

TEST REPORT

No. ETA19010005P-001 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	84170
Trade Mark	Superior Life®
Date of Issue	May 15, 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 °C ± 1 °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	1190505-01-001 through 1190505-01-002		
Base Model	84170		
Additional Model	8417X_40W_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	40W		
Nominal Lumen Output	4720lm; 4800lm		
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-43U-43B-GP-1000
Driver output Voltage and Current	35-37V, 1000mA
Maximum Recommended Temperature (°C) During Normal Operation	74
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.: 84170

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	12.7%	0.311	36.93	0.989	4448.48	120.46
277.0	60.0	12.1%	0.144	37.67	0.942	/	/

Input Voltage (V)	Frequency (Hz)	CCT (K)	CRI Ra	R9	x CIE1931	y CIE1931
120.0	60.0	4065	82.8	12	0.3782	0.3776

Input Voltage (V)	Frequency (Hz)	u' CIE1976	v' CIE1976	Duv	Rf	Rg
120.0	60.0	0.2233	0.5016	0.0010	82	96

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	3963.60	107.33 (-3% tolerances)	7.3%

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515	0.5701	44.7600	720	0.0674	5.2900
520	0.6094	47.8500	725	0.0578	4.5400
525	0.6434	50.5200	730	0.0496	3.8960
530	0.6620	51.9800	735	0.0423	3.3240
535	0.6818	53.5300	740	0.0364	2.8550
540	0.6975	54.7700	745	0.0312	2.4510
545	0.7166	56.2700	750	0.0270	2.1220
550	0.7372	57.8800	755	0.0232	1.8250
555	0.7568	59.4200	760	0.0202	1.5900
560	0.7731	60.7100	765	0.0175	1.3770
565	0.7918	62.1700	770	0.0151	1.1820
570	0.8153	64.0200	775	0.0130	1.0180
575	0.8395	65.9100	780	0.0120	0.9444
580	0.8494	66.6900			

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Test Model No.: 8417X_40W_50K

Initial Photometric and Electrical Test Data

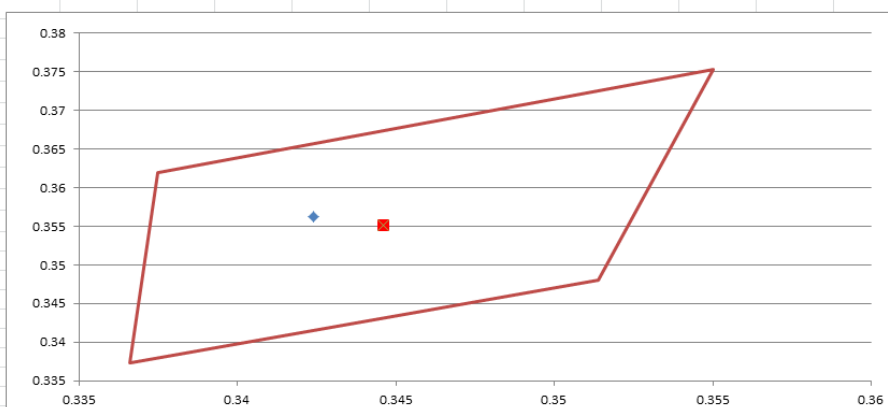
Input Voltage (V)	Frequency (Hz)	ITHD	Input Current (A)	Input Power (W)	Power Factor	Lumen Output (Lumens)	Efficiency Lumen/w
120.0	60.0	13.0%	0.304	36.10	0.989	/	/
277.0	60.0	12.5%	0.141	36.64	0.939	/	/

Input Voltage (V)	Frequency (Hz)	CCT (K)	CRI Ra	R9	x CIE1931	y CIE1931
120.0	60.0	5117	84.4	15	0.3424	0.3563

Input Voltage (V)	Frequency (Hz)	u' CIE1976	v' CIE1976	Duv	Rf	Rg
120.0	60.0	0.2078	0.4866	0.0035	83	94

7 Step Quadrangle

Measure	x	y
1	0.3424	0.3563
2		
3		
4		
5		
6		
7		
8		
9		
10		
Center	0.3446	0.3551
P1	0.3550	0.3753
P2	0.3375	0.3619
P3	0.3366	0.3373
P4	0.3514	0.3481
	0.3550	0.3753



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**Spectral Energy Distribution**

