



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:

No.2, Chengwan Road, Suzhou Industrial Park, Suzhou 21522, China

Catalog Number

55117

Project Number

4790320956

Report Number

4790320956_6

Test Date

2022-03-15~2022-03-17

Issue Date

2022-03-24

Revision Date

N/A

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Wu, Elvis

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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)-Luminaires	IES LM-79-2008	≥2000	-10%	3103.97
Minimum Luminaire Efficacy (lm/W)-Luminaires	IES LM-79-2008	≥110	-3%	121.66
Spacing Criteria (0-180°)	IES LM-79-2008	1.0-2.0	±0.1	1.22
Spacing Criteria (90-270°)	IES LM-79-2008	1.0-2.0	±0.1	1.26
Zonal Lumen Requirement 1(0°-60°)	IES LM-79-2008	≥75%	-3%	80.80%
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3428
Allowable CCT (4000K)	IES LM-79-2008/ANSI C78.377-2015	3985±275	N/A	4240
Allowable CCT (5000K)	IES LM-79-2008/ANSI C78.377-2015	5029±283	N/A	5019
Minimum CRI	IES LM-79-2008/CIE 13.3-1995	≥80	-1	83
Minimum R9	IES LM-79-2008	≥0	-1	9.0
Minimum Rg	IES LM-79-2008	≥89	-1	94
Minimum Rf	IES LM-79-2008	≥70	-1	83
Rcs,h1	IES LM-79-2008	-12%-23%	-1%	-11%
Unified Glare Rating (UGR)	IES LM-79-2008	≤22	N/A	21.9
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	0.9541
Total Harmonic Distortion (A%)	ANSI C82.77-10-2014	≤20%	5%	11.79%
In-Situ Temperature Measurement Test for LED 1 (°C)	UL1598-2008	≤105	N/A	50.7
In-Situ Temperature Measurement Test for Driver 1 (°C)	UL1598-2008	≤90	N/A	54.3
Max Chromaticity Shift (1000-6000h)	N/A	≤0.004	0.0004	0.0024
Minimum Luminaire Warranty (Years)	N/A	≥5	N/A	≥5



Test List

Sample Received Date: 2022-03-17

Test Item	Test Date	Model Number	Tests Conducted By
Integrating Sphere Test	2022-03-16	55117-35W-35K	Yang, Gavin X
Integrating Sphere Test	2022-03-16	55117-35W-40K	Yang, Gavin X
Integrating Sphere Test	2022-03-16	55117-35W-50K	Yang, Gavin X
Integrating Sphere Test	2022-03-16	55117-30W-35K	Yang, Gavin X
Integrating Sphere Test	2022-03-16	55117-25W-35K	Yang, Gavin X
Goniophotometer Test	2022-03-15	55117-35W-35K	Yang, Gavin X
Goniophotometer Test	2022-03-15	55117-35W-50K	Yang, Gavin X
THD and PF Test	2022-03-15	55117-35W-35K	Yang, Gavin X
THD and PF Test	2022-03-15	55117-35W-40K	Yang, Gavin X
THD and PF Test	2022-03-15	55117-35W-50K	Yang, Gavin X
THD and PF Test	2022-03-15	55117-30W-35K	Yang, Gavin X
THD and PF Test	2022-03-15	55117-25W-35K	Yang, Gavin X
In-Situ Temperature Measurement Test	2022-03-17	55117-35W-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: 2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces

Model Number: 55117

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

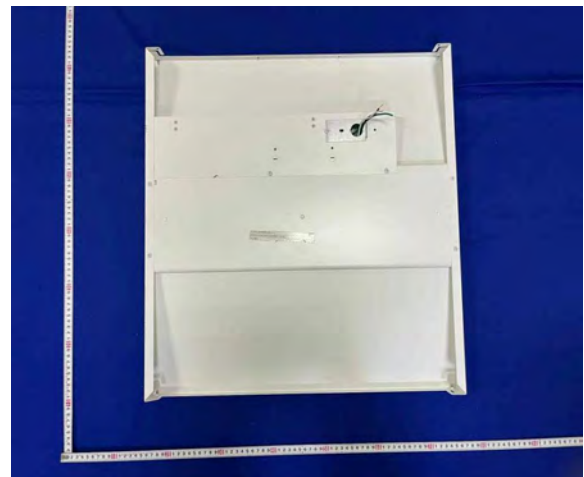
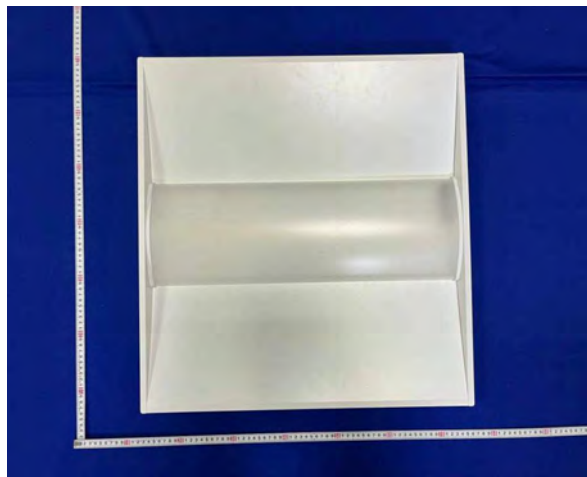
LED Package: STW8A2PD-XX

Dimming Information: Continuous dimming capability

Products Scaled Value

Model Number	CCT	Luminous Flux	Power	Luminous Efficacy
55117-35W-35K	3500k	4375	35	125
55117-35W-40K	4000K	4410	35	126
55117-35W-50K	5000k	4445	35	127
55117-30W-35K	3500k	3840	30	128
55117-30W-40K	4000K	3870	30	129
55117-30W-50K	5000k	3900	30	130
55117-25W-35K	3500k	3275	25	131
55117-25W-40K	4000K	3300	25	132
55117-25W-50K	5000k	3325	25	133

Photos of Products Characteristics





Integrating Sphere Test

Model No.	55117-35W-35K		Sample ID.	4773522
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.

