



DLC V4.2 TEST REPORT

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

Address : 2285 Ward Avenue Simi Valley, CA 93065

Brand Name.....: Superior Life®

Report No.: BTR66.181.17.0020.19

Product Name.....: WALL PACK FIXTURE

Basic Model: 83328

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: Feb 01, 2018

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

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TEL: + 86-755-28236006; FAX: + 86-755-23467087
Email: certification@bestcert.cn

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

Test specification

Standard: DLC V4.2

Test procedure: DLC Test Procedure

Non-standard test method: No

Test Report Form No.: BEST_DLC-V4.2

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

Master TRF: BEST_DLC V4.2.doc

Note:

The laboratory has not been responsible for the sampling stage (e.g. the sample has been provided by the customer), it shall state in the report that the results apply to the sample as received.

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Product description:	
The date of sampling	Jan 22, 2018
The date of receipt of the test sample / requirement /item(s).....	Jan 22, 2018
Test Date	Jan 22, 2018 to Feb 01, 2018
Sample Quantity	1 pcs per model
Model Number	83328_50K 833XX_40K
Rating(s) (V; Hz).....	AC 120V-277V
Nominal Power	25W
Nominal Power Factor	N/A
Nominal Lumen Output.....	2900lm; 2930lm
Nominal CCT	4000K; 5000K
Nominal CRI(Ra)	≥80
Nominal Life	50000H
Product Classification	<input checked="" type="checkbox"/> Premium <input 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 –Low Output
Primary use.....	Outdoor Non-Cutoff and Semi-Cutoff Wall-mounted Area Luminaires
Dimmable for -09 models	<input type="checkbox"/> Yes, <input checked="" type="checkbox"/> No
Dimmable for -01 models	<input checked="" type="checkbox"/> Yes, <input type="checkbox"/> No
If Yes, Select Dimming Mechanism for -01 models	<input checked="" type="checkbox"/> Continuous dimming, <input type="checkbox"/> Step dimming
If Yes, Mini Dimming Level for -01 models	10%
Integral Controller for -09 models	<input type="checkbox"/> Yes, <input checked="" type="checkbox"/> No
Integral Controller for -01 models	<input checked="" type="checkbox"/> Yes, <input type="checkbox"/> No
LED Lighting Source Manufacture.....	Lumileds
LED Lighting Source Model.....	LUMILEDS 3030 2D
LED Driver Brand.....	Longbright
LED Driver Model Number	PFU28S-40
Maximum Recommended Temperature (°C) During Normal Operation	65

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 Luminaires
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
833XX_40K	120.0	60.0	0.200	9.8%	23.77	0.990	2957.14	124.41
833XX_40K	277.0	60.0	0.092	11.4%	23.17	0.907	/	/
83328	120.0	60.0	0.212	10.1%	24.78	0.975	/	/
83328	277.0	60.0	0.097	10.8%	24.21	0.901	/	/

EUT	CCT (K)	CRI Ra	R9	x CIE1931	y CIE1931
833XX_40K	4193	83.5	14	0.3724	0.3719
83328	5238	82.4	9	0.3390	0.3523

EUT	u' CIE1976	v' CIE1976	Duv	Rf	Rg
833XX_40K	0.2217	0.4982	0.0002	82	95
83328	0.2071	0.4841	0.0028	81	95

