



DesignLights Consortium Test Report

Reference Standards

UL1598-2008

ANSI C82.77-10-2014

IES LM-79-2008

Prepared For

P.Q.L., Inc.

2285 Ward Avenue / Simi Valley, CA 93065

Test Laboratory:

UL-CCIC Company Limited

Test Laboratory Address:

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Catalog Number

55760

Project Number

4790446284

Report Number

4790446284_30

Test Date

2022-07-14

Issue Date

2022-07-26

Revision Date

N/A

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The results contained in this report pertain only to the tested sample.

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Test Summary

DLC Technical Requirements V5.1- issued 2020-02-14

Requirement Category	Test Method	Requirements	Tolerance	Test Result
Minimum Light Output (lm/ft)-Luminaires	IES LM-79-2008	≥375	-10%	1141.51
Minimum Luminaire Efficacy (lm/W)-Luminaires	IES LM-79-2008	≥115	-3%	134.11
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3501
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3495
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3489
Minimum CRI	IES LM-79-2008/CIE 13.3-1995	≥80	-1	82
Minimum R9	IES LM-79-2008	≥0	-1	6.0
Minimum Rf	IES LM-79-2008	≥70	-1	83
Minimum Rg	IES LM-79-2008	≥89	-1	95
Rcs,h1	IES LM-79-2008	-12%-23%	-1%	-12%
L70 Lumen maintenance (Hours)	N/A	≥50000	N/A	≥50000
L90 Lumen maintenance (Hours)	N/A	≥36000	N/A	≥36000
Power Factor	ANSI C82.77-10-2014	≥0.9	-0.03	0.9590
Total Harmonic Distortion (A%)	ANSI C82.77-10-2014	≤20%	5%	5.78%
In-Situ Temperature Measurement Test for LED 1 (°C)	UL1598-2008	≤105	N/A	45.7
In-Situ Temperature Measurement Test for Driver 1 (°C)	UL1598-2008	≤90	N/A	74.3
Max Chromaticity Shift (1000-6000h)	N/A	≤0.004	0.0004	0.0022
Minimum Luminaire Warranty (Years)	N/A	≥5	N/A	≥5



Test List

Sample Received Date: 2022-06-10

Test Item	Test Date	Model Number	Tests Conducted By
Integrating Sphere Test	2022-07-14	55760-90W-35K	Yang, Gavin X
Integrating Sphere Test	2022-07-14	55760-75W-35K	Yang, Gavin X
Integrating Sphere Test	2022-07-14	55760-65W-35K	Yang, Gavin X
THD and PF Test	2022-07-14	55760-90W-35K	Yang, Gavin X
THD and PF Test	2022-07-14	55760-75W-35K	Yang, Gavin X
THD and PF Test	2022-07-14	55760-65W-35K	Yang, Gavin X
In-Situ Temperature Measurement Test	2022-07-14	55760-90W-35K	Yang, Gavin X

Remark (if any)

1. UL test equipment information is recorded on Meter Use in UL's Aurora database.
2. The accuracy method decision rule is applied when the compliance or verdict is made to the results of this report.