WL(nm)	Spectrum	Spectrum	WL(nm)	Spectrum	Spectrum
380	0.0068	0.7213	585	0.5771	61.2400
385	0.0054	0.5685	590	0.5760	61.1200
390	0.0039	0.4125	595	0.5682	60.3000
395	0.0035	0.3700	600	0.5578	59.1900
400	0.0039	0.4100	605	0.5419	57.5000
405	0.0049	0.5209	610	0.5233	55.5300
410	0.0084	0.8888	615	0.5029	53.3700
415	0.0155	1.6490	620	0.4755	50.4600
420	0.0296	3.1430	625	0.4472	47.4600
425	0.0562	5.9660	630	0.4179	44.3500
430	0.1051	11.1500	635	0.3846	40.8100
435	0.1851	19.6500	640	0.3530	37.4600
440	0.3116	33.0700	645	0.3208	34.0500
445	0.5232	55.5200	650	0.2886	30.6200
450	0.8461	89.7800	655	0.2590	27.4800
455	0.9948	105.6000	660	0.2322	24.6400
460	0.7631	80.9800	665	0.2039	21.6400
465	0.5368	56.9700	670	0.1794	19.0400
470	0.4361	46.2800	675	0.1566	16.6100
475	0.3358	35.6300	680	0.1366	14.5000
480	0.2706	28.7100	685	0.1189	12.6200
485	0.2609	27.6800	690	0.1035	10.9800
490	0.2777	29.4700	695	0.0894	9.4850
495	0.3113	33.0300	700	0.0772	8.1950
500	0.3528	37.4300	705	0.0663	7.0320
505	0.3992	42.3600	710	0.0572	6.0680
510	0.4395	46.6400	715	0.0491	5.2070
515	0.4674	49.6000	720	0.0424	4.5020
520	0.4916	52.1700	725	0.0364	3.8600
525	0.5121	54.3400	730	0.0314	3.3320
530	0.5214	55.3300	735	0.0269	2.8550
535	0.5318	56.4300	740	0.0231	2.4560
540	0.5387	57.1600	745	0.0199	2.1170
545	0.5475	58.1000	750	0.0173	1.8330
550	0.5564	59.0500	755	0.0149	1.5790
555	0.5637	59.8100	760	0.0130	1.3780
560	0.5670	60.1700	765	0.0112	1.1860
565	0.5713	60.6300	770	0.0097	1.0330
570	0.5771	61.2500	775	0.0084	0.8896
575	0.5829	61.8500	780	0.0078	0.8282
580	0.5786	61.4100			

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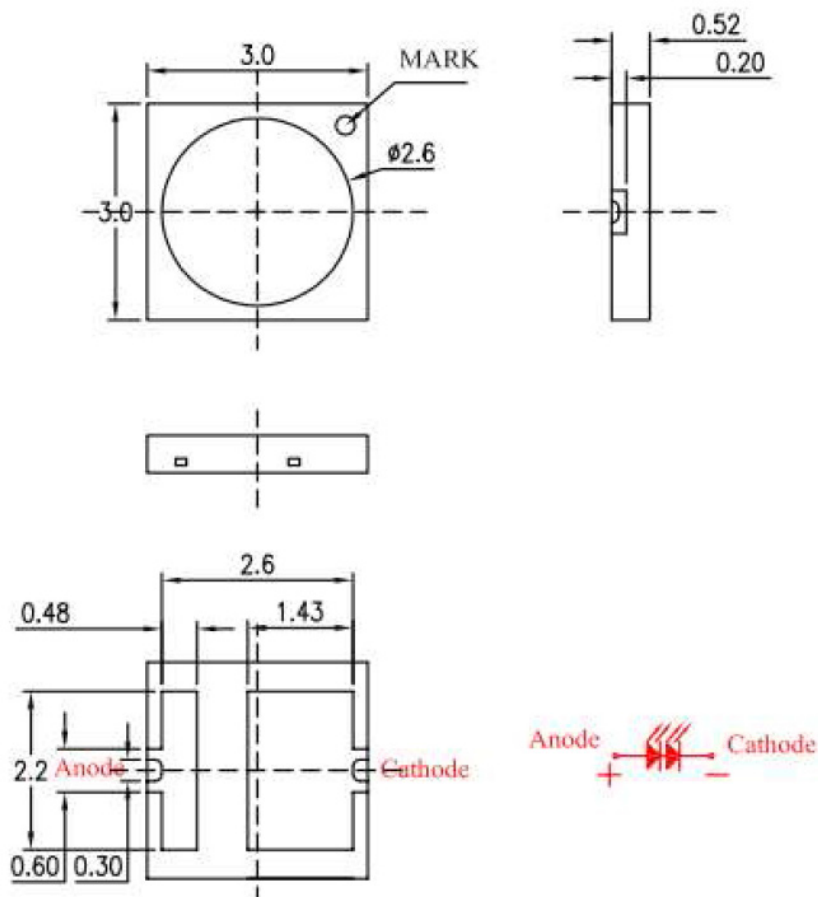
RESULT OF TEMPERATURE TEST

