(s) (V; Hz)	120-277VAC 50/60HZ
Nominal Power.....	75W
Nominal Power Factor	N/A
Nominal Lumen Output.....	8850lm; 9000lm
Nominal CCT	4000K; 5000K
Nominal CRI(Ra)	≥70
Nominal Life	50000H
Product Classification	<input type="checkbox"/> Premium <input checked="" type="checkbox"/> Standard
Category	<input type="checkbox"/> Indoor <input type="checkbox"/> Indoor Retrofit Kit
	<input checked="" type="checkbox"/> Outdoor <input type="checkbox"/> Outdoor Retrofit Kit
	<input type="checkbox"/> Linear Replacement Lamp <input type="checkbox"/> E39 Replacements for HID Lamps
	<input type="checkbox"/> Four Pin-Base Replacement Lamps for CFLs
General Applicant	Outdoor –Mid Output
Primary use	Outdoor Full-Cutoff Wall-mounted Area Luminaires
Dimmable	<input checked="" type="checkbox"/> Yes, <input type="checkbox"/> No
If Yes, Select Dimming Mechanism ...:	<input checked="" type="checkbox"/> Continuous dimming, <input type="checkbox"/> Step dimming
If Yes, Mini Dimming Level	10%
Integral Controller	<input checked="" type="checkbox"/> Yes, <input type="checkbox"/> No
LED Lighting Source Manufacture	Lumileds
LED Lighting Source Model	LUXEON 3030 2D
LED Driver Brand.....	N/A
LED Driver Model Number.....	N/A
Maximum Recommended Temperature (°C) During Normal Operation	N/A
Fixtures Band (Retrofit Kit/Lamp Only)	N/A
Fixtures Model No. (Retrofit Kit/Lamp Only)	N/A

