



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

55677

Project Number

4790110305

Report Number

4790110305_28

Test Date

2021-01-18~2022-02-22

Issue Date

2022-02-25

Revision Date

N/A

Prepared By

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Roger Xu

Zhao, Elaine/Xu, Roger

Approved By

Elvis Wu

Wu, Elvis

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)-Luminaires	IES LM-79-2008	≥1500	-10%	3120.29
Minimum Luminaire Efficacy (lm/W)-Luminaires	IES LM-79-2008	≥110	-3%	114.33
Spacing Criteria (0-180°)	IES LM-79-2008	1.0-2.0	±0.1	1.28
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%	78.50%
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3381
Allowable CCT (4000K)	IES LM-79-2008/ANSI C78.377-2015	3985±275	N/A	4045
Minimum CRI	IES LM-79-2008/CIE 13.3-1995	≥80	-1	83
Minimum R9	IES LM-79-2008	≥0	-1	26.0
Minimum Rg	IES LM-79-2008	≥89	-1	98
Minimum Rf	IES LM-79-2008	≥70	-1	82
Rcs,h1	IES LM-79-2008	-12%-23%	-1%	-10%
Unified Glare Rating (UGR)	IES LM-79-2008	≤22	N/A	
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	0.9255
Total Harmonic Distortion (A%)	ANSI C82.77-10-2014	≤20%	5%	15.70%
In-Situ Temperature Measurement Test for LED 1 (°C)	UL1598-2008	≤105	N/A	42.4
In-Situ Temperature Measurement Test for Driver 1 (°C)	UL1598-2008	≤90	N/A	56.3
Max Chromaticity Shift (1000-6000h)	N/A	≤0.004	0.0004	0.0023
Minimum Luminaire Warranty (Years)	N/A	≥5	N/A	≥5



Test List

Sample Received Date:

Test Item	Test Date	Model Number	Tests Conducted By
Integrating Sphere Test	2022-01-18	55677-40W-35K	Yang, Gavin X
Integrating Sphere Test	2021-01-18	55677-40W-40K	Yang, Gavin X
Integrating Sphere Test	2022-01-19	55677-40W-50K	Yang, Gavin X
Integrating Sphere Test	2022-01-18	55677-30W-35K	Yang, Gavin X
Integrating Sphere Test	2022-01-18	55677-25W-35K	Yang, Gavin X
Goniophotometer Test	2022-01-14	55677-40W-35K	Yang, Gavin X
Goniophotometer Test	2022-02-21	55677-40W-50K	Yang, Gavin X
THD and PF Test	2022-01-14	55677-40W-35K	Yang, Gavin X
THD and PF Test	2022-01-14	55677-40W-40K	Yang, Gavin X
THD and PF Test	2022-02-21	55677-40W-50K	Yang, Gavin X
THD and PF Test	2022-01-14	55677-30W-35K	Yang, Gavin X
THD and PF Test	2022-01-14	55677-25W-35K	Yang, Gavin X
In-Situ Temperature Measurement Test	2022-02-22	55677-40W-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: 1X4 Luminaires for Ambient Lighting of Interior Commercial Spaces

Model Number: 55677

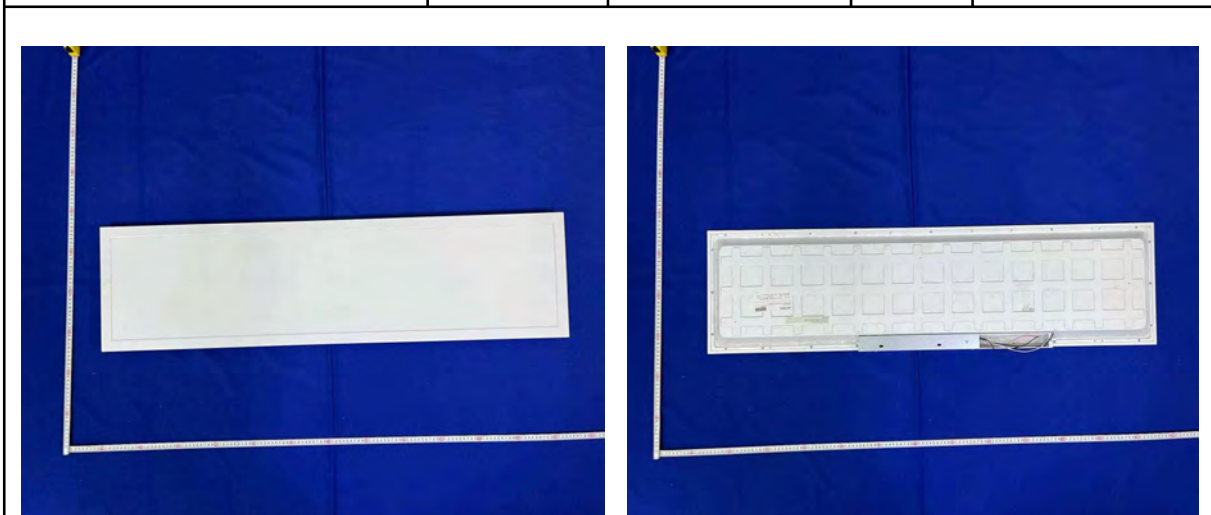
Electrical Parameter: 120-277V, 50/60Hz

LED Package: P2835Y-WXXXXXXXXXXXX-XXXX

Dimming Information: Continuous dimming capability

Products Scaled Value

Model Number	CCT	Luminous Flux	Power	Luminous Efficacy
55677-40W-35K	3500k	4480	40	112
55677-40W-40K	4000k	4520	40	113
55677-40W-50K	5000k	4560	40	114
55677-30W-35K	3500k	3540	30	118
55677-30W-40K	4000k	3570	30	119
55677-30W-50K	5000k	3600	30	120
55677-25W-35K	3500k	3100	25	124
55677-25W-40K	4000k	3125	25	125
55677-25W-50K	5000k	3150	25	126





Integrating Sphere Test

Model No.	55677-40W-35K	Sample ID.	4576024
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.