Test Model No.: 84170

Test Result

Measurement Point	Measured LED Current (mA)	Maximum Measured Source Temperature (°C)	Maximum Rated Source Temperature (°C)
Ts	198.4	51.6	105.0

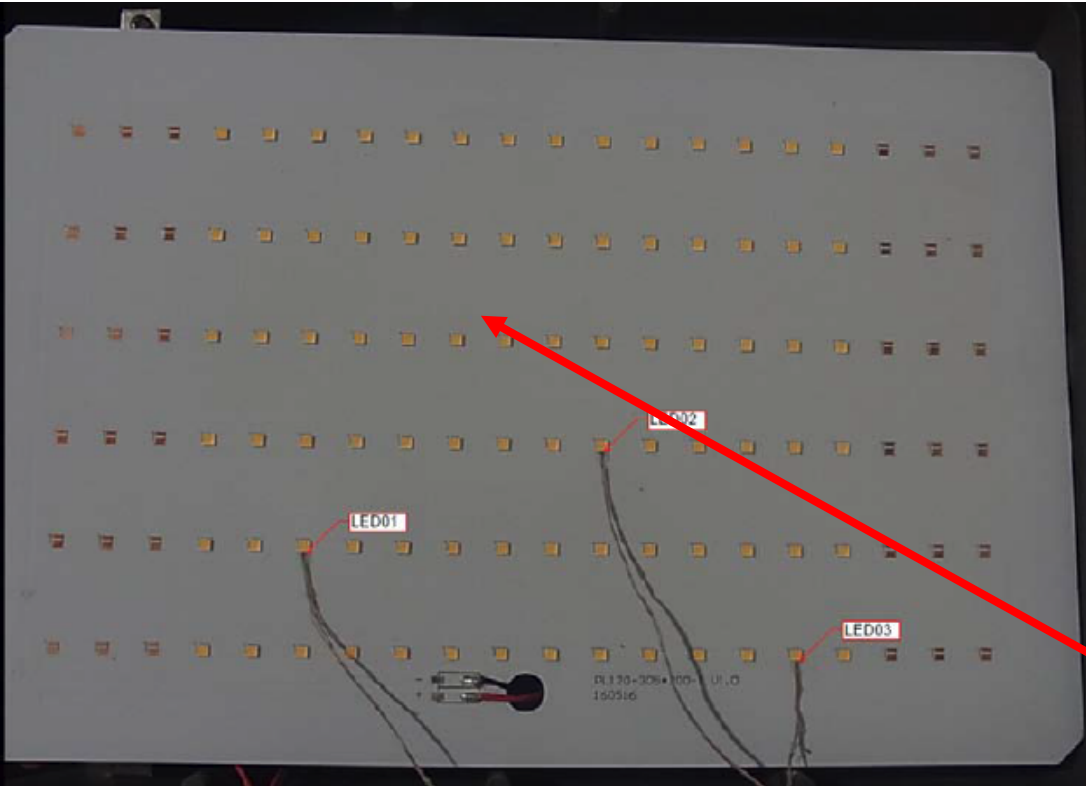
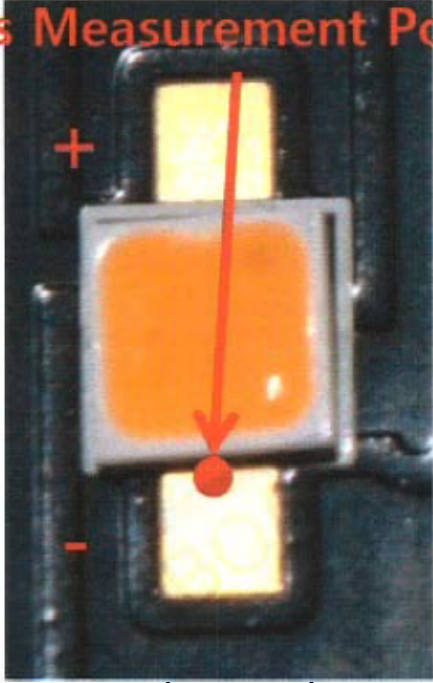
LED Lighting Source Temperature Measurement Point in LM-80 Report



