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
55119

Project Number
4790527704
Report Number
4790527704_1R01

Test Date
2022-08-26~2022-08-27
Issue Date
2022-08-31
Revision Date
2022-08-31

Prepared By	**Approved By**
Zhao, Elaine	Zhou, Maxine

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%	4467.73
Minimum Luminaire Efficacy (lm/W)-Luminaires	**IES LM-79-2008**	≥110	-3%	123.78
Spacing Criteria (0-180°)	**IES LM-79-2008**	1.0-2.0	±0.1	1.22
Spacing Criteria (90-270°)	**IES LM-79-2008**	1.0-2.0	±0.1	1.26
Zonal Lumen Requirement 1(0°-60°)	**IES LM-79-2008**	≥75%	-3%	80.70%
Allowable CCT (3500K)	**IES LM-79-2008/ANSI C78.377-2015**	3465±245	N/A	3470
Allowable CCT (4000K)	**IES LM-79-2008/ANSI C78.377-2015**	3985±275	N/A	4109
Allowable CCT (5000K)	**IES LM-79-2008/ANSI C78.377-2015**	5029±283	N/A	4967
Allowable CCT (3500K)	**IES LM-79-2008/ANSI C78.377-2015**	3465±245	N/A	3466
Allowable CCT (3500K)	**IES LM-79-2008/ANSI C78.377-2015**	3465±245	N/A	3457
Minimum CRI	**IES LM-79-2008/CIE 13.3-1995**	≥80	-1	82
Minimum R9	**IES LM-79-2008**	≥0	-1	5.0
Minimum Rg	**IES LM-79-2008**	≥89	-1	94
Minimum Rf	**IES LM-79-2008**	≥70	-1	82
Rcs,h1	**IES LM-79-2008**	-12%-23%	-1%	-12%
Unified Glare Rating (UGR)	**IES LM-79-2008**	≤22	N/A	21.0
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	0.9457
Total Harmonic Distortion (A%)	**ANSI C82.77-10-2014**	≤20%	5%	12.72%
In-Situ Temperature Measurement Test for LED 1 (°C)	**UL1598-2008**	≤105	N/A	45.6
In-Situ Temperature Measurement Test for Driver 1 (°C)	**UL1598-2008**	≤90	N/A	63.0
Max Chromaticity Shift (1000-6000h)	**N/A**	≤0.004	0.0004	0.0024
Minimum Luminaire Warranty (Years)	**N/A**	≥5	N/A	≥5

Test List

Sample Received Date: 2022-07-29

Test Item	Test Date	Model Number	Tests Conducted By
Integrating Sphere Test	2022-08-26	55119-50W-35K	Yang, Gavin X
Integrating Sphere Test	2022-08-26	55119-50W-40K	Yang, Gavin X
Integrating Sphere Test	2022-08-26	55119-50W-50K	Yang, Gavin X
Integrating Sphere Test	2022-08-26	55119-42W-35K	Yang, Gavin X
Integrating Sphere Test	2022-08-26	55119-34W-35K	Yang, Gavin X
Goniophotometer Test	2022-08-26	55119-50W-35K	Yang, Gavin X
Goniophotometer Test	2022-08-26	55119-50W-50K	Yang, Gavin X
THD and PF Test	2022-08-26	55119-50W-35K	Yang, Gavin X
THD and PF Test	2022-08-26	55119-50W-40K	Yang, Gavin X
THD and PF Test	2022-08-26	55119-50W-50K	Yang, Gavin X
THD and PF Test	2022-08-26	55119-42W-35K	Yang, Gavin X
THD and PF Test	2022-08-26	55119-34W-35K	Yang, Gavin X
In-Situ Temperature Measurement Test	2022-08-27	55119-50W-35K	Yang, Gavin X

Remark (if any)

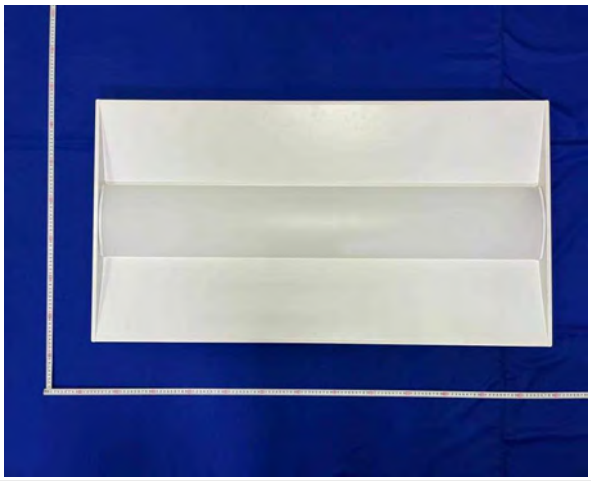
1. UL test equipment information is recorded on Meter Use in UL's Aurora database.
2. The accuracy method decision rule is applied when the compliance or verdict is made to the results of this report.
3. This report replace 4790527704_1, the report 4790527704_1 is terminated.

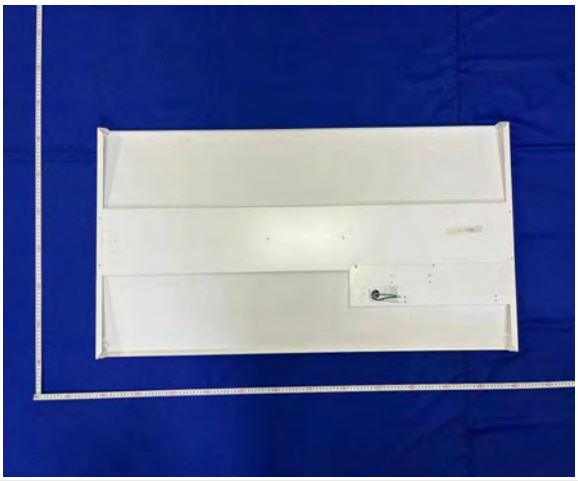
Product Description

Lamp/Luminaire Description: 2x4 Luminaires for Ambient Lighting of Interior Commercial Spaces
Model Number: 55119
Electrical Parameter: 120-277V, 50/60Hz
LED Package: STW8A2PD-XX
Dimming Information: Continuous dimming capability

