



## 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

55571

### Project Number

4790110305

### Report Number

4790110305\_15

### Test Date

2022-01-14~2022-01-21

### Issue Date

2022-01-25

### 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	≥3000	-10%	3881.05
Minimum Luminaire Efficacy (lm/W)-Luminaires	IES LM-79-2008	≥110	-3%	131.57
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	1.28
Zonal Lumen Requirement 1(0°-60°)	IES LM-79-2008	≥75%	-3%	78.10%
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3357
Allowable CCT (4000K)	IES LM-79-2008/ANSI C78.377-2015	3985±275	N/A	4055
Minimum CRI	IES LM-79-2008/CIE 13.3-1995	≥80	-1	84
Minimum R9	IES LM-79-2008	≥0	-1	44.0
Minimum Rg	IES LM-79-2008	≥89	-1	99
Minimum Rf	IES LM-79-2008	≥70	-1	81
Rcs,h1	IES LM-79-2008	-12%-23%	-1%	-7%
Unified Glare Rating (UGR)	IES LM-79-2008	≤22	N/A	21.8
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	0.9125
Total Harmonic Distortion (A%)	ANSI C82.77-10-2014	≤20%	5%	16.18%
In-Situ Temperature Measurement Test for LED 1 (°C)	UL1598-2008	≤105	N/A	35.8
In-Situ Temperature Measurement Test for Driver 1 (°C)	UL1598-2008	≤90	N/A	66.1
Max Chromaticity Shift (1000-6000h)	N/A	≤0.004	0.0004	0.0033
Minimum Luminaire Warranty (Years)	N/A	≥5	N/A	≥5



## Test List

Sample Received Date: 2022-01-12

Test Item	Test Date	Model Number	Tests Conducted By
Integrating Sphere Test	2022-01-18	55571-40W-35K	Yang, Gavin X
Integrating Sphere Test	2022-01-18	55571-40W-40K	Yang, Gavin X
Integrating Sphere Test	2022-01-18	55571-40W-50K	Yang, Gavin X
Integrating Sphere Test	2022-01-18	55571-35W-35K	Yang, Gavin X
Integrating Sphere Test	2022-01-18	55571-30W-35K	Yang, Gavin X
Goniophotometer Test	2022-01-14	55571-40W-35K	Yang, Gavin X
Goniophotometer Test	2022-01-14	55571-40W-50K	Yang, Gavin X
THD and PF Test	2022-01-14	55571-40W-35K	Yang, Gavin X
THD and PF Test	2022-01-14	55571-40W-40K	Yang, Gavin X
THD and PF Test	2022-01-14	55571-40W-50K	Yang, Gavin X
THD and PF Test	2022-01-14	55571-35W-35K	Yang, Gavin X
THD and PF Test	2022-01-14	55571-30W-35K	Yang, Gavin X
In-Situ Temperature Measurement Test	2022-01-21	55571-40W-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:** 2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces

**Model Number:** 55571

**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
55571-40W-35K	3500k	5040	40	126
55571-40W-40K	4000k	5080	40	127
55571-40W-50K	5000k	5120	40	128
55571-35W-35K	3500k	4515	35	129
55571-35W-40K	4000k	4550	35	130
55571-35W-50K	5000k	4585	35	131
55571-30W-35K	3500k	3960	30	132
55571-30W-40K	4000k	3990	30	133
55571-30W-50K	5000k	4020	30	134

### Photos of Products Characteristics





## Integrating Sphere Test

<b>Model No.</b>	55571-40W-35K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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.

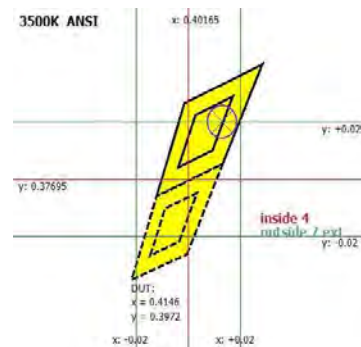
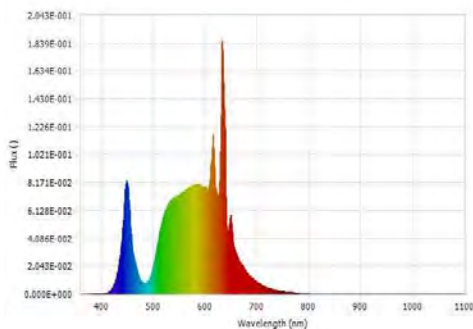
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption 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	120.06	60	0.3316	39.427	0.9903	Horizontal

### Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3357	84	44.0	0.0009	5195.4	131.77	N/A



Luminous Flux (lm)	5195.4	Chrom x	0.4146
Chrom y	0.3972	Chrom u	0.2390
Chrom v	0.3435	Duv	0.0009
Chrom u'	0.2390	Chrom v'	0.5153
CCT (K)	3357	Luminous Efficacy (lm/W)	131.77
Ra	84	R1	86.0
R2	85.0	R3	83.0
R4	85.0	R5	83.0
R6	79.0	R7	88.0
R8	79.0	R9	44.0
R10	63.0	R11	85.0
R12	54.0	R13	85.0
R14	89.0	R15	83.0
Rf	81	Rg	103
Rcs,h1	-8%		