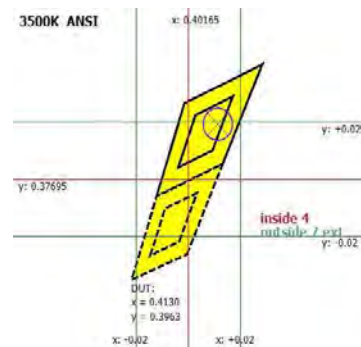
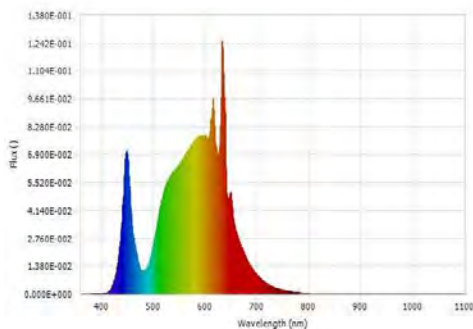
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption 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	120.07	60	0.3298	39.261	0.9915	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3381	83	26.0	0.0008	4536.59	115.55	N/A

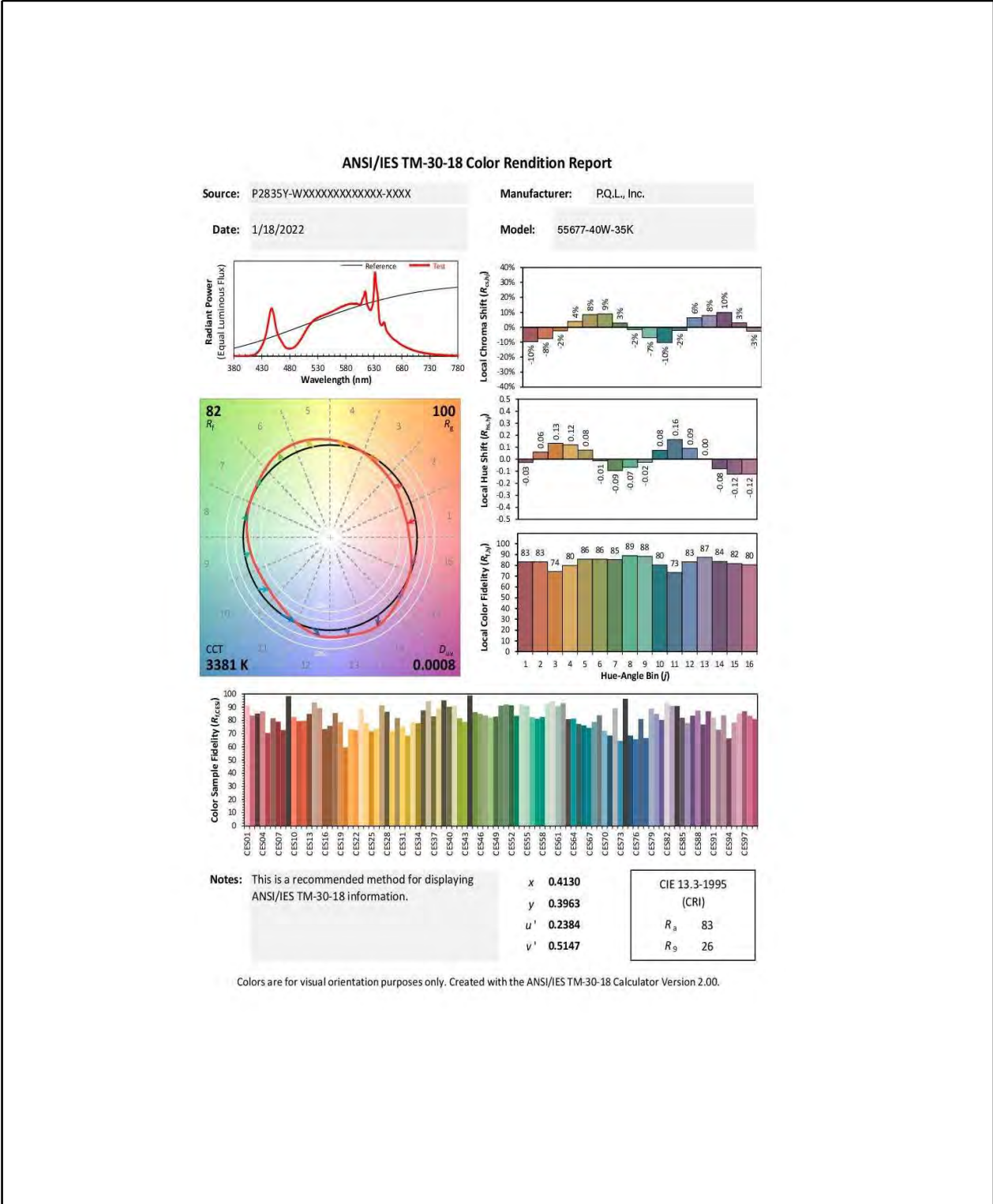


Luminous Flux (lm)	4536.59	Chrom x	0.4130
Chrom y	0.3963	Chrom u	0.2384
Chrom v	0.3431	Duv	0.0008
Chrom u'	0.2384	Chrom v'	0.5147
CCT (K)	3381	Luminous Efficacy (lm/W)	115.55
Ra	83	R1	83.0
R2	86.0	R3	88.0
R4	84.0	R5	81.0
R6	81.0	R7	88.0
R8	71.0	R9	26.0
R10	67.0	R11	83.0
R12	59.0	R13	83.0
R14	93.0	R15	78.0
Rf	82	Rg	100
Rcs,h1	-10%		



Integrating Sphere Test (Cont'd)

tm-30 Report





Integrating Sphere Test

Model No.	55677-40W-40K		Sample ID.	4576024
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.

