

TEST REPORT

No. ETA19010005P-003 for

P.Q.L., Inc.

2285 Ward Avenue / Simi Valley, CA 93065



Service	Electrical and Photometric as required to the IESNA LM-79 test standard and Design Lights Consortium V4.4.
Product Classification	Premium
Primary Use	Outdoor - Outdoor Non-Cutoff and Semi-Cutoff Wall-mounted Area Luminaires
Model Number	84174
Trade Mark	Superior Life®
Date of Issue	August 29, 2019
Date of Tests	May 5, 2019 through May 15, 2019
Test Laboratory	ETA Testing Technology Co., Ltd.
Address	Floor 8, Building A, The Western Science Park, Yuhang District, Hangzhou 311121, China
Test Location	ETA Testing Technology Co., Ltd.
Prepared By	Kavi Ding 
Reviewer	Lionel Zha 



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REFERENCE STANDARD

Designation	Description
DesignLights Consortium V4.4	Qualification Requirements for Luminaires (Light Fixtures)
ANSI C82.77-10-2014	American National Standard for Lighting Equipment -Harmonic Emission Limits—Related Power Quality Requirements
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products (Goniophotometer)
ANSI C78.377-2015	Specifications for the Chromaticity of Solid State Lighting Products
ANSI / UL 1598	Standard for Safety of Luminaires
IES TM-21-11	Projecting Long Term Lumen Maintenance of LED Light Sources + Addendum B

The above standards or test methods were used in part or totally to test.

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**EQUIPMENT LIST**

Equipment Used	Model Number	Control Number	Due date
Everfine – Goniophotometer	GO-R5000	ETA1013	---
AC power source for Goniophotometer System	DPS1010	ETA1006	2019/12/8
Power Analyzer for Goniophotometer	WT310	ETA1005	2019/12/8
Two meter integrating sphere unit	Everfine – 2M	ETA1014	---
AC power source for Integrating Sphere System	DPS1010	ETA1002	2019/12/8
Power Analyzer for Integrating Sphere System	WT310	ETA1001	2019/12/8
Spectroradiometer	HAAS 2000	ETA1003	---
DC Linear Power Source	WY12010	ETA1004	2019/12/8
AC power source for Integrating Sphere System	DPS1010	ETA1006	2019/12/8
Power Analyzer for Integrating Sphere System	WT310	ETA1001	2019/12/8
Illumination Photometer	HA-1	ETA1007	2019/12/8
Luminous intensity Standard lamp For Goniophotometer	---	ETA1008	2020/3/22
Standard lamp	D204	ETA1009	2020/3/22
Digital thermometer	TES-1311A	ETA1141	2019/12/8
Tektronix Oscilloscope	DPO2012B	ETA1187	2020/5/1

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TEST METHOD

Photometric, Chromaticity and Electrical Measurements

No seasoning was performed in accordance with IESNA LM-79

Photometric and chromaticity were measured using a 2 meters integrating sphere spectral lamp measurement system. Maintain the ambient temperature at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. Temperature was measured at a position inside the sphere shielded from direct light. Relative humidity of 65% was measured at a position in the testing laboratory.

Spectral radiant flux measurements were made using spectroradiometer (bandwidth: 5nm) attached to the detector port of the integrating sphere. Each fixture was allowed to stabilise before measurements were made. The calibration of the integrating sphere spectroradiometer system is by the reference/standard lamps which are traceable to NIST. Lamp efficacy (lumens per watt) for each fixture model was then computed based on the luminous flux result.

Prior to measurement, stabilize the fixture as specified in section 5.0 of IES LM-79-08 Calculate the stabilization variation as [(maximum—minimum)/minimum] of at least three readings of the input power and lumen output over a period of 30 minutes, taken 15 minutes apart.

Electrical measurements including voltage, power and power factor were measured using YOKOGAWA - Digital Power Meter, model WT310.

A goniophotometer was used to measure the intensity (candelas) at each angle of distribution for each sample.

Ambient temperature was measured equal to the height of the sample mounted on the goniophotometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the power analyzer YOKOGAWA - Digital Power Meter, model WT310.