Product Description

Lamp/Luminaire Description: Direct Linear Ambient Luminaires

Model Number: 55760

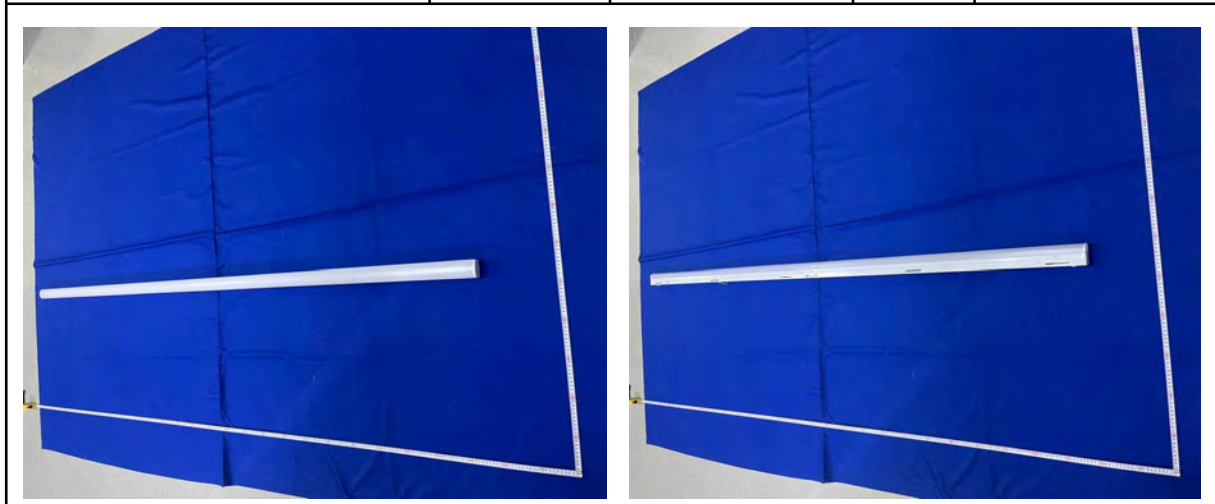
Electrical Parameter: 120-277V, 50/60Hz

LED Package: BXEN-(A)E-11M-3AA

Dimming Information: Continuous dimming capability

Products Scaled Value

Model Number	CCT	Luminous Flux	Power	Luminous Efficacy
55760-90W-35K	3500K	11970	90	133
55760-90W-40K	4000K	12870	90	143
55760-90W-50K	5000K	12150	90	135
55760-75W-35K	3500K	10425	75	139
55760-75W-40K	4000K	11175	75	149
55760-75W-50K	5000K	10575	75	141
55760-65W-35K	3500K	9295	65	143
55760-65W-40K	4000K	9945	65	153
55760-65W-50K	5000K	9425	65	145





Integrating Sphere Test

Model No.	55760-90W-35K		Sample ID.	5041611
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

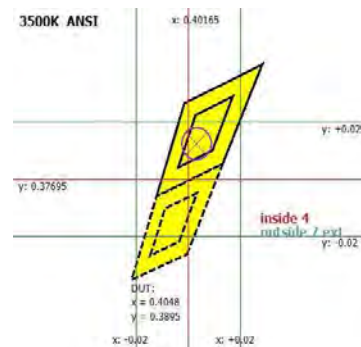
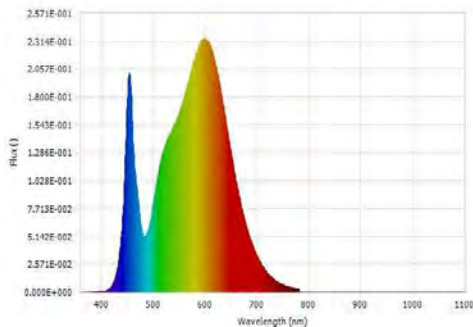
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.3	120.06	60	0.7731	92.43	0.9959	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3501	82	6.0	-0.0004	12395.9	134.11	1549.49



Luminous Flux (lm)	12395.9	Chrom x	0.4048
Chrom y	0.3895	Chrom u	0.2359
Chrom v	0.3405	Duv	-0.0004
Chrom u'	0.2359	Chrom v'	0.5107
CCT (K)	3501	Luminous Efficacy (lm/W)	134.11
Ra	82	R1	81.0
R2	89.0	R3	96.0
R4	80.0	R5	80.0
R6	86.0	R7	84.0
R8	61.0	R9	6.0
R10	75.0	R11	79.0
R12	62.0	R13	83.0
R14	98.0	R15	74.0
Rf	83	Rg	95
Rcs,h1	-12%		



Integrating Sphere Test (Cont'd)