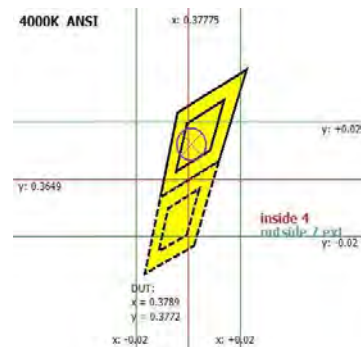
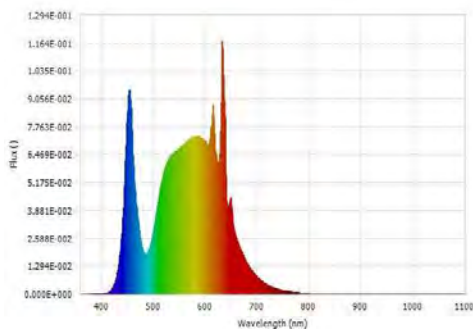
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption 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	0.3156	37.575	0.9913	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4045	85	36.0	0.0006	4750.69	126.43	N/A



Luminous Flux (lm)	4750.69	Chrom x	0.3789
Chrom y	0.3772	Chrom u	0.2239
Chrom v	0.3344	Duv	0.0006
Chrom u'	0.2239	Chrom v'	0.5015
CCT (K)	4045	Luminous Efficacy (lm/W)	126.43
Ra	85	R1	86.0
R2	89.0	R3	89.0
R4	86.0	R5	84.0
R6	83.0	R7	91.0
R8	77.0	R9	36.0
R10	71.0	R11	84.0
R12	56.0	R13	86.0
R14	93.0	R15	82.0
Rf	85	Rg	98
Rcs,h1	-9%		



Integrating Sphere Test (Cont'd)

TM-30 Report

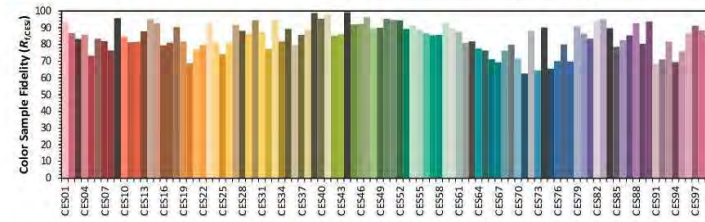
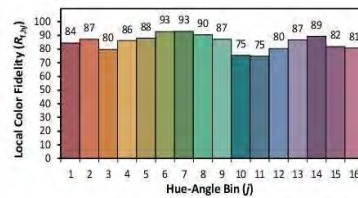
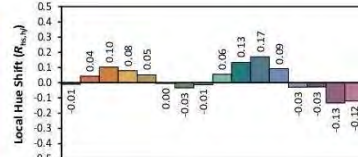
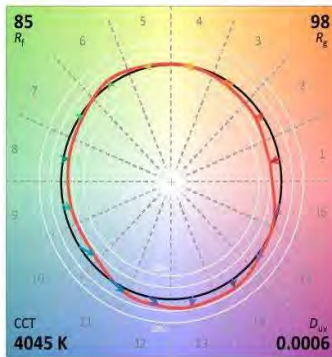
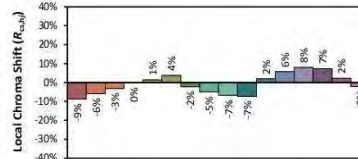
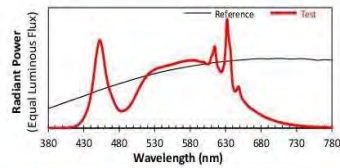
ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX

Manufacturer: P.Q.L., Inc.

Date: 1/18/2022

Model: 55677-40W-40K



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

x 0.3789
 y 0.3772
 u' 0.2239
 v' 0.5015

CIE 13.3-1995
 (CRI)
 R_a 85
 R_g 36

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



Integrating Sphere Test

Model No.	55677-40W-50K	Sample ID.	4576024
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 $25\text{ °C} \pm 1\text{ °C}$. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

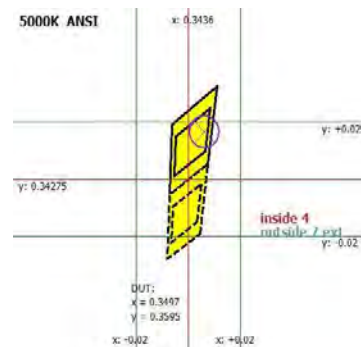
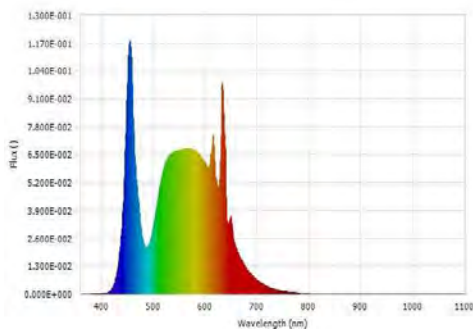
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption 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 (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.8	120.05	60	0.3259	38.784	0.9914	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4860	85	35.0	0.0021	4532.48	116.86	N/A



Luminous Flux (lm)	4532.48	Chrom x	0.3497
Chrom y	0.3595	Chrom u	0.2115
Chrom v	0.3261	Duv	0.0021
Chrom u'	0.2115	Chrom v'	0.4891
CCT (K)	4860	Luminous Efficacy (lm/W)	116.86
Ra	85	R1	84.0
R2	88.0	R3	88.0
R4	85.0	R5	83.0
R6	82.0	R7	92.0
R8	78.0	R9	35.0
R10	69.0	R11	82.0
R12	51.0	R13	85.0
R14	93.0	R15	81.0
Rf	84	Rg	98
Rcs,h1	-10%		



Integrating Sphere Test (Cont'd)

TM-30 Report

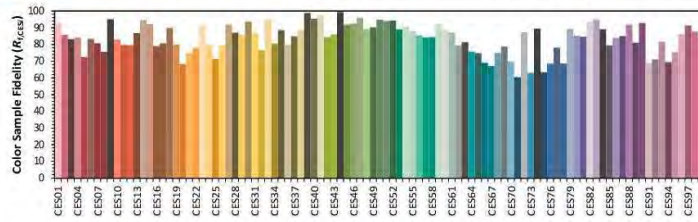
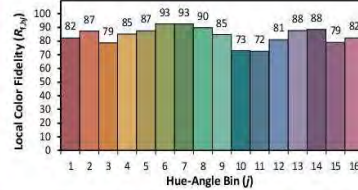
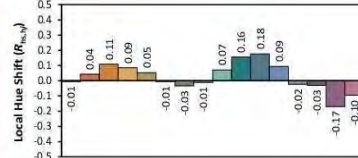
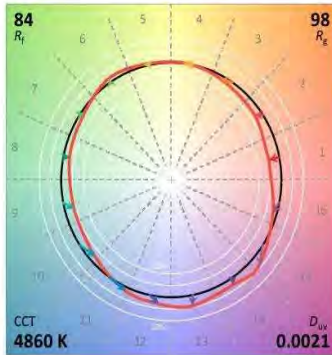
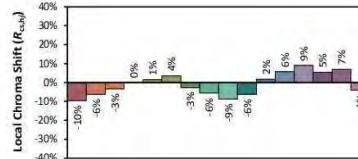
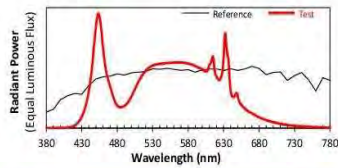
ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX

Manufacturer: P.Q.L., Inc.