Maximum In-Situ LED Source Point Temperature

LED source operating temperature measurements were taken on one test sample per model with a thermocouple and temperature meter. Power supply or source temperature measurements were measured at the TMP or T_s point as indicated by the included diagram in accordance with manufacturers declared documentation. The luminaire was allowed to reach thermal equilibrium before measurements were taken. The maximum temperature was recorded for the sample. A simulated ceiling or other enclosure may be used in accordance to UL 1598 as applicable.

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**PRODUCT INFORMATION**

Manufacturer	P.Q.L., Inc.		
Address	2285 Ward Avenue / Simi Valley, CA 93065		
Trade Mark	Superior Life®		
Sample Quantity	2 pcs		
Sample Number	1190505-03-001 through 1190505-03-002		
Base Model	84174		
Additional Model	8417X_80W_50K		
Note: These models as above are all the same except for the CCT, Sensor Device and Surface Color.			
Nominal Operate Voltage (V; Hz)	AC 120V-277V		
Nominal Power	80W		
Nominal Lumen Output	9600lm; 9760lm		
Nominal CCT	4000K; 5000K		
Nominal CRI(Ra)	≥80		
Nominal Life	50000H		
Warranty	5 years		
Product Classification	<input checked="" type="checkbox"/> Premium	<input type="checkbox"/> Standard	
Primary Use	Outdoor - Outdoor Non-Cutoff and Semi-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	<input type="checkbox"/> Not Provide
If Yes, Mini Dimming Level	10%		
Integral Controller? (For Test Model)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Color-Tunable	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
If Yes, Select Color-Tunable types	<input type="checkbox"/> White-Tunable	<input type="checkbox"/> Warm-Dimming	
If Yes, lowest efficacy setting	N/A		
Field-Adjustable	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
If Yes, default setting	N/A		

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If Yes, rated wattage range	N/A
If Yes, rated light output range	N/A
LED Lighting Source Manufacture	LUMILEDS
LED Lighting Source Model	30302D
Driver Brand	WeledPower
Driver Model Number	WP-HHG-075U00381900
Driver output Voltage and Current	35-37V, 1900mA
Maximum Recommended Temperature (°C) During Normal Operation	78
Fixtures Band (Retrofit Kit/Lamp Only)	N/A
Fixtures Model No. (Retrofit Kit/Lamp Only)	N/A

Remarks	
TBD	To Be Determined, test case will be conducted
N/A	Test case does not apply to the test object

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**TEST SUMMARY**

Test Model No.: 84174

Initial Photometric and Electrical Test Data

Input Voltage (V)	Frequency (Hz)	ITHD	Input Current (A)	Input Power (W)	Power Factor	Lumen Output (Lumens)	Efficiency Lumen/w
120.0	60.0	3.0%	0.609	72.89	0.998	9100.55	124.85
277.0	60.0	8.9%	0.279	73.43	0.949	/	/

Input Voltage (V)	Frequency (Hz)	CCT (K)	CRI Ra	R9	x CIE1931	y CIE1931
120.0	60.0	4082	83.1	12	0.3773	0.3759

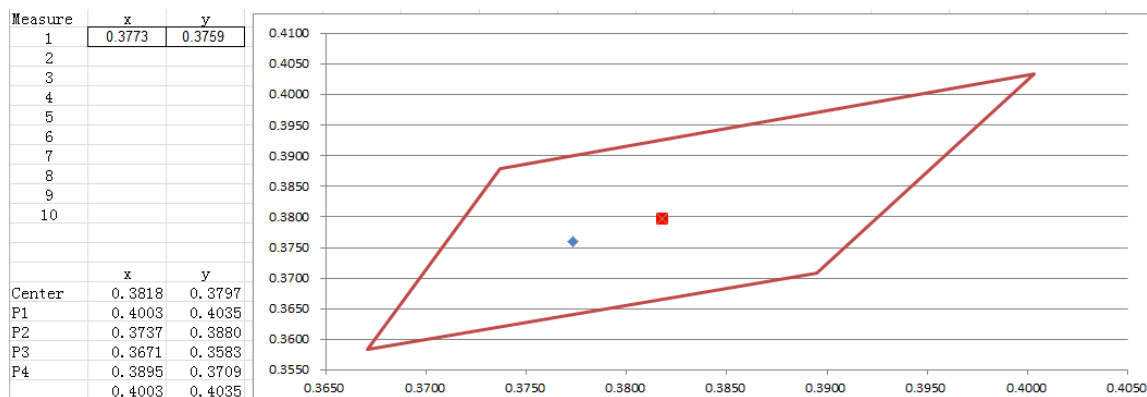
Input Voltage (V)	Frequency (Hz)	u' CIE1976	v' CIE1976	Duv	Rf	Rg
120.0	60.0	0.2233	0.5007	0.0005	82	95

