DesignLights Consortium Test Report

Refference 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
55570

Project Number
4790110305
Report Number
4790110305_14

Test Date
2022-01-19~2022-01-21
Issue Date
2022-01-25
Revision Date
N/A

Prepared By	Approved By
Zhao, Elaine/Xu, Roger	Wu, Elvis

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%	2749.51
Minimum Luminaire Efficacy (lm/W)-Luminaires	**IES LM-79-2008**	≥110	-3%	125.06
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%	77.80%
Allowable CCT (3500K)	**IES LM-79-2008/ANSI C78.377-2015**	3465±245	N/A	3456
Allowable CCT (4000K)	**IES LM-79-2008/ANSI C78.377-2015**	3985±275	N/A	4110
Minimum CRI	**IES LM-79-2008/CIE 13.3-1995**	≥80	-1	82
Minimum R9	**IES LM-79-2008**	≥0	-1	4.0
Minimum Rg	**IES LM-79-2008**	≥89	-1	95
Minimum Rf	**IES LM-79-2008**	≥70	-1	83
Rcs,h1	**IES LM-79-2008**	-12%-23%	-1%	-12%
Unified Glare Rating (UGR)	**IES LM-79-2008**	≤22	N/A	21.7
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	0.9239
Total Harmonic Distortion (A%)	**ANSI C82.77-10-2014**	≤20%	5%	13.64%
In-Situ Temperature Measurement Test for LED 1 (°C)	**UL1598-2008**	≤105	N/A	40.4
In-Situ Temperature Measurement Test for Driver 1 (°C)	**UL1598-2008**	≤90	N/A	67.0
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	2022-01-20	55570-30W-35K	Yang, Gavin X
Integrating Sphere Test	2022-01-20	55570-30W-40K	Yang, Gavin X
Integrating Sphere Test	2022-01-20	55570-30W-50K	Yang, Gavin X
Integrating Sphere Test	2022-01-20	55570-25W-35K	Yang, Gavin X
Integrating Sphere Test	2022-01-20	55570-20W-35K	Yang, Gavin X
Goniophotometer Test	2022-01-19	55570-30W-35K	Yang, Gavin X
Goniophotometer Test	2022-01-20	55570-30W-50K	Yang, Gavin X
THD and PF Test	2022-01-19	55570-30W-35K	Yang, Gavin X
THD and PF Test	2022-01-19	55570-30W-40K	Yang, Gavin X
THD and PF Test	2022-01-19	55570-30W-50K	Yang, Gavin X
THD and PF Test	2022-01-19	55570-25W-35K	Yang, Gavin X
THD and PF Test	2022-01-19	55570-20W-35K	Yang, Gavin X
In-Situ Temperature Measurement Test	2022-01-21	55570-30W-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.

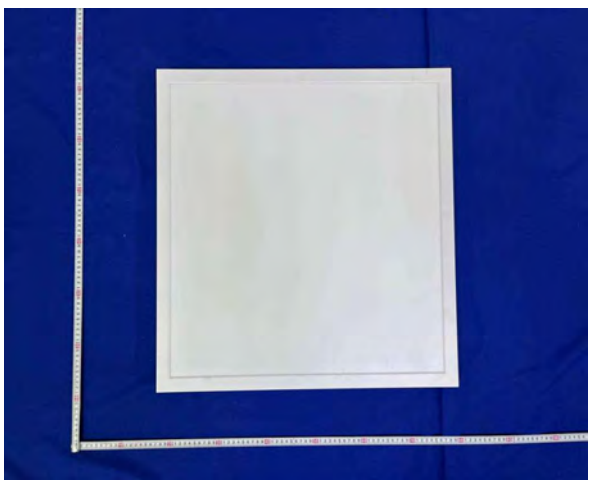
Product Description

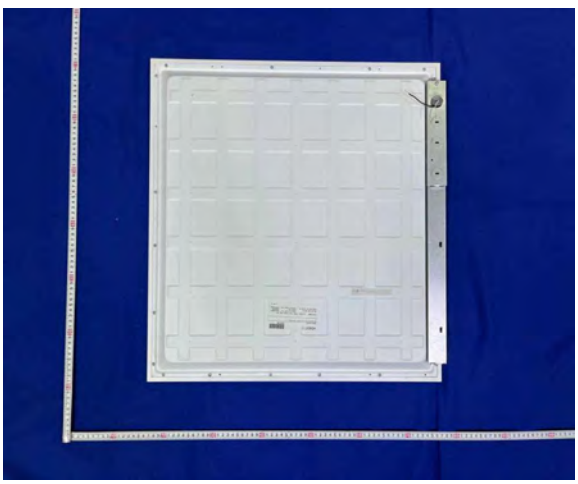
Lamp/Luminaire Description: 2x2 Luminaires for Ambient Lighting of Interior Commercial Spaces
Model Number: 55570
Electrical Parameter: 120-277V, 50/60Hz
LED Package: P2835Y-WXXXXXXXXXXXXX-XXXX
Dimming Information: Continuous dimming capability

Products Scaled Value

Model Number	CCT	Luminous Flux	Power	Luminous Efficacy
55570-30W-35K	3500k	3780	30	126
55570-30W-40K	4000k	3810	30	127
55570-30W-50K	5000k	3840	30	128
55570-25W-35K	3500k	3250	25	130
55570-25W-40K	4000k	3275	25	131
55570-25W-50K	5000k	3300	25	132
55570-20W-35K	3500k	2660	20	133
55570-20W-40K	4000k	2680	20	134
55570-20W-50K	5000k	2700	20	135

Photos of Products Characteristics





Integrating Sphere Test

Model No.	55570-30W-35K	Sample ID.	4576021
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

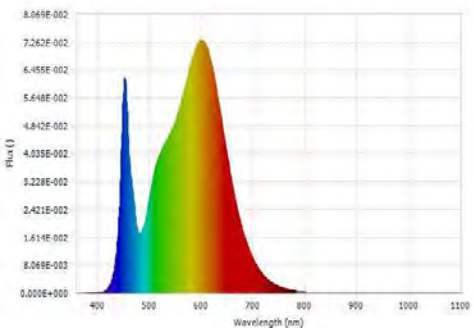
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. 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 was 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.