Test Method Description

ANSI C78.376-2001 Specifications for the Chromaticity of Fluorescent Lamps
ANSI C78.377-2015 Specifications for the Chromaticity of Solid State Lighting Products
ANSI/NEMA/ANSLG C78.377-2011 Specifications for the Chromaticity of Solid State Lighting Products
ANSI C78.5-2003 Specifications for Performance of Self-ballasted Compact Fluorescent Lamps
ANSI/ANSLG C78.81-2010 Double-Capped Fluorescent Lamps—Dimensional and Electrical Characteristics
ANSI C78.901-2014 Single-Based Fluorescent Lamps—Dimensional and Electrical Characteristics
ANSI/ANSLG C81.61-2009 Specifications for Bases (Caps) for Electric Lamps
ANSI/ANSLG C81.62-2009 Lamp holders for Electric Lamps
ANSI C82.11-2011 High-Frequency Fluorescent Lamp Ballasts
ANSI/ANSLG C82.16-2015 (anticipated) Light Emitting Diode Drivers—Methods of Measurement
ANSI C82.2-2002 Method of Measurement of Fluorescent Lamp Ballasts
ANSI C82.77-10:2014 Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
ANSI/IEEE C62.41.1-2002 IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits
ANSI/IEEE C62.41.2-2002 IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000V and Less) AC Power Circuits
ANSI/UL 153-2002 Standard for Safety of Portable Electric Luminaires
ANSI/UL 935-2009 Standard for Safety of Fluorescent-Lamp Ballasts
ANSI/UL 1310-2010 Standard for Safety of Class 2 Power Units
ANSI/UL 1574-2004 Standard for Safety of Track Lighting Systems
ANSI/UL 1598-2008 Standard for Safety of Luminaires
ANSI/UL 1598C Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits
ANSI/UL 1598B-2010 Standard for Supplemental Requirements for Luminaire Reflector Kits for Installation on Previously Installed Fluorescent Luminaires
ANSI/UL 1993-2009 Standard for Safety of Self-Ballasted Lamps and Lamp Adapters
ANSI/UL 2108-2004 Standard for Low-Voltage Lighting Systems
ANSI/UL 8750-2009 Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products
ASTM E283-04 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
CIE Pub. No. 13.3-1995 Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004 Colorimetry
EU Directive 2002/95/EC Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the Restriction of the Use of Certain Hazardous Substances In Electrical and Electronic Equipment
FCC CFR Title 47 Part 15 Radio Frequency Devices
FCC CFR Title 47 Part 18 Industrial, Scientific, and Medical Equipment
IEC 60061-1 (2012) Lamp Caps and Holders Together with Gauges for the Control of Interchangeability and Safety – Part 1: Lamp Caps
IEC 60081 Amend 4 Ed 5.0 (2010) Double-capped Fluorescent Lamps - Performance Specifications
IEC 60901 (2011) Single-capped Fluorescent Lamps - Performance Specifications
IEC 62301 ED.2.0 B:2011 Household electrical appliances - Measurement of standby power
IEC 61347-2-3-am2 ed1.0 b.2011 Amendment 2 - Lamp Control Gear - Part 2-3: Particular Requirements for A.C. Supplied Electronic Ballasts for Fluorescent Lamps
IEC 62321 Ed. 1.0 Electrotechnical Products - Determination Of Levels Of Six Regulated Substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)
IEEE PAR1789 IEEE Recommending Practices for Modulating Current in High Brightness LEDs for Mitigating Health Risks to Viewers
IES LM-9-09 Electric and Photometric Measurements of Fluorescent Lamps
IES LM-10-96 or LM-10-XX Photometric Testing of Outdoor Fluorescent Luminaires (2015 update anticipated)
IES LM-31-95 Photometric Testing of Roadway Luminaires Using Incandescent Filament and High Intensity Discharge (HID) Lamps
IES LM-40-10 Life Testing of Fluorescent Lamps
IES LM-41-14 Approved Method for Photometric Testing of Indoor Fluorescent Luminaires
IES LM-46-04 Photometric Testing of Indoor Luminaires Using High Intensity Discharge or Incandescent Filament Lamps
IES LM-49-12 Life Testing of Incandescent Filament Lamps
IES LM-58-13 Method for Spectroradiometric Measurement Methods for Light Sources
IES LM-65-14 Life Testing of Compact Fluorescent Lamps
IES LM-66-14 Electrical and Photometric Measurements of Single-Ended Compact Fluorescent Lamps
IES LM-79-08 Electrical and Photometric Measurements of Solid-State Lighting Products
IES LM-80-08 Measuring Lumen Maintenance of LED Light Sources
IES LM-82-12 Method for the Characterization of LED Light Engines and Integrated LED Lamps for Electrical and Photometric Properties as a Function of Temperature
IES LM-84-14 Measuring Luminous Flux and Color Maintenance of LED Lamps, Light Engines, and Luminaires
IES RP-16-10 Nomenclature and Definitions for Illuminating Engineering
IES TM-21-11 Projecting Long Term Lumen Maintenance of LED Sources
IES TM-28-14 Projecting Long-Term Luminous Flux Maintenance of LED Lamps and Luminaries
NEMA LL 9-2009 Dimming of T8 Fluorescent Lighting Systems
NEMA LSD 45-2009 Recommendations for Solid State Lighting Sub-Assembly Interfaces for Luminaires
NEMA SSL 7A-2013 Phase Cut Dimming for Solid State Lighting: Basic Compatibility

Initial Photometric and Electrical Test Data

EUT	Input Voltage (V)	Frequency (Hz)	Input Current (A)	ITHD	Input Power (W)	Power Factor	Lumen Output (Lumens)	Efficiency Lumen/w
83367	120.0	60.0	0.676	9.6%	80.38	0.991	9557.06	118.90
83367	277.0	60.0	0.298	13.8%	79.26	0.959	/	/

EUT	CCT (K)	CRI Ra	R9	x CIE1931	y CIE1931
83367	4003	73.3	-20	0.3788	0.3711
83368	5171	72.0	95	0.3403	0.3448

EUT	u' CIE1976	v' CIE1976	Duv	Rf	Rg
83367	0.2263	0.4988	-0.0022	71	95
83368	0.2108	0.4806	-0.0015	72	95