Input Voltage (V)	Frequency (Hz)	0-90° Lumen Output (Lumens)	0-90° Efficiency (Lumen/w)	Zonal Lumen Density zone (80-90°)
120.0	60.0	8217.78	112.74 (-3% tolerances)	6.4%

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7 Step Quadrangle



Spectral Energy Distribution

WL(nm)	Spectrum	Spectrum	WL(nm)	Spectrum	Spectrum
380	0.0096	1.4100	585	0.8728	128.7000
385	0.0070	1.0280	590	0.8858	130.6000
390	0.0057	0.8342	595	0.8855	130.6000
395	0.0046	0.6780	600	0.8790	129.6000
400	0.0054	0.7962	605	0.8624	127.2000
405	0.0076	1.1180	610	0.8384	123.6000
410	0.0126	1.8650	615	0.8106	119.5000
415	0.0241	3.5470	620	0.7704	113.6000
420	0.0455	6.7150	625	0.7267	107.2000
425	0.0854	12.5900	630	0.6810	100.4000
430	0.1528	22.5300	635	0.6274	92.5100
435	0.2614	38.5400	640	0.5768	85.0500
440	0.4245	62.6000	645	0.5250	77.4000
445	0.6718	99.0600	650	0.4719	69.5900
450	0.9528	140.5000	655	0.4243	62.5600
455	0.9501	140.1000	660	0.3805	56.1000
460	0.7024	103.6000	665	0.3342	49.2800
465	0.5237	77.2100	670	0.2940	43.3500
470	0.4124	60.8100	675	0.2566	37.8400
475	0.3149	46.4300	680	0.2237	32.9900
480	0.2676	39.4500	685	0.1953	28.8000
485	0.2634	38.8400	690	0.1697	25.0200
490	0.2873	42.3600	695	0.1466	21.6100
495	0.3350	49.3900	700	0.1266	18.6600
500	0.3947	58.2000	705	0.1088	16.0500
505	0.4605	67.9000	710	0.0940	13.8600
510	0.5215	76.8900	715	0.0808	11.9200

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515	0.5675	83.6800	720	0.0695	10.2500
520	0.6076	89.5900	725	0.0598	8.8210
525	0.6429	94.7900	730	0.0514	7.5780
530	0.6621	97.6200	735	0.0439	6.4780
535	0.6835	100.8000	740	0.0379	5.5940
540	0.7001	103.2000	745	0.0327	4.8210
545	0.7200	106.2000	750	0.0282	4.1550
550	0.7412	109.3000	755	0.0245	3.6070
555	0.7625	112.4000	760	0.0213	3.1370
560	0.7796	115.0000	765	0.0184	2.7070
565	0.8004	118.0000	770	0.0157	2.3220
570	0.8243	121.5000	775	0.0138	2.0280
575	0.8490	125.2000	780	0.0126	1.8520
580	0.8596	126.7000			

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Test Model No.: 8417X_80W_50K