## Integrating Sphere Test (Cont'd)

### TM-30 Report

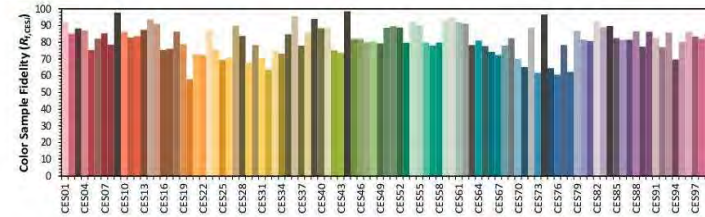
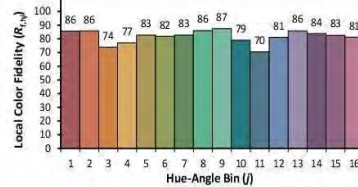
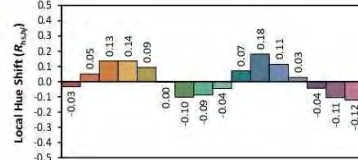
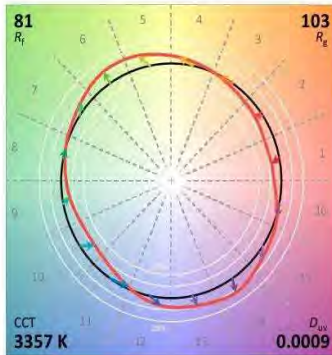
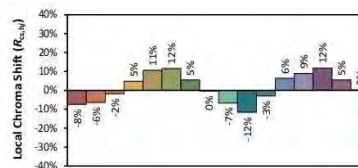
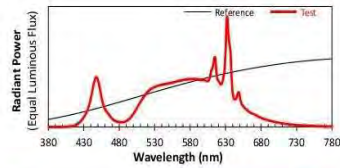
#### ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX

Manufacturer: P.Q.L., Inc.

Date: 1/18/2022

Model: 55571-40W-35K



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

x 0.4146  
 y 0.3972  
 u' 0.2390  
 v' 0.5153

CIE 13.3-1995  
 (CRI)  
 R<sub>a</sub> 84  
 R<sub>g</sub> 44

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



## Integrating Sphere Test

<b>Model No.</b>	55571-40W-40K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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.

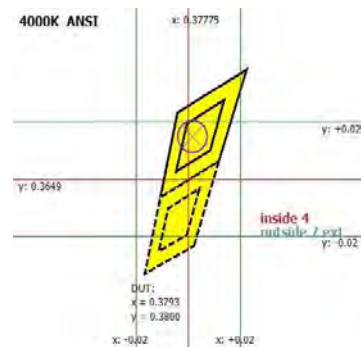
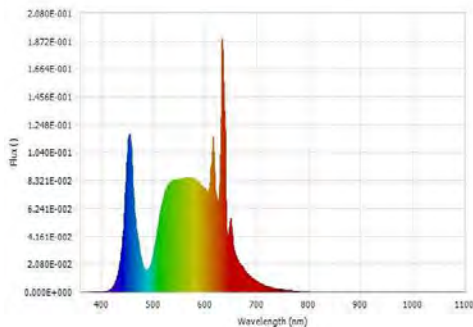
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption 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	120.06	60	0.3197	38.001	0.9900	Horizontal

### Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4055	86	53.0	0.0019	5428.1	142.84	N/A



Luminous Flux (lm)	5428.1	Chrom x	0.3793
Chrom y	0.3800	Chrom u	0.2230
Chrom v	0.3352	Duv	0.0019
Chrom u'	0.2230	Chrom v'	0.5029
CCT (K)	4055	Luminous Efficacy (lm/W)	142.84
Ra	86	R1	87.0
R2	87.0	R3	84.0
R4	88.0	R5	85.0
R6	81.0	R7	92.0
R8	84.0	R9	53.0
R10	66.0	R11	85.0
R12	51.0	R13	87.0
R14	90.0	R15	86.0
Rf	84	Rg	100
Rcs,h1	-7%		



## Integrating Sphere Test (Cont'd)

### TM-30 Report

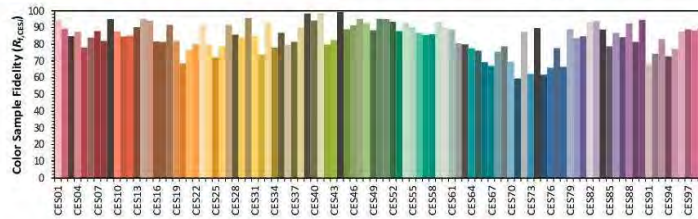
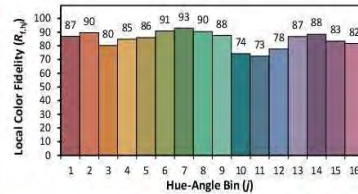
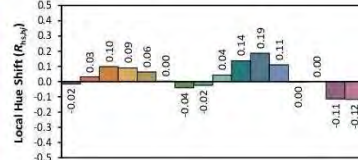
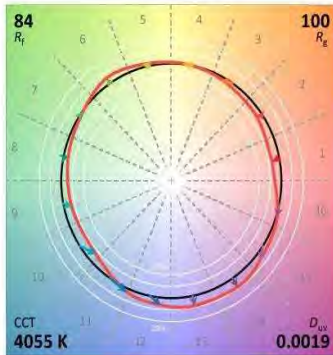
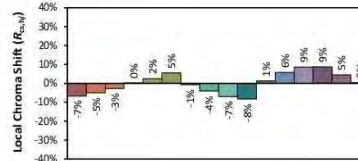
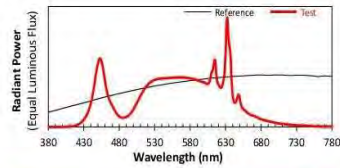
#### ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX

Manufacturer: P.Q.L., Inc.

Date: 1/18/2022

Model: 55571-40W-40K



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

x 0.3793  
 y 0.3800  
 u' 0.2230  
 v' 0.5029

CIE 13.3-1995  
 (CRI)  
 R<sub>a</sub> 86  
 R<sub>9</sub> 53

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





## Integrating Sphere Test

<b>Model No.</b>	55571-40W-50K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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.

