



Photometric Test Report

Relevant Standards

IES LM-79-2008
ANSI C82.77-10:2014
CIE 13.3-1995

Prepared For

P.Q.L. Inc
2285 Ward Avenue SIMI VALLEY CA 93065

Prepared By

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Report Number

SHEE2202000052LM

Test Date

2022/02/25

Issue Date

2022/03/10

Prepared and checked by:

Abby Yang
Project Engineer

Reviewed by:

Henry Hu
Technical Manager

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Member of the SGS Group (SGS SA)

TRF No. EEC_SSL DLC A

1.0 Production Description

Product Description: Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires

Sample Receive date: 2022/02/24

Model Number: SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC]

Electrical Specification: AC 120-277V 50/60Hz, 80/100/120W

Applicant: P.Q.L. Inc

Brand Name: Superior Life

Manufacturer: P.Q.L. Inc

Address: 2285 Ward Avenue / Simi Valley, CA 93065

Testing Location: SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Address: 588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China



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2.0 Goniometer Measurement and Test Results

2.1 Test Conditions

Before measurements are taken, there is no seasoning for the LED luminaires, and LED luminaires in emitting-light surface down position was stabilized for 1 hour in the ambient temperature $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$.

The AC Power Source DPS-1060 (Everfine) as used to generate 120V/60Hz to the tested samples for the mentioned tests which was measured by Everfine GO-R5000 system.

The Electrical quantities are measured by means of a calibrated Digital Power Meter WT310 (Yokogawa).

The sample was mounted at emitting-light surface down position. The geometric centre of the LED luminaires was considered as optical reference centre for photometric test.

Light distribution was measured by calibrated Everfine GO-R5000 Type C goniophotometer with the distance 30 m between the detector and the sample's reference center.

The Total Luminous Flux of the light emitted by the LED luminaires was measured by calibrated Everfine GO-R5000 Type C goniophotometer with the distance 2,6 m between the detector and the sample's reference center.

The ambient temperature during measurements was 25°C

The uncertainty of luminous flux measurement is $U=2,30\%$ ($K=2$), the uncertainty of the CCT measurement is $U=1,08\%$ ($K=2$), all measurements results are traceable to NIM.



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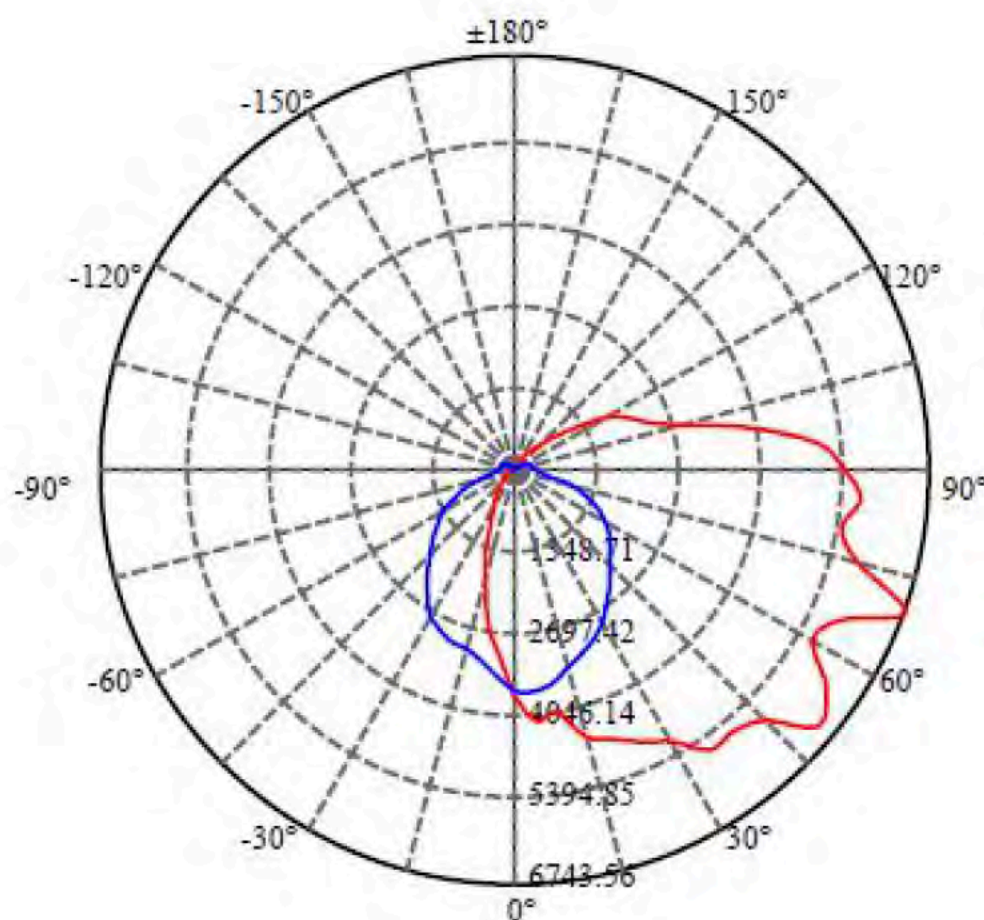
2.2 Electrical Characteristics