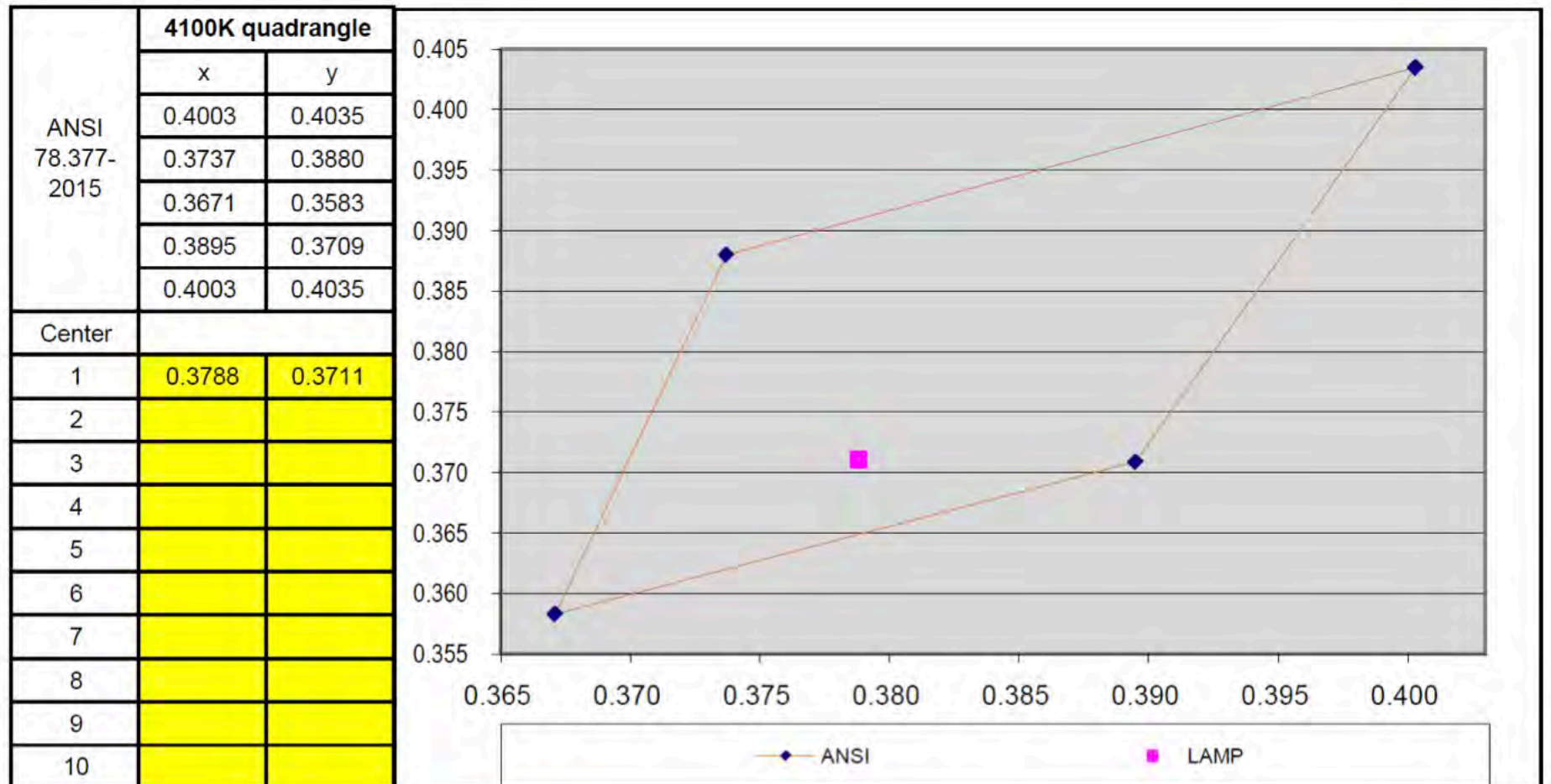
EUT	Zonal Lumen Density zone (0-90°)	Zonal Lumen Density zone (80-90°)*
83367	100.0%	0.7%

Note:

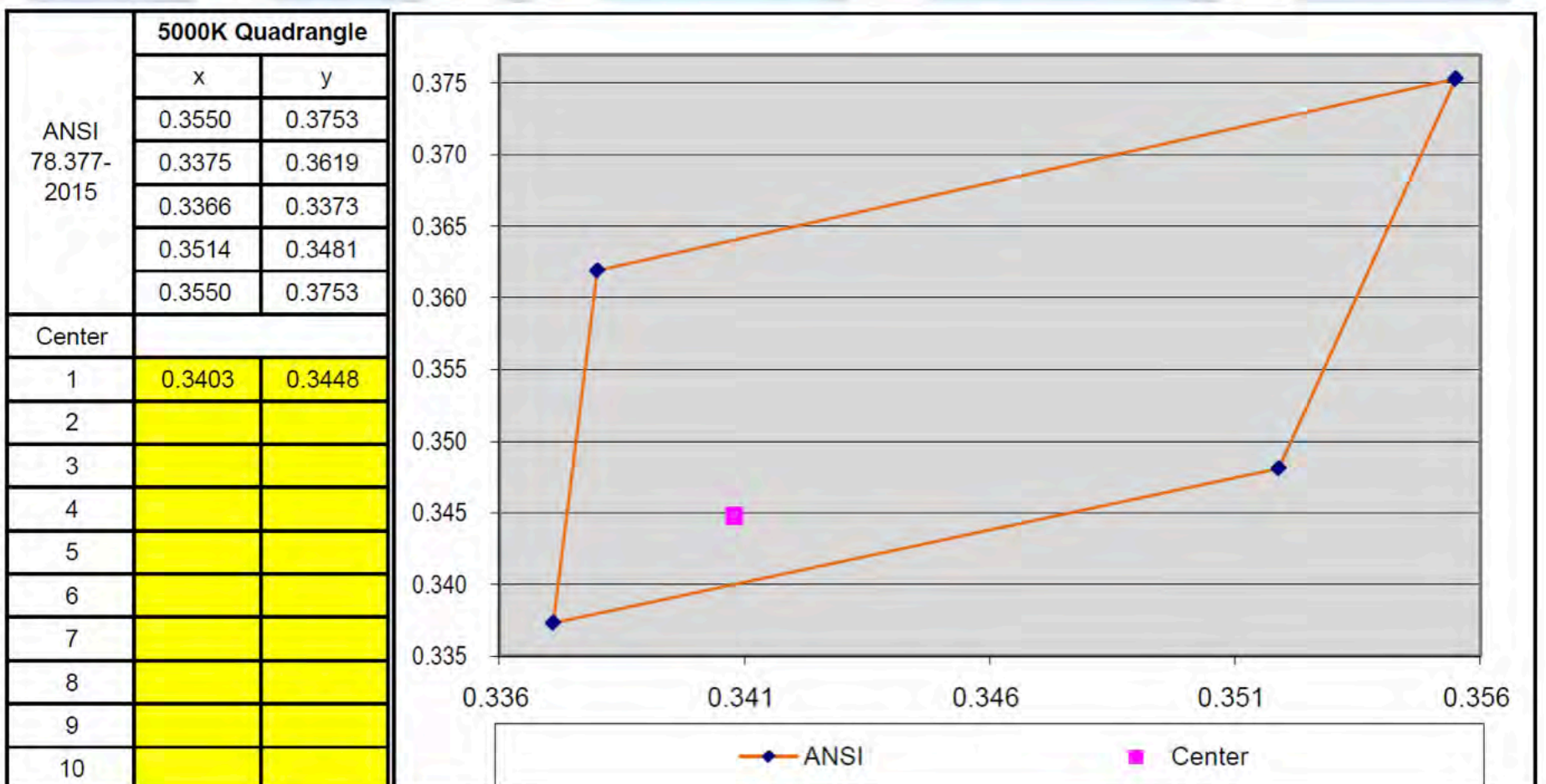
1. See the annex of Luminous Intensity Distribution Test Plots