Products Scaled Value

Model Number	CCT	Luminous Flux	Power	Luminous Efficacy
55119-50W-35K	3500K	6250	50	125
55119-50W-40K	4000K	6750	50	135
55119-50W-50K	5000K	6350	50	127
55119-42W-35K	3500K	5376	42	128
55119-42W-40K	4000K	5796	42	138
55119-42W-50K	5000K	5460	42	130
55119-34W-35K	3500K	4454	34	131
55119-34W-40K	4000K	5794	34	141
55119-34W-50K	5000K	4522	34	133





Integrating Sphere Test

Model No.	55119-50W-35K	Sample ID.	5193587
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

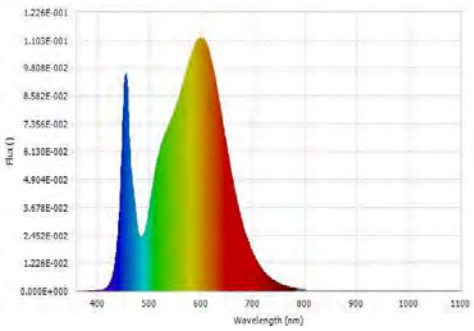
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C.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

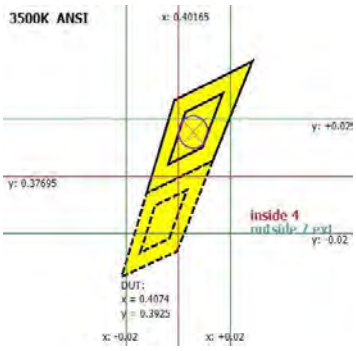
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.8	120.04	60	0.4054	48.317	0.9929	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3470	82	5.0	0.0003	6057.89	125.38	N/A





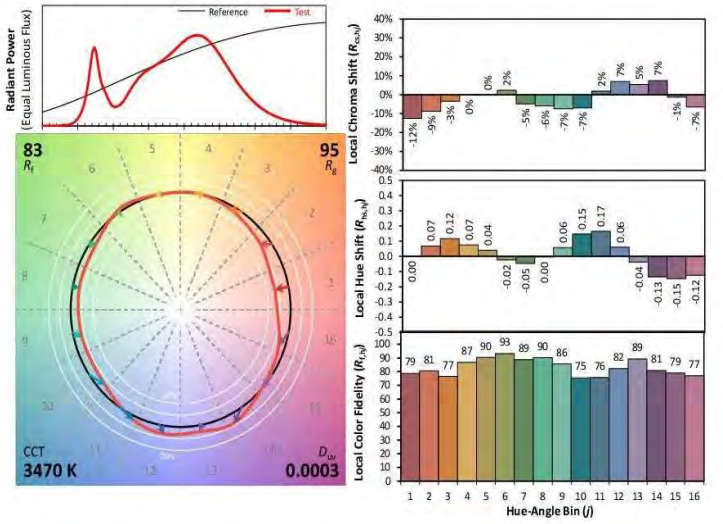
Luminous Flux (lm)	6057.89	Chrom x	0.4074
Chrom y	0.3925	Chrom u	0.2363
Chrom v	0.3415	Duv	0.0003
Chrom u’	0.2363	Chrom v’	0.5123
CCT (K)	3470	Luminous Efficacy (lm/W)	125.38
Ra	82	R1	80.0
R2	89.0	R3	95.0
R4	79.0	R5	79.0
R6	84.0	R7	84.0
R8	61.0	R9	5.0
R10	73.0	R11	77.0
R12	59.0	R13	82.0
R14	97.0	R15	73.0
Rf	83	Rg	95
Rcs,h1	-12%		

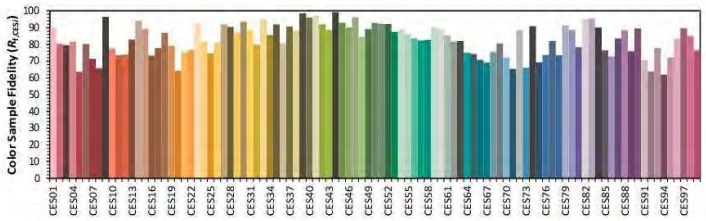
Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source:	STW8A2PD-XX	**Manufacturer:**	P.Q.L., Inc.
Date:	8/26/2022	**Model:**	55119-50W-35K





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

x	0.4074
y	0.3925
u'	0.2363
v'	0.5123

CIE 13.3-1995 (CRI)

R_a	82
R_9	5

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

Integrating Sphere Test

Model No.	55119-50W-40K	Sample ID.	5193587
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

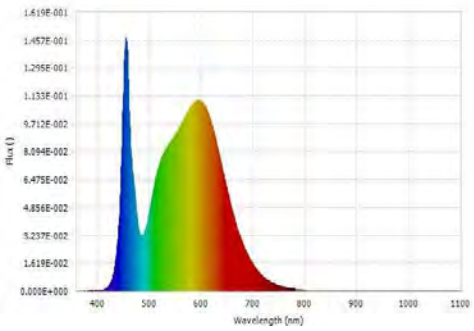
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C.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

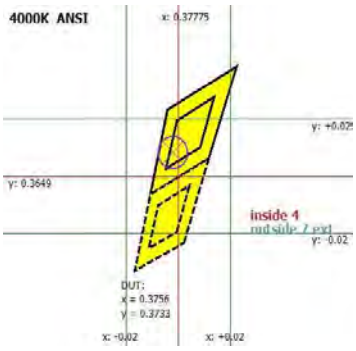
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.8	120.06	60	0.3893	46.413	0.9930	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4109	83	12.0	-0.0002	6540.99	140.93	N/A





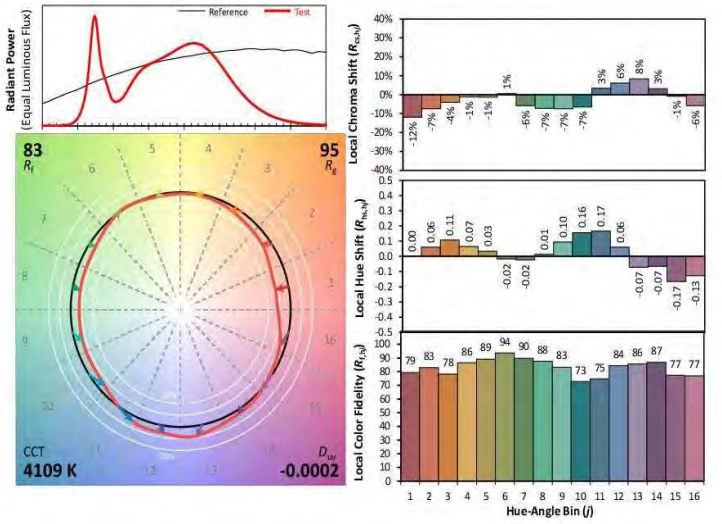
Luminous Flux (lm)	6540.99	Chrom x	0.3756
Chrom y	0.3733	Chrom u	0.2233
Chrom v	0.3329	Duv	-0.0002
Chrom u’	0.2233	Chrom v’	0.4993
CCT (K)	4109	Luminous Efficacy (lm/W)	140.93
Ra	83	R1	82.0
R2	90.0	R3	94.0
R4	81.0	R5	81.0
R6	85.0	R7	86.0
R8	66.0	R9	12.0
R10	74.0	R11	79.0
R12	56.0	R13	84.0
R14	97.0	R15	76.0
Rf	83	Rg	94
Rcs,h1	-12%		