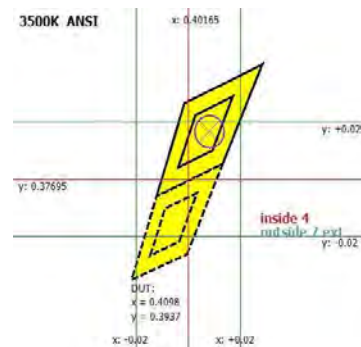
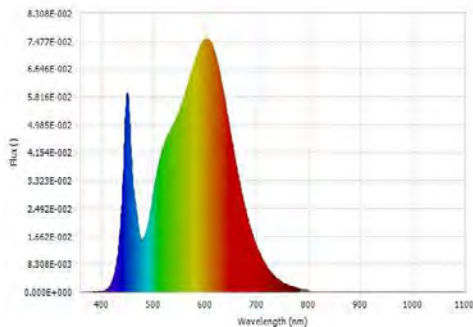
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption 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
24.8	120.08	60	0.2812	33.535	0.9930	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3428	84	16.0	0.0003	4112.32	122.63	N/A



Luminous Flux (lm)	4112.32	Chrom x	0.4098
Chrom y	0.3937	Chrom u	0.2374
Chrom v	0.3421	Duv	0.0003
Chrom u'	0.2374	Chrom v'	0.5132
CCT (K)	3429	Luminous Efficacy (lm/W)	122.63
Ra	84	R1	83.0
R2	90.0	R3	95.0
R4	84.0	R5	83.0
R6	86.0	R7	86.0
R8	66.0	R9	16.0
R10	76.0	R11	84.0
R12	68.0	R13	84.0
R14	97.0	R15	76.0
Rf	85	Rg	98
Rcs,h1	-11%		



Integrating Sphere Test (Cont'd)

TM-30 Report

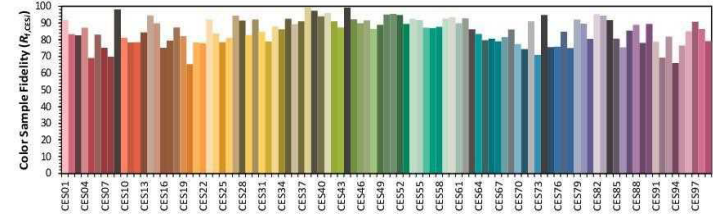
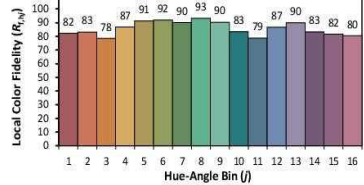
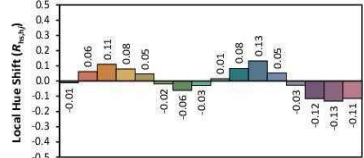
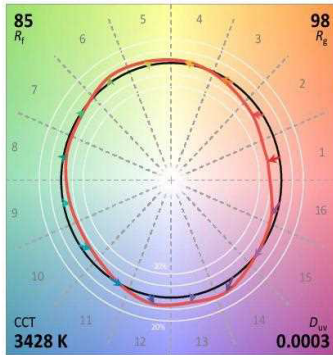
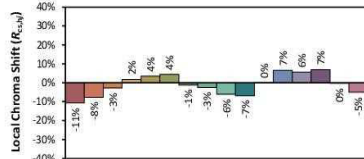
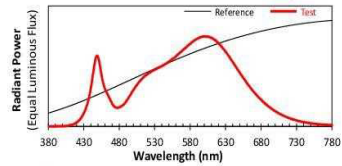
ANSI/IES TM-30-18 Color Rendition Report

Source: STW8A2PD-XX

Manufacturer: P.Q.L., Inc.

Date: 3/16/2022

Model: 55117-35W-35K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4098	CIE 13.3-1995 (CRI)	
y	0.3937		
u'	0.2374		
v'	0.5132		
		R_a	84
		R_9	16

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



Integrating Sphere Test

Model No.	55117-35W-40K		Sample ID.	4773522
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.

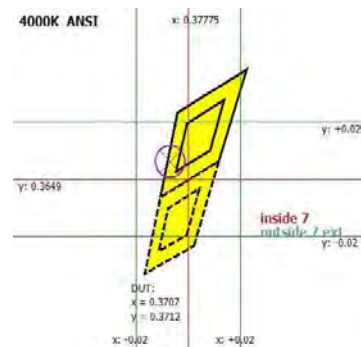
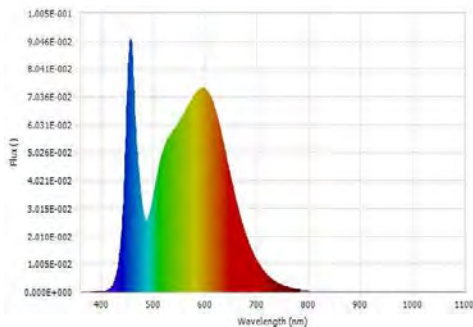
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption 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
24.8	120.09	60	0.2688	32.056	0.9931	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4240	85	19.0	0.0004	4386.82	136.85	N/A



Luminous Flux (lm)	4386.82	Chrom x	0.3707
Chrom y	0.3712	Chrom u	0.2209
Chrom v	0.3318	Duv	0.0004
Chrom u'	0.2209	Chrom v'	0.4976
CCT (K)	4240	Luminous Efficacy (lm/W)	136.85
Ra	85	R1	84.0
R2	92.0	R3	95.0
R4	82.0	R5	83.0
R6	87.0	R7	87.0
R8	68.0	R9	19.0
R10	78.0	R11	81.0
R12	60.0	R13	86.0
R14	98.0	R15	78.0
Rf	84	Rg	94
Rcs,h1	-11%		



Integrating Sphere Test (Cont'd)