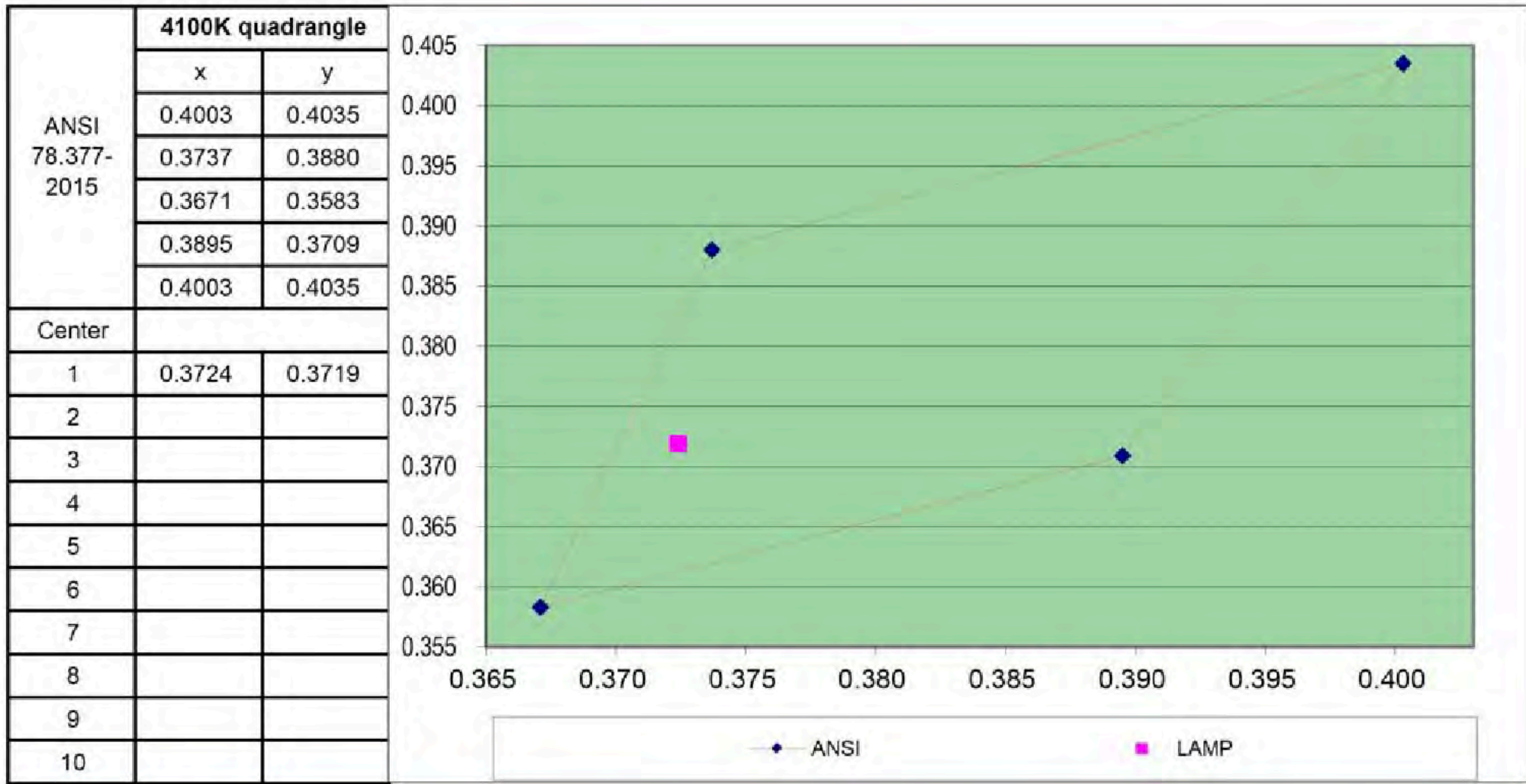
EUT	Lumen Output (Lumens)*	Efficiency (Lumen/w)*	Zonal Lumen Density zone (80-90°)
833XX_40K	2582	108.62 (-3% tolerance)	11.34% (3% tolerance)

Note:

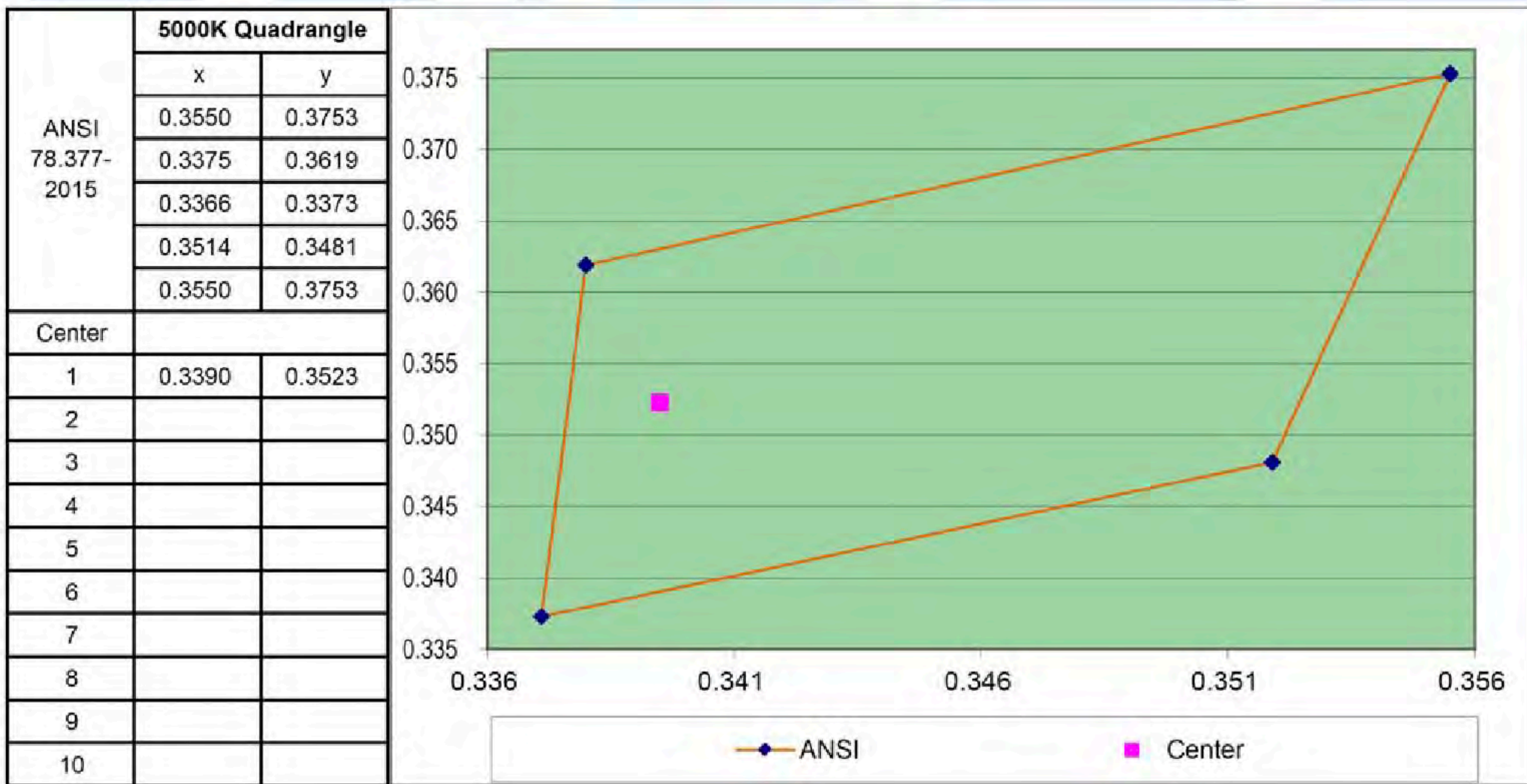
- * evaluated based on the lumens in the 0-90° zone
- See the annex of Luminous Intensity Distribution Test Plots

7 Step Quadrangle

833XX_40K



83328



Spectral Energy Distribution

833XX_40K

WL(nm)	Spectrum	Spectrum	WL(nm)	Spectrum	Spectrum
380	0.0185	0.9150	585	0.7903	39.1300
385	0.0128	0.6331	590	0.7967	39.4500
390	0.0095	0.4683	595	0.7978	39.5000
395	0.0076	0.3758	600	0.7921	39.2200
400	0.0072	0.3567	605	0.7784	38.5400
405	0.0080	0.3973	610	0.7578	37.5200
410	0.0121	0.5986	615	0.7303	36.1600
415	0.0207	1.0250	620	0.6963	34.4800
420	0.0368	1.8230	625	0.6563	32.5000
425	0.0655	3.2450	630	0.6126	30.3300
430	0.1145	5.6700	635	0.5661	28.0300
435	0.1999	9.8970	640	0.5177	25.6300
440	0.3454	17.1000	645	0.4698	23.2600
445	0.5949	29.4600	650	0.4228	20.9400
450	0.9077	44.9500	655	0.3792	18.7800
455	0.9741	48.2400	660	0.3369	16.6800
460	0.7246	35.8800	665	0.2992	14.8100
465	0.5394	26.7100	670	0.2642	13.0800
470	0.4321	21.4000	675	0.2326	11.5200
475	0.3278	16.2300	680	0.2039	10.1000
480	0.2729	13.5100	685	0.1786	8.8420
485	0.2681	13.2800	690	0.1561	7.7280
490	0.2855	14.1400	695	0.1359	6.7320
495	0.3211	15.9000	700	0.1179	5.8360
500	0.3725	18.4400	705	0.1020	5.0520
505	0.4262	21.1000	710	0.0882	4.3660
510	0.4742	23.4800	715	0.0760	3.7620
515	0.5162	25.5600	720	0.0657	3.2530
520	0.5447	26.9700	725	0.0566	2.8030
525	0.5770	28.5700	730	0.0487	2.4120
530	0.6041	29.9200	735	0.0422	2.0880
535	0.6257	30.9800	740	0.0364	1.8020
540	0.6450	31.9400	745	0.0314	1.5540
545	0.6640	32.8800	750	0.0272	1.3470
550	0.6827	33.8100	755	0.0235	1.1660
555	0.7014	34.7300	760	0.0206	1.0210
560	0.7200	35.6500	765	0.0178	0.8815
565	0.7371	36.5000	770	0.0155	0.7652
570	0.7539	37.3300	775	0.0135	0.6674
575	0.7685	38.0500	780	0.0124	0.6153
580	0.7814	38.6900			