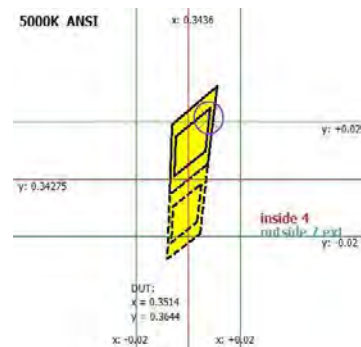
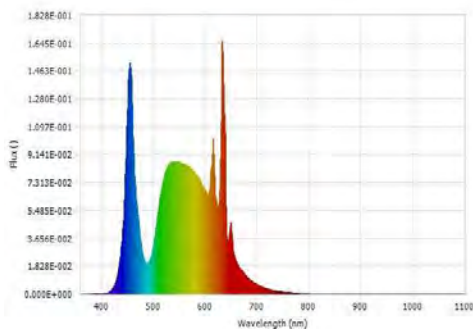
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption 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	0.3287	39.077	0.9904	Horizontal

### Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4821	85	50.0	0.0039	5326.8	136.32	N/A



Luminous Flux (lm)	5326.8	Chrom x	0.3514
Chrom y	0.3644	Chrom u	0.2107
Chrom v	0.3278	Duv	0.0039
Chrom u'	0.2107	Chrom v'	0.4917
CCT (K)	4821	Luminous Efficacy (lm/W)	136.32
Ra	85	R1	86.0
R2	86.0	R3	84.0
R4	86.0	R5	83.0
R6	79.0	R7	93.0
R8	84.0	R9	50.0
R10	64.0	R11	83.0
R12	45.0	R13	85.0
R14	90.0	R15	84.0
Rf	84	Rg	99
Rcs,h1	-8%		



## Integrating Sphere Test (Cont'd)

### TM-30 Report

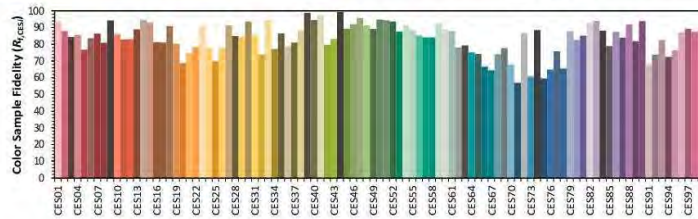
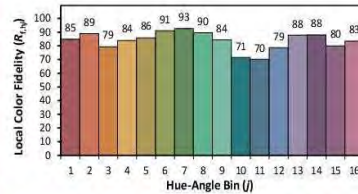
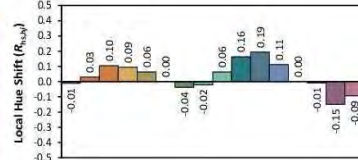
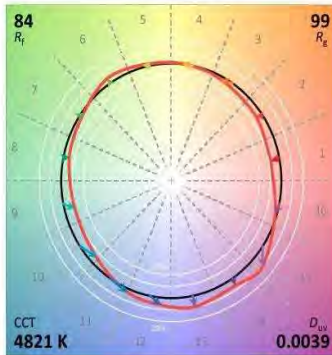
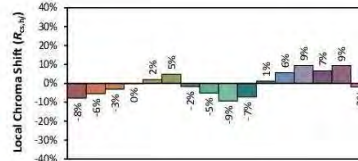
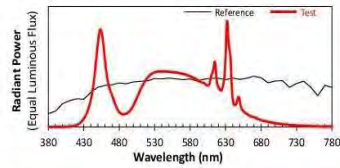
#### ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX

Manufacturer: P.Q.L., Inc.

Date: 1/18/2022

Model: 55571-40W-50K



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

x 0.3514  
 y 0.3644  
 u' 0.2107  
 v' 0.4917

CIE 13.3-1995  
 (CRI)  
 R<sub>a</sub> 85  
 R<sub>g</sub> 50

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



## Integrating Sphere Test

<b>Model No.</b>	55571-35W-35K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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.

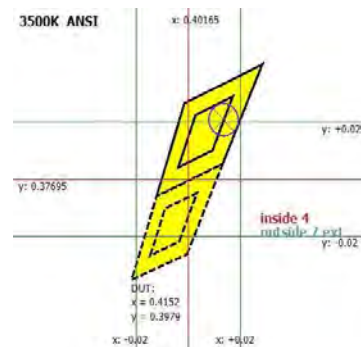
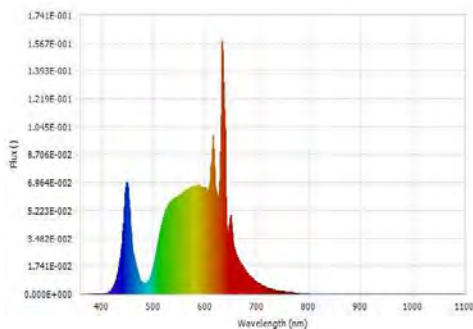
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption 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	120.02	60	0.2805	33.236	0.9873	Horizontal

### Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3351	84	44.0	0.0011	4481.57	134.84	N/A



Luminous Flux (lm)	4481.57	Chrom x	0.4152
Chrom y	0.3979	Chrom u	0.2391
Chrom v	0.3438	Duv	0.0011
Chrom u'	0.2391	Chrom v'	0.5157
CCT (K)	3351	Luminous Efficacy (lm/W)	134.84
Ra	84	R1	86.0
R2	86.0	R3	83.0
R4	86.0	R5	83.0
R6	80.0	R7	89.0
R8	79.0	R9	44.0
R10	63.0	R11	85.0
R12	54.0	R13	85.0
R14	89.0	R15	83.0
Rf	82	Rg	103
Rcs,h1	-7%		



