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CNAS L3337

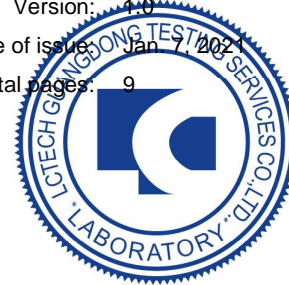
**IESNA
SUSTAINING
MEMBER**

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Test report of

In Situ Temperature Measurement and TM-21

Rendered to:

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For products:

LED MODULE

Models No.:

Q3-0.96W-139-65K

Test Date: Dec. 25, 2020 to Jan. 6, 2021

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Template No.: LC-RT-PL-012 Rev.1.4

Test Note:

Complied by:

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Jan. 7, 2021

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Jan. 7, 2021

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1. General

1.1 Product Information

Brand Name	iTEK
Product Type	LED MODULE
Model Number	Q3-0.96W-139-65K
Rated Inputs	12VDC
Rated Power	0.96W
Rated Light output	139lm
Declared CCT	6500K
Power Supply	N/A
LED Package, Array or Module	Model: L128-6580RG35000D1, manufactured by Lumileds Holding B.V.
Receipt Samples	2 units
Sample Code of lab.	201216107001, 210105102001
Date of Receipt Samples	Dec. 16, 2020, Jan. 5, 2021
Note	-



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1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/UL 1598:2008 (Secs. 19.7, 19.10-16)	Luminaires
IES LM-80:2008	Solid State Lighting Luminaires – Lumen Maintenance
IES LM-80:2015	Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules
IES TM-21-11*	Projecting Long Term Lumen Maintenance of LED Light Sources

Note:

*For reference only and not in the scope of NVLAP.

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-923	CHP-500	2020-12-23	2021-12-22
AC Power supply	LC-I-987	APW-120N	2020-12-23	2021-12-22
Power analyzer	LC-I-928	WT210	2020-12-25	2021-12-24
Power analyzer	LC-I-954	WT210	2020-12-25	2021-12-24
Multimeter	LC-I-972	Fluke	2020-07-20	2021-07-19
J thermocouple	LC-I-096	TT-J-30-SLE(200 m/r)	2020-02-25	2021-02-24
Data acquisition/Switch unit	LC-I-098	34970A	2020-02-25	2021-02-24
T&H recorder	LC-I-958	DWRP-B(0)	2020-07-20	2021-07-19

2. Test conducted and method

The luminaire provided by the client was installed to simulate intended usage to record the maximum temperature that can be encountered under the intended use.

2.1 Ambient Condition

Test was conducted in an ambient temperature of 25 ± 5 °C. Ambient temperature variations above or below 25 °C was respectively subtracted from or added to temperatures recorded at points on the luminaire.

The ambient temperature was measured by a thermocouple which was immersed in 15 ml of mineral oil in a glass container which was placed in the horizontal plane passing through the midpoint of the luminaire's vertical axis at a horizontal distance from the luminaire equal to at least 3 times the luminaire diameter

2.2 Temperature Stabilization

Measurements were not taken until the luminaire has stabilized thermally whose temperatures is changing at a rate less than 1 °C per hour.

2.3 Thermocouples

Temperatures recorded at points on LED was measured by means of thermocouples. Type J thermocouple was used. The thermocouples have conductors of 0.05mm^2 (30AWG), and complied with the requirements specified in ASTM MNL 12 and limits of error specified in NIST ITS 90 and ISA MC96.1.

2.4 Thermocouples contact

Thermocouples were directly in contact with the TMP_{LED} described in LM-80 test report. In order to gain the maximum temperature, if appropriate, more than one thermocouple were contact in these locations. For details information, please refer to clause 3.3 for the photo of thermocouple contact..

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result
Input Voltage & Frequency	11.99 V
Input Current(A)	0.080
Total Power(W)	0.961
Power Factor	1.000
Current on each LED(mA)	80

3.2 Temperature data

Criteria Item	Result
Total operated period(hours)	3.6
Ambient temperature(°C)	22.3
Measured Temperature @T _{MP} LED(°C)	48.7
Maximum Temperature @T _{MP} LED(Normalized to 25°C) (°C)	51.4

3.3 Lumen Maintenance Projection (IESNA TM-21 Method)

Criteria Item	Result
6000 hours lumen maintenance of LED light source	98.87%
forward current on each LED light source	80 mA
Reported L ₇₀ lumen maintenance life	>54000 hours

Note: Please refer to section 3.6 for details of TM-21 inputs and results.