Date: 1/19/2022

Model: 55677-40W-50K



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

x 0.3497
 y 0.3595
 u' 0.2115
 v' 0.4891

CIE 13.3-1995
 (CRI)
 R_a 85
 R₉ 35

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



Integrating Sphere Test

Model No.	55677-30W-35K		Sample ID.	4576024
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.

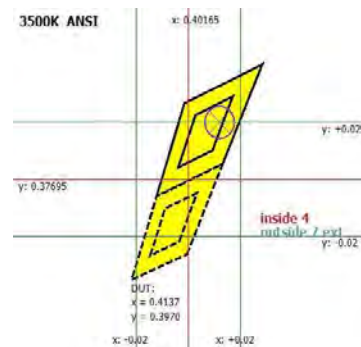
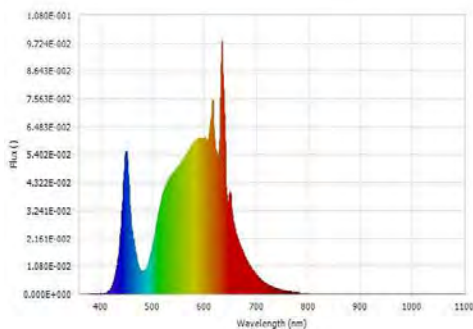
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using 4π geometry. The self-absorption 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	0.2451	29	0.9853	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3373	83	26.0	0.0010	3541.91	122.13	N/A



Luminous Flux (lm)	3541.91	Chrom x	0.4137
Chrom y	0.3970	Chrom u	0.2386
Chrom v	0.3434	Duv	0.0010
Chrom u'	0.2386	Chrom v'	0.5151
CCT (K)	3373	Luminous Efficacy (lm/W)	122.13
Ra	83	R1	83.0
R2	86.0	R3	88.0
R4	84.0	R5	82.0
R6	82.0	R7	88.0
R8	71.0	R9	26.0
R10	67.0	R11	83.0
R12	59.0	R13	83.0
R14	93.0	R15	78.0
Rf	83	Rg	100
Rcs,h1	-10%		



Integrating Sphere Test (Cont'd)

TM-30 Report

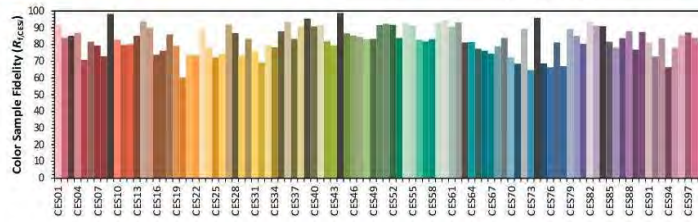
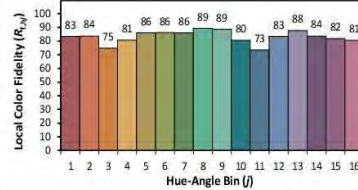
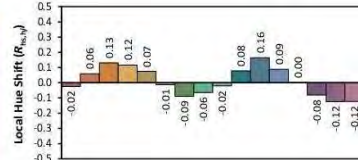
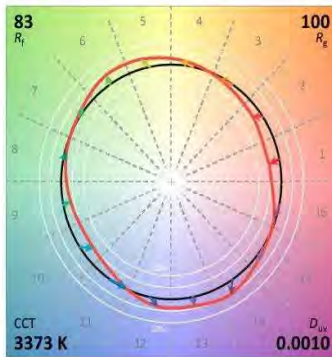
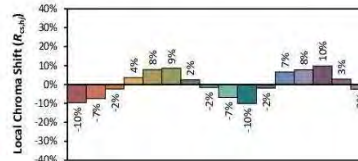
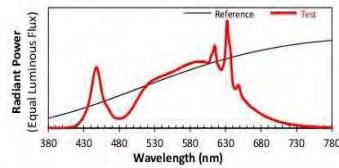
ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX

Manufacturer: P.Q.L., Inc.

Date: 1/18/2022

Model: 55677-30W-35K



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

x 0.4137
 y 0.3970
 u' 0.2386
 v' 0.5151

CIE 13.3-1995
 (CRI)
 R_a 83
 R₉ 26

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



Integrating Sphere Test

Model No.	55677-25W-35K	Sample ID.	4576024
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.

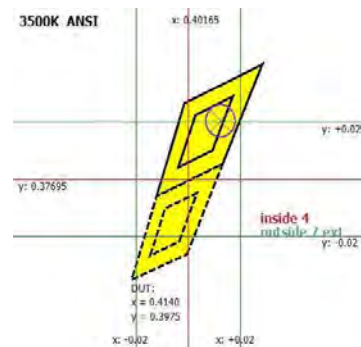
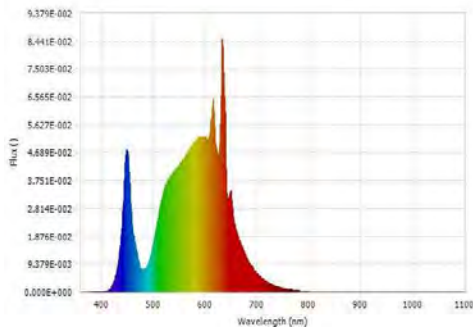
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Integrating Sphere Test Conditions

Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.8	120.05	60	0.2111	24.973	0.9854	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3372	83	27.0	0.0011	3120.29	124.95	N/A