## Integrating Sphere Test (Cont'd)

### TM-30 Report

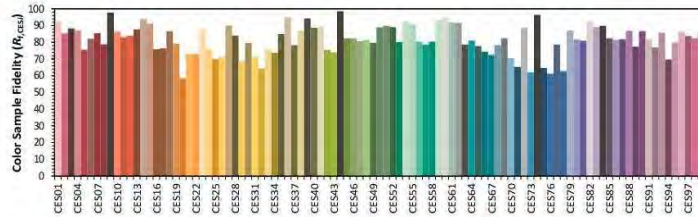
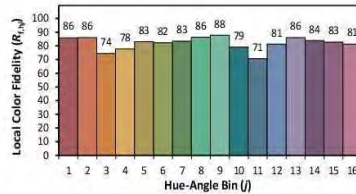
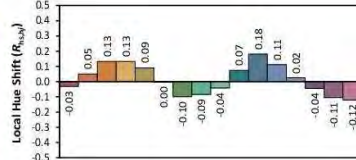
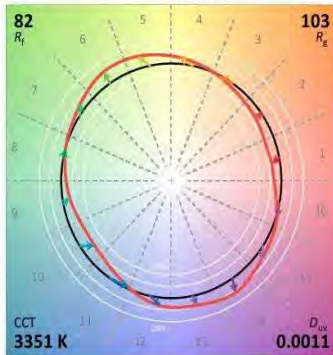
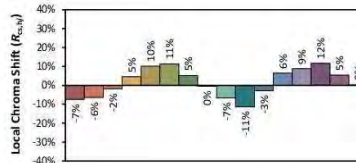
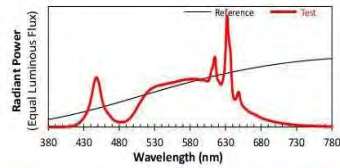
#### ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX

Manufacturer: P.Q.L., Inc.

Date: 1/18/2022

Model: 55571-35W-35K



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

x 0.4152  
 y 0.3979  
 u' 0.2391  
 v' 0.5157

CIE 13.3-1995  
 (CRI)  
 R<sub>a</sub> 84  
 R<sub>9</sub> 44

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



## Integrating Sphere Test

<b>Model No.</b>	55571-30W-35K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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.

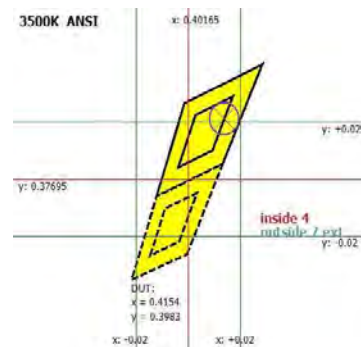
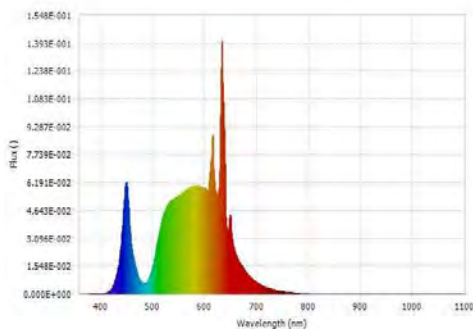
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions were using  $4\pi$  geometry. The self-absorption 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	120.12	60	0.2425	28.598	0.9819	Horizontal

### Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3350	84	45.0	0.0012	3881.05	135.71	N/A



Luminous Flux (lm)	3881.05	Chrom x	0.4154
Chrom y	0.3983	Chrom u	0.2391
Chrom v	0.3439	Duv	0.0012
Chrom u'	0.2391	Chrom v'	0.5158
CCT (K)	3350	Luminous Efficacy (lm/W)	135.71
Ra	84	R1	86.0
R2	86.0	R3	83.0
R4	86.0	R5	83.0
R6	80.0	R7	89.0
R8	79.0	R9	45.0
R10	63.0	R11	85.0
R12	54.0	R13	85.0
R14	89.0	R15	83.0
Rf	82	Rg	103
Rcs,h1	-7%		



## Integrating Sphere Test (Cont'd)

### TM-30 Report

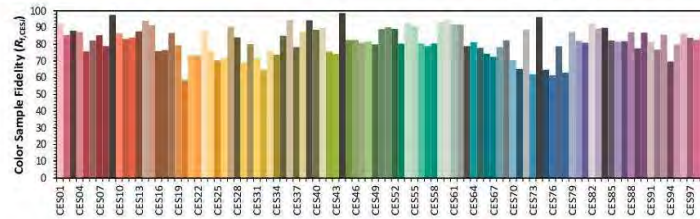
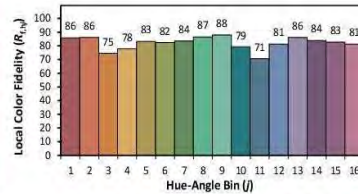
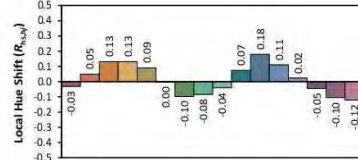
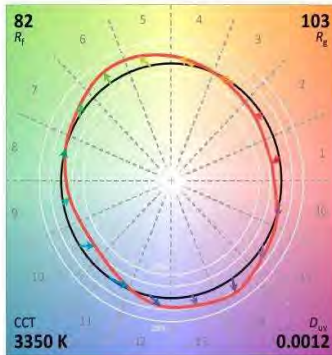
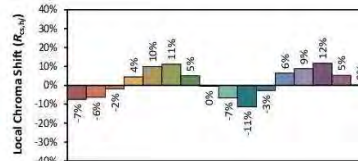
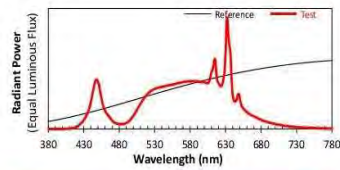
#### ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX

Manufacturer: P.Q.L., Inc.