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LED Lighting Source In Situ Temperature Measurement

Ts Measurement Point

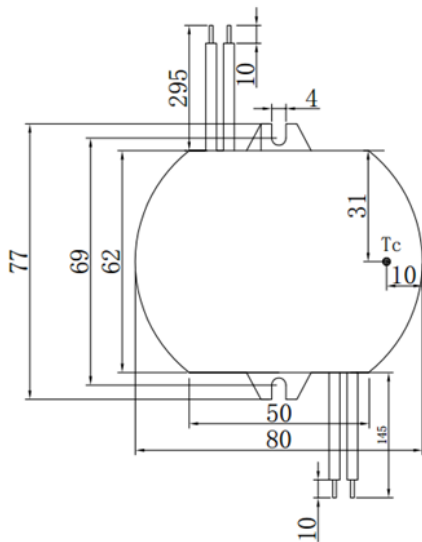


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Test Result

Measurement Point	Measured Driver Case Temperature (°C)	Maximum Rated Driver Case Temperature (°C)
Tc	59.0	74.0

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																																																																									
<p>Instructions</p> <p>Yellow fields are completed by the user. Fields not used should be left blank. Cyan fields are calculated based on user entries.</p> <p>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.</p> <p>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.</p> <p>Enter drive current, in-situ temperature data and the percentage of initial lumens to project to in the fields labeled "In-Situ Inputs".</p> <p>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".</p>	<p>Description of LED Light Source Tested (manufacturer, model, catalog number)</p>																																																																								
	<p>LM-80 Test Inputs</p> <table border="1"> <thead> <tr> <th colspan="2">Test Data for 55°C Case Temperature</th> <th colspan="2">Test Data for 85°C Case Temperature</th> <th colspan="2">Test Data for 105°C Case Temperature</th> </tr> <tr> <th>Time (hours)</th> <th>Lumen Maintenance (%)</th> <th>Time (hours)</th> <th>Lumen Maintenance (%)</th> <th>Time (hours)</th> <th>Lumen Maintenance (%)</th> </tr> </thead> <tbody> <tr><td>0</td><td>100.00%</td><td>0</td><td>100.00%</td><td>0</td><td>100.00%</td></tr> <tr><td>1000</td><td>100.32%</td><td>1000</td><td>100.23%</td><td>1000</td><td>100.10%</td></tr> <tr><td>2000</td><td>100.12%</td><td>2000</td><td>100.03%</td><td>2000</td><td>99.89%</td></tr> <tr><td>3000</td><td>99.96%</td><td>3000</td><td>99.78%</td><td>3000</td><td>99.64%</td></tr> <tr><td>4000</td><td>99.76%</td><td>4000</td><td>99.56%</td><td>4000</td><td>99.29%</td></tr> <tr><td>5000</td><td>99.60%</td><td>5000</td><td>99.36%</td><td>5000</td><td>99.05%</td></tr> <tr><td>6000</td><td>99.41%</td><td>6000</td><td>99.11%</td><td>6000</td><td>98.80%</td></tr> <tr><td>7000</td><td>99.24%</td><td>7000</td><td>98.89%</td><td>7000</td><td>98.54%</td></tr> <tr><td>8000</td><td>99.02%</td><td>8000</td><td>98.62%</td><td>8000</td><td>98.24%</td></tr> <tr><td>9000</td><td>98.82%</td><td>9000</td><td>98.39%</td><td>9000</td><td>97.96%</td></tr> </tbody> </table>	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	99.96%	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	97.96%
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	<p>Results</p> <table border="1"> <tr><td>Time (t) at which to estimate lumen maintenance (hours):</td><td>50,000</td></tr> <tr><td>Lumen maintenance at time (t) (%):</td><td>91.42%</td></tr> <tr><td>Reported L70 (hours):</td><td>>54000</td></tr> </table>	Time (t) at which to estimate lumen maintenance (hours):	50,000	Lumen maintenance at time (t) (%):	91.42%	Reported L70 (hours):	>54000																																																																		
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L90

TM-21 Inputs																																																																									
<p>Instructions</p> <p>Yellow fields are completed by the user. Fields not used should be left blank. Cyan fields are calculated based on user entries.</p> <p>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.</p> <p>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.</p> <p>Enter drive current, in-situ temperature data and the percentage of initial lumens to project to in the fields labeled "In-Situ Inputs".</p> <p>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".</p>	<p>Description of LED Light Source Tested (manufacturer, model, catalog number)</p>																																																																								
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PRODUCT PICTURES



None Attachment

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

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