Luminous Flux (lm)	3120.29	Chrom x	0.4140
Chrom y	0.3975	Chrom u	0.2385
Chrom v	0.3436	Duv	0.0011
Chrom u'	0.2385	Chrom v'	0.5154
CCT (K)	3372	Luminous Efficacy (lm/W)	124.95
Ra	83	R1	83.0
R2	87.0	R3	89.0
R4	84.0	R5	82.0
R6	82.0	R7	88.0
R8	71.0	R9	27.0
R10	67.0	R11	83.0
R12	59.0	R13	83.0
R14	93.0	R15	78.0
Rf	83	Rg	100
Rcs,h1	-10%		



Integrating Sphere Test (Cont'd)

TM-30 Report

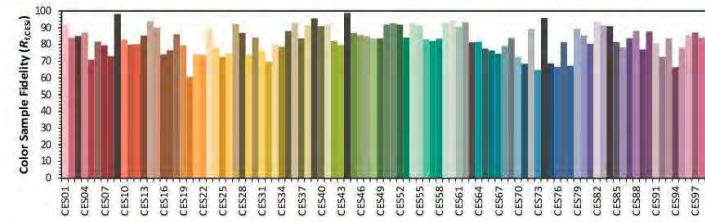
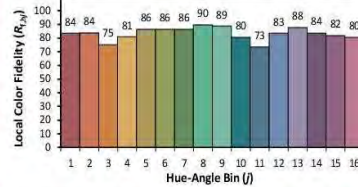
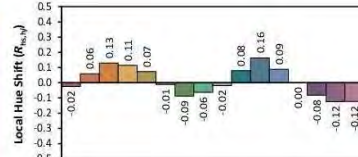
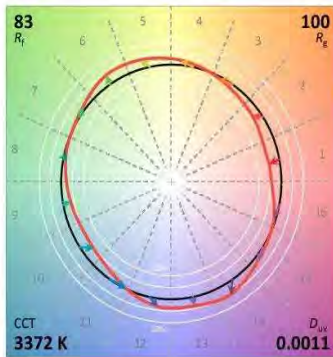
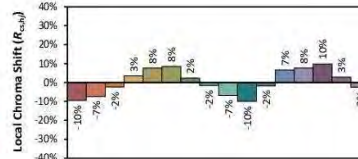
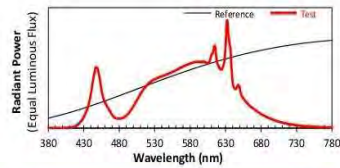
ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX

Manufacturer: P.Q.L., Inc.

Date: 1/18/2022

Model: 55677-25W-35K



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

x 0.4140
 y 0.3975
 u' 0.2385
 v' 0.5154

CIE 13.3-1995
 (CRI)
 R_a 83
 R_9 27

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



Goniophotometer Test

Model No.	55677-40W-35K	Sample ID.	4576024
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
25.0	120.06	60	0.3290	39.19	0.9922	7.85%	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	
4480.4	78.50%	N/A	111.8	113.5	114.33

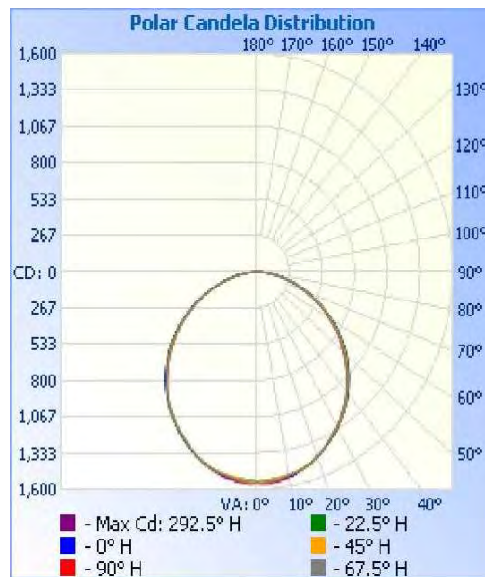
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
N/A	N/A	1.28	1.26