Date: 1/18/2022

Model: 55571-30W-35K



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

x 0.4154  
 y 0.3983  
 u' 0.2391  
 v' 0.5158

CIE 13.3-1995  
 (CRI)  
 R<sub>a</sub> 84  
 R<sub>g</sub> 45

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



### Goniophotometer Test

<b>Model No.</b>	55571-40W-35K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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	0.3308	39.376	0.9912	8.19%	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	
5180.6	78.10%	N/A	113.5	113.4	131.57

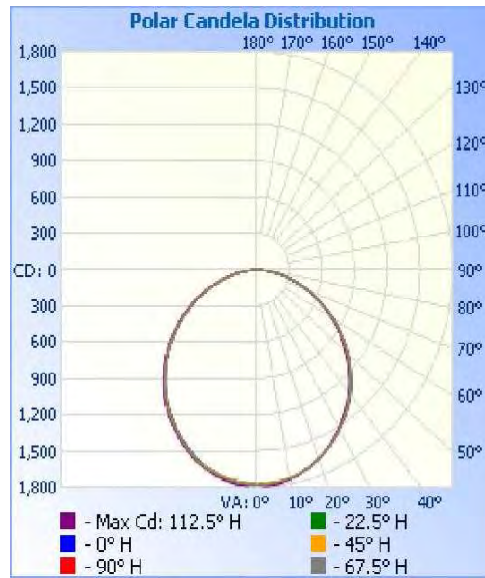
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
20.0	21.8	1.28	1.28

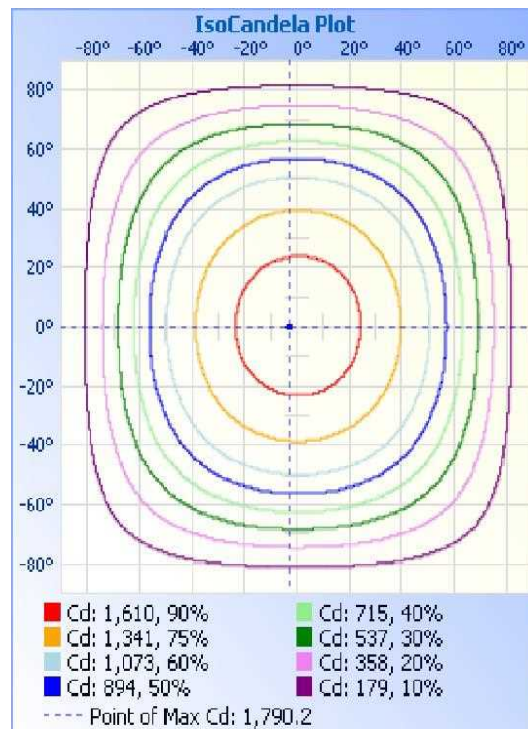


## Goniophotometer Test (Cont'd)

### Polar Candela Distribution



### IsoCandela Plot







**Goniophotometer Test (Cont'd)**  
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1386.5	26.80%
0-40	2277.1	44.00%
0-60	4048.5	78.10%
60-90	1120.8	21.60%
70-100	482.5	9.30%
90-120	4.2	0.10%
0-90	5169.3	99.80%
90-180	11.3	0.20%
0-180	5180.6	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	42.5	0.80%	90-95	1.4	0.00%
5-10	126.2	2.40%	95-100	0.8	0.00%
10-15	205.5	4.00%	100-105	0.5	0.00%
15-20	278.3	5.40%	105-110	0.5	0.00%
20-25	341.2	6.60%	110-115	0.5	0.00%
25-30	392.8	7.60%	115-120	0.5	0.00%
30-35	432.4	8.30%	120-125	0.5	0.00%
35-40	458.2	8.80%	125-130	0.6	0.00%
40-45	467.5	9.00%	130-135	0.6	0.00%
45-50	461.4	8.90%	135-140	0.7	0.00%
50-55	440.2	8.50%	140-145	0.7	0.00%
55-60	402.3	7.80%	145-150	0.7	0.00%
60-65	351.1	6.80%	150-155	0.7	0.00%
65-70	289.4	5.60%	155-160	0.8	0.00%
70-75	220.8	4.30%	160-165	0.7	0.00%
75-80	151.2	2.90%	165-170	0.6	0.00%
80-85	83.7	1.60%	170-175	0.4	0.00%
85-90	24.7	0.50%	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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
1	1774	1771	1776	1782	1783	1782	1778	1774	1773	1771	1774	1781	1786	1782	1779	1775	1775
2	1773	1771	1773	1782	1788	1788	1780	1773	1770	1772	1774	1780	1784	1785	1783	1777	1775
3	1770	1769	1770	1780	1789	1790	1783	1775	1769	1769	1770	1778	1787	1790	1783	1783	1774
4	1773	1765	1769	1776	1787	1789	1785	1777	1766	1764	1765	1775	1784	1789	1788	1776	1772
5	1768	1764	1766	1774	1784	1788	1785	1778	1765	1761	1764	1770	1785	1788	1787	1779	1769
6	1768	1762	1762	1770	1782	1783	1781	1772	1759	1757	1758	1768	1780	1787	1784	1777	1768
7	1765	1759	1761	1764	1776	1782	1777	1767	1758	1752	1755	1763	1776	1783	1781	1776	1765
8	1764	1752	1758	1759	1771	1771	1772	1763	1756	1748	1750	1758	1769	1777	1777	1771	1764
9	1759	1751	1750	1755	1760	1769	1768	1757	1749	1742	1744	1752	1762	1770	1771	1766	1759
10	1751	1746	1749	1747	1756	1757	1755	1750	1742	1733	1738	1746	1756	1762	1765	1763	1752