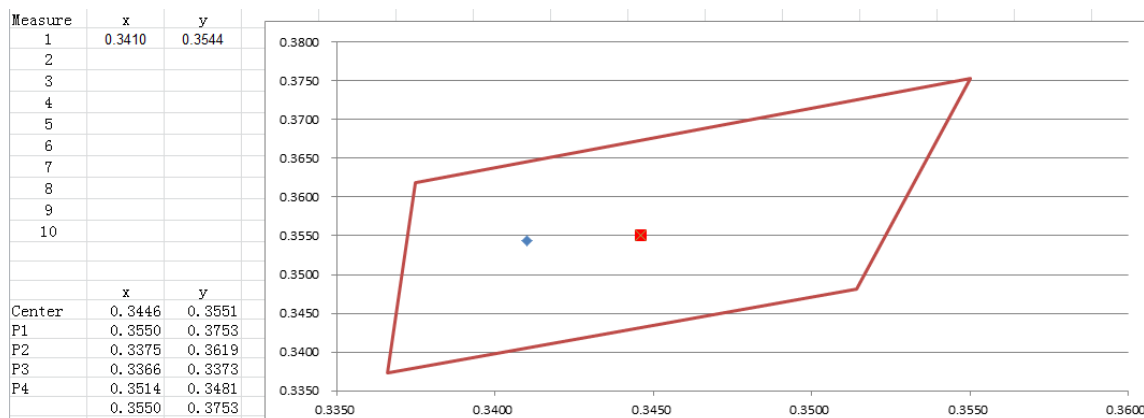
Initial Photometric and Electrical Test Data

Input Voltage (V)	Frequency (Hz)	ITHD	Input Current (A)	Input Power (W)	Power Factor	Lumen Output (Lumens)	Efficiency Lumen/w
120.0	60.0	2.9%	0.610	73.09	0.998	/	/
277.0	60.0	9.1%	0.279	73.19	0.946	/	/

Input Voltage (V)	Frequency (Hz)	CCT (K)	CRI Ra	R9	x CIE1931	y CIE1931
120.0	60.0	5166	84.8	17	0.3410	0.3544

Input Voltage (V)	Frequency (Hz)	u' CIE1976	v' CIE1976	Duv	Rf	Rg
120.0	60.0	0.2076	0.4854	0.0031	83	94

7 Step Quadrangle



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Spectral Energy Distribution

WL(nm)	Spectrum	Spectrum	WL(nm)	Spectrum	Spectrum
380	0.0074	1.4590	585	0.5813	114.8000
385	0.0051	1.0170	590	0.5798	114.6000
390	0.0046	0.9145	595	0.5720	113.0000
395	0.0036	0.7140	600	0.5617	111.0000
400	0.0041	0.8194	605	0.5454	107.8000
405	0.0054	1.0700	610	0.5260	103.9000
410	0.0089	1.7620	615	0.5052	99.8200
415	0.0163	3.2230	620	0.4771	94.2700
420	0.0310	6.1290	625	0.4487	88.6500
425	0.0578	11.4300	630	0.4189	82.7700
430	0.1052	20.7900	635	0.3855	76.1600
435	0.1834	36.2400	640	0.3537	69.8900
440	0.3063	60.5200	645	0.3219	63.6000
445	0.4973	98.2500	650	0.2896	57.2300
450	0.7950	157.1000	655	0.2603	51.4300
455	0.9969	197.0000	660	0.2335	46.1300
460	0.8391	165.8000	665	0.2054	40.5900
465	0.5930	117.2000	670	0.1811	35.7700
470	0.4755	93.9400	675	0.1581	31.2400
475	0.3754	74.1800	680	0.1381	27.2900
480	0.2987	59.0200	685	0.1207	23.8500
485	0.2778	54.8800	690	0.1051	20.7700
490	0.2893	57.1600	695	0.0910	17.9900
495	0.3181	62.8400	700	0.0786	15.5400
500	0.3548	70.1000	705	0.0678	13.4000
505	0.3987	78.7700	710	0.0586	11.5700
510	0.4380	86.5300	715	0.0504	9.9680
515	0.4653	91.9400	720	0.0437	8.6300
520	0.4891	96.6300	725	0.0377	7.4410
525	0.5112	101.0000	730	0.0325	6.4270
530	0.5213	103.0000	735	0.0278	5.4920
535	0.5321	105.1000	740	0.0240	4.7400
540	0.5395	106.6000	745	0.0208	4.1070
545	0.5484	108.3000	750	0.0180	3.5530
550	0.5581	110.3000	755	0.0156	3.0870
555	0.5655	111.7000	760	0.0135	2.6760
560	0.5689	112.4000	765	0.0117	2.3170
565	0.5743	113.5000	770	0.0102	2.0140
570	0.5803	114.7000	775	0.0088	1.7480
575	0.5862	115.8000	780	0.0082	1.6220
580	0.5830	115.2000			