7 Step Quadrangle

83367



83368



Spectral Energy Distribution

83367

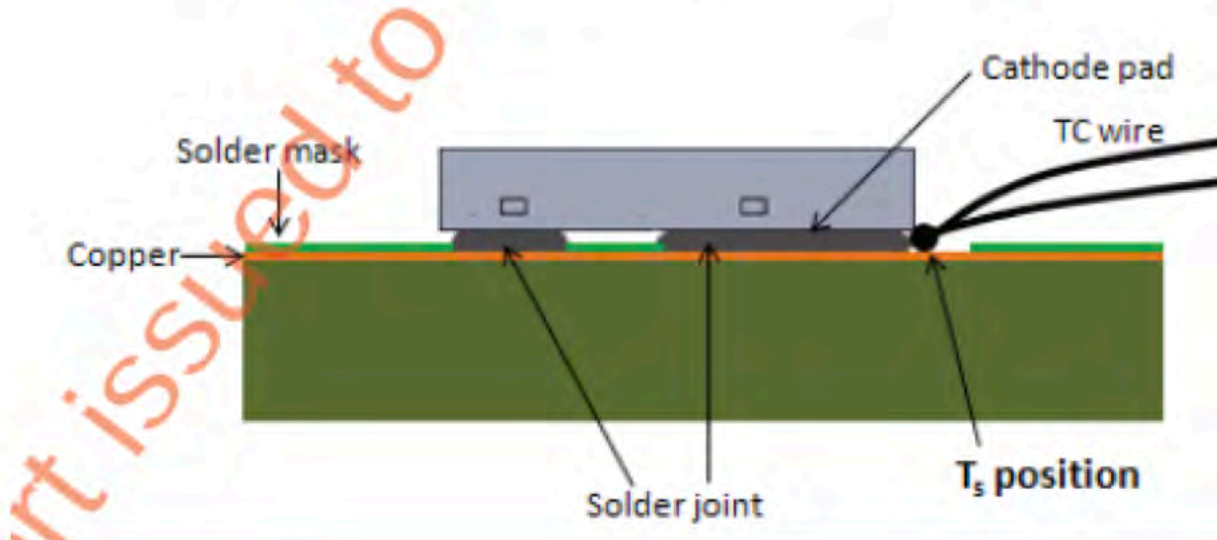
WL(nm)	Spectrum	Spectrum	WL(nm)	Spectrum	Spectrum
380	0.0215	3.5510	585	0.8649	142.9000
385	0.0155	2.5600	590	0.8592	141.9000
390	0.0105	1.7270	595	0.8443	139.5000
395	0.0094	1.5470	600	0.8211	135.6000
400	0.0094	1.5530	605	0.7896	130.4000
405	0.0140	2.3130	610	0.7546	124.7000
410	0.0254	4.1950	615	0.7117	117.6000
415	0.0521	8.6020	620	0.6668	110.2000
420	0.1011	16.7100	625	0.6205	102.5000
425	0.1740	28.7400	630	0.5713	94.3700
430	0.2838	46.8800	635	0.5220	86.2300
435	0.4406	72.7800	640	0.4751	78.4800
440	0.6454	106.6000	645	0.4286	70.8000
445	0.8951	147.9000	650	0.3838	63.4000
450	0.9906	163.6000	655	0.3438	56.7900
455	0.7311	120.8000	660	0.3052	50.4200
460	0.4623	76.3700	665	0.2702	44.6400
465	0.3276	54.1200	670	0.2379	39.3000
470	0.2278	37.6200	675	0.2083	34.4100
475	0.1590	26.2700	680	0.1830	30.2400
480	0.1331	21.9900	685	0.1602	26.4600
485	0.1297	21.4300	690	0.1404	23.1900
490	0.1448	23.9200	695	0.1223	20.2100
495	0.1831	30.2500	700	0.1065	17.6000
500	0.2390	39.4800	705	0.0922	15.2400
505	0.3049	50.3600	710	0.0803	13.2600
510	0.3756	62.0400	715	0.0695	11.4800
515	0.4416	72.9400	720	0.0605	9.9930
520	0.5000	82.6000	725	0.0526	8.6910
525	0.5506	90.9500	730	0.0455	7.5120
530	0.5936	98.0600	735	0.0394	6.5050
535	0.6325	104.5000	740	0.0341	5.6310
540	0.6674	110.3000	745	0.0301	4.9790
545	0.7003	115.7000	750	0.0261	4.3190
550	0.7312	120.8000	755	0.0227	3.7580
555	0.7637	126.2000	760	0.0202	3.3400
560	0.7924	130.9000	765	0.0175	2.8940
565	0.8181	135.1000	770	0.0155	2.5610
570	0.8402	138.8000	775	0.0135	2.2330
575	0.8548	141.2000	780	0.0126	2.0840
580	0.8649	142.9000			