TM-30 Report

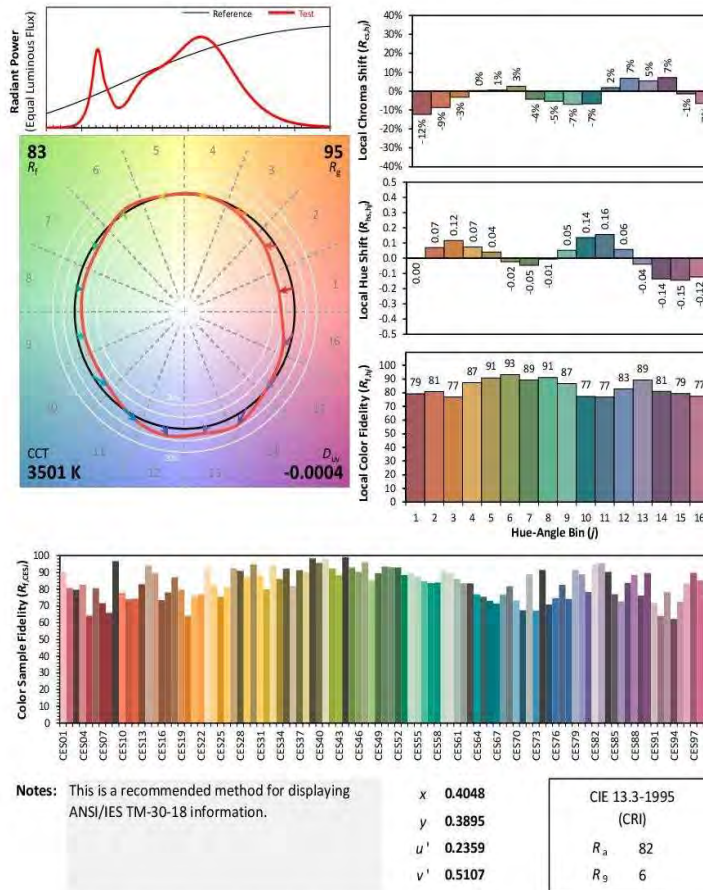
ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-(A)E-11M-3AA

Manufacturer: P.Q.L., Inc.

Date: 7/14/2022

Model: 55760-90W-35K



Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



Integrating Sphere Test

Model No.	55760-75W-35K		Sample ID.	5041611
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

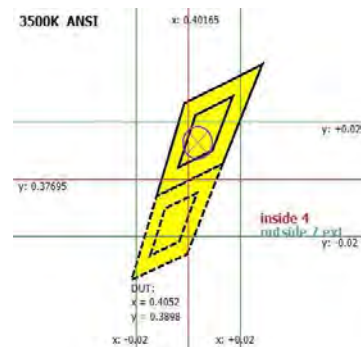
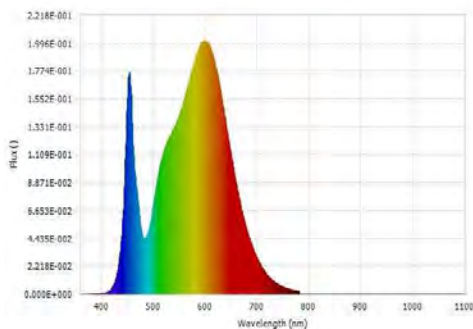
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.3	120.15	60	0.6413	76.52	0.9930	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3495	82	6.0	-0.0004	10689.2	139.69	1336.16



Luminous Flux (lm)	10689.2	Chrom x	0.4052
Chrom y	0.3898	Chrom u	0.2360
Chrom v	0.3406	Duv	-0.0004
Chrom u'	0.2360	Chrom v'	0.5108
CCT (K)	3495	Luminous Efficacy (lm/W)	139.69
Ra	82	R1	81.0
R2	90.0	R3	96.0
R4	80.0	R5	80.0
R6	86.0	R7	84.0
R8	61.0	R9	6.0
R10	75.0	R11	79.0
R12	62.0	R13	83.0
R14	98.0	R15	74.0
Rf	83	Rg	95
Rcs,h1	-12%		



Integrating Sphere Test (Cont'd)