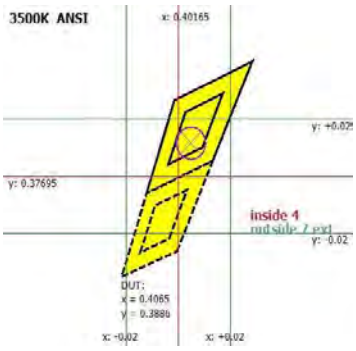
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.03	60	0.2585	30.808	0.9929	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3456	83	8.0	-0.0012	3859.66	125.28	N/A





Luminous Flux (lm)	3859.66	Chrom x	0.4065
Chrom y	0.3886	Chrom u	0.2374
Chrom v	0.3404	Duv	-0.0012
Chrom u’	0.2374	Chrom v’	0.5106
CCT (K)	3456	Luminous Efficacy (lm/W)	125.28
Ra	83	R1	82.0
R2	91.0	R3	96.0
R4	82.0	R5	82.0
R6	88.0	R7	84.0
R8	61.0	R9	8.0
R10	79.0	R11	81.0
R12	67.0	R13	84.0
R14	99.0	R15	75.0
Rf	84	Rg	96
Rcs,h1	-12%		

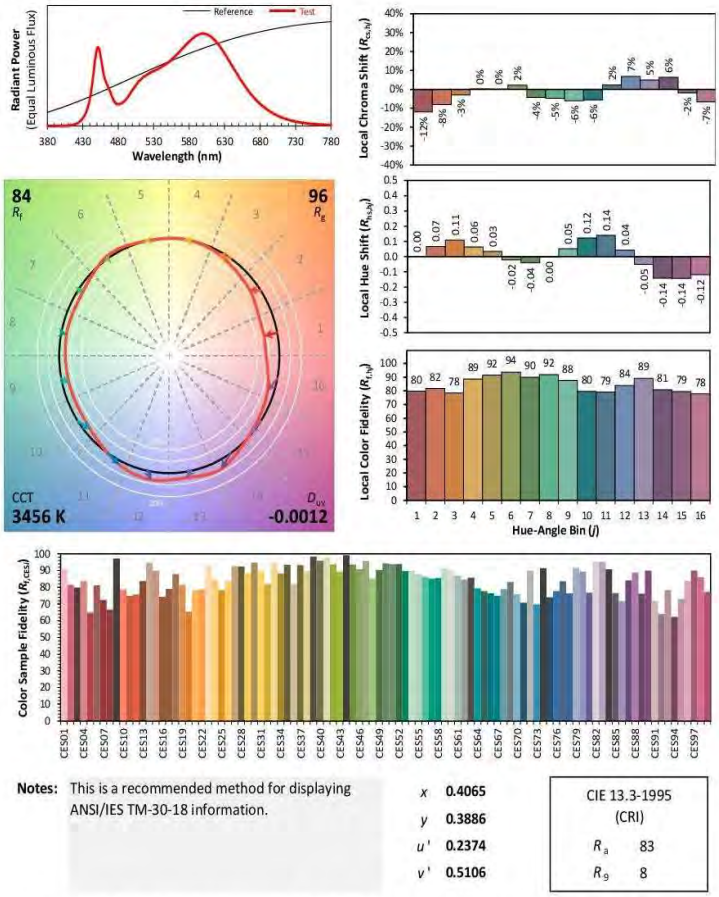
Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX **Manufacturer:** P.Q.L., Inc.

Date: 1/20/2022 **Model:** 55570-30W-35K



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

x	0.4065
y	0.3886
u'	0.2374
v'	0.5106

CIE 13.3-1995 (CRI)

R_a	83
R_9	8

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

Integrating Sphere Test

Model No.	55570-30W-40K	Sample ID.	4576021
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

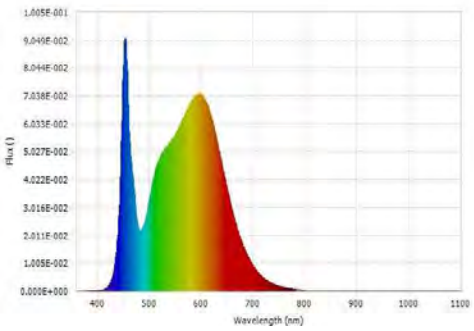
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. 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 was 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.

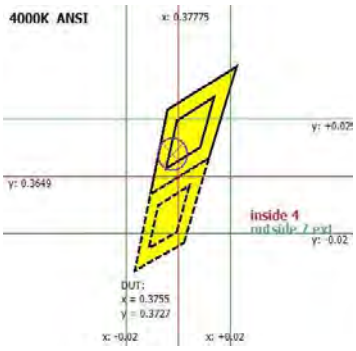
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.01	60	0.2492	29.686	0.9928	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4110	84	12.0	-0.0004	4122.43	138.87	N/A





Luminous Flux (lm)	4122.43	Chrom x	0.3755
Chrom y	0.3727	Chrom u	0.2234
Chrom v	0.3327	Duv	-0.0004
Chrom u’	0.2234	Chrom v’	0.4991
CCT (K)	4110	Luminous Efficacy (lm/W)	138.87
Ra	84	R1	83.0
R2	91.0	R3	95.0
R4	82.0	R5	83.0
R6	86.0	R7	86.0
R8	66.0	R9	12.0
R10	77.0	R11	82.0
R12	60.0	R13	85.0
R14	98.0	R15	77.0
Rf	84	Rg	95
Rcs,h1	-12%		