WL(nm)	Spectrum	Spectrum	WL(nm)	Spectrum	Spectrum
380	0.0208	4.8250	585	0.5705	132.5000
385	0.0157	3.6520	590	0.5567	129.3000
390	0.0094	2.1900	595	0.5397	125.3000
395	0.0079	1.8370	600	0.5190	120.5000
400	0.0079	1.8430	605	0.4946	114.9000
405	0.0108	2.5000	610	0.4674	108.6000
410	0.0200	4.6550	615	0.4372	101.5000
415	0.0398	9.2420	620	0.4067	94.4500
420	0.0786	18.2500	625	0.3759	87.2900
425	0.1410	32.7600	630	0.3445	80.0000
430	0.2330	54.1100	635	0.3132	72.7300
435	0.3644	84.6300	640	0.2831	65.7400
440	0.5511	128.0000	645	0.2547	59.1500
445	0.8132	188.9000	650	0.2277	52.8800
450	0.9998	232.2000	655	0.2032	47.1800
455	0.8277	192.2000	660	0.1804	41.8900
460	0.5293	122.9000	665	0.1592	36.9800
465	0.3680	85.4500	670	0.1410	32.7400
470	0.2587	60.0700	675	0.1231	28.5800
475	0.1760	40.8700	680	0.1085	25.2000
480	0.1366	31.7200	685	0.0944	21.9100
485	0.1249	29.0000	690	0.0825	19.1600
490	0.1315	30.5300	695	0.0719	16.7000
495	0.1592	36.9700	700	0.0626	14.5300
500	0.2055	47.7300	705	0.0542	12.5800
505	0.2612	60.6600	710	0.0476	11.0600
510	0.3218	74.7300	715	0.0411	9.5490
515	0.3765	87.4300	720	0.0358	8.3030
520	0.4242	98.5200	725	0.0311	7.2130
525	0.4614	107.2000	730	0.0270	6.2590
530	0.4908	114.0000	735	0.0236	5.4690
535	0.5125	119.0000	740	0.0202	4.7020
540	0.5298	123.0000	745	0.0179	4.1530
545	0.5444	126.4000	750	0.0155	3.6000
550	0.5551	128.9000	755	0.0135	3.1320
555	0.5641	131.0000	760	0.0120	2.7900
560	0.5732	133.1000	765	0.0106	2.4590
565	0.5787	134.4000	770	0.0091	2.1170
570	0.5821	135.2000	775	0.0081	1.8780
575	0.5829	135.4000	780	0.0076	1.7700
580	0.5782	134.3000			