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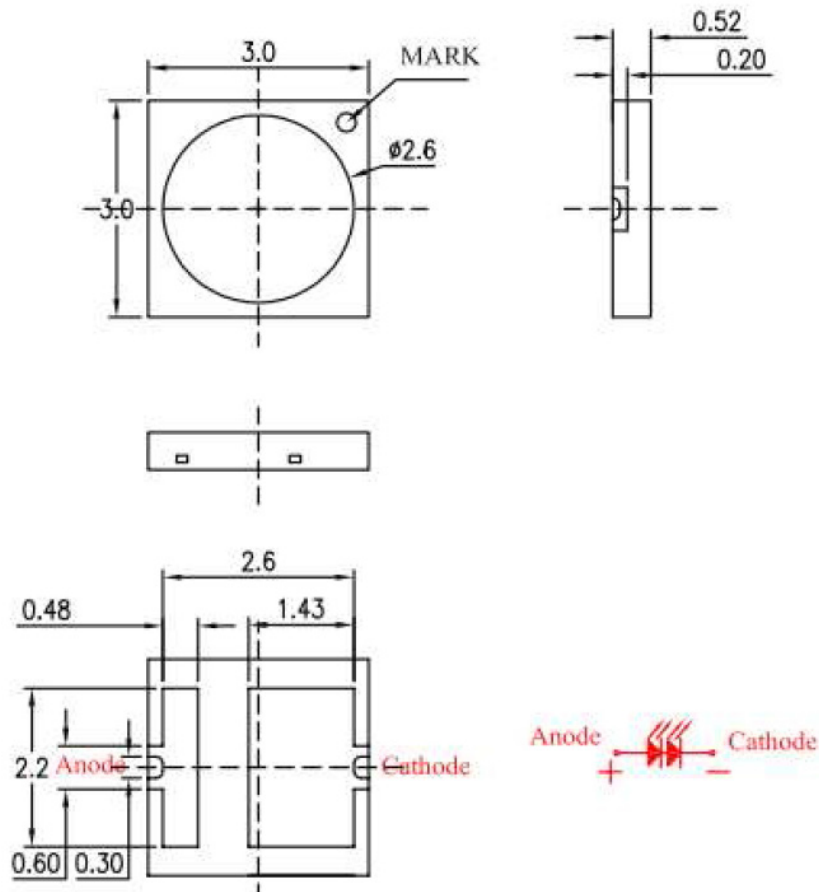
RESULT OF TEMPERATURE TEST

Test Model No.: 84174

Test Result

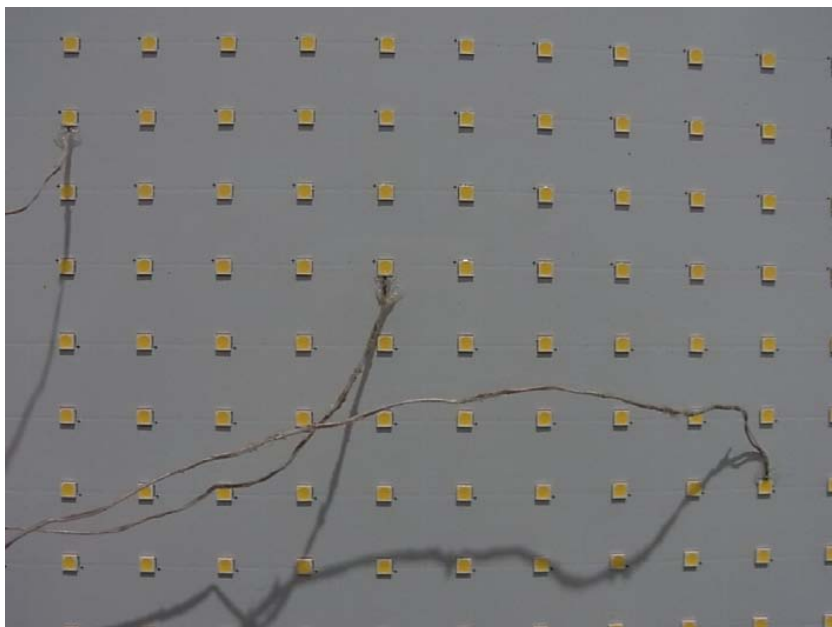
Measurement Point	Measured LED Current (mA)	Maximum Measured Source Temperature (°C)	Maximum Rated Source Temperature (°C)
Ts	171.2	61.1	105.0