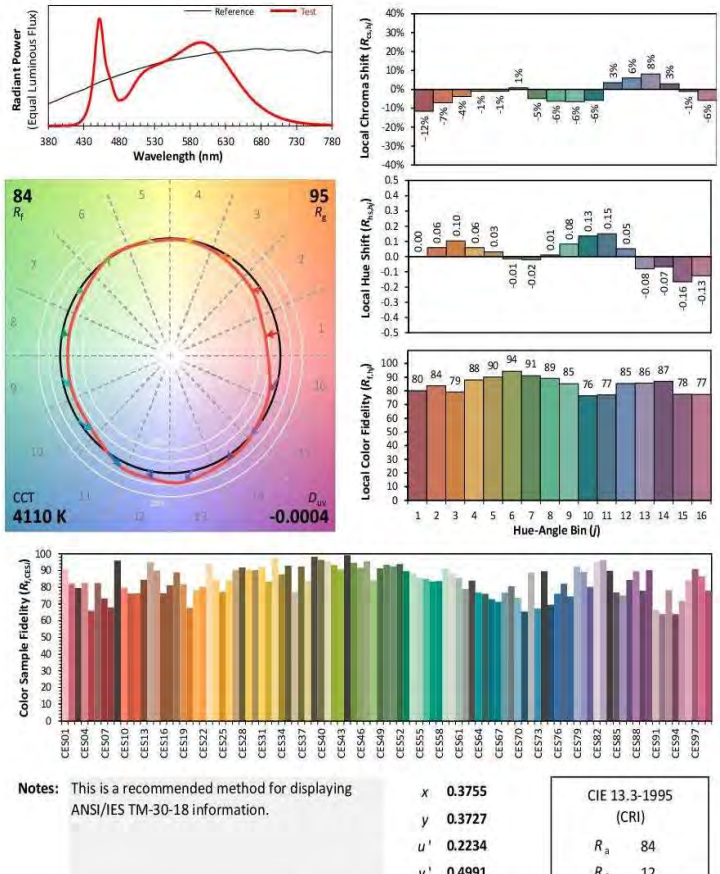
Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX **Manufacturer:** P.Q.L., Inc.

Date: 1/20/2022 **Model:** 55570-30W-40K



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

x	0.3755
y	0.3727
u'	0.2234
v'	0.4991

CIE 13.3-1995 (CRI)

R_a	84
R_9	12

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

Integrating Sphere Test

Model No.	55570-30W-50K	Sample ID.	4576021
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

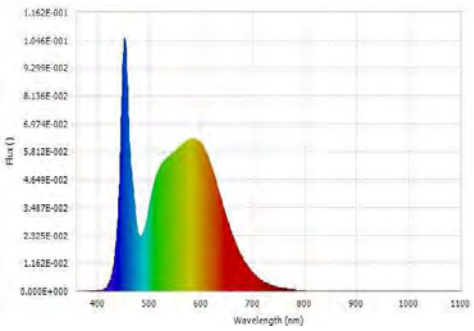
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. 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 was 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.

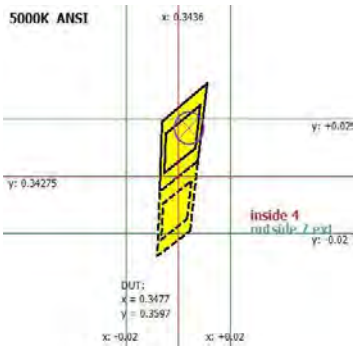
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.02	60	0.2589	30.851	0.9930	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4934	82	4.0	0.0030	3990.49	129.35	N/A





Luminous Flux (lm)	3990.49	Chrom x	0.3477
Chrom y	0.3597	Chrom u	0.2100
Chrom v	0.3260	Duv	0.0030
Chrom u’	0.2100	Chrom v’	0.4889
CCT (K)	4934	Luminous Efficacy (lm/W)	129.35
Ra	82	R1	80.0
R2	88.0	R3	93.0
R4	81.0	R5	80.0
R6	82.0	R7	88.0
R8	66.0	R9	4.0
R10	70.0	R11	80.0
R12	54.0	R13	82.0
R14	96.0	R15	74.0
Rf	83	Rg	95
Rcs,h1	-13%		

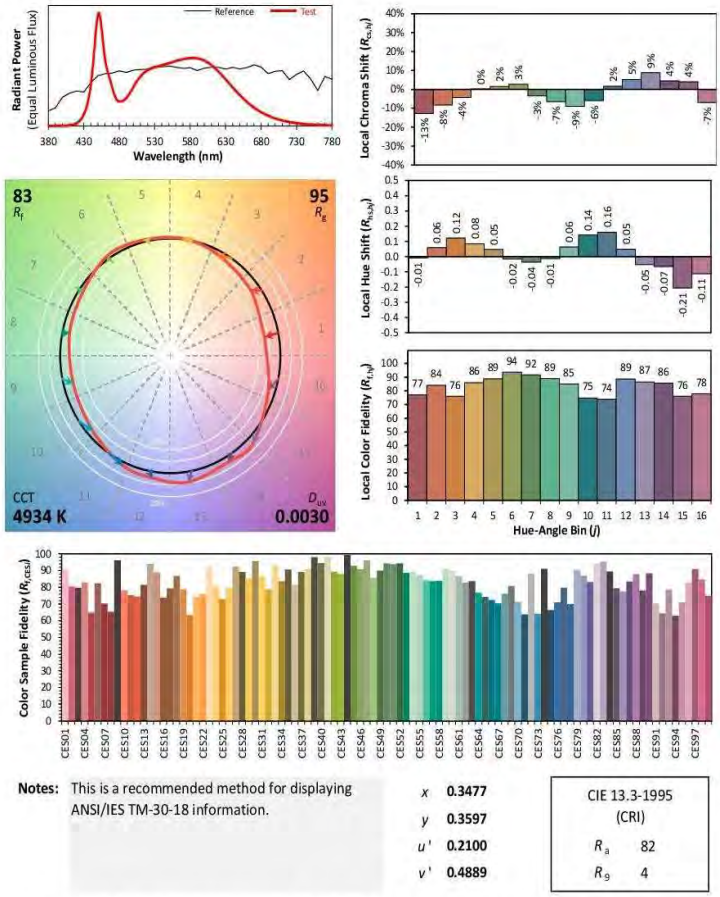
Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX **Manufacturer:** P.Q.L., Inc.

Date: 1/20/2022 **Model:** 55570-30W-50K



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

x	0.3477
y	0.3597
u'	0.2100
v'	0.4889

CIE 13.3-1995 (CRI)

R_a	82
R_9	4

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Integrating Sphere Test

Model No.	55570-25W-35K	Sample ID.	4576021
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

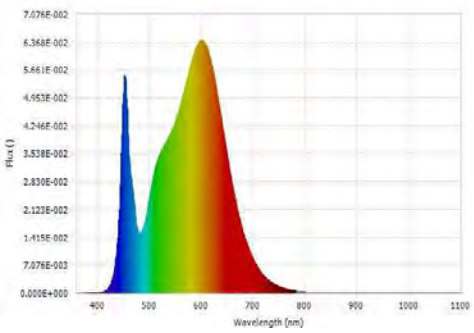
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. 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 was 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.