TM-30 Report

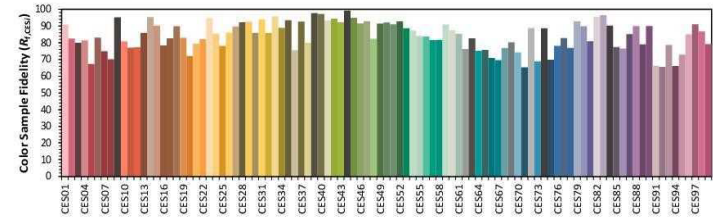
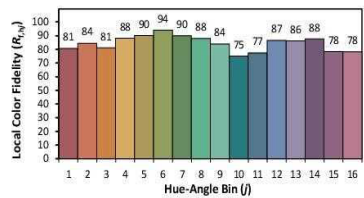
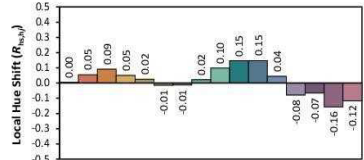
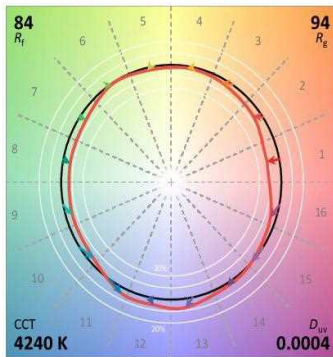
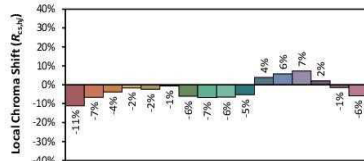
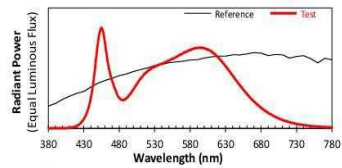
ANSI/IES TM-30-18 Color Rendition Report

Source: STW8A2PD-XX

Manufacturer: P.Q.L., Inc.

Date: 3/16/2022

Model: 55117-35W-40K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3707
y 0.3712
u' 0.2209
v' 0.4976

CIE 13.3-1995
(CRI)
 R_a 85
 R_9 19

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



Integrating Sphere Test

Model No.	55117-35W-50K		Sample ID.	4773522
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.

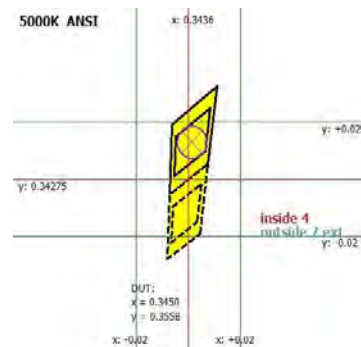
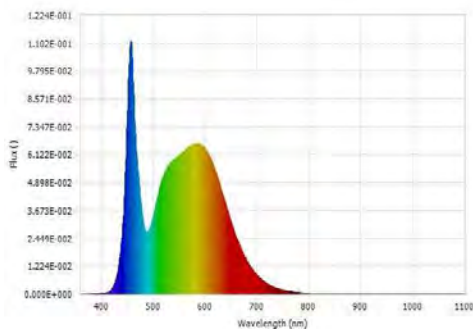
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption 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
24.8	120.1	60	0.2768	33.015	0.9930	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
5019	83	9.0	0.0021	4161.7	126.05	N/A



Luminous Flux (lm)	4161.7	Chrom x	0.3450
Chrom y	0.3558	Chrom u	0.2097
Chrom v	0.3244	Duv	0.0021
Chrom u'	0.2097	Chrom v'	0.4867
CCT (K)	5018	Luminous Efficacy (lm/W)	126.05
Ra	83	R1	82.0
R2	90.0	R3	94.0
R4	81.0	R5	81.0
R6	85.0	R7	86.0
R8	66.0	R9	9.0
R10	75.0	R11	79.0
R12	59.0	R13	84.0
R14	97.0	R15	77.0
Rf	83	Rg	94
Rcs,h1	-13%		



Integrating Sphere Test (Cont'd)

TM-30 Report

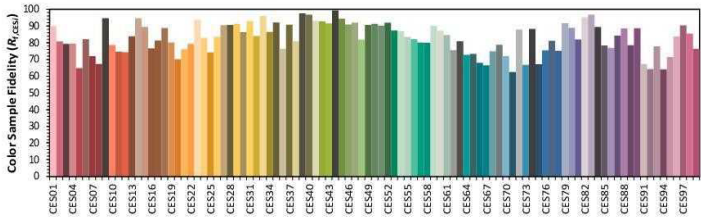
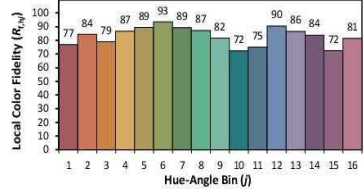
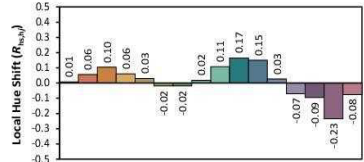
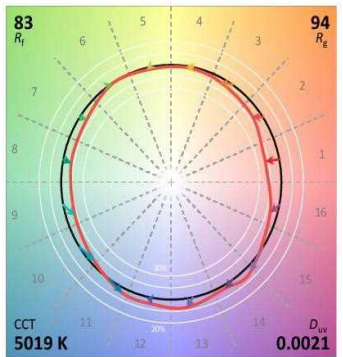
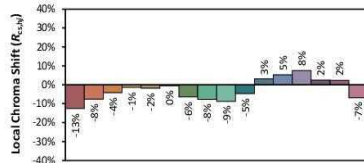
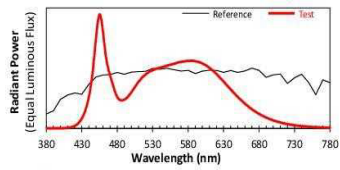
ANSI/IES TM-30-18 Color Rendition Report

Source: STW8A2PD-XX

Manufacturer: P.Q.L., Inc.

Date: 3/16/2022

Model: 55117-35W-50K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3450
 y 0.3558
 u' 0.2097
 v' 0.4867

CIE 13.3-1995
 (CRI)
 R_a 83
 R₉ 9

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



Integrating Sphere Test

Model No.	55117-30W-35K		Sample ID.	4773522
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.