11	1747	1743	1740	1746	1748	1752	1750	1743	1739	1730	1732	1736	1746	1755	1757	1752	1745
12	1740	1735	1735	1736	1741	1743	1740	1736	1729	1724	1726	1735	1742	1748	1751	1745	1739
13	1733	1730	1727	1734	1734	1734	1730	1727	1720	1715	1719	1725	1736	1739	1740	1737	1732
14	1723	1720	1721	1723	1727	1723	1720	1713	1709	1708	1710	1720	1725	1731	1730	1728	1724
15	1717	1711	1717	1714	1716	1711	1714	1709	1706	1704	1708	1712	1717	1720	1719	1721	1716
16	1711	1710	1711	1711	1707	1708	1703	1699	1698	1694	1699	1707	1711	1714	1710	1707	1710
17	1700	1701	1702	1704	1700	1694	1689	1686	1684	1683	1690	1697	1704	1704	1706	1702	1702
18	1688	1688	1691	1691	1690	1682	1676	1674	1671	1674	1680	1688	1692	1693	1691	1691	1690
19	1677	1677	1680	1679	1678	1669	1665	1662	1659	1662	1670	1675	1681	1681	1679	1679	1677
20	1668	1666	1667	1669	1666	1659	1652	1648	1646	1652	1658	1664	1669	1668	1668	1667	1667
25	1604	1600	1599	1598	1592	1592	1583	1577	1575	1580	1585	1590	1594	1604	1602	1605	1602
30	1524	1525	1523	1518	1513	1510	1502	1497	1497	1500	1503	1510	1513	1521	1524	1527	1528
35	1440	1438	1435	1431	1423	1417	1411	1406	1405	1408	1415	1423	1429	1432	1438	1439	1439
40	1336	1336	1331	1327	1322	1315	1310	1304	1302	1302	1309	1316	1328	1332	1335	1339	1336
45	1219	1220	1215	1208	1204	1197	1192	1188	1186	1185	1191	1197	1206	1215	1220	1223	1222
50	1098	1100	1094	1090	1079	1069	1065	1060	1061	1065	1069	1074	1080	1088	1093	1099	1100
55	966	964	960	954	944	934	926	921	924	929	932	939	946	949	954	957	965
60	818	814	810	807	798	790	781	776	779	778	786	792	800	808	810	814	816
65	660	663	660	655	647	639	634	626	626	629	635	641	652	658	662	665	667
70	512	509	508	504	497	491	482	477	474	477	482	491	501	505	511	513	512
75	368	365	360	356	351	344	338	336	332	334	340	345	355	359	367	367	366
80	228	229	225	221	215	211	205	200	201	203	207	212	219	224	229	229	233
85	107	104	99	99	94	90	86	82	84	86	88	92	95	102	103	104	106
90	11	7	8	9	6	6	4	2	2	4	4	6	8	10	10	10	10
95	1	2	1	2	2	2	3	1	0	2	1	2	1	1	1	3	2
100	0	1	0	2	2	1	1	0	0	1	1	0	0	2	1	1	2
105	1	2	1	2	0	1	1	1	1	1	2	0	1	1	1	1	1
110	0	1	3	3	1	2	2	0	1	1	0	1	0	1	1	1	0
115	2	2	1	2	2	2	0	0	1	0	1	0	0	2	1	0	2
120	3	1	1	0	1	0	1	2	0	0	1	0	1	2	2	2	1
125	0	1	0	2	2	2	0	1	1	1	2	1	1	2	1	0	2
130	2	0	1	0	3	2	1	1	1	4	0	1	0	2	1	1	2
135	2	2	2	1	3	2	1	2	3	0	2	2	2	0	1	3	3
140	3	2	2	2	2	2	0	3	1	2	2	2	3	0	1	3	3
145	2	4	2	3	1	3	5	3	2	2	2	0	2	1	2	4	0
150	3	2	4	4	3	3	3	2	3	3	3	2	2	2	2	2	2
155	3	3	4	2	2	4	2	4	4	5	3	2	4	2	5	3	4
160	3	3	3	4	3	4	4	2	4	4	3	4	4	4	2	3	5
165	4	3	5	4	5	6	4	4	5	4	4	4	5	4	4	4	3
170	5	6	5	5	6	6	7	5	6	7	6	6	4	7	5	5	5
175	5	4	6	5	5	5	5	5	6	6	6	6	6	7	6	5	6
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6