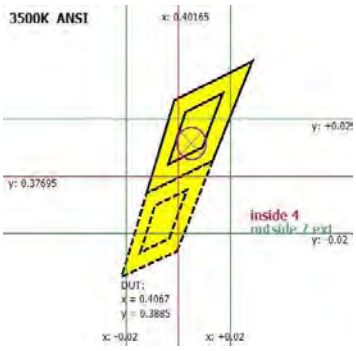
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.04	60	0.2207	26.232	0.9904	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3452	83	9.0	-0.0013	3378.41	128.79	N/A





Luminous Flux (lm)	3378.41	Chrom x	0.4067
Chrom y	0.3885	Chrom u	0.2375
Chrom v	0.3404	Duv	-0.0013
Chrom u’	0.2375	Chrom v’	0.5105
CCT (K)	3452	Luminous Efficacy (lm/W)	128.79
Ra	83	R1	82.0
R2	91.0	R3	96.0
R4	82.0	R5	82.0
R6	88.0	R7	84.0
R8	62.0	R9	9.0
R10	79.0	R11	81.0
R12	67.0	R13	85.0
R14	99.0	R15	75.0
Rf	84	Rg	96
Rcs,h1	-12%		

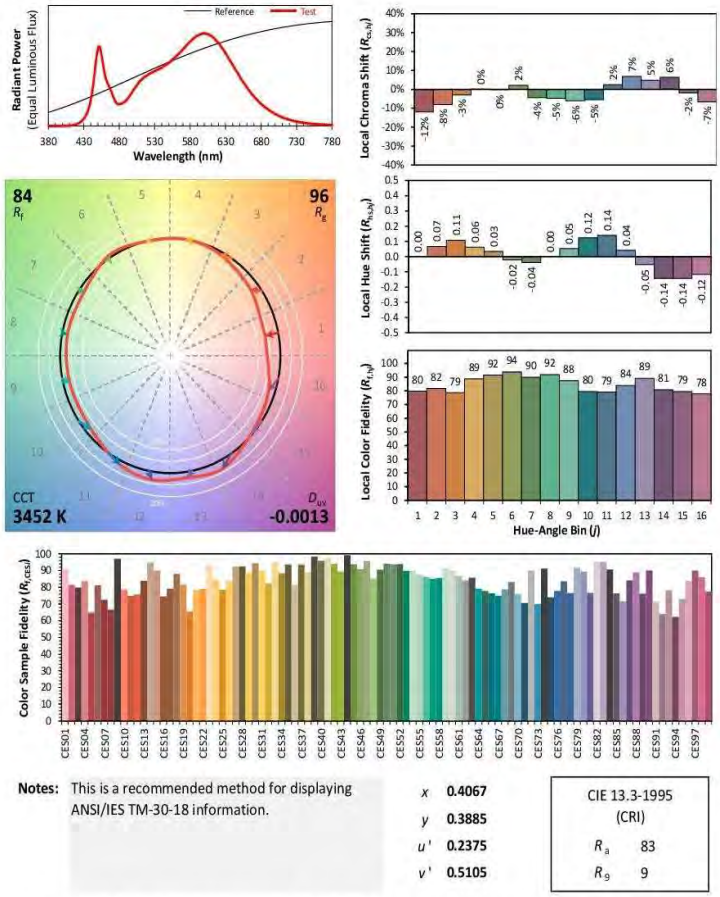
Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source: P2835Y-WXXXXXXXXXXXX-XXXX **Manufacturer:** P.Q.L., Inc.

Date: 1/20/2022 **Model:** 55570-25W-35K



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

x	0.4067
y	0.3885
u'	0.2375
v'	0.5105

CIE 13.3-1995 (CRI)

R_a	83
R_9	9

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Integrating Sphere Test

Model No.	55570-20W-35K	Sample ID.	4576021
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

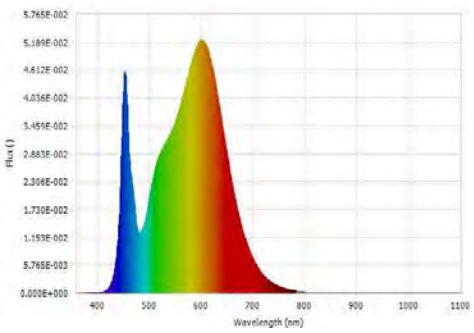
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. 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 was 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.

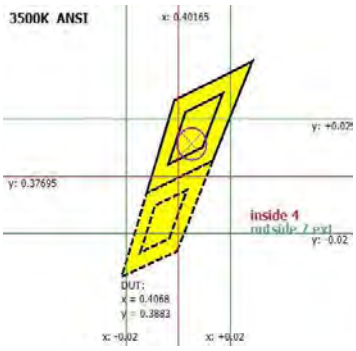
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.06	60	0.1748	20.675	0.9849	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3448	84	9.0	-0.0013	2749.51	132.99	N/A