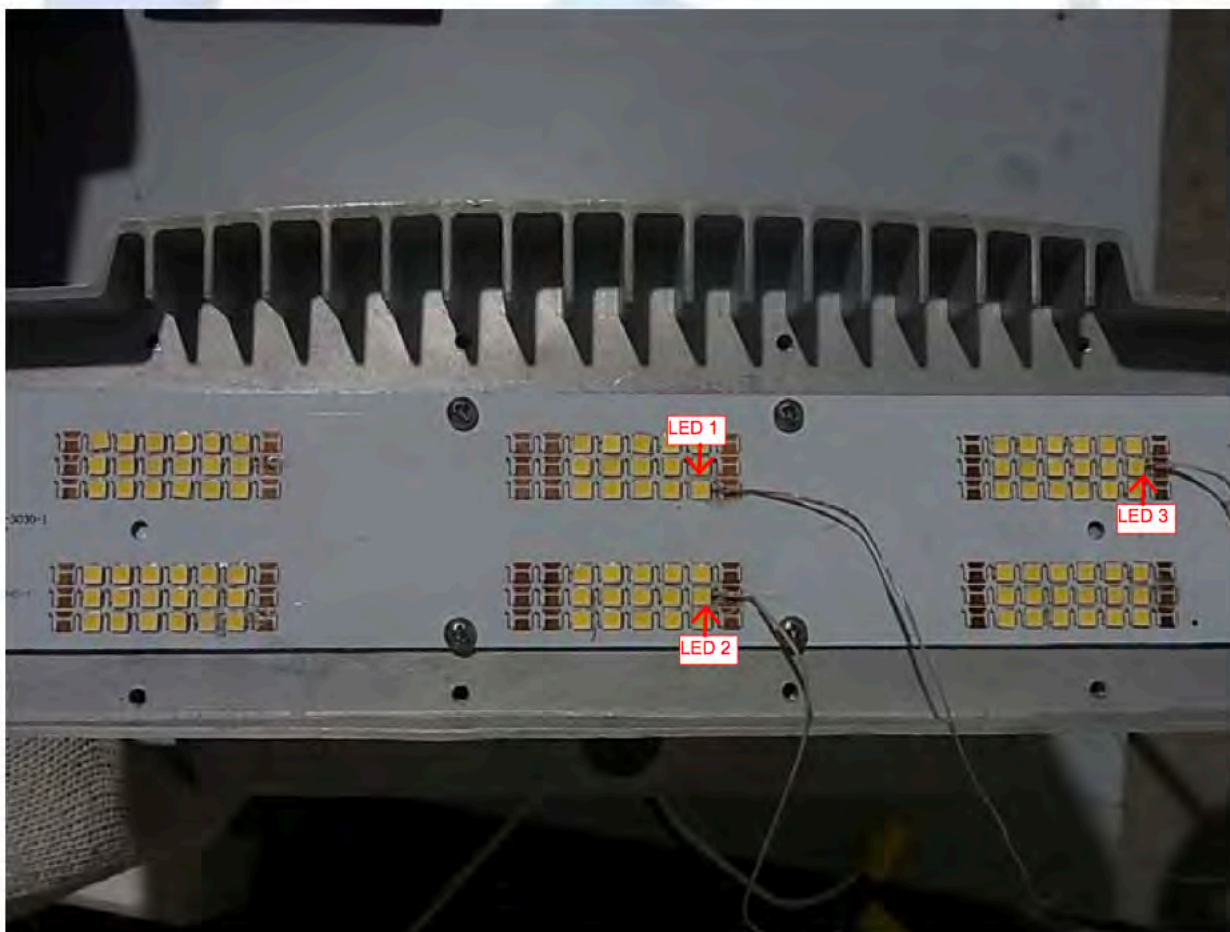
Driver Case Temperature/ LED Drive Current/TMP_{LED} Test Data

EUT	Driver Max Tc (°C)	Driver In-Situ Temperature (°C)	LED In-Situ Current (mA)	LED In-Situ Temperature (°C)(1#)	LED In-Situ Temperature (°C)(2#)	LED In-Situ Temperature (°C)(3#)
83367	N/A	N/A	130.0	72.3	72.0	69.4