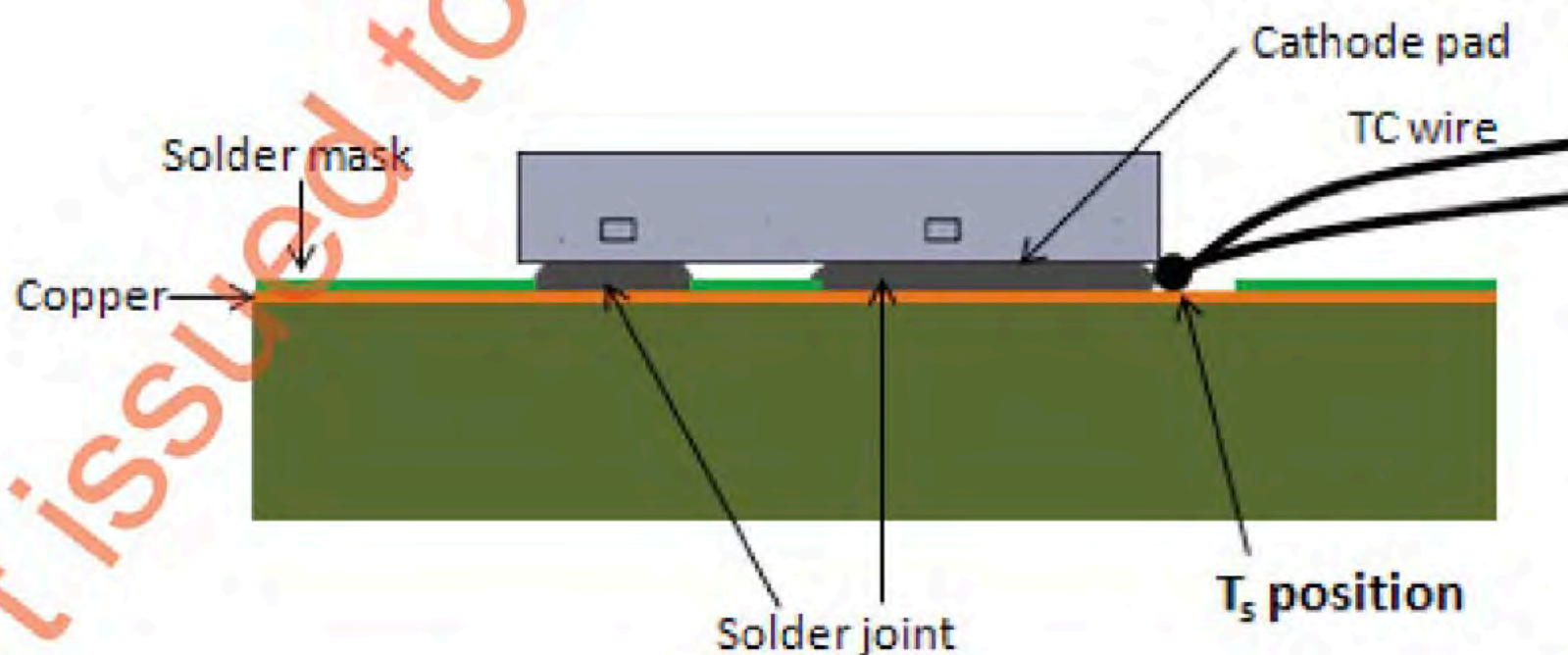
83328

WL(nm)	Spectrum	Spectrum	WL(nm)	Spectrum	Spectrum
380	0.0198	1.3660	585	0.5703	39.3800
385	0.0131	0.9070	590	0.5641	38.9500
390	0.0088	0.6084	595	0.5555	38.3600
395	0.0071	0.4892	600	0.5434	37.5300
400	0.0065	0.4505	605	0.5277	36.4400
405	0.0079	0.5469	610	0.5077	35.0600
410	0.0123	0.8519	615	0.4846	33.4600
415	0.0224	1.5460	620	0.4581	31.6300
420	0.0422	2.9140	625	0.4291	29.6300
425	0.0789	5.4460	630	0.3980	27.4800
430	0.1454	10.0400	635	0.3657	25.2500
435	0.2569	17.7400	640	0.3329	22.9900
440	0.4533	31.3000	645	0.3009	20.7800
445	0.7728	53.3700	650	0.2703	18.6600
450	0.9968	68.8300	655	0.2415	16.6800
455	0.8396	57.9800	660	0.2146	14.8200
460	0.5951	41.0900	665	0.1901	13.1300
465	0.4632	31.9900	670	0.1678	11.5900
470	0.3486	24.0700	675	0.1477	10.2000
475	0.2654	18.3200	680	0.1297	8.9560