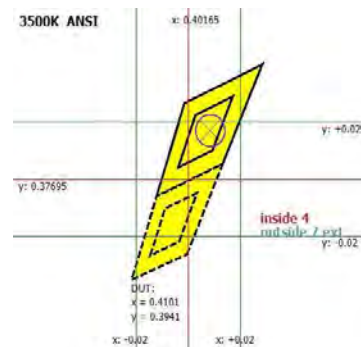
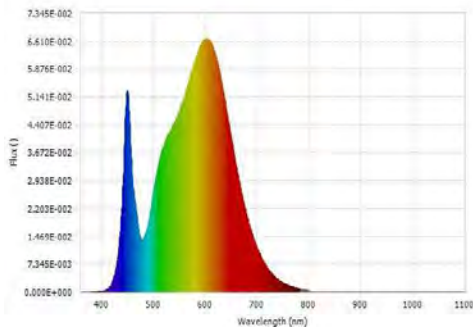
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption 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
24.8	120.11	60	0.2409	28.663	0.9907	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3424	84	16.0	0.0004	3635.16	126.82	N/A



Luminous Flux (lm)	3635.16	Chrom x	0.4101
Chrom y	0.3941	Chrom u	0.2374
Chrom v	0.3422	Duv	0.0004
Chrom u'	0.2374	Chrom v'	0.5134
CCT (K)	3424	Luminous Efficacy (lm/W)	126.82
Ra	84	R1	83.0
R2	90.0	R3	96.0
R4	84.0	R5	83.0
R6	87.0	R7	86.0
R8	66.0	R9	16.0
R10	76.0	R11	84.0
R12	68.0	R13	84.0
R14	97.0	R15	76.0
Rf	86	Rg	98
Rcs,h1	-11%		



Integrating Sphere Test (Cont'd)

TM-30 Report

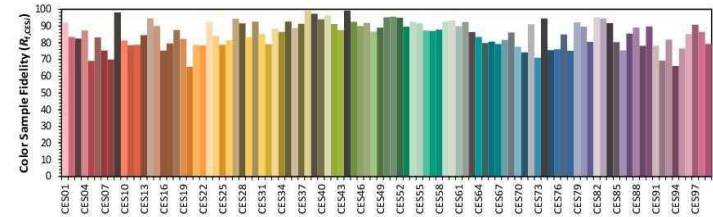
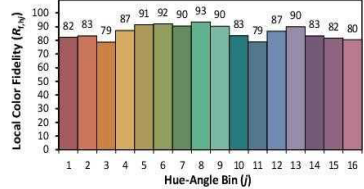
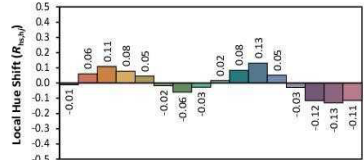
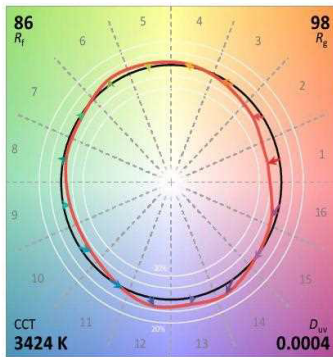
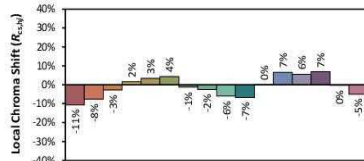
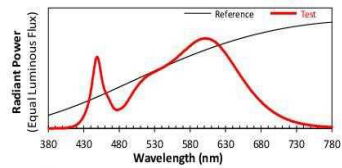
ANSI/IES TM-30-18 Color Rendition Report

Source: STW8A2PD-XX

Manufacturer: P.Q.L., Inc.

Date: 3/16/2022

Model: 55117-30W-35K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4101
 y 0.3941
 u' 0.2374
 v' 0.5134

CIE 13.3-1995
 (CRI)
 R_a 84
 R_9 16

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



Integrating Sphere Test

Model No.	55117-25W-35K		Sample ID.	4773522
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.

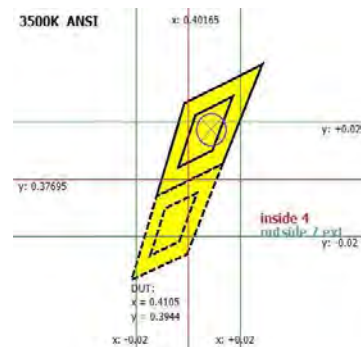
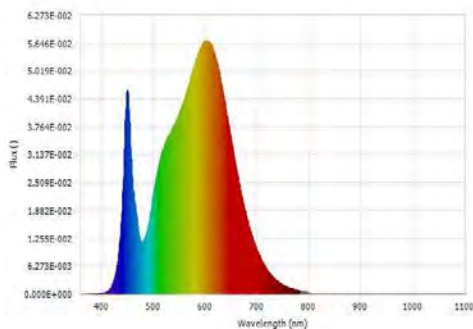
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption 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
24.8	120.13	60	0.1995	23.638	0.9863	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3418	84	17.0	0.0005	3103.97	131.31	N/A



Luminous Flux (lm)	3103.97	Chrom x	0.4105
Chrom y	0.3944	Chrom u	0.2376
Chrom v	0.3424	Duv	0.0005
Chrom u'	0.2376	Chrom v'	0.5136
CCT (K)	3418	Luminous Efficacy (lm/W)	131.31
Ra	84	R1	83.0
R2	90.0	R3	96.0
R4	84.0	R5	83.0
R6	87.0	R7	87.0
R8	66.0	R9	17.0
R10	76.0	R11	84.0
R12	68.0	R13	84.0
R14	98.0	R15	76.0
Rf	86	Rg	98
Rcs,h1	-11%		



Integrating Sphere Test (Cont'd)

TM-30 Report

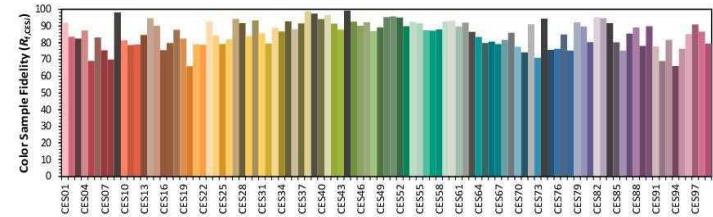
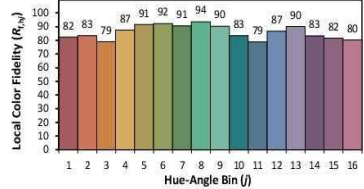
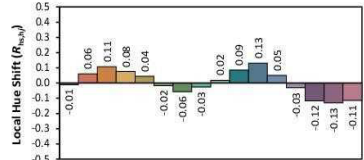
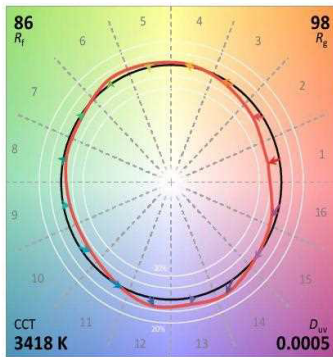
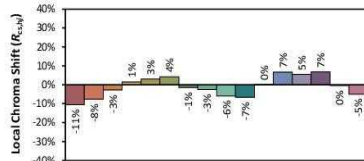
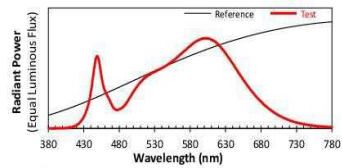
ANSI/IES TM-30-18 Color Rendition Report

Source: STW8A2PD-XX

Manufacturer: P.Q.L., Inc.