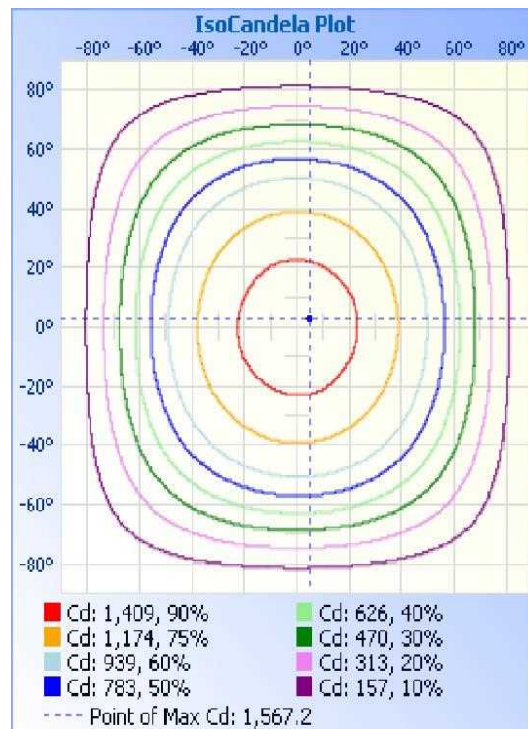


Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot





Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1204.6	26.90%
0-40	1977.6	44.10%
0-60	3513.2	78.40%
60-90	954.3	21.30%
70-100	405.5	9.10%
90-120	4.5	0.10%
0-90	4467.5	99.70%
90-180	12.9	0.30%
0-180	4480.4	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	37.0	0.80%	90-95	1.2	0.00%
5-10	110.0	2.50%	95-100	0.8	0.00%
10-15	179.1	4.00%	100-105	0.7	0.00%
15-20	241.8	5.40%	105-110	0.6	0.00%
20-25	295.9	6.60%	110-115	0.6	0.00%
25-30	340.8	7.60%	115-120	0.6	0.00%
30-35	375.3	8.40%	120-125	0.6	0.00%
35-40	397.6	8.90%	125-130	0.7	0.00%
40-45	405.6	9.10%	130-135	0.8	0.00%
45-50	400.4	8.90%	135-140	0.8	0.00%
50-55	381.4	8.50%	140-145	0.9	0.00%
55-60	348.2	7.80%	145-150	0.9	0.00%
60-65	303.0	6.80%	150-155	0.9	0.00%
65-70	247.9	5.50%	155-160	0.8	0.00%
70-75	188.0	4.20%	160-165	0.7	0.00%
75-80	127.0	2.80%	165-170	0.6	0.00%
80-85	69.1	1.50%	170-175	0.4	0.00%
85-90	19.4	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	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546	1546
1	1541	1540	1544	1555	1560	1553	1546	1544	1540	1538	1544	1554	1560	1554	1546	1546	1541
2	1542	1538	1542	1554	1563	1558	1552	1548	1540	1536	1542	1554	1561	1560	1553	1548	1542
3	1542	1535	1539	1553	1563	1562	1557	1549	1539	1532	1538	1551	1560	1565	1557	1552	1543
4	1541	1531	1534	1547	1561	1566	1559	1551	1539	1530	1532	1545	1559	1566	1563	1553	1540
5	1541	1529	1530	1544	1556	1566	1561	1552	1539	1527	1528	1541	1554	1567	1563	1553	1542
6	1540	1526	1527	1540	1553	1564	1561	1550	1537	1525	1523	1537	1551	1565	1562	1552	1539
7	1538	1525	1522	1535	1548	1560	1559	1548	1535	1523	1519	1532	1546	1560	1560	1550	1538
8	1536	1524	1518	1529	1544	1556	1555	1547	1533	1521	1517	1529	1541	1555	1555	1547	1536
9	1531	1521	1516	1524	1538	1549	1550	1542	1527	1518	1513	1522	1537	1547	1551	1543	1530
10	1526	1516	1510	1518	1531	1542	1542	1534	1524	1514	1508	1517	1532	1539	1544	1538	1526
11	1522	1512	1510	1515	1527	1531	1533	1529	1517	1511	1506	1512	1524	1532	1534	1531	1522
12	1514	1508	1505	1509	1518	1524	1524	1520	1512	1504	1505	1509	1516	1522	1526	1524	1515
13	1507	1502	1505	1505	1513	1513	1515	1513	1504	1500	1500	1504	1510	1513	1514	1514	1509
14	1502	1496	1499	1502	1504	1504	1503	1504	1496	1493	1495	1499	1503	1503	1504	1506	1502
15	1494	1490	1493	1498	1495	1493	1491	1494	1489	1484	1490	1494	1494	1494	1491	1494	1492
16	1484	1481	1487	1490	1486	1484	1480	1482	1478	1478	1481	1486	1486	1483	1481	1484	1484
17	1475	1472	1478	1482	1478	1474	1470	1470	1469	1469	1472	1477	1478	1473	1471	1471	1475
18	1466	1464	1467	1474	1470	1462	1457	1459	1459	1460	1462	1468	1468	1462	1460	1461	1466
19	1456	1454	1456	1462	1460	1451	1447	1449	1448	1450	1452	1456	1458	1453	1447	1452	1455
20	1444	1444	1444	1449	1449	1441	1435	1438	1438	1440	1438	1443	1446	1443	1436	1441	1444
25	1388	1387	1381	1377	1380	1382	1379	1380	1381	1379	1373	1371	1377	1382	1383	1384	1388
30	1322	1321	1314	1311	1310	1310	1313	1314	1314	1314	1307	1303	1307	1310	1316	1321	1322
35	1247	1247	1242	1238	1233	1231	1231	1235	1238	1235	1233	1231	1228	1231	1235	1242	1248
40	1162	1157	1149	1144	1142	1143	1143	1147	1151	1145	1138	1135	1138	1143	1148	1155	1162
45	1063	1059	1047	1039	1036	1038	1043	1050	1053	1046	1035	1030	1033	1038	1049	1060	1064
50	958	957	944	934	927	925	929	940	944	941	931	924	922	925	936	950	958
55	841	839	827	816	809	805	807	816	824	822	812	806	804	806	816	828	840
60	710	710	700	689	682	681	684	689	694	691	684	676	676	681	691	703	711
65	577	573	566	557	550	548	552	556	560	554	547	544	543	549	559	572	577
70	444	439	432	424	418	417	419	423	425	420	413	410	412	417	427	437	443
75	313	312	304	298	294	292	293	296	298	294	287	285	285	292	300	310	315
80	195	193	187	181	178	177	177	178	179	176	171	170	171	176	181	189	194
85	89	87	83	80	78	75	73	73	74	71	69	69	71	75	78	84	88
90	5	6	6	5	3	3	3	3	2	2	3	2	2	3	4	6	6
95	2	2	2	2	2	2	2	2	2	2	2	1	1	2	1	2	2
100	2	1	2	2	2	1	2	1	1	1	1	1	1	2	1	1	2
105	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
110	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	2
115	1	1	1	2	1	1	1	2	2	1	1	1	1	2	1	1	2
120	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2
125	2	1	2	2	2	1	1	2	2	1	2	1	2	1	1	2	2
130	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2
135	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
140	3	2	2	2	3	2	2	3	2	2	3	3	3	3	2	2	3
145	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
150	3	3	3	3	3	3	3	4	3	3	4	4	4	3	3	3	4
155	4	4	4	3	4	3	3	4	3	4	3	4	4	4	3	3	4
160	4	4	4	4	4	4	4	4	4	4	4	5	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	5	5	6	6	6	6	6	6	6
175	6	6	6	5	6	6	6	6	6	5	6	6	6	6	5	6	6
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6



Goniophotometer Test

Model No.	55677-40W-50K	Sample ID.	4576024
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
25.2	120.13	60	0.3262	38.87	0.9920	7.91%	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	
4501.9	78.50%	N/A	111.8	113.4	115.82

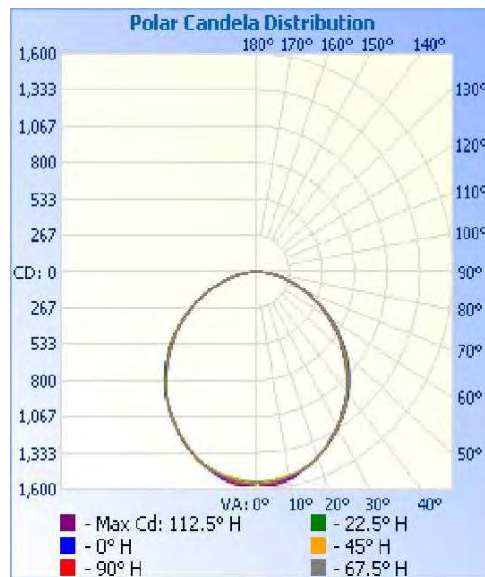
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
N/A	N/A	1.28	1.26