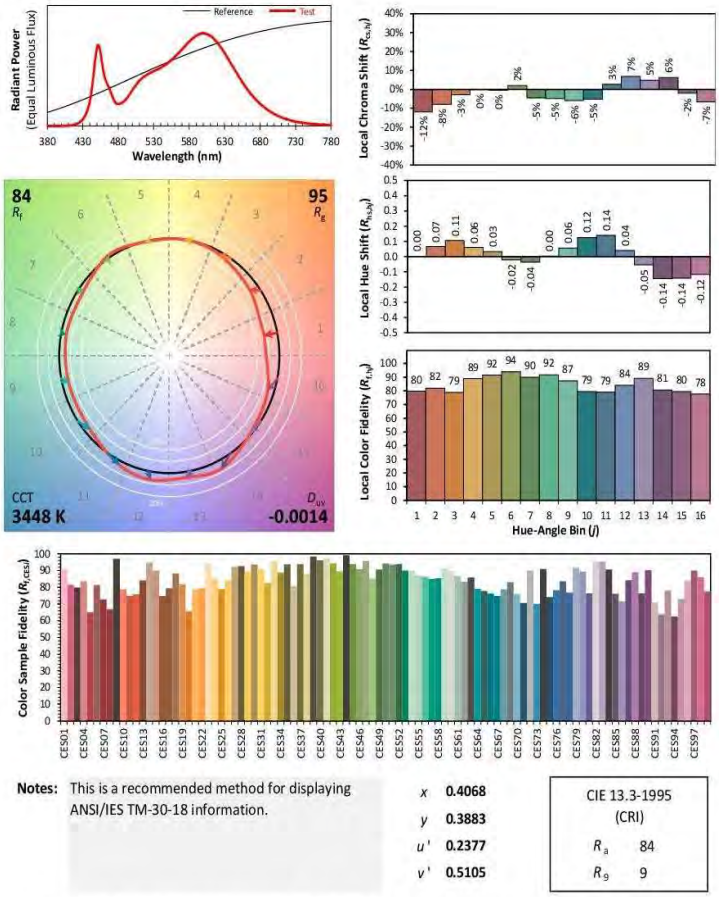
Luminous Flux (lm)	2749.51	Chrom x	0.4068
Chrom y	0.3883	Chrom u	0.2377
Chrom v	0.3403	Duv	-0.0013
Chrom u’	0.2377	Chrom v’	0.5105
CCT (K)	3448	Luminous Efficacy (lm/W)	132.99
Ra	84	R1	82.0
R2	92.0	R3	96.0
R4	82.0	R5	83.0
R6	89.0	R7	84.0
R8	62.0	R9	9.0
R10	80.0	R11	81.0
R12	67.0	R13	85.0
R14	99.0	R15	76.0
Rf	84	Rg	95
Rcs,h1	-12%		

Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source:	P2835Y-WXXXXXXXXXXX-XXXX	**Manufacturer:**	P.Q.L., Inc.
Date:	1/20/2022	**Model:**	55570-20W-35K



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

x	0.4068
y	0.3883
u'	0.2377
v'	0.5105

CIE 13.3-1995 (CRI)

R_a	84
R_9	9

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

Goniophotometer Test

Model No.	55570-30W-35K	Sample ID.	4576021
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	120.07	60	0.2585	30.86	0.9943	6.96%	Horizontal

Test Results

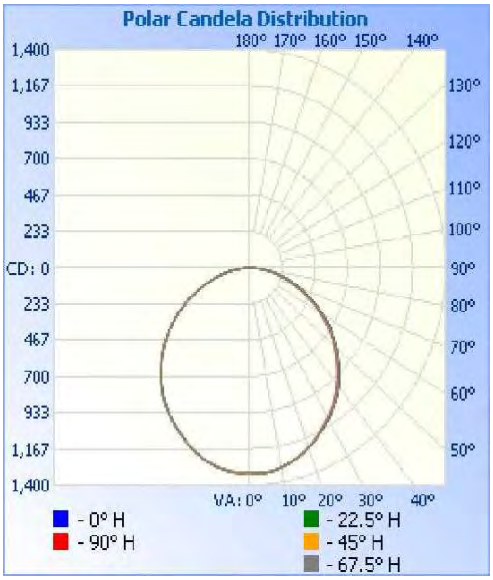
Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
3859.3	77.80%	N/A	113.3	114.3	125.06

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

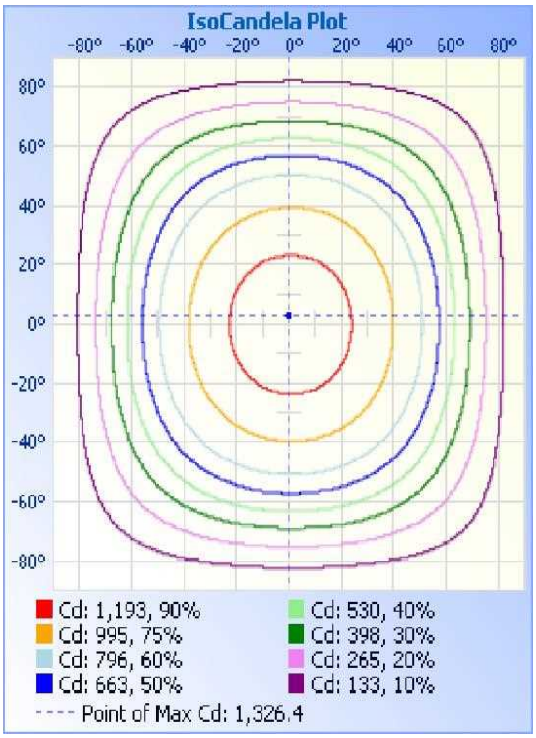
UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
21.6	21.2	1.28	1.26

Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot



Goniophotometer Test (Cont'd)

Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1027.5	26.60%
0-40	1689.1	43.80%
0-60	3008.2	77.90%
60-90	839.9	21.80%
70-100	366.1	9.50%
90-120	4.0	0.10%
0-90	3848.1	99.70%
90-180	11.2	0.30%
0-180	3859.3	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	31.6	0.80%	90-95	1.0	0.00%
5-10	93.9	2.40%	95-100	0.7	0.00%
10-15	152.9	4.00%	100-105	0.6	0.00%
15-20	206.3	5.30%	105-110	0.5	0.00%
20-25	252.3	6.50%	110-115	0.5	0.00%
25-30	290.5	7.50%	115-120	0.5	0.00%
30-35	320.9	8.30%	120-125	0.6	0.00%
35-40	340.8	8.80%	125-130	0.6	0.00%
40-45	347.8	9.00%	130-135	0.7	0.00%
45-50	343.6	8.90%	135-140	0.7	0.00%
50-55	327.9	8.50%	140-145	0.8	0.00%
55-60	299.8	7.80%	145-150	0.8	0.00%
60-65	261.4	6.80%	150-155	0.7	0.00%
65-70	214.2	5.60%	155-160	0.7	0.00%
70-75	164.4	4.30%	160-165	0.6	0.00%
75-80	114.2	3.00%	165-170	0.5	0.00%
80-85	65.3	1.70%	170-175	0.4	0.00%
85-90	20.4	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	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315
1	1323	1322	1320	1319	1319	1316	1315	1313	1313	1314	1317	1318	1319	1322	1323	1321	1322
2	1326	1325	1324	1321	1321	1319	1317	1316	1315	1317	1319	1320	1322	1324	1325	1325	1325
3	1326	1326	1324	1323	1323	1320	1319	1318	1318	1318	1320	1322	1322	1326	1325	1325	1326
4	1326	1326	1326	1324	1322	1320	1318	1319	1317	1319	1320	1322	1323	1324	1326	1326	1326
5	1322	1325	1322	1322	1322	1318	1318	1317	1319	1317	1319	1321	1321	1323	1324	1323	1322
6	1321	1321	1320	1319	1320	1318	1317	1316	1317	1317	1317	1320	1319	1320	1322	1321	1320
7	1318	1317	1316	1317	1316	1314	1315	1314	1314	1315	1315	1317	1317	1317	1319	1318	1316
8	1314	1314	1314	1313	1312	1311	1311	1311	1311	1311	1313	1314	1313	1313	1314	1313	1312
9	1309	1310	1310	1310	1308	1307	1307	1308	1307	1307	1308	1310	1309	1309	1309	1310	1310
10	1303	1303	1303	1302	1303	1302	1303	1303	1303	1305	1305	1306	1305	1304	1304	1303	1303
11	1298	1298	1298	1298	1297	1297	1298	1299	1298	1298	1298	1301	1299	1300	1299	1299	1298
12	1292	1290	1292	1292	1292	1291	1292	1294	1293	1294	1295	1296	1295	1293	1294	1293	1292
13	1287	1286	1286	1286	1287	1286	1286	1288	1288	1288	1289	1290	1289	1287	1287	1287	1286
14	1281	1279	1279	1278	1278	1278	1280	1281	1282	1282	1281	1283	1283	1281	1282	1281	1280
15	1273	1273	1272	1272	1272	1272	1272	1274	1274	1274	1275	1275	1276	1274	1275	1274	1273
16	1266	1266	1264	1264	1265	1264	1264	1265	1267	1267	1268	1267	1267	1266	1266	1265	1265
17	1258	1258	1257	1255	1256	1254	1256	1257	1258	1258	1259	1259	1259	1258	1260	1258	1258
18	1250	1249	1249	1246	1245	1246	1247	1249	1248	1249	1248	1249	1250	1250	1251	1251	1249
19	1241	1239	1239	1237	1236	1237	1238	1240	1238	1240	1239	1239	1240	1241	1242	1242	1240
20	1231	1230	1229	1229	1227	1227	1228	1230	1228	1230	1231	1232	1230	1232	1233	1232	1231
25	1180	1178	1175	1173	1172	1171	1172	1173	1176	1178	1178	1179	1180	1180	1182	1181	1179
30	1124	1121	1117	1115	1112	1113	1114	1118	1120	1122	1123	1124	1124	1127	1127	1126	1124
35	1065	1061	1058	1052	1049	1050	1052	1055	1057	1061	1062	1061	1062	1064	1065	1066	1064
40	990	986	983	975	973	972	976	979	981	984	986	986	986	989	992	993	988
45	901	899	894	888	886	885	888	893	896	898	900	900	900	903	905	907	903
50	810	808	802	796	793	793	796	801	804	807	806	808	808	811	813	814	812
55	716	708	702	695	691	690	694	698	703	705	704	705	706	709	711	714	712
60	605	600	592	586	582	581	585	591	594	596	595	596	598	601	604	608	606
65	490	489	481	473	469	468	471	476	480	483	481	480	482	486	489	493	492
70	381	375	366	358	353	354	358	364	368	370	368	367	368	371	376	380	380
75	275	270	262	254	249	250	255	261	266	266	264	262	262	265	270	276	276
80	177	174	167	159	154	154	159	164	169	168	166	164	164	167	172	177	178
85	86	81	76	71	67	67	71	74	78	77	76	75	76	78	82	85	86
90	5	5	3	3	2	2	2	2	2	2	4	4	5	6	6	6	6
95	1	2	2	2	1	2	2	2	1	1	2	2	2	1	2	1	2
100	1	2	1	2	1	1	2	1	1	1	1	2	2	1	2	1	1
105	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
110	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
115	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
120	1	2	1	2	1	1	1	1	2	2	1	1	1	1	1	1	1
125	1	2	1	2	1	1	1	1	1	1	1	2	2	1	2	1	1
130	1	2	2	2	2	2	2	2	1	2	1	2	1	2	2	1	2
135	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
140	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
145	3	2	3	3	2	3	3	3	3	2	2	3	2	3	3	2	2
150	2	2	3	3	3	2	3	3	2	2	2	3	2	3	3	2	2
155	3	3	4	3	4	3	3	4	3	3	3	3	3	3	3	3	4
160	3	3	4	4	4	3	3	4	3	4	4	4	4	3	3	4	4
165	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	4
170	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
175	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
180	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Goniophotometer Test

Model No.	55570-30W-50K	Sample ID.	4576021
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
25.1	120.07	60	0.2580	30.80	0.9942	7.06%	Horizontal

Test Results

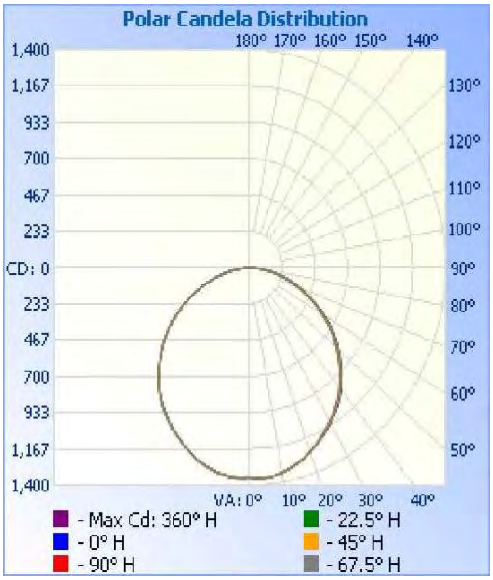
Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
3946.2	78.00%	N/A	113.1	114.0	128.12