Date: 3/16/2022

Model: 55117-25W-35K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4105
 y 0.3944
 u' 0.2376
 v' 0.5136

CIE 13.3-1995
 (CRI)
 R_a 84
 R_9 17

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



Goniophotometer Test

Model No.	55117-35W-35K	Sample ID.	4773522
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 assume to be brand new without seasoning.
- 2.Photometric parameters were measured using a type C goniophotometer and software.
- 3.The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The reference standard lamp is rated current 3.8581A, 3.8558A, 3.8466A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
- 4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonallumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the largest dimension of the test SSL product.

Goniophotometer Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.9	120.06	60	0.2814	33.582	0.9940	8.53%	Horizontal

Test Results

Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
4085.6	81.10%	N/A	105.5	94.3	121.66

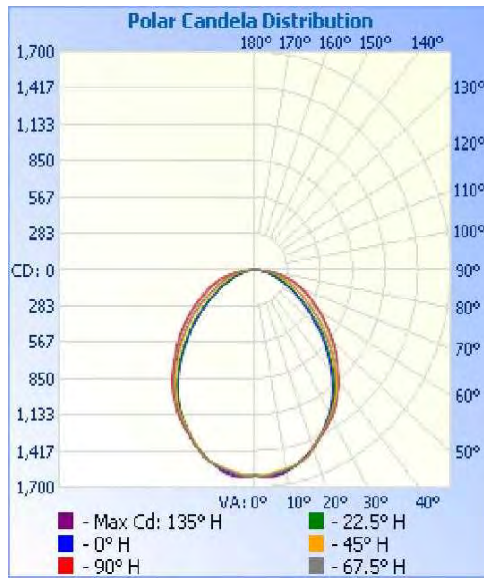
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
18.5	21.9	1.22	1.24

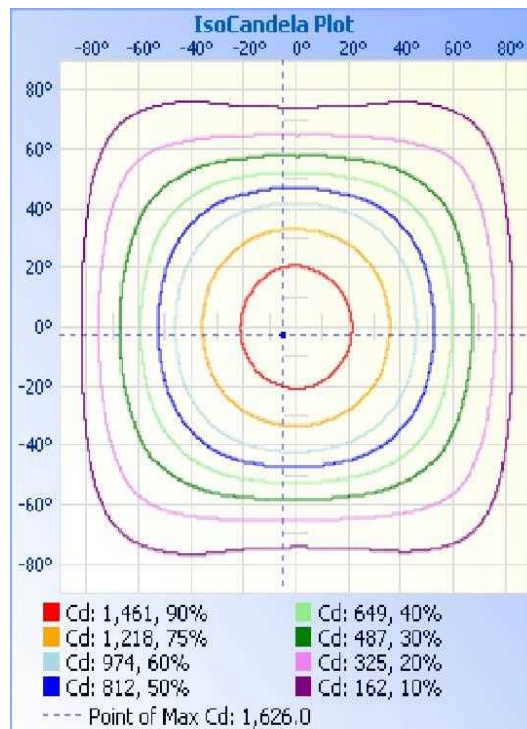


Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot





Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1229.9	30.10%
0-40	1981.8	48.50%
0-60	3311.6	81.10%
60-90	761.8	18.60%
70-100	338.2	8.30%
90-120	3.9	0.10%
0-90	4073.4	99.70%
90-180	12.1	0.30%
0-180	4085.6	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	38.6	0.90%	90-95	1.0	0.00%
5-10	114.5	2.80%	95-100	0.7	0.00%
10-15	185.8	4.50%	100-105	0.6	0.00%
15-20	249.1	6.10%	105-110	0.5	0.00%
20-25	300.3	7.40%	110-115	0.5	0.00%
25-30	341.7	8.40%	115-120	0.6	0.00%
30-35	370.1	9.10%	120-125	0.6	0.00%
35-40	381.7	9.30%	125-130	0.7	0.00%
40-45	375.1	9.20%	130-135	0.8	0.00%
45-50	353.9	8.70%	135-140	0.8	0.00%
50-55	321.0	7.90%	140-145	0.9	0.00%
55-60	279.8	6.80%	145-150	0.9	0.00%
60-65	234.6	5.70%	150-155	0.8	0.00%
65-70	190.8	4.70%	155-160	0.8	0.00%
70-75	150.3	3.70%	160-165	0.7	0.00%
75-80	108.1	2.60%	165-170	0.6	0.00%
80-85	61.5	1.50%	170-175	0.4	0.00%
85-90	16.5	0.40%	175-180	0.1	0.00%



Goniophotometer Test (Cont'd)
Intensity Data(cd)

Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1607	1607	1607	1607	1607	1607	1607	1607	1607	1607	1607	1607	1607	1607	1607	1607	1607
1	1607	1606	1607	1616	1613	1616	1608	1602	1605	1607	1607	1618	1614	1617	1612	1603	1602
2	1611	1609	1608	1620	1618	1621	1617	1611	1608	1609	1607	1620	1618	1621	1616	1611	1608
3	1610	1611	1604	1617	1618	1624	1622	1615	1609	1608	1604	1617	1615	1623	1619	1615	1610
4	1611	1606	1603	1613	1614	1626	1623	1616	1611	1606	1601	1613	1613	1624	1625	1617	1609
5	1609	1604	1596	1608	1613	1624	1626	1619	1609	1602	1593	1607	1612	1623	1624	1617	1610
6	1608	1599	1591	1601	1608	1623	1625	1616	1607	1598	1587	1600	1606	1620	1624	1616	1607
7	1605	1597	1585	1597	1604	1617	1617	1612	1602	1593	1583	1594	1602	1616	1621	1611	1604
8	1603	1595	1580	1593	1599	1611	1614	1607	1600	1589	1578	1587	1597	1611	1615	1608	1600
9	1598	1592	1578	1589	1595	1606	1609	1603	1594	1585	1574	1584	1590	1606	1608	1604	1599
10	1592	1586	1576	1582	1590	1598	1599	1594	1588	1578	1568	1577	1581	1596	1600	1596	1591
11	1584	1581	1572	1579	1582	1590	1591	1584	1580	1575	1566	1571	1575	1586	1590	1584	1584
12	1577	1579	1569	1576	1572	1579	1579	1574	1572	1569	1560	1568	1565	1575	1576	1576	1576
13	1568	1571	1564	1569	1567	1569	1568	1560	1562	1560	1556	1559	1559	1564	1566	1565	1566
14	1556	1563	1558	1564	1557	1556	1554	1550	1551	1554	1549	1553	1550	1554	1555	1553	1557
15	1545	1552	1547	1554	1548	1546	1542	1538	1538	1542	1540	1546	1542	1543	1542	1542	1545
16	1533	1540	1539	1545	1541	1534	1530	1524	1527	1531	1531	1537	1533	1532	1529	1528	1534
17	1519	1527	1529	1534	1530	1524	1519	1511	1514	1520	1518	1523	1524	1520	1515	1515	1522
18	1505	1513	1513	1520	1518	1512	1504	1498	1499	1502	1503	1511	1509	1507	1502	1499	1505
19	1492	1499	1497	1504	1504	1499	1491	1481	1484	1487	1485	1495	1494	1493	1488	1485	1490
20	1478	1482	1480	1487	1489	1484	1476	1467	1468	1469	1465	1477	1476	1478	1472	1467	1474
25	1387	1394	1394	1402	1407	1403	1395	1382	1377	1377	1378	1391	1395	1398	1396	1388	1389
30	1295	1303	1315	1330	1336	1330	1313	1293	1284	1285	1294	1312	1320	1318	1310	1294	1294
35	1176	1196	1216	1238	1243	1230	1207	1177	1163	1173	1195	1219	1230	1223	1206	1183	1178
40	1035	1060	1095	1126	1136	1122	1091	1044	1022	1038	1072	1106	1120	1112	1086	1047	1034
45	882	910	961	1002	1012	999	960	900	870	887	936	980	994	987	951	898	878
50	725	761	826	878	890	873	820	750	712	738	801	855	872	860	813	749	722
55	572	611	688	750	768	744	681	602	560	592	666	731	754	737	679	606	575
60	439	472	554	627	650	624	549	466	428	457	534	608	636	616	548	470	438
65	326	355	432	512	542	513	430	350	316	340	414	493	526	500	426	350	323
70	230	257	332	416	446	415	330	253	222	245	316	400	433	406	328	255	231
75	152	178	249	322	346	319	248	174	145	166	234	309	341	319	247	177	153
80	94	109	168	213	227	211	166	108	79	99	156	206	224	212	167	108	83
85	31	49	75	91	92	89	73	48	28	43	68	90	96	94	77	50	31
90	3	2	2	2	2	3	2	2	2	2	2	3	3	3	3	3	2
95	1	2	2	1	2	2	2	1	1	1	1	2	2	2	1	1	1
100	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
105	1	1	1	1	2	2	1	1	1	1	1	1	2	1	1	1	1
110	1	0	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
115	1	0	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
120	1	1	2	1	1	2	1	1	1	1	1	1	2	1	1	1	1
125	1	2	1	2	2	2	1	2	2	2	1	1	2	1	1	2	1
130	1	2	2	1	2	2	2	2	2	1	2	2	2	2	2	2	2
135	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
140	2	3	3	3	2	2	2	3	2	3	2	2	2	2	2	3	3
145	3	3	3	3	3	2	3	3	3	3	2	3	3	2	3	3	3
150	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3
155	4	4	3	3	4	4	3	4	3	4	4	3	3	3	4	4	4
160	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
165	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
170	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
175	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6



Goniophotometer Test

Model No.	55117-35W-50K	Sample ID.	4773522
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 assume to be brand new without seasoning.
- 2.Photometric parameters were measured using a type C goniophotometer and software.
- 3.The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The reference standard lamp is rated current 3.8581A, 3.8558A, 3.8466A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
- 4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonallumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the largest dimension of the test SSL product.

Goniophotometer Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	120.07	60	0.2767	33.03	0.9941	8.31%	Horizontal

Test Results

Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
4164.5	80.80%	N/A	106.6	94.9	126.08

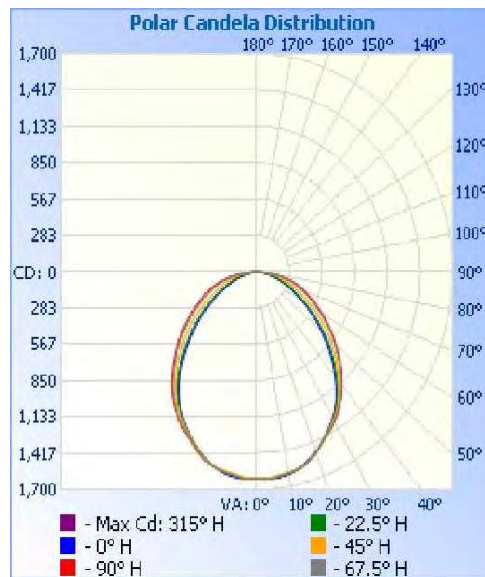
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
18.7	21.9	1.22	1.26