LED Lighting Source Temperature Measurement Point in LM-80 Report

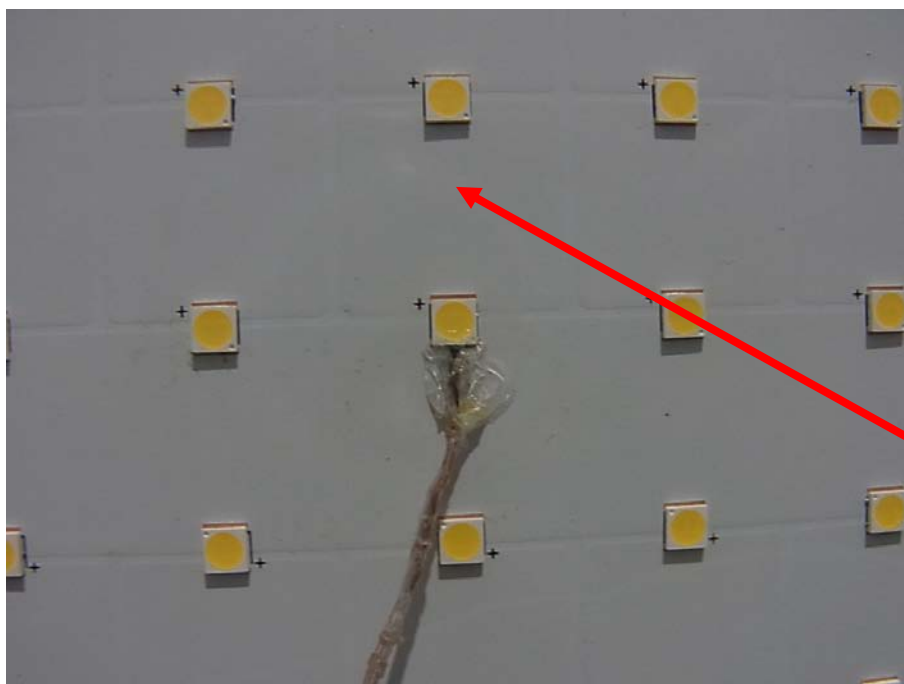


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LED Lighting Source In Situ Temperature Measurement



TOP: LED 2 (Maximum)