### Goniophotometer Test

<b>Model No.</b>	55571-40W-50K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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	120.05	60	0.3286	39.10	0.9912	8.18%	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	
5266.7	78.30%	N/A	113.3	113.2	134.70

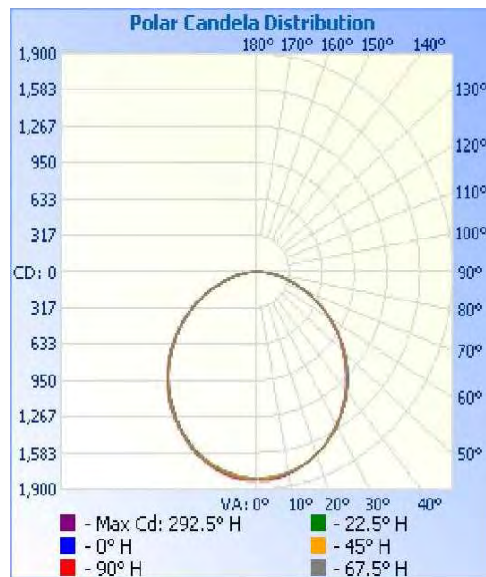
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
20.1	19.9	1.28	1.28

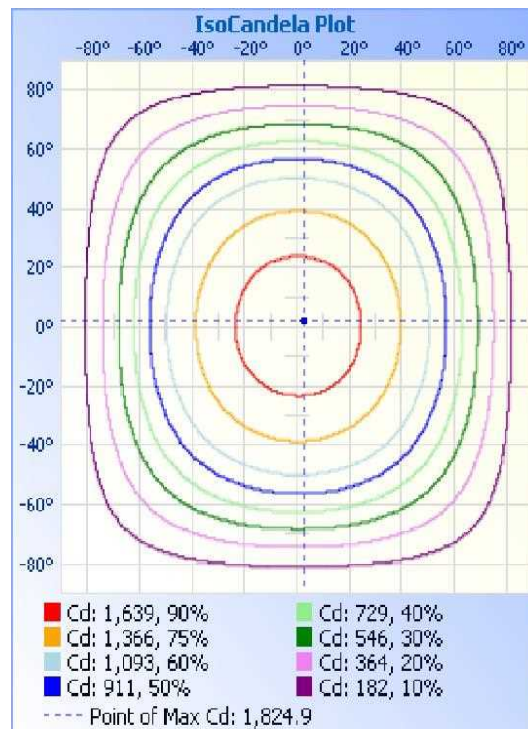


## Goniophotometer Test (Cont'd)

### Polar Candela Distribution



### IsoCandela Plot





**Goniophotometer Test (Cont'd)**  
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1412.3	26.80%
0-40	2318.9	44.00%
0-60	4120.5	78.20%
60-90	1135.5	21.60%
70-100	487.2	9.30%
90-120	3.6	0.10%
0-90	5256.0	99.80%
90-180	10.7	0.20%
0-180	5266.7	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	43.3	0.80%	90-95	1.1	0.00%
5-10	128.6	2.40%	95-100	0.7	0.00%
10-15	209.4	4.00%	100-105	0.5	0.00%
15-20	282.9	5.40%	105-110	0.5	0.00%
20-25	347.8	6.60%	110-115	0.4	0.00%
25-30	400.3	7.60%	115-120	0.4	0.00%
30-35	440.3	8.40%	120-125	0.5	0.00%
35-40	466.2	8.90%	125-130	0.5	0.00%
40-45	475.7	9.00%	130-135	0.6	0.00%
45-50	469.7	8.90%	135-140	0.7	0.00%
50-55	447.3	8.50%	140-145	0.7	0.00%
55-60	408.9	7.80%	145-150	0.7	0.00%
60-65	357.1	6.80%	150-155	0.8	0.00%
65-70	293.0	5.60%	155-160	0.8	0.00%
70-75	223.7	4.20%	160-165	0.7	0.00%
75-80	153.0	2.90%	165-170	0.6	0.00%
80-85	84.0	1.60%	170-175	0.4	0.00%
85-90	24.5	0.50%	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	1815	1815	1815	1815	1815	1815	1815	1815	1815	1815	1815	1815	1815	1815	1815	1815	1815
1	1804	1804	1807	1816	1821	1815	1813	1809	1807	1804	1808	1814	1822	1816	1814	1808	1806
2	1804	1801	1807	1816	1821	1817	1814	1806	1803	1802	1806	1814	1820	1821	1815	1811	1806
3	1802	1799	1806	1816	1821	1824	1820	1808	1800	1796	1804	1814	1822	1823	1819	1814	1808
4	1803	1796	1801	1812	1823	1822	1820	1810	1801	1799	1801	1810	1819	1825	1824	1814	1803
5	1803	1796	1798	1807	1816	1820	1819	1809	1798	1790	1794	1804	1819	1820	1822	1812	1801
6	1801	1790	1796	1803	1813	1816	1816	1808	1793	1790	1792	1803	1815	1821	1821	1808	1800
7	1797	1790	1793	1798	1809	1810	1814	1802	1791	1783	1786	1796	1811	1819	1820	1808	1800
8	1795	1786	1789	1793	1803	1809	1809	1798	1787	1776	1784	1790	1807	1813	1815	1806	1796
9	1791	1780	1785	1787	1796	1802	1801	1793	1784	1771	1780	1789	1796	1806	1807	1799	1789
10	1784	1778	1782	1784	1788	1795	1792	1784	1776	1769	1773	1782	1792	1798	1799	1794	1785
11	1780	1769	1772	1777	1782	1786	1784	1777	1769	1763	1766	1773	1785	1792	1793	1787	1779
12	1767	1767	1766	1772	1775	1778	1776	1769	1762	1754	1758	1764	1778	1785	1782	1779	1775
13	1764	1758	1761	1765	1766	1765	1762	1759	1754	1746	1753	1762	1773	1773	1778	1770	1766
14	1756	1750	1752	1758	1757	1758	1753	1748	1744	1741	1746	1750	1759	1766	1765	1763	1761
15	1747	1742	1747	1748	1750	1743	1740	1738	1735	1729	1738	1744	1752	1752	1752	1751	1747
16	1735	1734	1737	1738	1737	1733	1730	1726	1722	1719	1725	1738	1742	1740	1744	1740	1739
17	1726	1725	1726	1727	1726	1718	1718	1711	1710	1711	1714	1722	1730	1730	1728	1728	1724
18	1714	1712	1714	1717	1718	1706	1705	1705	1703	1704	1710	1714	1718	1716	1715	1719	1715
19	1702	1701	1707	1706	1706	1704	1698	1693	1691	1694	1701	1707	1707	1706	1709	1706	1704
20	1695	1697	1700	1698	1698	1692	1684	1679	1680	1682	1690	1695	1703	1701	1700	1698	1699
25	1632	1633	1630	1625	1625	1618	1613	1609	1608	1612	1616	1619	1626	1632	1635	1630	1634
30	1555	1554	1550	1545	1540	1538	1530	1528	1528	1529	1533	1539	1543	1547	1553	1552	1553
35	1462	1462	1459	1460	1449	1445	1439	1431	1431	1434	1440	1450	1453	1458	1463	1462	1462
40	1355	1360	1353	1349	1346	1338	1332	1327	1324	1328	1332	1342	1346	1354	1360	1361	1359
45	1241	1240	1236	1230	1223	1218	1210	1211	1209	1210	1212	1220	1230	1236	1244	1244	1246
50	1116	1120	1116	1108	1097	1088	1080	1079	1079	1084	1089	1094	1099	1107	1110	1115	1117
55	979	980	974	966	960	948	939	937	939	945	949	954	960	964	970	975	977
60	828	828	826	818	810	803	796	792	791	794	799	808	813	820	824	828	830
65	676	674	672	665	658	650	642	638	638	640	645	653	660	665	672	673	675
70	520	517	514	508	500	495	487	484	480	484	489	496	507	512	517	520	520
75	370	367	366	362	354	349	343	339	338	340	344	352	360	366	369	372	372
80	234	232	227	222	218	210	207	203	202	205	208	214	219	225	228	232	231
85	107	104	101	98	95	91	85	83	82	84	87	93	98	101	102	107	107
90	10	8	10	10	6	5	4	3	2	2	3	7	8	8	10	6	8
95	2	0	2	1	1	2	2	1	2	3	0	1	1	2	0	0	2
100	1	2	1	2	0	1	0	0	2	1	1	1	2	1	0	0	2
105	0	1	0	2	1	1	0	1	1	2	0	1	1	0	2	0	3
110	1	0	0	1	0	0	2	1	0	0	0	0	1	1	1	0	1
115	1	2	3	1	2	1	2	1	1	0	0	1	0	3	0	1	0
120	1	3	2	1	0	1	2	1	0	2	1	3	1	1	1	0	0
125	2	1	2	0	1	2	3	1	0	2	0	1	0	2	3	2	0
130	1	0	1	1	2	2	1	3	0	0	2	0	0	0	1	1	1
135	2	2	2	3	2	4	1	2	0	3	1	2	2	2	1	0	1
140	2	1	1	3	3	2	2	2	2	4	3	1	2	2	2	1	2
145	3	1	3	1	3	3	2	1	2	2	2	4	4	0	2	4	2
150	3	3	4	2	2	2	0	2	2	2	3	1	3	2	4	3	2
155	3	3	3	2	3	3	4	3	3	6	4	3	2	4	4	4	3
160	4	2	4	2	4	3	2	3	4	4	4	4	3	4	2	4	6
165	4	4	5	5	4	6	5	3	5	3	5	4	4	3	4	4	5
170	5	4	6	6	6	6	5	6	7	6	6	7	5	3	7	3	6
175	7	4	5	5	6	4	3	6	6	6	5	6	6	5	6	4	6
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6