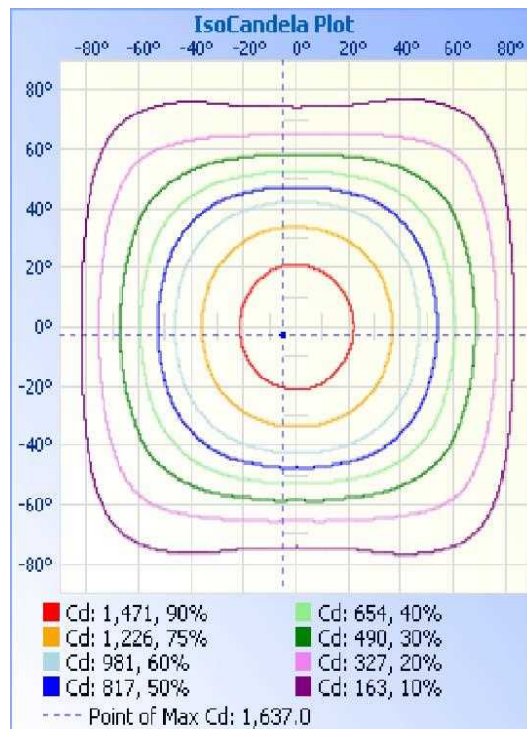


Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot





Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1244.0	29.90%
0-40	2009.0	48.20%
0-60	3369.0	80.90%
60-90	783.3	18.80%
70-100	348.9	8.40%
90-120	4.0	0.10%
0-90	4152.2	99.70%
90-180	12.3	0.30%
0-180	4164.5	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	38.8	0.90%	90-95	1.0	0.00%
5-10	115.3	2.80%	95-100	0.8	0.00%
10-15	187.4	4.50%	100-105	0.6	0.00%
15-20	251.8	6.00%	105-110	0.5	0.00%
20-25	304.0	7.30%	110-115	0.5	0.00%
25-30	346.7	8.30%	115-120	0.6	0.00%
30-35	376.2	9.00%	120-125	0.6	0.00%
35-40	388.8	9.30%	125-130	0.6	0.00%
40-45	382.9	9.20%	130-135	0.8	0.00%
45-50	361.7	8.70%	135-140	0.9	0.00%
50-55	328.7	7.90%	140-145	0.9	0.00%
55-60	286.6	6.90%	145-150	0.9	0.00%
60-65	240.3	5.80%	150-155	0.8	0.00%
65-70	195.8	4.70%	155-160	0.8	0.00%
70-75	154.3	3.70%	160-165	0.8	0.00%
75-80	111.3	2.70%	165-170	0.6	0.00%
80-85	64.0	1.50%	170-175	0.4	0.00%
85-90	17.5	0.40%	175-180	0.1	0.00%



Goniophotometer Test (Cont'd)
Intensity Data(cd)

Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616
1	1616	1615	1616	1625	1623	1624	1618	1612	1612	1617	1616	1626	1622	1626	1618	1615	1613
2	1621	1619	1618	1629	1628	1630	1625	1621	1615	1618	1617	1628	1626	1630	1627	1619	1618
3	1621	1621	1619	1628	1629	1635	1630	1626	1617	1616	1616	1627	1627	1634	1631	1625	1620
4	1623	1618	1614	1625	1626	1635	1634	1626	1618	1616	1610	1621	1623	1633	1634	1626	1621
5	1619	1615	1611	1618	1624	1636	1635	1628	1616	1610	1604	1614	1622	1635	1637	1628	1619
6	1619	1614	1603	1614	1620	1634	1635	1627	1615	1606	1597	1608	1616	1633	1634	1627	1617
7	1616	1608	1598	1609	1617	1631	1632	1623	1611	1602	1593	1602	1614	1630	1632	1626	1615
8	1612	1606	1597	1604	1612	1626	1628	1620	1609	1598	1585	1597	1609	1625	1627	1620	1612
9	1610	1601	1592	1601	1608	1621	1621	1612	1604	1596	1583	1596	1603	1616	1620	1615	1610
10	1603	1596	1590	1596	1604	1612	1615	1606	1599	1592	1581	1590	1597	1608	1611	1607	1604
11	1599	1595	1585	1593	1594	1605	1604	1596	1593	1588	1577	1585	1588	1599	1602	1599	1598
12	1591	1590	1584	1588	1588	1594	1593	1587	1581	1583	1574	1581	1581	1590	1591	1587	1589
13	1583	1586	1580	1583	1580	1583	1580	1574	1572	1575	1570	1574	1574	1577	1579	1577	1582
14	1573	1578	1574	1578	1571	1570	1568	1562	1562	1567	1563	1568	1565	1567	1567	1567	1570
15	1560	1568	1565	1569	1563	1560	1558	1551	1552	1558	1553	1562	1556	1558	1558	1555	1562
16	1548	1558	1557	1561	1555	1550	1544	1539	1541	1547	1545	1554	1549	1549	1546	1542	1550
17	1536	1546	1546	1550	1544	1536	1532	1528	1525	1532	1533	1541	1541	1537	1533	1532	1538
18	1522	1530	1531	1536	1532	1526	1520	1512	1513	1517	1517	1527	1530	1524	1520	1518	1524
19	1509	1516	1515	1522	1519	1513	1507	1498	1498	1501	1500	1512	1514	1512	1507	1502	1510
20	1494	1498	1497	1505	1502	1498	1493	1481	1482	1484	1484	1494	1496	1496	1493	1487	1492
25	1409	1414	1413	1421	1421	1418	1410	1399	1394	1397	1399	1413	1420	1419	1420	1409	1409
30	1317	1324	1333	1347	1351	1342	1330	1309	1301	1307	1317	1337	1347	1346	1336	1319	1317
35	1202	1218	1236	1253	1255	1244	1220	1191	1180	1196	1221	1246	1257	1250	1233	1208	1201
40	1056	1081	1114	1141	1148	1135	1101	1058	1040	1061	1099	1134	1152	1145	1118	1078	1061
45	899	930	977	1015	1025	1010	968	911	882	910	962	1008	1029	1018	985	929	903
50	742	775	838	888	899	879	828	757	724	758	826	882	905	891	844	778	744
55	591	622	699	758	774	750	687	608	573	611	690	757	784	766	705	628	591
60	450	483	560	631	653	627	552	471	437	472	554	632	663	642	570	488	451
65	331	361	436	515	541	512	431	352	322	353	431	516	552	527	447	367	333
70	237	260	334	416	445	415	330	254	228	255	332	420	458	430	347	268	238
75	158	180	249	321	345	319	246	174	149	175	248	326	360	337	261	185	156
80	85	110	168	213	228	211	164	106	81	106	167	218	241	228	180	116	87
85	33	49	76	92	95	91	72	47	29	46	75	96	104	102	86	54	33
90	3	3	3	2	2	3	2	1	2	2	2	2	2	2	3	3	3
95	1	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	1
100	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1
105	1	1	1	1	1	1	1	1	0	1	1	2	1	1	1	1	0
110	1	1	1	1	2	1	1	1	1	1	1	2	2	1	1	1	1
115	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1
120	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1
125	1	1	2	2	1	1	1	1	1	1	2	2	1	1	1	2	1
130	2	2	2	2	2	2	2	1	1	1	2	1	1	2	1	2	2
135	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
140	2	2	3	3	3	3	2	3	2	3	3	2	3	3	2	3	3
145	2	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3
150	3	3	3	3	4	3	3	3	3	4	3	3	3	3	3	3	3
155	4	3	3	4	4	4	4	4	4	4	4	4	4	3	3	4	3
160	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	4	4
165	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
170	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
175	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6