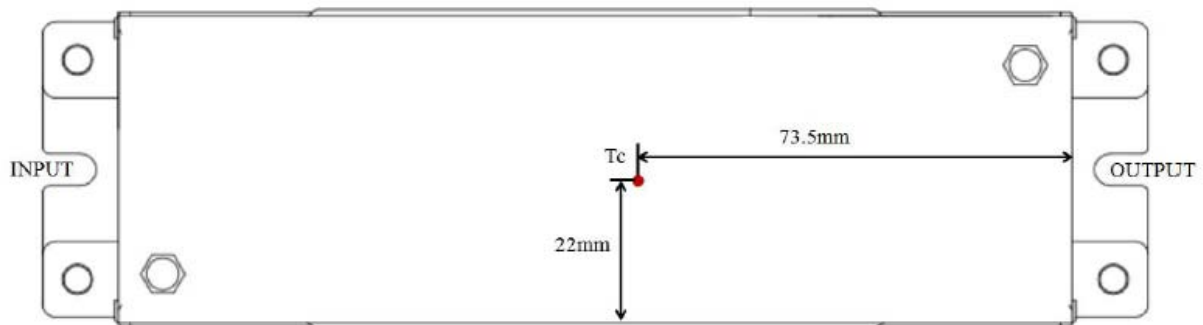


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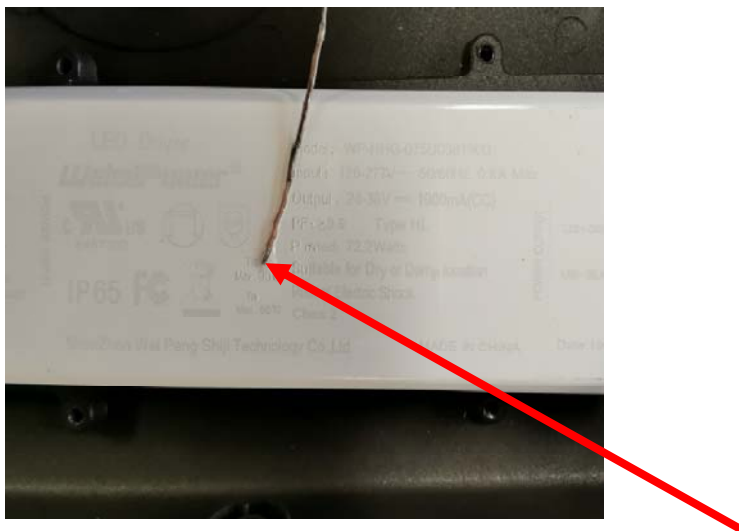
Test Result

Measurement Point	Measured Driver Case Temperature (°C)	Maximum Rated Driver Case Temperature (°C)
Tc	55.2	78.0

Driver Hot Spot Location and Tc




Driver Hot Spot In-Situ Temperature Measurement



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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)		LM-80 Test Inputs					
		Test Data for 55°C Case Temperature		Test Data for 85°C Case Temperature		Test Data for 105°C Case Temperature	
		Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
		0	100.00%	0	100.00%	0	100.00%
		1000	100.32%	1000	100.23%	1000	100.10%
		2000	100.12%	2000	100.03%	2000	99.89%
		3000	99.98%	3000	99.78%	3000	99.64%
		4000	99.76%	4000	99.56%	4000	99.29%
		5000	99.60%	5000	99.36%	5000	99.05%
		6000	99.41%	6000	99.11%	6000	98.80%
		7000	99.24%	7000	98.89%	7000	98.54%
		8000	99.02%	8000	98.62%	8000	98.24%
		9000	98.82%	9000	98.39%	9000	97.98%

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):	9000
Tested drive current (mA):	200
Tested case temperature 1 (T _c , °C):	55
Tested case temperature 2 (T _c , °C):	85
Tested case temperature 3 (T _c , °C):	105

In-Situ Inputs	
Drive current for each LED package/array/module (mA):	171.2
In-situ case temperature (T _a , °C):	61.1
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) (%):	90.95%
Reported L70 (hours):	>=94000

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)		LM-80 Test Inputs					
		Test Data for 55°C Case Temperature		Test Data for 85°C Case Temperature		Test Data for 105°C Case Temperature	
		Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
		0	100.00%	0	100.00%	0	100.00%
		1000	100.32%	1000	100.23%	1000	100.10%
		2000	100.12%	2000	100.03%	2000	99.89%
		3000	99.98%	3000	99.78%	3000	99.64%
		4000	99.76%	4000	99.56%	4000	99.29%
		5000	99.60%	5000	99.36%	5000	99.05%
		6000	99.41%	6000	99.11%	6000	98.80%
		7000	99.24%	7000	98.89%	7000	98.54%
		8000	99.02%	8000	98.62%	8000	98.24%
		9000	98.82%	9000	98.39%	9000	97.98%