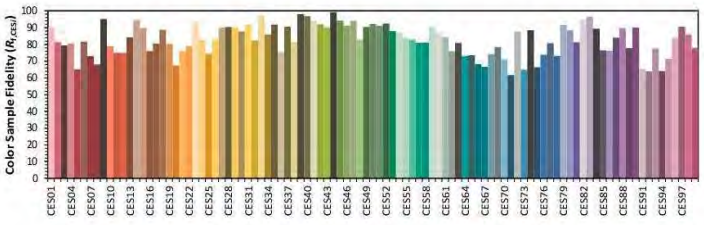
Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source:	STW8A2PD-XX	**Manufacturer:**	P.Q.L., Inc.
Date:	8/26/2022	**Model:**	55119-50W-40K





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

x	0.3756
y	0.3733
u'	0.2233
v'	0.4993

CIE 13.3-1995 (CRI)

R_a	83
R_9	12

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Integrating Sphere Test

Model No.	55119-50W-50K	Sample ID.	5193587
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.
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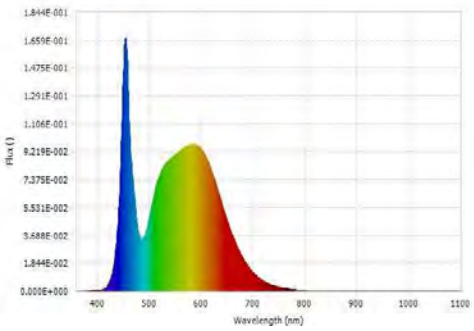
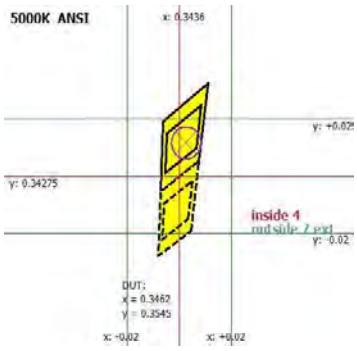
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.8	120.04	60	0.405	48.269	0.9929	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4967	82	9.0	0.0010	6164.64	127.71	N/A





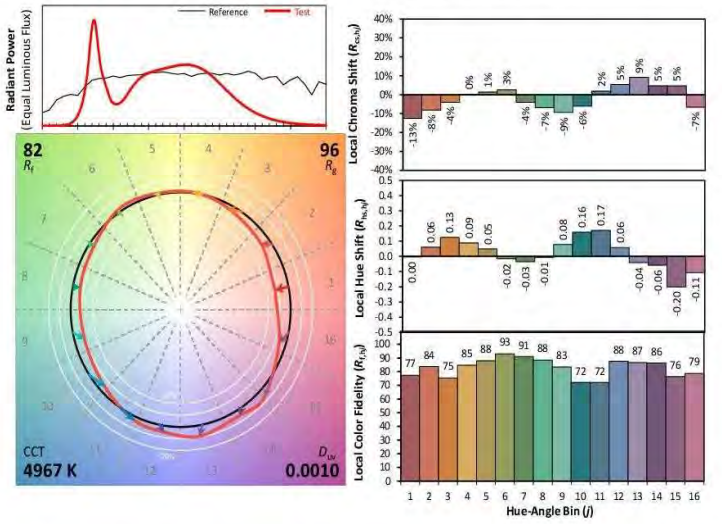
Luminous Flux (lm)	6164.64	Chrom x	0.3462
Chrom y	0.3545	Chrom u	0.2111
Chrom v	0.3242	Duv	0.0010
Chrom u’	0.2111	Chrom v’	0.4863
CCT (K)	4967	Luminous Efficacy (lm/W)	127.71
Ra	82	R1	81.0
R2	88.0	R3	92.0
R4	81.0	R5	80.0
R6	82.0	R7	88.0
R8	68.0	R9	9.0
R10	70.0	R11	79.0
R12	52.0	R13	83.0
R14	96.0	R15	76.0
Rf	82	Rg	96
Rcs,h1	-13%		

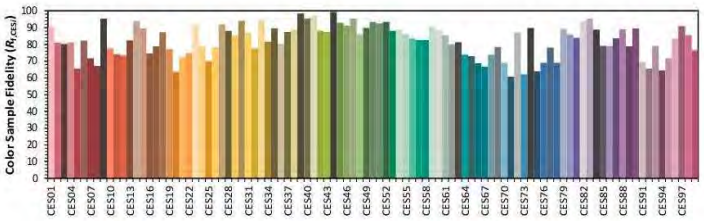
Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source:	STW8A2PD-XX	**Manufacturer:**	P.Q.L., Inc.
Date:	8/26/2022	**Model:**	55119-50W-50K





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

x	0.3462
y	0.3545
u'	0.2111
v'	0.4863

CIE 13.3-1995 (CRI)

R_a	82
R_9	9

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Integrating Sphere Test

Model No.	55119-42W-35K	Sample ID.	5193587
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

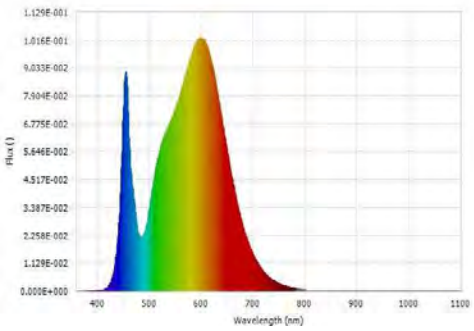
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C.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