TM-30 Report

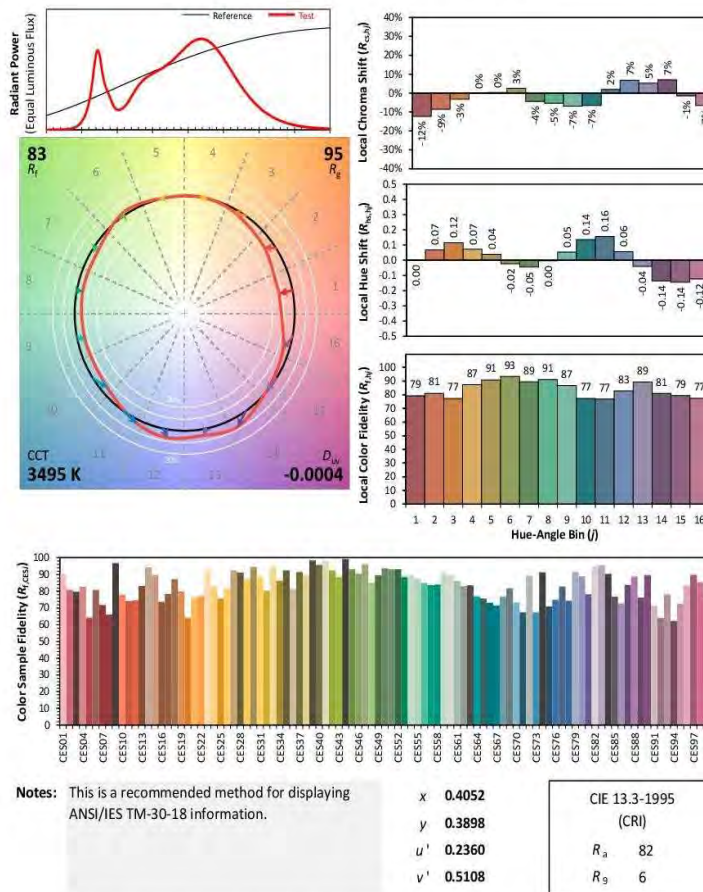
ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-(A)E-11M-3AA

Manufacturer: P.Q.L., Inc.

Date: 7/14/2022

Model: 55760-75W-35K



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Integrating Sphere Test

Model No.	55760-65W-35K		Sample ID.	5041611
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assumed to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The reference standard lamp is rated current 2.679A omnidirectional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

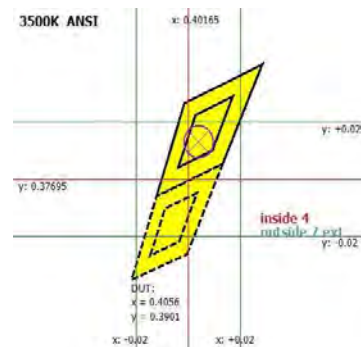
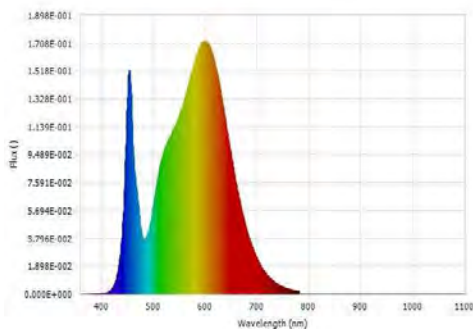
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.3	120.03	60	0.5295	63.098	0.9927	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3489	82	7.0	-0.0004	9132.1	144.73	1141.51



Luminous Flux (lm)	9132.1	Chrom x	0.4056
Chrom y	0.3901	Chrom u	0.2362
Chrom v	0.3407	Duv	-0.0004
Chrom u'	0.2362	Chrom v'	0.5110
CCT (K)	3489	Luminous Efficacy (lm/W)	144.73
Ra	82	R1	81.0
R2	90.0	R3	96.0
R4	81.0	R5	81.0
R6	86.0	R7	84.0
R8	61.0	R9	7.0
R10	76.0	R11	79.0
R12	62.0	R13	83.0
R14	98.0	R15	74.0
Rf	83	Rg	95
Rcs,h1	-12%		



Integrating Sphere Test (Cont'd)