THD and PF Test

Model No.	55117-35W-35K	Sample ID.	4773522
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
24.9	120.06	60	0.2814	33.58	0.9940	8.53%	Horizontal
24.9	277.12	60	0.1275	34.41	0.9739	9.38%	Horizontal



THD and PF Test

Model No.	55117-35W-40K	Sample ID.	4773522
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
24.9	120.01	60	0.2401	28.59	0.9917	10.04%	Horizontal
24.9	277.11	60	0.1119	29.95	0.9659	10.11%	Horizontal



THD and PF Test

Model No.	55117-35W-50K	Sample ID.	4773522
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
24.9	120.07	60	0.2767	33.02	0.9941	8.30%	Horizontal
24.9	277.09	60	0.1256	33.86	0.9732	9.36%	Horizontal



THD and PF Test

Model No.	55117-30W-35K	Sample ID.	4773522
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
24.9	120.01	60	0.2401	28.59	0.9917	10.04%	Horizontal
24.9	277.11	60	0.1119	29.95	0.9659	10.11%	Horizontal



THD and PF Test

Model No.	55117-25W-35K	Sample ID.	4773522
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
24.9	120.04	60	0.1992	23.63	0.9881	11.79%	Horizontal
24.9	277.11	60	0.0966	25.47	0.9541	11.38%	Horizontal



In-Situ Temperature Measurement Test

Model No.	55117-35W-35K	Sample ID.	4773522
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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
24.5	120.06	60	0.2814	33.582	0.9940	8.53%	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	24.5	25.0				
TMP of Location 1	105	50.2	50.7	0.0024	STW8A2PD-XX	200	105

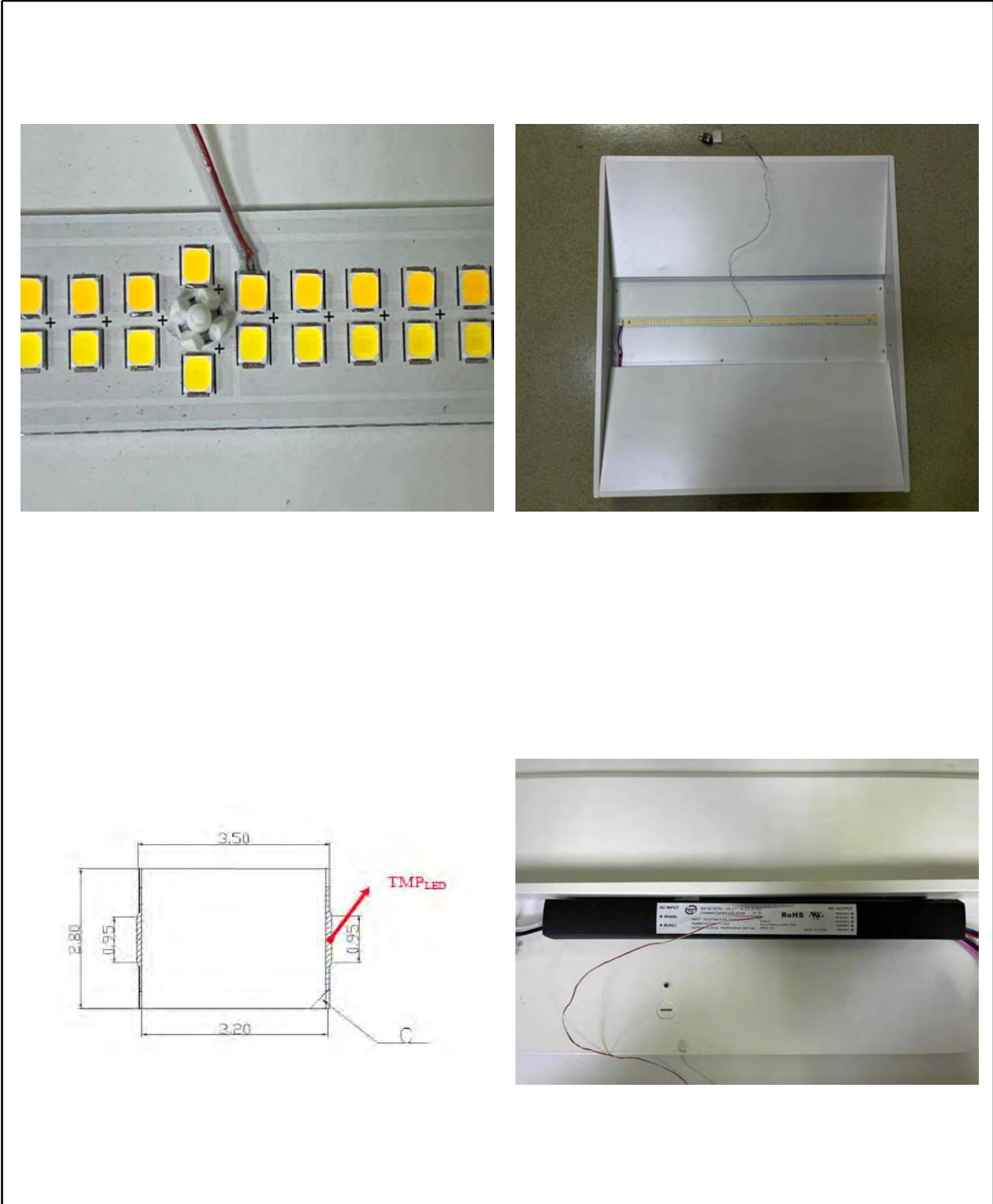
Test Results (Drivers)

Thermocouple Location	Temperature for Driver (°C)		Driver Model Number	Driver Limit Temp (°C)
	Test Result	Test Result (Correct to 25 °C)		
Ambient TEMP	24.5	25.0		
TMP of Location 1	53.8	54.3	SIF 30-I0750 120-277 W D1-S1S2	85



In-Situ Temperature Measurement Test (Cont'd)

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





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