480	0.2361	16.3100	685	0.1135	7.8380
485	0.2374	16.3900	690	0.0991	6.8460
490	0.2576	17.7900	695	0.0865	5.9740
495	0.2958	20.4300	700	0.0751	5.1860
500	0.3433	23.7100	705	0.0651	4.4970
505	0.3897	26.9100	710	0.0563	3.8850
510	0.4293	29.6400	715	0.0486	3.3560
515	0.4624	31.9300	720	0.0419	2.8970
520	0.4831	33.3600	725	0.0362	2.5000
525	0.5063	34.9600	730	0.0312	2.1560
530	0.5244	36.2100	735	0.0268	1.8520
535	0.5375	37.1100	740	0.0231	1.5950
540	0.5481	37.8500	745	0.0200	1.3780
545	0.5568	38.4500	750	0.0172	1.1910
550	0.5647	39.0000	755	0.0150	1.0330
555	0.5710	39.4300	760	0.0130	0.8999
560	0.5758	39.7600	765	0.0113	0.7792
565	0.5783	39.9400	770	0.0098	0.6757
570	0.5791	39.9900	775	0.0086	0.5918
575	0.5779	39.9100	780	0.0078	0.5414
580	0.5752	39.7200			

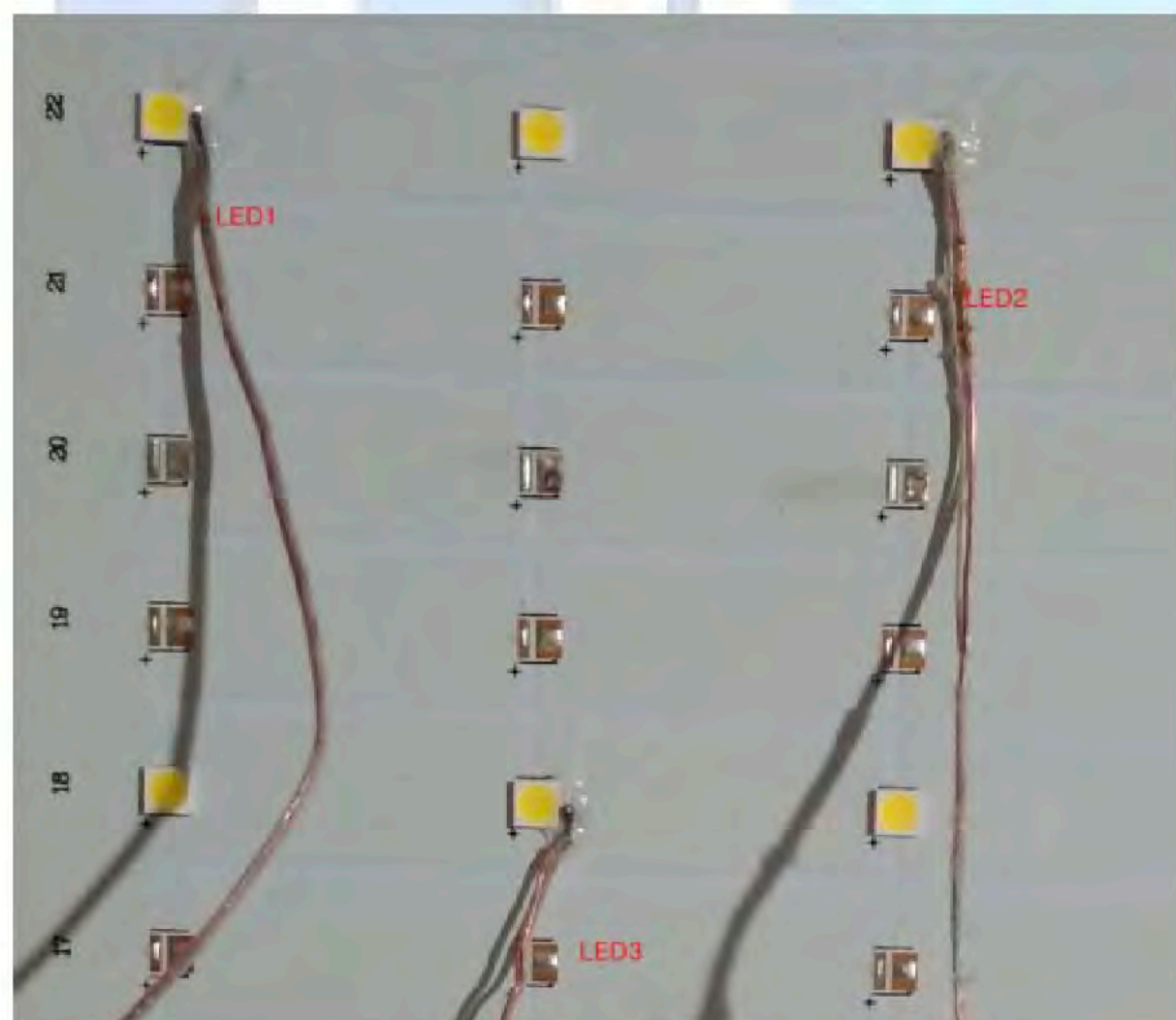
Driver Case Temperature/ LED Drive Current/TMP_{LED} Test Data