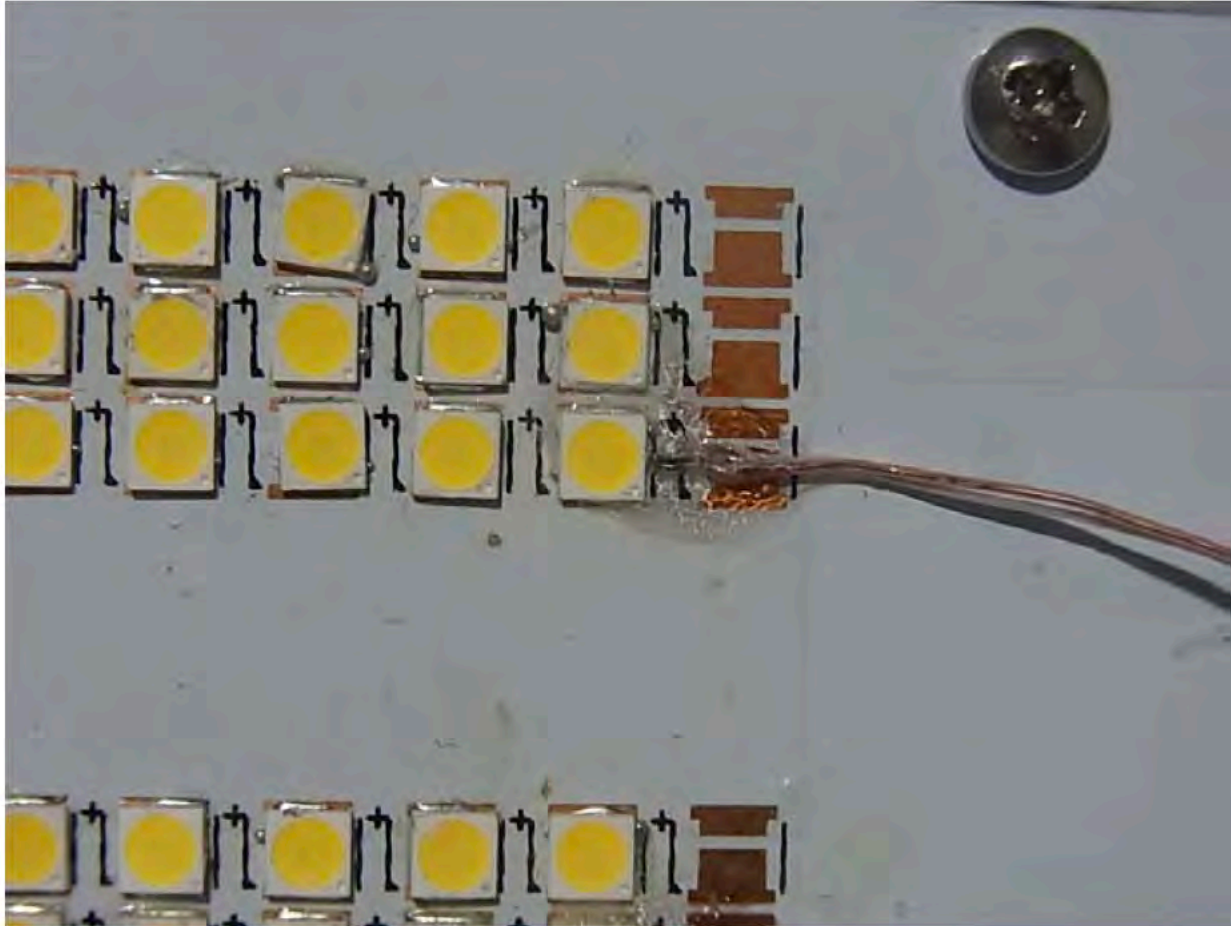
LED Lighting Source Temperature Measurement Point in LM-80 Report



LED Lighting Source In Situ Temperature Measurement




TOP: LED 1



Lumen Maintenance and Lighting Source Life Test Data

L70



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 labeled "Report".

Description of LED Light Source Tested
(manufacturer, model, catalog number)

Lumileds LUXEON 3030 2D

LM-80 Testing Details

Total number of units tested per case temperature:	20
Number of failures:	0
Number of units measured:	20
Test duration (hours):	9000
Tested drive current (mA):	165
Tested case temperature 1 (T _c , °C):	55
Tested case temperature 2 (T _c , °C):	85
Tested case temperature 3 (T _c , °C):	105

Test Data for 55°C Case Temperature	
Time (hours)	Lumen Maintenance (%)
1000	99.18%
2000	98.66%
3000	98.49%
4000	97.91%
5000	97.58%
6000	97.18%
7000	96.66%
8000	96.56%
9000	96.30%

Test Data for 85°C Case Temperature	
Time (hours)	Lumen Maintenance (%)
1000	98.98%
2000	98.21%
3000	97.84%
4000	97.15%
5000	96.76%
6000	96.36%
7000	95.94%
8000	95.99%
9000	95.53%

Test Data for 105°C Case Temperature	
Time (hours)	Lumen Maintenance (%)
1000	98.84%
2000	98.00%
3000	97.50%
4000	96.62%
5000	96.24%
6000	95.70%
7000	95.33%
8000	95.45%
9000	94.81%

In-Situ Inputs

Drive current for each LED package/array/module (mA):	130
<i>In-situ</i> case temperature (T _c , °C):	72.3
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):	50,000
Lumen maintenance at time (t) (%):	83.76%
Reported L70 (hours):	>54000

EUT Photos