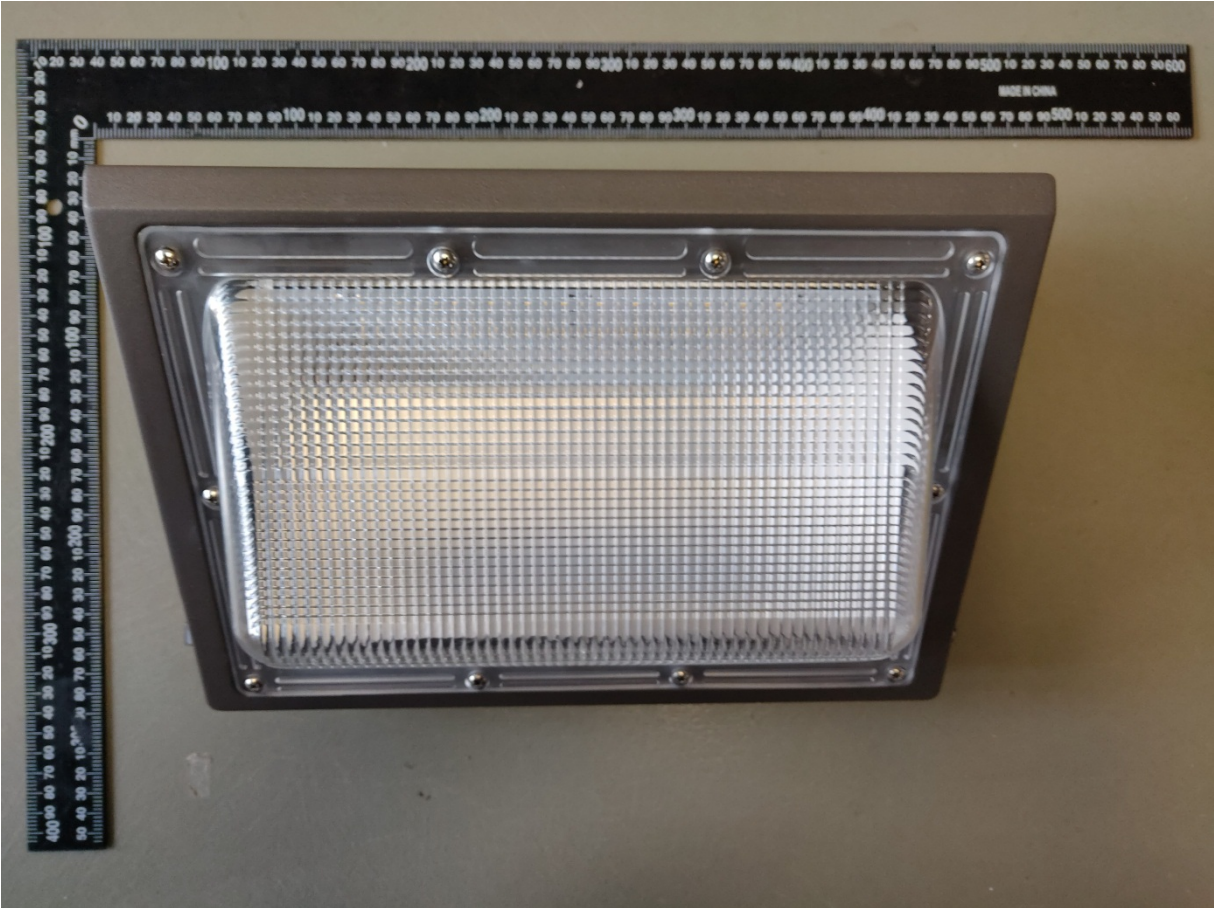
LM-80 Testing Details	
Total number of units tested per case temperature:	25
Number of failures:	0
Number of units measured:	25
Test duration (hours):	9000
Tested drive current (mA):	200
Tested case temperature 1 (T _c , °C):	55
Tested case temperature 2 (T _c , °C):	85
Tested case temperature 3 (T _c , °C):	105

In-Situ Inputs	
Drive current for each LED package/array/module (mA):	171.2
In-situ case temperature (T _a , °C):	61.1
Percentage of initial lumens to project to (e.g. for L ₉₀ , enter 90):	90

Results	
Time (t) at which to estimate lumen maintenance (hours):	36,000
Lumen maintenance at time (t) (%):	93.56%
Reported L90 (hours):	>=94000

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PRODUCT PICTURES



None Attachment

***** End of Report *****

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