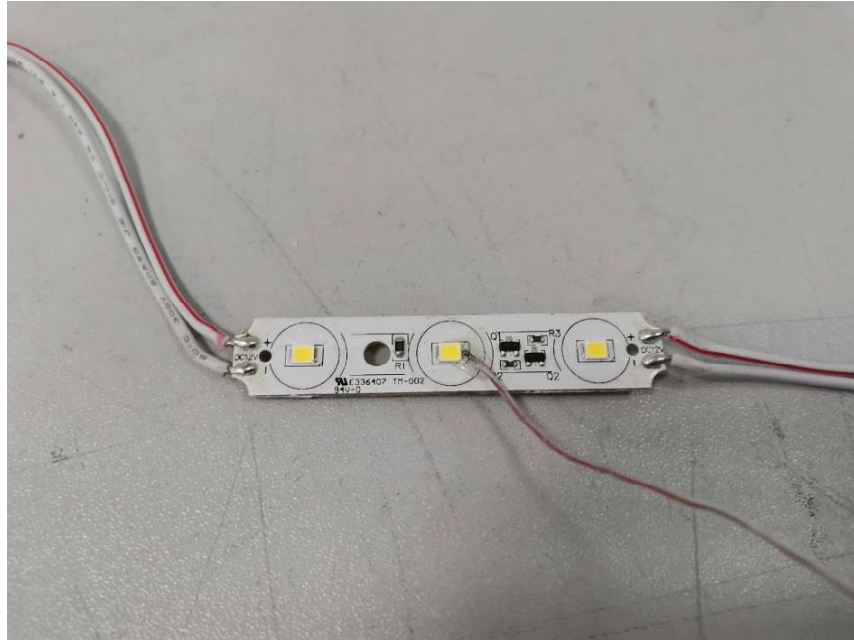
3.4 LM-80 Information

Report originated by	Bay Area Compliance Laboratories Corp. (Dongguan).		
Manufactured by	Lumileds Holding B.V.		
LM-80 report No.	R2DG191113050-10		
LED Model	L128-6580RG35000D1		
LED Part Number	L128-6580RG35000D1		
Number of LED light source tested	25 units per case temperature		
Drive Current	80mA		
Case temperature	85°C	115°C	-
lumen maintenance during 9000 hours test	98.10%	97.39%	-
Color maintenance(Δu'v') during 9000 hours test	0.0019	0.0022	-



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3.5 Thermocouple Contact Photo





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3.6 TM-21 input and output



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 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 85°C Case Temperature		Test Data for 115°C Case Temperature		Tested Case Temperature 3	
Model: L128-8580RG35000D1, manufactured by Lumileds Holding B.V.		Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
		0	100.00%	0	100.00%				
		1000	100.15%	1000	99.98%				
		2000	99.92%	2000	99.69%				
		3000	99.65%	3000	99.36%				
		4000	99.40%	4000	99.03%				
		5000	99.14%	5000	98.69%				
		6000	98.89%	6000	98.38%				
		7000	98.60%	7000	98.05%				
		8000	98.35%	8000	97.71%				
		9000	98.10%	9000	97.39%				

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):	80
Tested case temperature 1 (T _{case} , °C):	85
Tested case temperature 2 (T _{case} , °C):	115
Tested case temperature 3 (T _{case} , °C):	

In-Situ Inputs	
Drive current for each LED package/array/module (mA):	80
In-situ case temperature (T _{case} , °C):	51.4
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) (%):	98.87%
Reported L70 (hours):	>54000