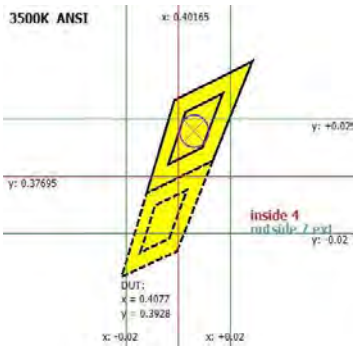
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.07	60	0.3614	43.183	0.9953	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3466	82	5.0	0.0004	5576.78	129.14	N/A





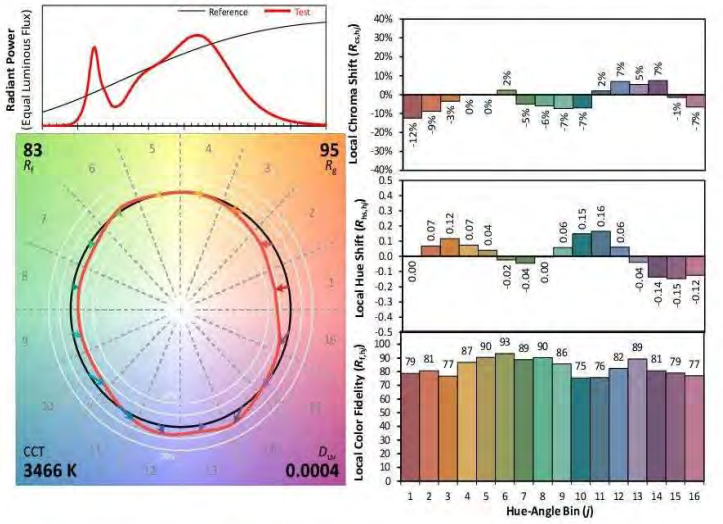
Luminous Flux (lm)	5576.78	Chrom x	0.4077
Chrom y	0.3928	Chrom u	0.2364
Chrom v	0.3416	Duv	0.0004
Chrom u’	0.2364	Chrom v’	0.5125
CCT (K)	3466	Luminous Efficacy (lm/W)	129.14
Ra	82	R1	80.0
R2	89.0	R3	95.0
R4	80.0	R5	79.0
R6	85.0	R7	85.0
R8	61.0	R9	5.0
R10	73.0	R11	78.0
R12	59.0	R13	82.0
R14	97.0	R15	73.0
Rf	83	Rg	95
Rcs,h1	-12%		

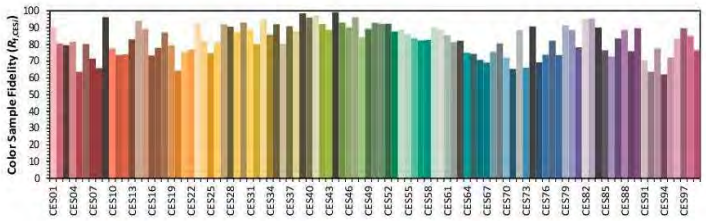
Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source:	STW8A2PD-XX	**Manufacturer:**	P.Q.L., Inc.
Date:	8/26/2022	**Model:**	55119-42W-35K





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

x	0.4077
y	0.3928
u'	0.2364
v'	0.5125

CIE 13.3-1995 (CRI)

R_a	82
R_9	5

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

Integrating Sphere Test

Model No.	55119-34W-35K	Sample ID.	5193587
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

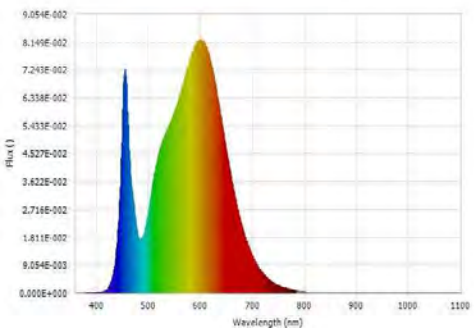
1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
2.Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C.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

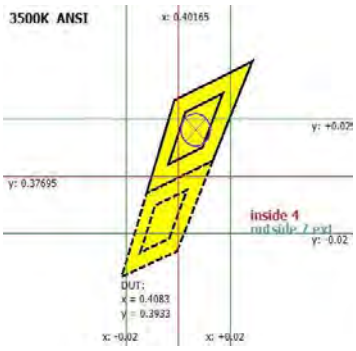
Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.13	60	0.2728	32.579	0.9941	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3457	82	5.0	0.0005	4467.73	137.14	N/A

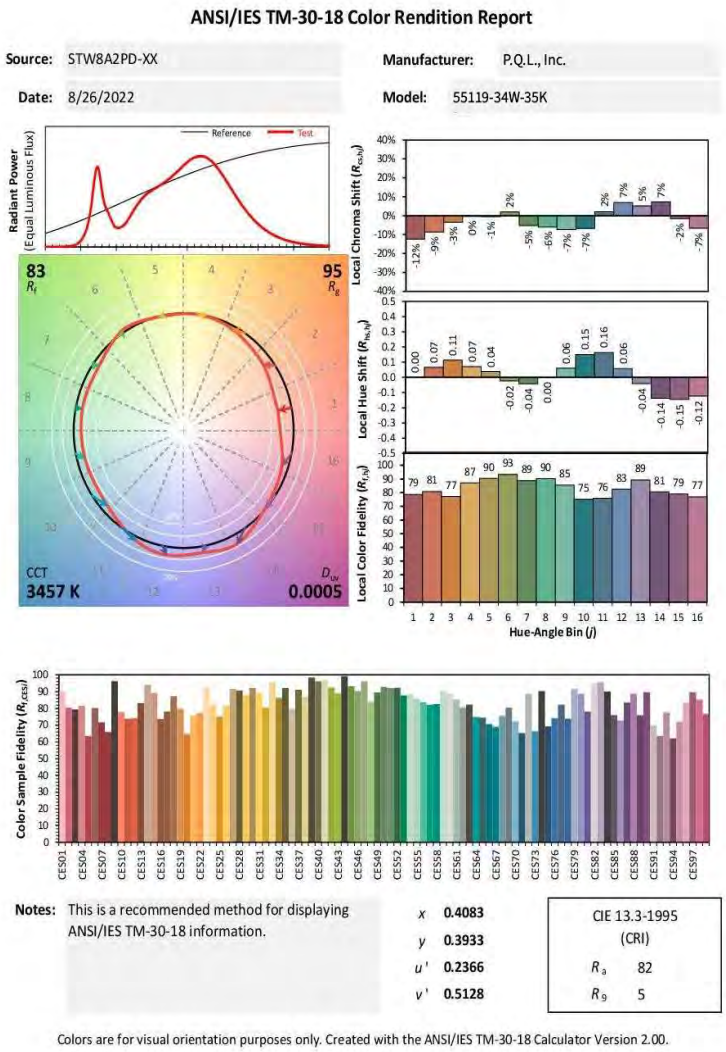




Luminous Flux (lm)	4467.73	Chrom x	0.4083
Chrom y	0.3933	Chrom u	0.2366
Chrom v	0.3418	Duv	0.0005
Chrom u’	0.2366	Chrom v’	0.5128
CCT (K)	3457	Luminous Efficacy (lm/W)	137.14
Ra	82	R1	80.0
R2	89.0	R3	95.0
R4	80.0	R5	79.0
R6	85.0	R7	85.0
R8	61.0	R9	5.0
R10	74.0	R11	78.0
R12	59.0	R13	82.0
R14	98.0	R15	73.0
Rf	83	Rg	95
Rcs,h1	-12%		