TM-30 Report

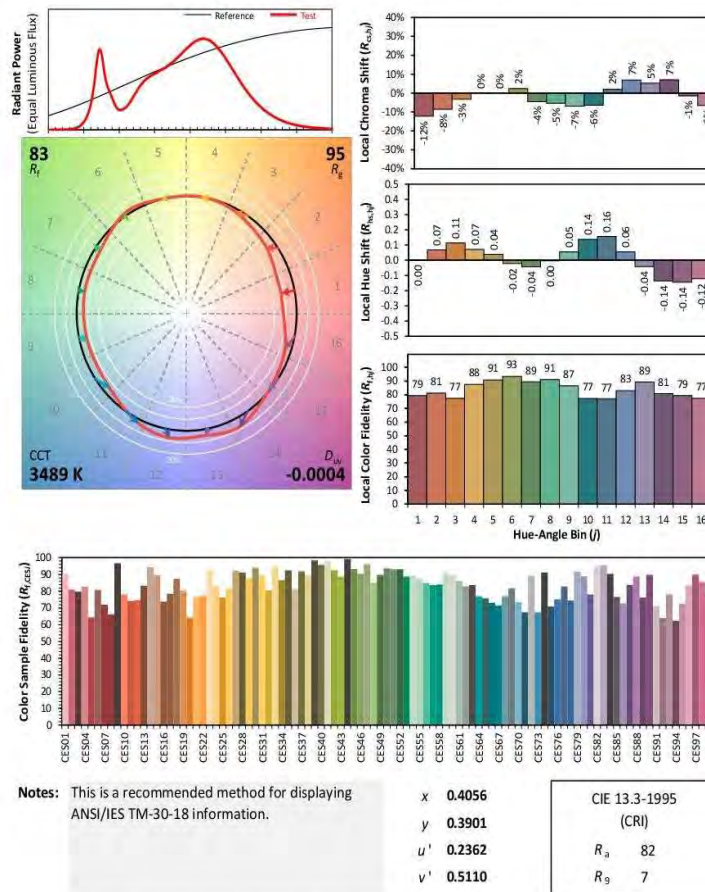
ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-(A)E-11M-3AA

Manufacturer: P.Q.L., Inc.

Date: 7/14/2022

Model: 55760-65W-35K



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THD and PF Test

Model No.	55760-90W-35K	Sample ID.	5041611
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	120.08	60	0.0771	93.05	0.9975	4.63%	Horizontal
24.8	277.07	60	0.3373	91.39	0.9781	5.04%	Horizontal



THD and PF Test

Model No.	55760-75W-35K	Sample ID.	5041611
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	120.13	60	0.6413	76.74	0.9959	5.52%	Horizontal
24.8	277.11	60	0.2822	75.69	0.9685	5.78%	Horizontal



THD and PF Test

Model No.	55760-65W-35K	Sample ID.	5041611
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	120.10	60	0.5258	62.91	0.9961	4.64%	Horizontal
24.8	277.09	60	0.2351	62.48	0.9590	5.29%	Horizontal



In-Situ Temperature Measurement Test

Model No.	55760-90W-35K	Sample ID.	5041611
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Test Method

1. In-Situ Temperature Measurement Test is conducted according to the UL 1598-2008, Section 14.
 2. The testing was conducted in a room with ambient temperature of 25 °C ± 5 °C. The apparatus construction followed those described in UL1598-2008 for normal temperature testing. Thermocouples were placed on the LED package in the locations indicated by LM-80 report. Thermocouples were placed on the LED driver case in the locations specified by the manufacture if necessary. The temperature was recorded after the lamp was operated by 7.5 hours.
 3. The data and photos in LM-80 test report is provided by the customer/ The data and photos in driver specification is provided by the customer.

In-Situ Temperature Measurement Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
23.2	120.08	60	0.0771	93.05	0.9975	4.63%	Horizontal

Test Results (LEDs)

Thermocouple Location	Declared Light Source Current (mA)	Temperature for Light Source (°C)		Max Chromaticity Shift (1000-6000h)	LED Model Number	LM-80 Limit Current (mA)	LM-80 Limit Temp (°C)
		Test Result	Test Result (Correct to 25 °C)				
Ambient TEMP	N/A	23.2	25.0				
TMP of Location 1	125	43.9	45.7	0.0022	BXEN-(A)E-11M-3AA	150	105