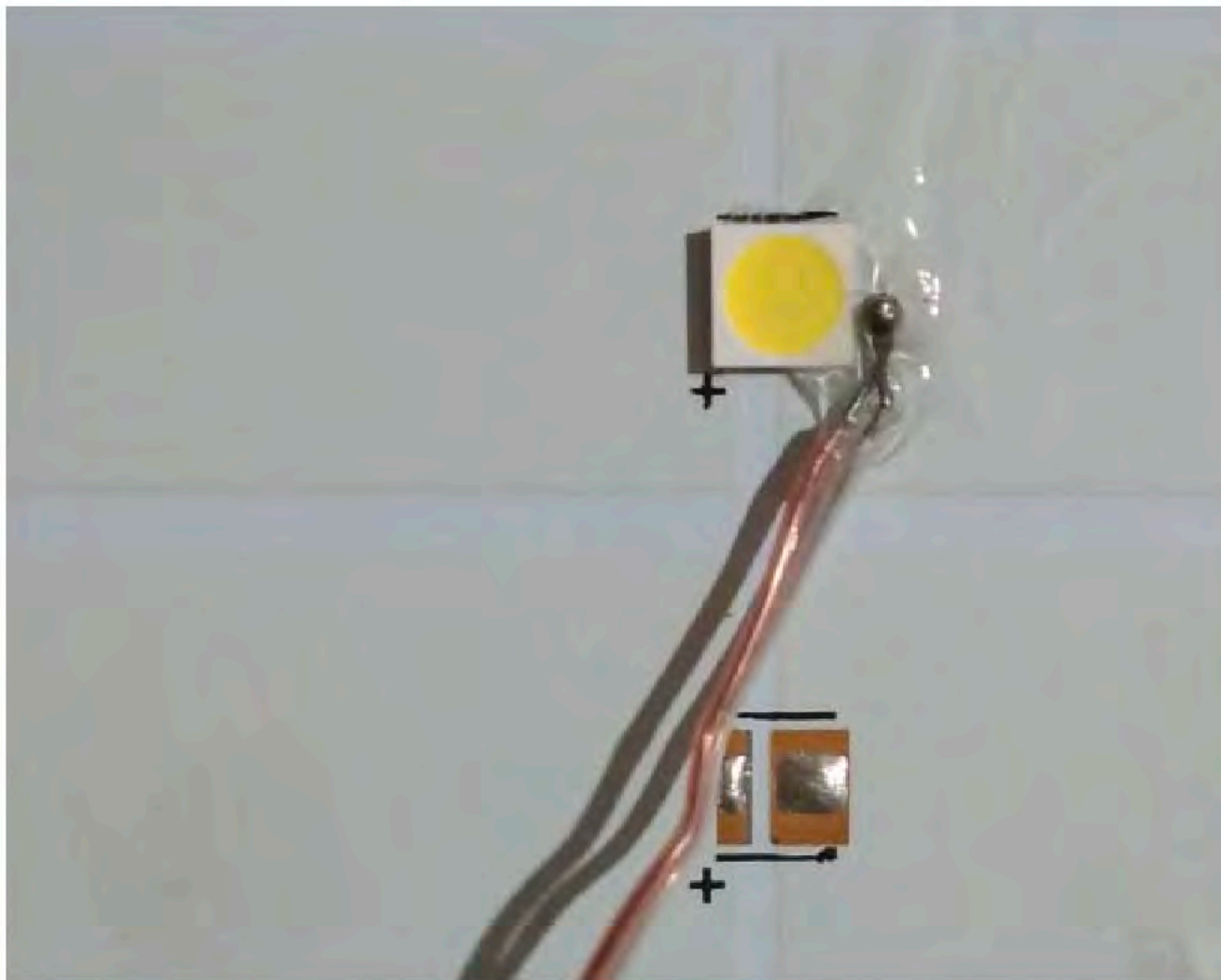
EUT	Driver Max Tc (°C)	Driver In-Situ Temperature (°C)	LED In-Situ Current (mA)	LED In-Situ Temperature (°C)(1#)	LED In-Situ Temperature (°C)(2#)	LED In-Situ Temperature (°C)(3#)
833XX_40K	65	54.5	115.2	53.9	55.1	55.3