Integrating Sphere Test (Cont'd)

TM-30 Report



Goniophotometer Test

Model No.	55119-50W-35K	Sample ID.	5193587
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	120.06	60	0.4048	48.297	0.9938	5.15%	Horizontal

Test Results

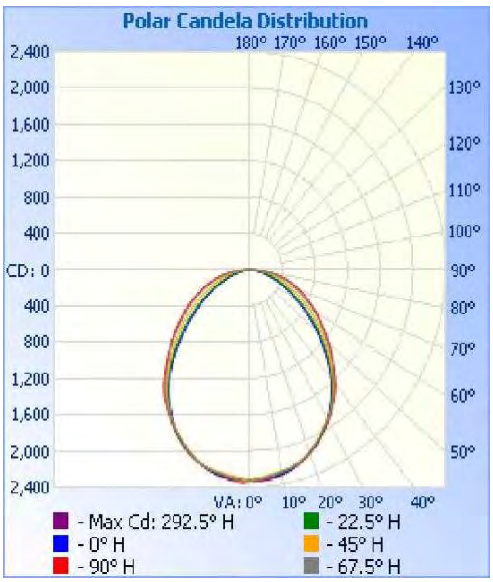
Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
5978.1	80.90%	N/A	104.5	95.2	123.78

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

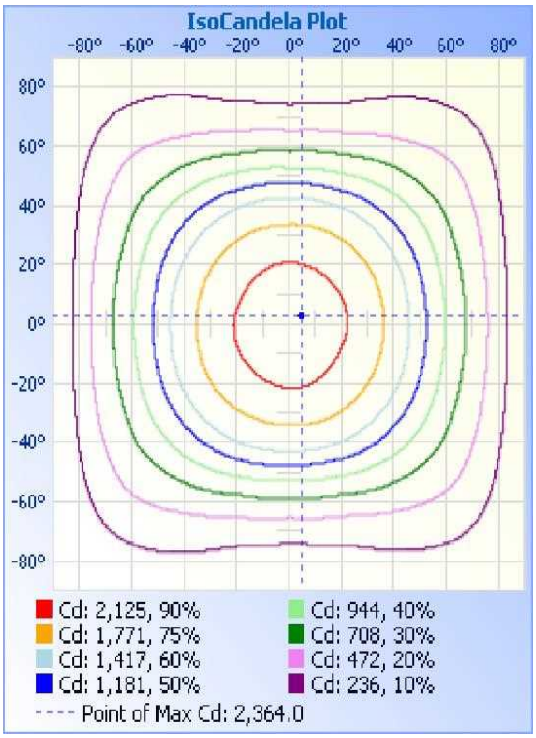
UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
17.5	20.8	1.22	1.24

Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot



Goniophotometer Test (Cont'd)

Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1788.8	29.90%
0-40	2889.4	48.30%
0-60	4829.4	80.80%
60-90	1134.2	19.00%
70-100	509.6	8.50%
90-120	4.5	0.10%
0-90	5963.6	99.80%
90-180	14.5	0.20%
0-180	5978.1	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	55.6	0.90%	90-95	1.2	0.00%
5-10	165.0	2.80%	95-100	0.8	0.00%
10-15	268.2	4.50%	100-105	0.6	0.00%
15-20	360.5	6.00%	105-110	0.6	0.00%
20-25	439.3	7.30%	110-115	0.6	0.00%
25-30	500.2	8.40%	115-120	0.6	0.00%
30-35	541.3	9.10%	120-125	0.7	0.00%
35-40	559.2	9.40%	125-130	0.8	0.00%
40-45	548.2	9.20%	130-135	0.9	0.00%
45-50	514.8	8.60%	135-140	1.1	0.00%
50-55	467.0	7.80%	140-145	1.1	0.00%
55-60	410.1	6.90%	145-150	1.1	0.00%
60-65	346.4	5.80%	150-155	1.0	0.00%
65-70	280.3	4.70%	155-160	1.0	0.00%
70-75	219.5	3.70%	160-165	0.9	0.00%
75-80	161.1	2.70%	165-170	0.8	0.00%
80-85	97.3	1.60%	170-175	0.5	0.00%
85-90	29.6	0.50%	175-180	0.2	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	2331	2331	2331	2331	2331	2331	2331	2331	2331	2331	2331	2331	2331	2331	2331	2331	2331
1	2318	2312	2312	2330	2339	2337	2329	2325	2322	2316	2318	2338	2341	2337	2319	2314	2316
2	2321	2307	2307	2327	2338	2349	2338	2330	2321	2309	2312	2335	2347	2353	2338	2326	2317
3	2317	2304	2300	2321	2338	2354	2348	2333	2319	2304	2307	2330	2346	2359	2345	2330	2315
4	2316	2296	2294	2311	2334	2354	2350	2333	2317	2298	2298	2321	2342	2362	2351	2330	2315
5	2313	2290	2287	2305	2330	2354	2348	2332	2319	2295	2291	2312	2334	2364	2355	2332	2313
6	2309	2287	2274	2299	2323	2353	2350	2329	2315	2292	2280	2306	2328	2362	2351	2332	2310
7	2305	2282	2267	2288	2317	2340	2343	2324	2311	2291	2275	2298	2318	2354	2350	2327	2306
8	2301	2280	2260	2277	2308	2333	2332	2320	2308	2290	2268	2286	2315	2341	2345	2323	2301
9	2294	2278	2255	2267	2302	2319	2324	2311	2297	2283	2264	2276	2307	2327	2334	2316	2294
10	2290	2273	2250	2261	2294	2305	2312	2302	2290	2281	2261	2270	2297	2317	2321	2309	2289
11	2279	2264	2248	2253	2283	2294	2299	2289	2281	2272	2259	2266	2288	2300	2310	2297	2280
12	2270	2254	2242	2246	2271	2280	2286	2277	2271	2264	2254	2255	2276	2287	2293	2287	2269
13	2256	2244	2239	2241	2262	2265	2266	2257	2259	2255	2251	2251	2267	2274	2279	2272	2256
14	2243	2230	2230	2233	2252	2248	2247	2242	2247	2244	2241	2243	2255	2257	2257	2252	2242
15	2229	2218	2219	2226	2236	2234	2227	2225	2231	2232	2232	2237	2242	2241	2233	2232	2226
16	2213	2207	2204	2214	2222	2216	2207	2205	2215	2215	2218	2226	2226	2221	2215	2211	2212
17	2198	2191	2186	2199	2207	2196	2189	2187	2197	2198	2198	2211	2212	2202	2194	2192	2196
18	2181	2179	2170	2178	2189	2176	2173	2178	2179	2182	2176	2188	2199	2185	2176	2175	2178
19	2169	2167	2159	2162	2174	2166	2157	2159	2165	2168	2163	2173	2179	2170	2160	2164	2167
20	2148	2147	2139	2140	2156	2147	2138	2140	2148	2152	2140	2147	2166	2157	2144	2144	2149
25	2035	2038	2022	2027	2049	2052	2044	2031	2044	2050	2033	2036	2056	2059	2051	2038	2038
30	1903	1909	1905	1908	1922	1919	1910	1899	1894	1912	1908	1914	1928	1924	1921	1908	1903
35	1733	1746	1766	1781	1793	1785	1764	1733	1731	1746	1762	1784	1796	1789	1770	1747	1736
40	1543	1560	1577	1610	1634	1628	1584	1541	1531	1554	1576	1615	1639	1626	1592	1553	1538
45	1321	1347	1382	1424	1446	1431	1379	1330	1290	1323	1369	1421	1444	1426	1387	1339	1320
50	1087	1132	1194	1245	1263	1240	1172	1108	1047	1093	1170	1239	1260	1236	1174	1115	1091
55	865	919	1004	1073	1093	1066	983	883	830	876	972	1058	1087	1065	985	903	860
60	662	712	822	911	938	906	804	686	642	684	793	892	927	898	807	704	662
65	490	533	643	747	786	744	626	518	473	510	620	731	771	729	627	525	493
70	348	388	492	601	642	600	479	373	325	359	466	583	625	586	477	380	348
75	230	271	374	473	505	470	362	255	208	242	347	452	488	458	361	266	230
80	126	170	270	332	346	322	251	158	110	148	240	313	338	321	256	166	127
85	47	90	138	162	160	148	119	72	37	70	114	147	160	158	131	83	47
90	4	7	7	5	4	3	3	2	2	3	2	3	5	6	6	7	4
95	1	2	1	3	0	3	2	2	1	2	1	1	2	2	1	2	2
100	2	2	1	1	1	0	1	1	1	2	1	2	2	2	1	0	1
105	2	2	3	3	1	0	2	1	1	0	0	1	1	1	1	0	1
110	1	1	0	0	1	2	2	2	1	2	1	1	1	1	1	1	1
115	1	1	1	1	0	2	2	1	2	1	1	0	2	2	0	1	1
120	1	1	1	3	1	2	1	1	1	2	1	2	1	1	2	1	2
125	1	2	2	2	2	1	2	1	2	2	2	1	2	2	2	1	2
130	2	1	2	2	1	3	3	3	2	2	2	3	2	3	1	3	1
135	4	4	2	4	1	4	2	2	1	1	3	1	3	2	4	3	3
140	3	2	3	3	3	3	4	4	2	3	2	3	4	2	4	3	3
145	3	4	4	4	3	4	4	2	2	5	3	4	4	3	3	4	3
150	3	4	3	5	4	5	3	4	4	4	3	5	3	3	4	5	3
155	3	4	6	5	5	4	5	4	4	4	5	4	4	5	5	4	5
160	5	5	5	7	6	6	5	4	4	5	5	4	5	6	5	5	5
165	6	8	6	5	6	6	6	5	5	7	6	6	6	7	6	6	6
170	6	8	7	7	7	8	7	7	6	6	8	7	7	7	7	8	7
175	7	7	8	7	7	7	8	8	7	7	8	8	7	7	8	7	8
180	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Goniophotometer Test

Model No.	55119-50W-50K	Sample ID.	5193587
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	120.05	60	0.4046	48.28	0.9938	5.16%	Horizontal

Test Results

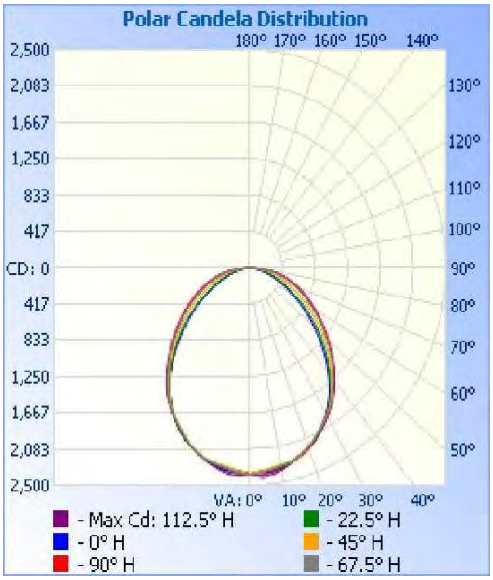
Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	0°-60°	N/A	Horizontal Spread	Vertical Spread	
6119.7	80.70%	N/A	105.8	96.0	126.75

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

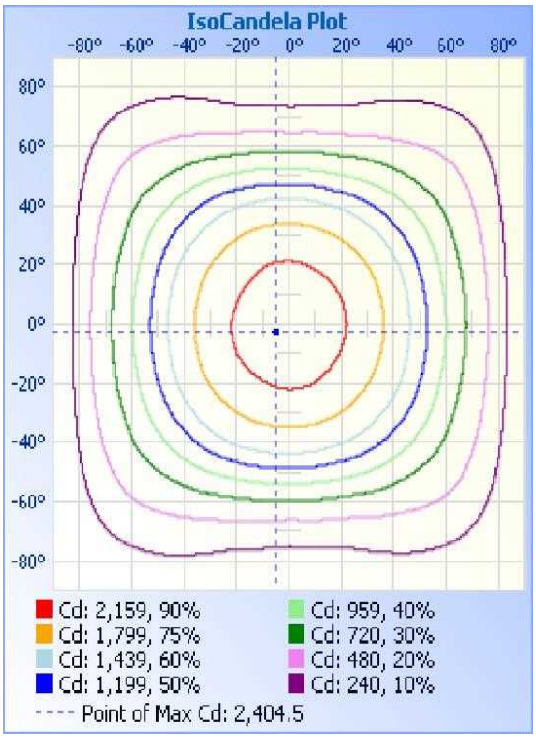
UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
17.2	21.0	1.22	1.26