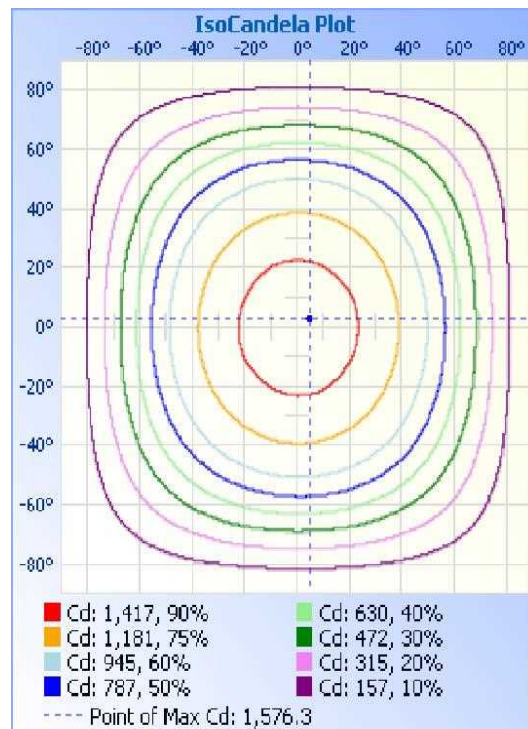


Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot





Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1211.6	26.90%
0-40	1988.5	44.20%
0-60	3530.4	78.40%
60-90	958.1	21.30%
70-100	407.6	9.10%
90-120	4.7	0.10%
0-90	4488.5	99.70%
90-180	13.4	0.30%
0-180	4501.9	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	37.2	0.80%	90-95	1.1	0.00%
5-10	110.6	2.50%	95-100	0.9	0.00%
10-15	180.1	4.00%	100-105	0.7	0.00%
15-20	243.2	5.40%	105-110	0.7	0.00%
20-25	297.6	6.60%	110-115	0.6	0.00%
25-30	342.8	7.60%	115-120	0.6	0.00%
30-35	377.3	8.40%	120-125	0.7	0.00%
35-40	399.7	8.90%	125-130	0.7	0.00%
40-45	407.5	9.10%	130-135	0.8	0.00%
45-50	401.6	8.90%	135-140	0.9	0.00%
50-55	382.9	8.50%	140-145	0.9	0.00%
55-60	349.9	7.80%	145-150	0.9	0.00%
60-65	303.6	6.70%	150-155	0.9	0.00%
65-70	248.9	5.50%	155-160	0.8	0.00%
70-75	189.0	4.20%	160-165	0.8	0.00%
75-80	127.4	2.80%	165-170	0.6	0.00%
80-85	69.6	1.50%	170-175	0.4	0.00%
85-90	19.6	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	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554
1	1549	1546	1552	1564	1570	1561	1554	1552	1548	1545	1551	1564	1569	1560	1554	1551	1549
2	1549	1543	1549	1561	1572	1567	1561	1556	1549	1541	1549	1563	1571	1566	1562	1555	1549
3	1549	1540	1546	1561	1570	1572	1566	1557	1548	1540	1546	1560	1571	1571	1565	1556	1549
4	1549	1538	1541	1556	1568	1575	1569	1560	1548	1537	1542	1556	1570	1576	1570	1560	1549
5	1547	1535	1537	1551	1564	1576	1571	1559	1547	1534	1536	1551	1565	1576	1572	1561	1547
6	1546	1534	1532	1546	1558	1574	1570	1558	1546	1531	1531	1547	1561	1575	1570	1560	1546
7	1544	1532	1528	1540	1555	1569	1567	1557	1543	1528	1526	1542	1557	1571	1569	1558	1544
8	1540	1529	1524	1536	1550	1562	1563	1554	1540	1527	1523	1538	1553	1566	1566	1555	1540
9	1537	1527	1520	1531	1546	1556	1559	1550	1536	1526	1520	1533	1547	1558	1562	1551	1537
10	1534	1523	1518	1527	1540	1549	1552	1545	1533	1523	1518	1527	1541	1550	1552	1545	1534
11	1529	1519	1516	1522	1535	1541	1544	1538	1528	1519	1515	1522	1535	1542	1545	1538	1529
12	1523	1515	1513	1518	1527	1530	1533	1528	1521	1513	1512	1518	1528	1532	1533	1531	1523
13	1515	1509	1510	1512	1520	1520	1522	1520	1514	1508	1509	1513	1521	1524	1525	1522	1515
14	1505	1502	1504	1509	1509	1510	1510	1509	1504	1499	1504	1511	1514	1514	1514	1514	1505
15	1498	1495	1499	1503	1502	1500	1498	1500	1497	1494	1499	1505	1506	1506	1503	1504	1498
16	1490	1487	1491	1497	1493	1490	1487	1490	1490	1488	1494	1499	1497	1494	1492	1493	1490
17	1480	1478	1483	1488	1486	1481	1478	1480	1481	1478	1484	1491	1488	1483	1480	1482	1480
18	1471	1470	1472	1477	1478	1470	1467	1468	1470	1468	1474	1482	1479	1472	1469	1470	1471
19	1463	1462	1462	1466	1468	1460	1455	1457	1460	1459	1462	1470	1469	1461	1458	1459	1463
20	1452	1451	1450	1454	1456	1449	1442	1446	1450	1449	1450	1456	1458	1451	1445	1448	1452
25	1393	1391	1384	1381	1385	1386	1386	1388	1392	1390	1386	1385	1390	1394	1392	1393	1393
30	1328	1324	1318	1313	1313	1316	1320	1324	1324	1323	1320	1315	1317	1319	1323	1325	1328
35	1250	1248	1243	1237	1234	1233	1237	1242	1247	1246	1245	1243	1240	1240	1244	1249	1250
40	1164	1157	1148	1143	1145	1146	1149	1156	1162	1157	1150	1147	1150	1152	1154	1158	1164
45	1066	1056	1045	1036	1036	1040	1048	1058	1062	1055	1045	1039	1041	1045	1053	1062	1066
50	958	952	940	929	924	924	931	946	953	949	939	932	930	932	937	950	958
55	836	836	822	811	807	805	812	823	835	836	826	819	816	815	820	831	836
60	707	703	692	681	676	678	686	694	704	702	696	689	684	686	693	701	707
65	572	566	557	549	544	546	553	563	568	565	557	552	550	555	560	568	572
70	437	432	422	417	414	415	422	430	434	432	425	422	422	426	432	438	437
75	309	303	295	288	287	289	294	301	305	303	300	296	296	297	303	308	309
80	189	185	179	175	173	174	177	181	185	184	180	178	178	181	183	187	189
85	84	80	76	74	73	72	74	76	80	79	76	76	78	80	81	84	84
90	4	3	3	2	3	2	2	2	3	2	3	2	2	2	4	4	4
95	2	2	2	2	2	1	2	1	2	2	1	2	1	1	2	2	2
100	1	2	2	1	1	2	2	1	1	1	2	1	1	2	2	2	1
105	1	2	1	2	2	1	1	1	1	2	1	2	1	2	2	2	1
110	1	1	1	1	1	2	1	1	2	1	1	1	1	2	2	2	1
115	1	1	2	2	1	1	1	1	2	1	1	1	2	1	1	1	1
120	1	1	2	1	1	2	2	1	1	2	1	2	2	1	2	2	1
125	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	1	2
130	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2
135	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
140	3	3	3	3	3	2	3	2	2	2	2	3	3	3	3	2	3
145	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
150	3	4	4	3	3	4	3	3	3	3	3	3	3	3	4	4	3
155	4	4	4	4	4	4	3	4	4	4	4	4	3	4	3	3	4
160	4	4	4	5	4	4	4	4	5	4	5	5	4	5	4	5	4
165	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
170	6	5	6	6	6	6	5	6	6	5	6	6	6	6	6	6	6
175	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6