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

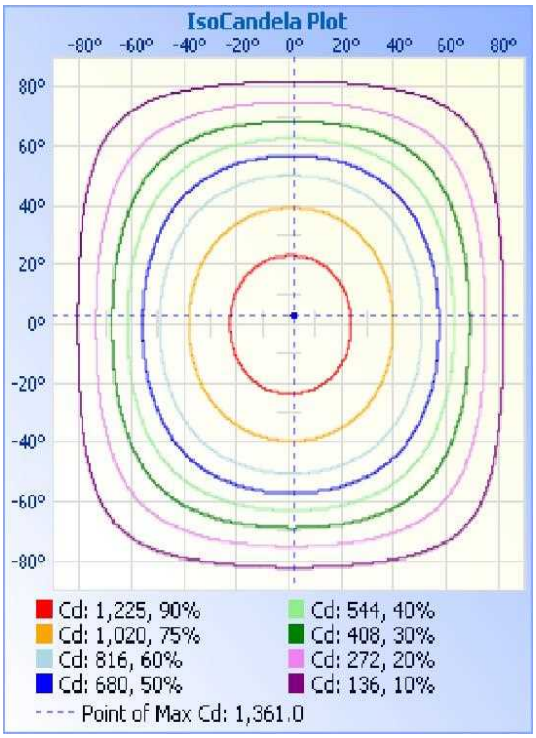
UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
21.7	21.2	1.28	1.26

Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot



Goniophotometer Test (Cont'd)

Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1053.6	26.70%
0-40	1731.5	43.90%
0-60	3080.6	78.10%
60-90	854.4	21.60%
70-100	371.1	9.40%
90-120	3.9	0.10%
0-90	3934.9	99.70%
90-180	11.3	0.30%
0-180	3946.2	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	32.4	0.80%	90-95	1.0	0.00%
5-10	96.4	2.40%	95-100	0.7	0.00%
10-15	156.7	4.00%	100-105	0.6	0.00%
15-20	211.6	5.40%	105-110	0.5	0.00%
20-25	258.7	6.60%	110-115	0.5	0.00%
25-30	297.8	7.50%	115-120	0.5	0.00%
30-35	328.7	8.30%	120-125	0.6	0.00%
35-40	349.2	8.80%	125-130	0.6	0.00%
40-45	356.2	9.00%	130-135	0.7	0.00%
45-50	351.0	8.90%	135-140	0.8	0.00%
50-55	335.4	8.50%	140-145	0.8	0.00%
55-60	306.6	7.80%	145-150	0.8	0.00%
60-65	266.2	6.70%	150-155	0.7	0.00%
65-70	218.7	5.50%	155-160	0.7	0.00%
70-75	167.7	4.20%	160-165	0.6	0.00%
75-80	115.7	2.90%	165-170	0.6	0.00%
80-85	66.0	1.70%	170-175	0.4	0.00%
85-90	20.1	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	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350
1	1359	1355	1355	1353	1352	1350	1349	1348	1348	1349	1351	1352	1354	1356	1356	1356	1356
2	1360	1358	1359	1356	1353	1352	1352	1350	1350	1351	1354	1354	1357	1358	1360	1359	1358
3	1360	1359	1360	1357	1356	1355	1352	1350	1352	1353	1355	1355	1358	1359	1361	1359	1361
4	1360	1358	1359	1357	1357	1356	1355	1352	1353	1352	1355	1357	1356	1360	1360	1361	1359
5	1358	1356	1358	1356	1356	1355	1352	1352	1353	1353	1353	1353	1355	1358	1359	1358	1358
6	1355	1354	1354	1354	1354	1353	1352	1351	1351	1349	1350	1351	1353	1355	1356	1356	1355
7	1352	1350	1351	1350	1351	1350	1350	1348	1349	1347	1348	1348	1350	1351	1353	1353	1351
8	1347	1346	1346	1347	1348	1346	1347	1346	1346	1342	1346	1344	1346	1349	1350	1349	1348
9	1343	1341	1342	1342	1342	1342	1342	1341	1341	1341	1342	1343	1343	1343	1345	1345	1342
10	1338	1336	1337	1337	1335	1336	1338	1337	1337	1336	1339	1338	1338	1339	1340	1340	1338
11	1330	1330	1331	1330	1331	1331	1331	1332	1332	1332	1333	1334	1333	1333	1334	1334	1332
12	1325	1324	1324	1325	1324	1326	1326	1325	1325	1326	1327	1328	1327	1326	1327	1327	1324
13	1319	1319	1318	1318	1318	1318	1319	1319	1320	1320	1321	1321	1320	1320	1320	1320	1319
14	1313	1312	1311	1311	1311	1311	1311	1313	1314	1314	1315	1313	1315	1315	1313	1311	1312
15	1306	1305	1304	1303	1304	1305	1305	1306	1306	1305	1307	1307	1307	1307	1306	1306	1305
16	1298	1298	1297	1296	1295	1296	1297	1297	1298	1298	1300	1300	1299	1298	1299	1299	1298
17	1290	1290	1289	1288	1286	1288	1288	1288	1292	1292	1291	1292	1293	1292	1292	1290	1290
18	1282	1281	1281	1279	1278	1278	1278	1279	1281	1282	1282	1283	1284	1283	1283	1282	1281
19	1272	1272	1272	1269	1268	1268	1269	1270	1270	1272	1273	1273	1273	1274	1274	1273	1272
20	1262	1262	1263	1260	1257	1258	1259	1260	1259	1261	1263	1263	1262	1264	1265	1263	1262
25	1211	1206	1205	1203	1201	1200	1203	1205	1206	1207	1208	1208	1208	1210	1211	1211	1210
30	1152	1149	1146	1142	1140	1140	1141	1145	1147	1149	1151	1154	1151	1155	1155	1155	1152
35	1091	1085	1081	1078	1074	1075	1077	1081	1083	1085	1087	1088	1088	1089	1091	1091	1090
40	1014	1010	1006	1001	997	996	998	1003	1005	1008	1011	1010	1012	1014	1016	1018	1015
45	924	920	915	909	907	906	908	911	916	917	919	920	921	923	924	926	925
50	828	826	819	814	812	811	813	816	820	823	824	825	824	828	831	832	830
55	730	724	717	711	708	708	711	716	719	722	722	723	723	727	730	732	730
60	619	613	605	599	595	595	596	601	605	607	607	608	609	612	616	619	617
65	500	498	489	482	478	479	480	485	488	489	490	490	491	494	499	502	501
70	386	382	374	366	361	363	368	373	377	378	377	375	376	379	385	389	388
75	282	275	266	259	254	254	258	266	269	269	267	265	265	268	275	280	280
80	178	175	168	161	156	156	161	166	170	170	167	166	166	169	174	180	180
85	85	82	77	71	67	67	71	75	78	77	76	75	76	78	82	85	87
90	5	4	3	3	2	2	2	2	2	2	2	3	4	5	5	5	5
95	2	1	2	2	1	2	1	1	1	1	1	1	1	2	2	1	1
100	2	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	2
105	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
110	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
115	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	2	1	1	2	1	2	1	1	1	1	1	1	1	1	1	2	1
125	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	2	2
130	2	2	1	2	2	2	1	2	1	2	1	1	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	2	3	2	2	2	2	2	2	2	2	2	2	2
145	3	2	2	2	2	3	2	3	3	3	2	2	2	3	2	3	3
150	3	2	3	2	3	3	2	3	2	2	2	3	2	3	3	3	3
155	4	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3
160	4	4	3	3	4	3	4	4	3	4	4	3	4	4	3	4	4
165	4	4	4	4	4	4	4	5	4	4	4	4	4	5	4	5	4
170	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
175	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
180	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