Goniophotometer Test (Cont'd)

Polar Candela Distribution



IsoCandela Plot



Goniophotometer Test (Cont'd)

Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1822.3	29.80%
0-40	2948.1	48.20%
0-60	4945.1	80.80%
60-90	1160.1	19.00%
70-100	519.6	8.50%
90-120	4.4	0.10%
0-90	6105.2	99.80%
90-180	14.5	0.20%
0-180	6119.7	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	56.6	0.90%	90-95	1.2	0.00%
5-10	167.7	2.70%	95-100	0.9	0.00%
10-15	272.8	4.50%	100-105	0.7	0.00%
15-20	367.0	6.00%	105-110	0.6	0.00%
20-25	447.7	7.30%	110-115	0.6	0.00%
25-30	510.6	8.30%	115-120	0.6	0.00%
30-35	553.8	9.00%	120-125	0.7	0.00%
35-40	572.0	9.30%	125-130	0.8	0.00%
40-45	562.4	9.20%	130-135	0.9	0.00%
45-50	530.5	8.70%	135-140	1.0	0.00%
50-55	482.2	7.90%	140-145	1.1	0.00%
55-60	421.8	6.90%	145-150	1.1	0.00%
60-65	354.4	5.80%	150-155	1.0	0.00%
65-70	288.2	4.70%	155-160	1.0	0.00%
70-75	226.3	3.70%	160-165	0.9	0.00%
75-80	165.0	2.70%	165-170	0.8	0.00%
80-85	97.7	1.60%	170-175	0.5	0.00%
85-90	28.5	0.50%	175-180	0.2	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	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370
1	2359	2356	2355	2378	2386	2380	2365	2356	2359	2352	2354	2372	2377	2373	2365	2361	2359
2	2359	2350	2348	2369	2391	2391	2375	2363	2360	2347	2348	2373	2376	2387	2378	2366	2359
3	2358	2343	2344	2365	2389	2397	2384	2368	2359	2340	2342	2366	2374	2394	2385	2374	2358
4	2359	2338	2338	2357	2386	2404	2389	2370	2354	2334	2336	2355	2371	2393	2385	2372	2359
5	2356	2334	2326	2350	2376	2402	2394	2372	2356	2328	2326	2349	2362	2392	2388	2373	2356
6	2356	2332	2318	2341	2369	2398	2392	2370	2352	2326	2315	2341	2354	2390	2384	2371	2356
7	2349	2329	2309	2332	2361	2388	2389	2370	2349	2322	2307	2329	2349	2381	2379	2365	2349
8	2339	2326	2305	2323	2356	2380	2383	2361	2344	2321	2299	2319	2340	2369	2376	2358	2339
9	2335	2322	2298	2316	2346	2367	2374	2358	2339	2317	2292	2305	2328	2356	2365	2352	2335
10	2329	2320	2298	2308	2340	2357	2365	2351	2328	2307	2290	2304	2321	2345	2349	2340	2329
11	2320	2316	2294	2299	2330	2340	2345	2339	2319	2301	2286	2295	2315	2330	2336	2332	2320
12	2310	2308	2295	2293	2320	2322	2330	2322	2313	2298	2282	2287	2303	2319	2325	2319	2310
13	2297	2296	2288	2286	2306	2307	2311	2309	2301	2285	2276	2279	2287	2302	2308	2303	2297
14	2283	2281	2281	2280	2292	2292	2291	2292	2290	2273	2266	2270	2276	2284	2286	2287	2283
15	2267	2268	2269	2274	2280	2276	2273	2273	2273	2262	2259	2265	2263	2267	2267	2268	2267
16	2252	2250	2252	2263	2267	2260	2254	2256	2258	2248	2246	2252	2247	2249	2244	2248	2252
17	2235	2239	2237	2250	2255	2246	2238	2239	2242	2234	2230	2241	2234	2231	2227	2226	2235
18	2218	2224	2219	2232	2241	2231	2223	2220	2222	2216	2213	2219	2220	2215	2206	2210	2218
19	2202	2209	2201	2212	2228	2214	2202	2198	2205	2199	2195	2199	2206	2196	2189	2190	2202
20	2185	2188	2180	2189	2209	2197	2182	2181	2186	2183	2180	2184	2187	2180	2177	2177	2185
25	2078	2087	2073	2076	2095	2100	2095	2083	2084	2079	2062	2058	2078	2084	2078	2070	2078
30	1943	1959	1960	1966	1979	1978	1973	1957	1948	1946	1944	1948	1956	1953	1945	1931	1943
35	1770	1790	1811	1834	1844	1836	1817	1793	1782	1784	1796	1815	1827	1816	1791	1769	1770
40	1558	1588	1623	1662	1685	1683	1650	1608	1582	1588	1610	1639	1660	1651	1606	1561	1558
45	1321	1369	1427	1480	1504	1491	1456	1395	1348	1370	1417	1455	1470	1448	1398	1336	1321
50	1085	1148	1232	1300	1319	1299	1241	1166	1111	1150	1222	1278	1288	1256	1183	1104	1085
55	862	921	1024	1114	1143	1117	1037	939	888	929	1018	1099	1114	1082	987	889	862
60	652	706	829	935	968	937	843	731	681	717	821	915	949	911	804	696	652
65	476	528	651	769	810	776	668	553	499	536	643	747	786	740	623	514	476
70	335	381	500	621	664	630	517	405	354	388	494	605	640	594	473	366	335
75	216	257	376	483	519	492	391	279	234	266	370	476	502	462	353	247	216
80	110	159	258	329	354	340	275	178	129	165	258	324	347	316	241	151	110
85	34	74	118	150	160	160	139	93	47	83	129	148	152	141	109	66	34
90	1	2	4	3	3	5	4	5	4	5	7	6	3	3	2	3	1
95	2	2	2	2	2	2	2	2	2	2	2	1	3	3	2	2	2
100	2	1	1	1	1	1	1	2	1	1	1	1	1	2	1	2	2
105	2	2	1	1	1	1	0	2	1	1	1	2	2	2	1	2	2
110	1	1	0	2	1	1	0	1	0	0	2	2	2	2	1	0	1
115	1	0	1	1	1	2	0	2	1	2	1	2	1	1	2	0	1
120	2	1	3	1	1	1	1	2	0	1	1	2	1	2	1	2	2
125	2	1	2	2	2	1	2	2	2	2	2	2	2	2	1	2	2
130	0	2	2	2	2	1	2	3	1	3	1	2	2	2	3	2	0
135	3	2	2	2	2	3	3	4	2	2	3	3	2	2	2	2	3
140	4	4	3	3	3	4	3	3	2	3	2	4	3	4	2	3	4
145	4	4	3	5	4	4	4	4	4	2	3	3	3	2	3	3	4
150	3	3	4	4	4	4	4	4	5	4	5	4	5	4	4	4	3
155	3	5	4	4	4	4	4	5	4	5	4	5	5	5	4	4	3
160	4	5	5	5	5	5	5	5	5	6	5	4	5	6	5	5	4
165	6	6	6	7	6	7	6	7	7	6	7	6	7	6	7	5	6
170	8	7	7	7	8	9	8	7	8	6	7	7	8	7	8	7	8
175	7	7	7	8	8	6	7	7	7	7	7	8	8	7	7	8	7
180	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