TM-21 Input

TM-21 Report

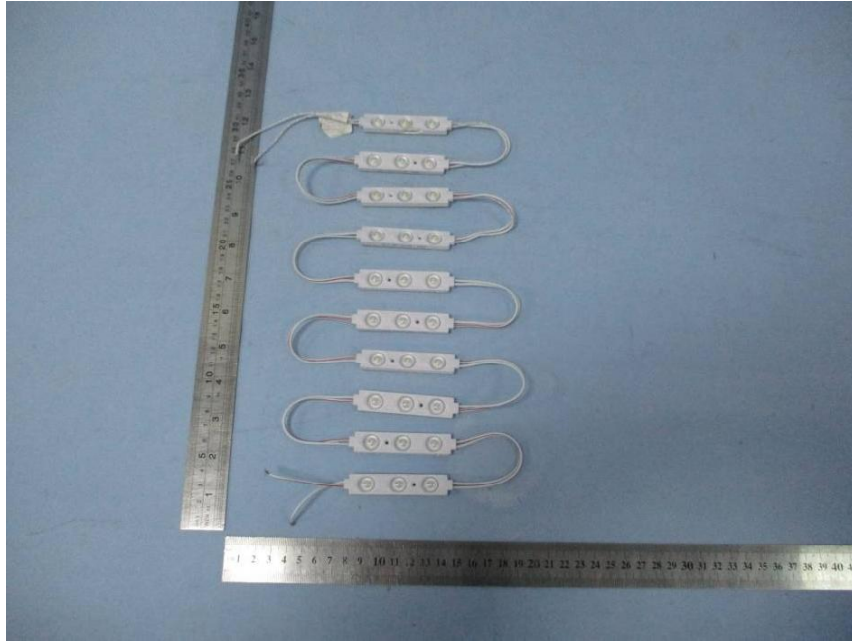
Table 1: Report at each LM-80 Test Condition	
Model: L128-8580RG35000D1, manufactured by Lumileds Holding B.V.	
Test Condition 1 - 85°C Case Temp	Test Condition 2 - 115°C Case Temp
Sample size: 25	Sample size: 25
Number of failures: 0	Number of failures: 0
DUT drive current used in the test (mA): 80	DUT drive current used in the test (mA): 80
Test duration (hours): 9,000	Test duration (hours): 9,000
Test duration used for projection (hour to hour): 4,000 - 9,000	Test duration used for projection (hour to hour): 4,000 - 9,000
Tested case temperature (°C): 85	Tested case temperature (°C): 115
α: 2.647E-06	α: 3.337E-06
B: 1.005	B: 1.004
Reported L70(9k) (hours): >54000	Reported L70(9k) (hours): >54000

Table 2: Interpolation Report (projection based on in-situ temperature entered)	
T _{case} (°C):	85.00
T _{case} (K):	358.15
α ₁ :	2.647E-06
B ₁ :	1.005
T _{case} (°C):	
T _{case} (K):	-
α ₂ :	-
B ₂ :	-
F ₀ /A ₀ :	-
A:	-
B ₀ :	1.005
T _{case} (°C):	51.40
T _{case} (K):	324.55
α ₀ :	2.647E-06
Reported L70(9k) at 51.4°C (hours):	>54000

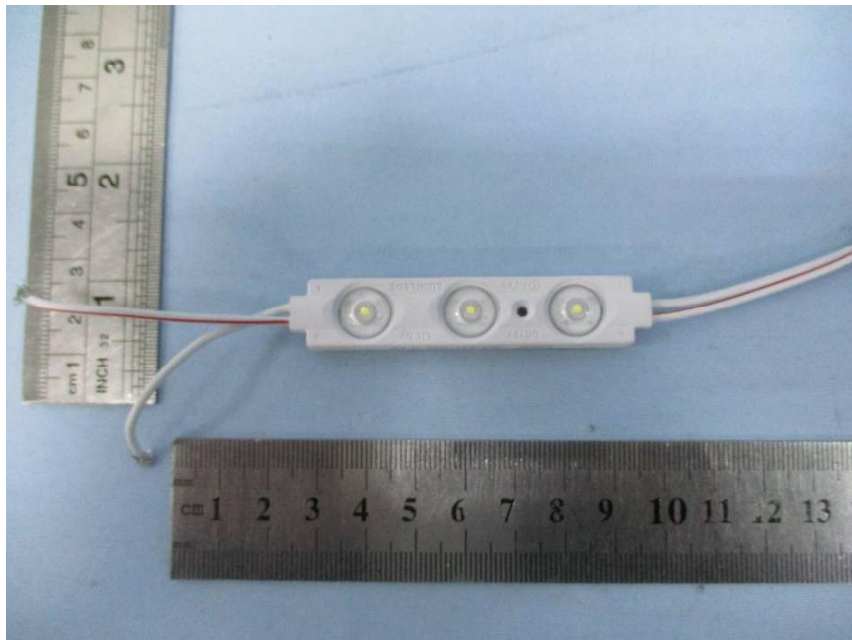
Report Generated By: Kargel Yuan	Notes:
Company: LCTECH Guangdong Testing Services Co., Ltd.	
Date: Jan. 7, 2021	

TM-21 Output

Appendix A Product Photo



Picture 1



Picture 2

****End of test report****