THD and PF Test

Model No.	55677-40W-35K	Sample ID.	4576024
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
25.0	120.06	60	0.3290	39.19	0.9922	7.85%	Horizontal
25.0	277.15	60	0.1505	39.74	0.9527	12.02%	Horizontal



THD and PF Test

Model No.	55677-40W-40K	Sample ID.	4576024
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
25.0	120.09	60	0.3146	37.48	0.9921	7.66%	Horizontal
25.0	277.09	60	0.1450	38.14	0.9496	12.16%	Horizontal



THD and PF Test

Model No.	55677-40W-50K	Sample ID.	4576024
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
25.0	120.12	60	0.3261	38.87	0.9920	7.91%	Horizontal
25.0	277.07	60	0.1493	39.37	0.9519	12.06%	Horizontal



THD and PF Test

Model No.	55677-30W-35K	Sample ID.	4576024
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
25.0	120.07	60	0.2437	28.87	0.9866	10.02%	Horizontal
25.0	277.13	60	0.1205	30.91	0.9255	15.70%	Horizontal



THD and PF Test

Model No.	55677-25W-35K	Sample ID.	4576024
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
25.0	120.01	60	0.2111	25.00	0.9871	11.15%	Horizontal
25.0	277.11	60	0.1031	26.66	0.9332	12.04%	Horizontal



In-Situ Temperature Measurement Test

Model No.	55677-40W-35K	Sample ID.	4576024
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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
24.6	120.06	60	0.3290	39.19	0.9922	7.85%	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	24.6	25.0				
TMP of Location 1	60	42.0	42.4	0.0023	P2835Y-WXXXXXXXXX XXXXX-XXXX	100	105

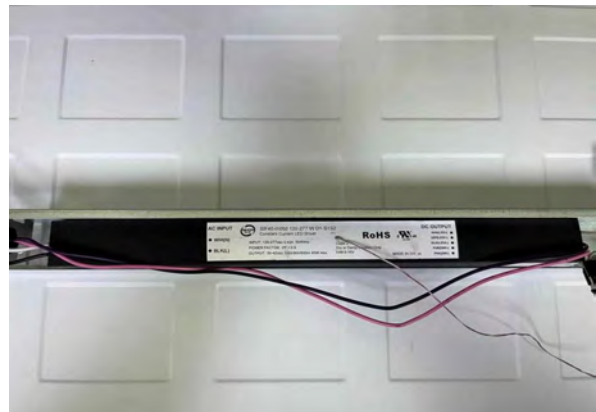
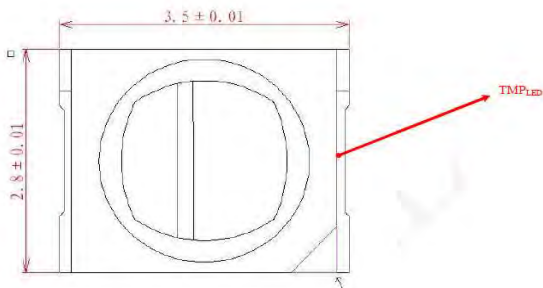
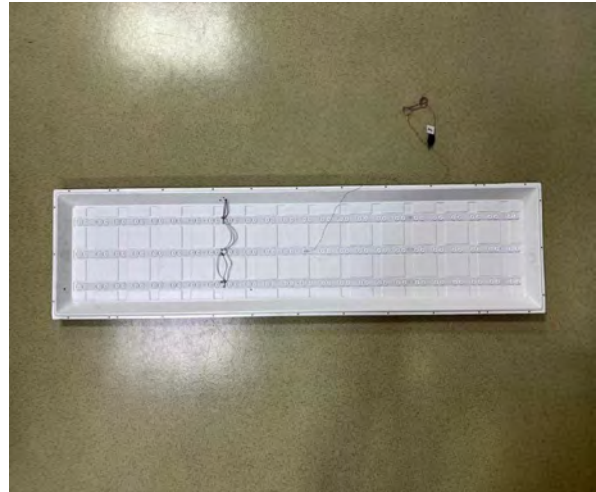
Test Results (Drivers)

Thermocouple Location	Temperature for Driver (°C)		Driver Model Number	Driver Limit Temp (°C)
	Test Result	Test Result (Correct to 25 °C)		
Ambient TEMP	24.6	25.0		
TMP of Location 1	55.9	56.3	SIF 40-I1050 120-277 W D1-S1S2	90



In-Situ Temperature Measurement Test (Cont'd)

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





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