THD and PF Test

Model No.	55570-30W-35K		Sample ID.	4576021
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	120.07	60	0.2585	30.86	0.9943	6.96%	Horizontal
24.9	277.04	60	0.1143	30.39	0.9593	10.41%	Horizontal

THD and PF Test

Model No.	55570-30W-40K		Sample ID.	4576021
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	0.2486	29.68	0.9943	6.73%	Horizontal
24.9	277.09	60	0.1106	29.32	0.9563	10.54%	Horizontal

THD and PF Test

Model No.	55570-30W-50K		Sample ID.	4576021
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	120.07	60	0.2580	30.80	0.9942	7.05%	Horizontal
24.9	277.10	60	0.1140	30.30	0.9591	10.38%	Horizontal

THD and PF Test

Model No.	55570-25W-35K		Sample ID.	4576021
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	120.03	60	0.2197	26.17	0.9921	8.18%	Horizontal
24.9	277.13	60	0.1005	26.37	0.9473	11.38%	Horizontal

THD and PF Test

Model No.	55570-20W-35K		Sample ID.	4576021
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	120.09	60	0.1730	20.54	0.9876	10.10%	Horizontal
24.9	277.14	60	0.0837	21.43	0.9239	13.64%	Horizontal

In-Situ Temperature Measurement Test

Model No.	55570-30W-35K	Sample ID.	4576021

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	120.07	60	0.2585	30.86	0.9943	6.96%	Horizontal

Test Results (LEDs)

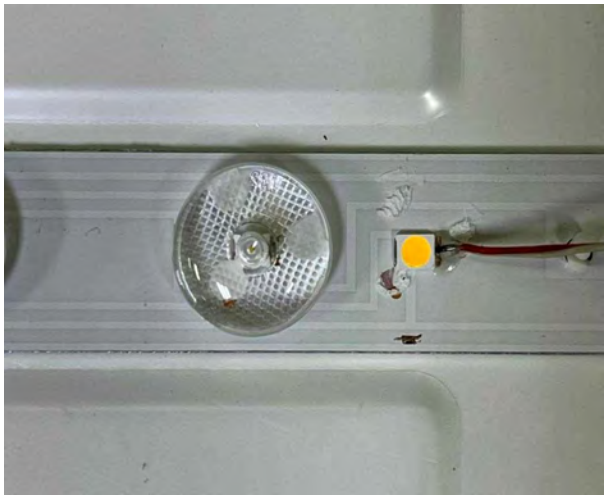
Thermocouple Location	Declared Light Source Current (mA)	Temperature for Light Source (°C)		Max Chromaticity Shift （1000-6000h)	LED Model Number	LM-80 Limit Current (mA)	LM-80 Limit Temp (°C)
		Test Result	Test Result (Correct to 25 °C)				
Ambient TEMP	N/A	24.1	25.0				
TMP of Location 1	45	39.5	40.4	0.0023	P2835Y-WXXXXXXXX XXXXX-XXXX	100	105

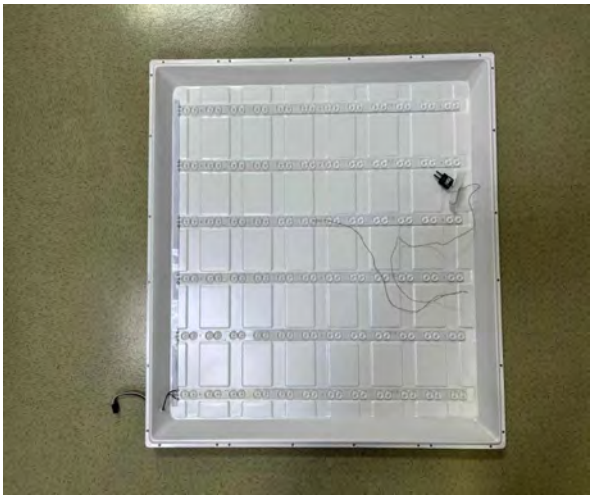
Test Results (Drivers)

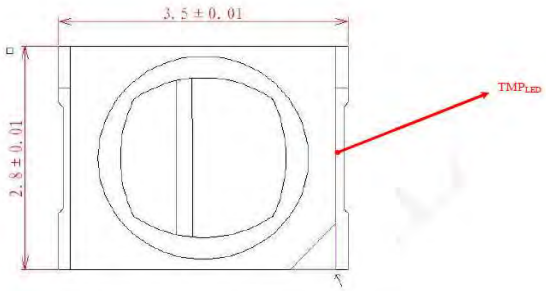
Thermocouple Location	Temperature for Driver (°C)		Driver Model Number	Driver Limit Temp (°C)
	Test Result	Test Result (Correct to 25 °C)		
Ambient TEMP	24.1	25.0		
TMP of Location 1	66.1	67.0	SIF 30-I0800 120-277 W D1-S1S2	90

In-Situ Temperature Measurement Test (Cont'd)

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







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