## THD and PF Test

<b>Model No.</b>	55571-40W-35K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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	0.3308	39.37	0.9912	8.19%	Horizontal
25.0	277.09	60	0.1496	39.17	0.9456	12.87%	Horizontal



## THD and PF Test

<b>Model No.</b>	55571-40W-40K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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	0.3189	37.96	0.9913	8.01%	Horizontal
25.0	277.07	60	0.1448	37.80	0.9422	13.26%	Horizontal





## THD and PF Test

<b>Model No.</b>	55571-40W-50K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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
25.0	120.05	60	0.3285	39.09	0.9912	8.18%	Horizontal
25.0	277.09	60	0.1484	38.85	0.9447	12.99%	Horizontal



## THD and PF Test

<b>Model No.</b>	55571-35W-35K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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	0.2808	33.31	0.9883	9.80%	Horizontal
25.0	277.04	60	0.1328	34.54	0.9390	14.05%	Horizontal



## THD and PF Test

<b>Model No.</b>	55571-30W-35K	<b>Sample ID.</b>	4576022
<b>Operate time (Min.)</b>	90	<b>Stabilization time (Min.)</b>	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	119.95	60	0.2420	28.56	0.9837	11.28%	Horizontal
25.0	277.12	60	0.1175	29.71	0.9125	16.18%	Horizontal



## In-Situ Temperature Measurement Test

<b>Model No.</b>	55571-40W-35K	<b>Sample ID.</b>	4576022
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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
24.1	120.06	60	0.3308	39.37	0.9912	8.19%	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	24.1	25.0				
TMP of Location 1	35	34.9	35.8	0.0023	P2835Y-WXXXXXXXXX XXXXX XXXXX	100	105

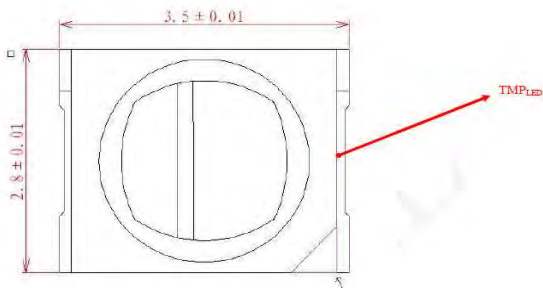
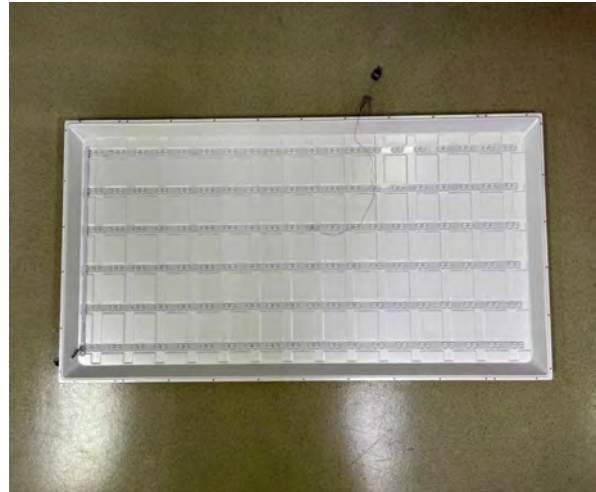
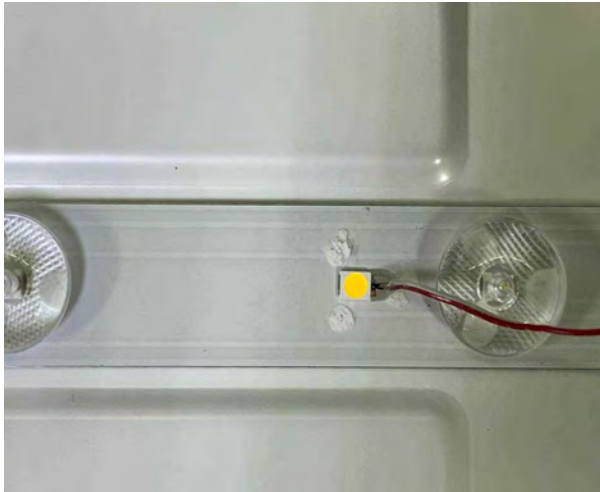
### Test Results (Drivers)

Thermocouple Location	Temperature for Driver (°C)		Driver Model Number	Driver Limit Temp (°C)
	Test Result	Test Result (Correct to 25 °C)		
Ambient TEMP	24.1	25.0		
TMP of Location 1	65.2	66.1	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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