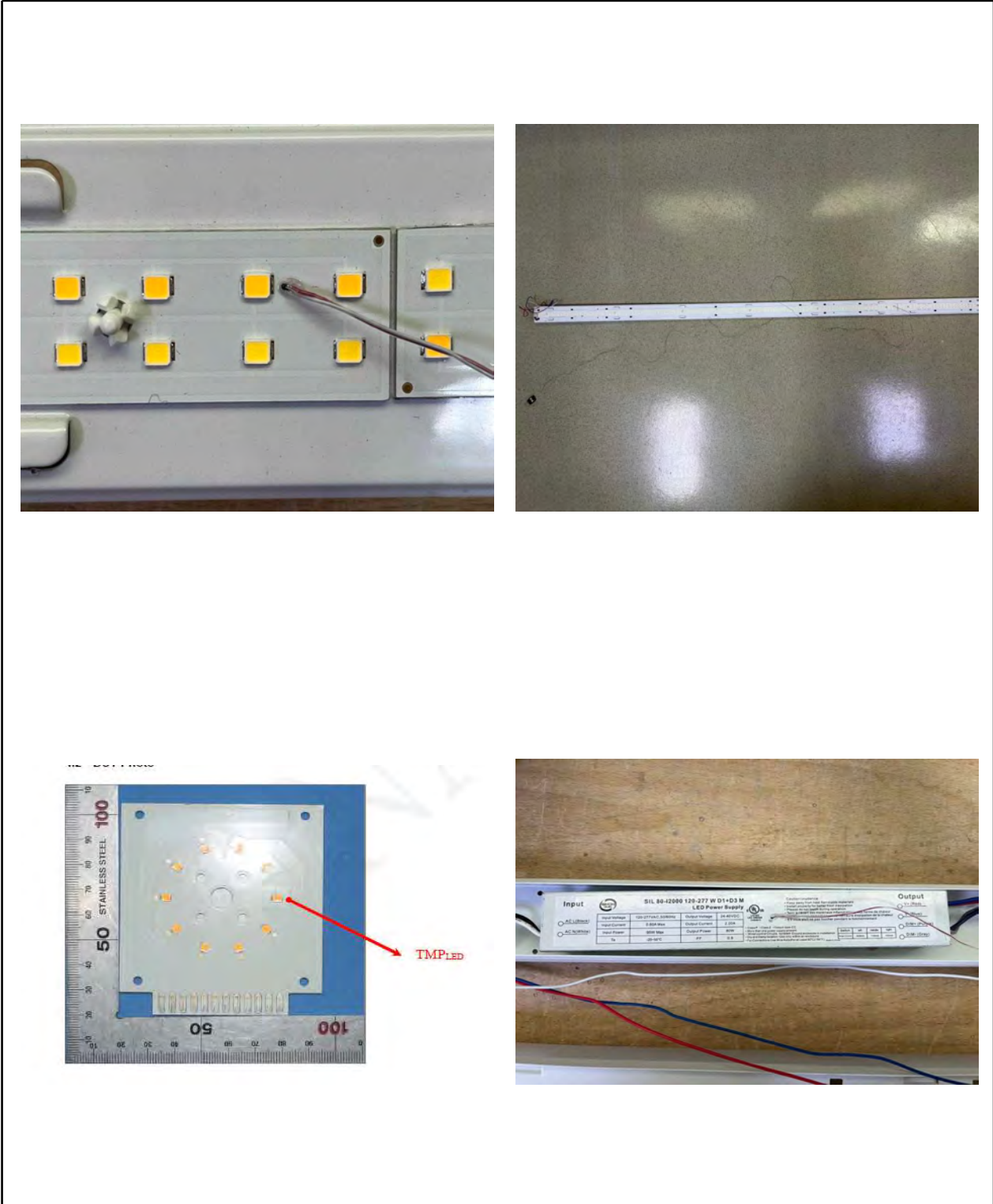
Test Results (Drivers)

Thermocouple Location	Temperature for Driver (°C)		Driver Model Number	Driver Limit Temp (°C)
	Test Result	Test Result (Correct to 25 °C)		
Ambient TEMP	23.2	25.0		
TMP of Location 1	72.5	74.3	SIL 80-I2000 120-277 W D1+D3 M	90



In-Situ Temperature Measurement Test (Cont'd)

Test Photos for Ts Point of Light Sources & Tc Point of Drivers





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