THD and PF Test

Model No.	55119-50W-35K		Sample ID.	5193587
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
25.2	120.06	60	0.4048	48.30	0.9938	5.15%	Horizontal
25.2	277.11	60	0.1794	48.20	0.9694	10.43%	Horizontal

THD and PF Test

Model No.	55119-50W-40K		Sample ID.	5193587
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
25.2	120.12	60	0.3886	46.39	0.9939	5.24%	Horizontal
25.2	277.09	60	0.1728	46.32	0.9677	10.54%	Horizontal

THD and PF Test

Model No.	55119-50W-50K		Sample ID.	5193587
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
25.2	120.05	60	0.4046	48.30	0.9938	5.15%	Horizontal
25.2	277.05	60	0.1803	48.33	0.9687	10.77%	Horizontal

THD and PF Test

Model No.	55119-42W-35K		Sample ID.	5193587
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
25.2	120.12	60	0.3596	43.04	0.9960	5.20%	Horizontal
25.2	277.12	60	0.1629	43.53	0.9640	11.04%	Horizontal

THD and PF Test

Model No.	55119-34W-35K		Sample ID.	5193587
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
25.2	120.07	60	0.1715	32.44	0.9952	5.90%	Horizontal
25.2	277.05	60	0.1296	33.96	0.9457	12.72%	Horizontal

In-Situ Temperature Measurement Test

Model No.	55119-50W-35K	Sample ID.	5193587

Test Method

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

In-Situ Temperature Measurement Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
23.5	120.06	60	0.4048	48.297	0.9938	5.15%	Horizontal

Test Results (LEDs)

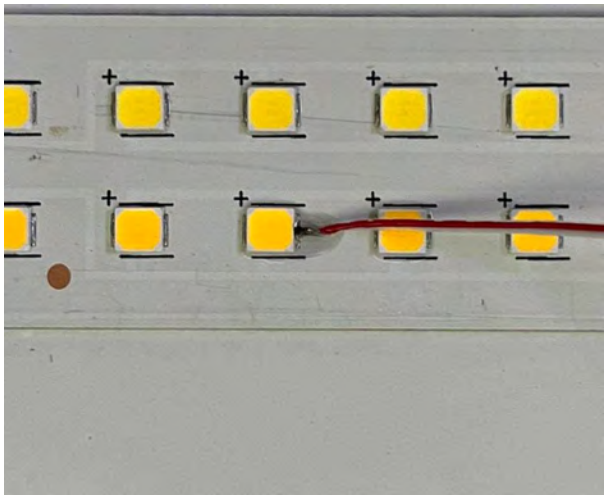
Thermocouple Location	Declared Light Source Current (mA)	Temperature for Light Source (°C)		Max Chromaticity Shift （1000-6000h)	LED Model Number	LM-80 Limit Current (mA)	LM-80 Limit Temp (°C)
		Test Result	Test Result (Correct to 25 °C)				
Ambient TEMP	N/A	23.5	25.0				
TMP of Location 1	120	44.1	45.6	0.0024	STW8A2PD-XX	200	105

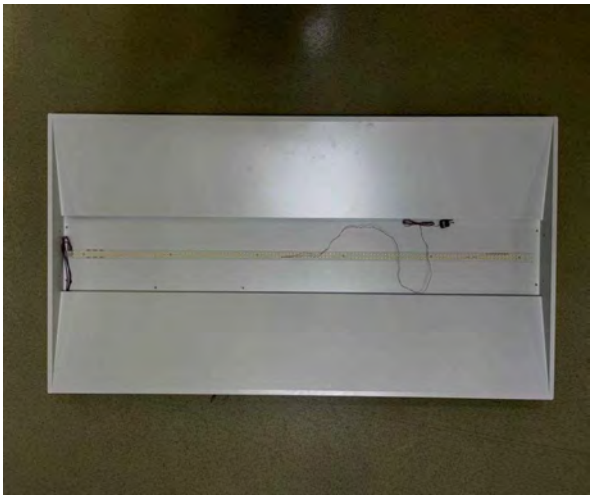
Test Results (Drivers)

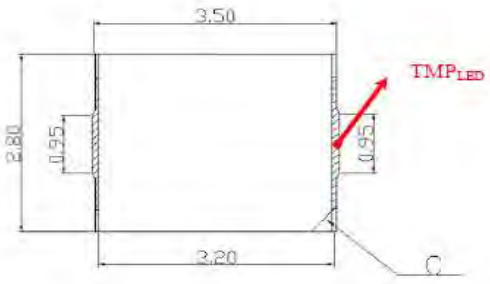
Thermocouple Location	Temperature for Driver (°C)		Driver Model Number	Driver Limit Temp (°C)
	Test Result	Test Result (Correct to 25 °C)		
Ambient TEMP	23.5	25.0		
TMP of Location 1	61.5	63.0	SIF50-I1100 120-277 W D1-S1S2	90

In-Situ Temperature Measurement Test (Cont'd)

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







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