LED Lighting Source Temperature Measurement Point in LM-80 Report

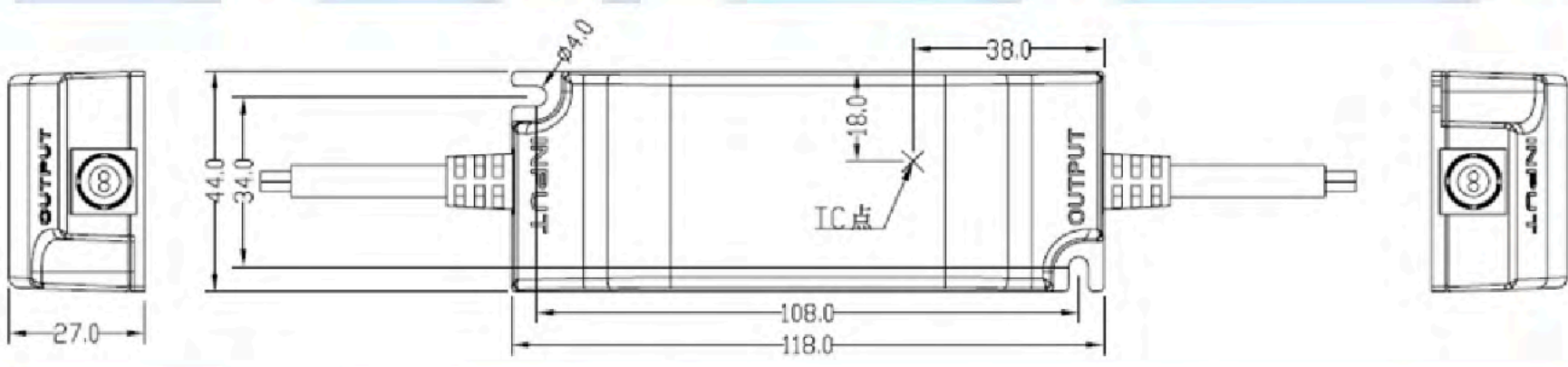


LED Lighting Source In Situ Temperature Measurement

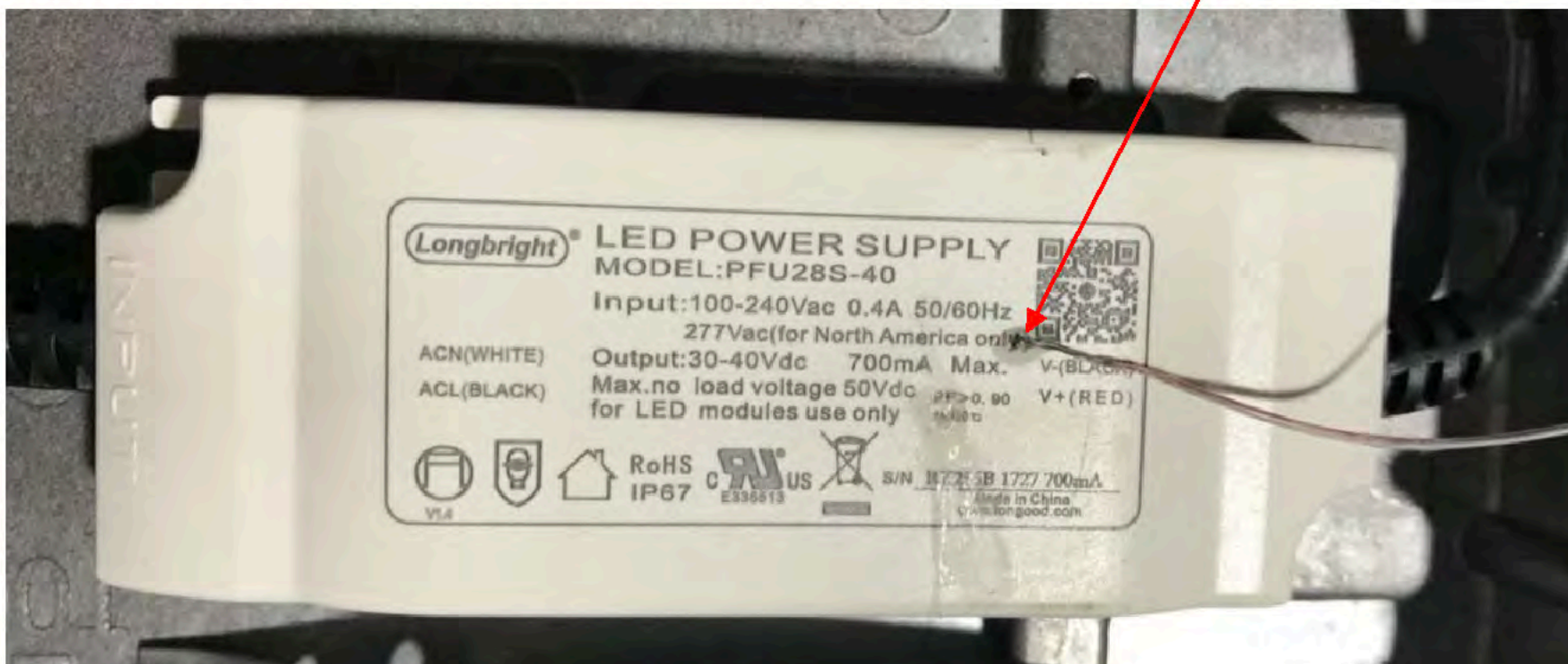




LED Driver Hot Spot Location and TC




LED Driver Hot Spot In-Situ Temperature Measurement



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:	25
Number of failures:	0
Number of units measured:	25
Test duration (hours):	6000
Tested drive current (mA):	120
Tested case temperature 1 (T _c , °C):	105
Tested case temperature 2 (T _c , °C):	
Tested case temperature 3 (T _c , °C):	

Test Data for 105°C Case Temperature	
Time (hours)	Lumen Maintenance (%)
1000	99.90%
2000	99.60%
3000	99.40%
4000	99.20%
5000	99.00%
6000	98.70%

Tested Case Temperature 2	
Time (hours)	Lumen Maintenance (%)
1000	
2000	
3000	
4000	
5000	
6000	

Tested Case Temperature 3	
Time (hours)	Lumen Maintenance (%)
1000	
2000	
3000	
4000	
5000	
6000	


In-Situ Inputs

Drive current for each LED package/array/module (mA):	115.2
<i>In-situ</i> case temperature (T _a , °C):	55.3
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) (%):	89.22%
Reported L70 (hours):	>36000

L90



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:	25
Number of failures:	0
Number of units measured:	25
Test duration (hours):	6000
Tested drive current (mA):	120
Tested case temperature 1 (T _c , °C):	105
Tested case temperature 2 (T _c , °C):	
Tested case temperature 3 (T _c , °C):	

Test Data for 105°C Case Temperature	
Time (hours)	Lumen Maintenance (%)
1000	99.90%
2000	99.60%
3000	99.40%
4000	99.20%
5000	99.00%
6000	98.70%

Tested Case Temperature 2	
Time (hours)	Lumen Maintenance (%)
1000	
2000	
3000	
4000	
5000	
6000	

Tested Case Temperature 3	
Time (hours)	Lumen Maintenance (%)
1000	
2000	
3000	
4000	
5000	
6000	

In-Situ Inputs

Drive current for each LED package/array/module (mA):	115.2
<i>In-situ</i> case temperature (T _a , °C):	55.3
Percentage of initial lumens to project to (e.g. for L ₉₀ , enter 70):	90

Results

Time (t) at which to estimate lumen maintenance (hours):	50,000
Lumen maintenance at time (t) (%):	89.22%
Reported L90 (hours):	>36000

EUT Photo