Model	Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC]	120.07	60	1.007	120.61	0.9974

2.3 Photometric Characteristics

Model	Luminous Flux (lm)(0 - 90°zone)	Luminous Efficacy (lm/W) (0 - 90°zone)	Zonal Lumen Requirement (80 - 90°)	Spacing Criteria 0-180°	Spacing Criteria 90-270°
SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC]	14346.432	118.95	12.96%	-	-

Light Distribution Curve



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Zone Lumen Summary

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	3565.114	0.000	0	0.00%	0.00%
5.0	3501.857	84.484	84.484	0.00%	0.47%
10.0	3325.369	244.231	328.715	0.00%	1.84%
15.0	3224.433	388.530	717.245	0.00%	4.01%
20.0	3061.492	518.049	1235.293	0.00%	6.91%
25.0	2924.941	627.866	1863.16	0.00%	10.42%
30.0	2802.025	724.752	2587.912	0.00%	14.48%
35.0	2652.809	803.262	3391.174	0.00%	18.97%
40.0	2570.430	871.458	4262.632	0.00%	23.85%
45.0	2493.572	937.641	5200.273	0.00%	29.09%
50.0	2474.398	1003.851	6204.124	0.00%	34.71%
55.0	2392.919	1058.317	7262.441	0.00%	40.63%
60.0	2189.688	1059.257	8321.698	0.00%	46.56%
65.0	2101.665	1043.236	9364.934	0.00%	52.40%
70.0	2101.153	1064.181	10429.114	0.00%	58.35%
75.0	1972.293	1064.733	11493.847	0.00%	64.31%
80.0	1739.551	993.186	12487.033	0.00%	69.86%
85.0	1713.761	938.348	13425.381	0.00%	75.11%
90.0	1650.098	921.051	14346.432	0.00%	80.27%
95.0	1417.462	839.922	15186.354	0.00%	84.97%
100.0	1128.501	691.799	15878.153	0.00%	88.84%
105.0	846.879	528.557	16406.71	0.00%	91.79%
110.0	676.617	398.217	16804.927	0.00%	94.02%
115.0	547.281	309.899	17114.826	0.00%	95.76%
120.0	442.341	240.579	17355.405	0.00%	97.10%
125.0	319.425	176.080	17531.485	0.00%	98.09%
130.0	227.291	118.874	17650.359	0.00%	98.75%
135.0	169.221	80.121	17730.48	0.00%	99.20%
140.0	128.313	55.091	17785.571	0.00%	99.51%
145.0	95.221	37.295	17822.866	0.00%	99.72%
150.0	67.667	23.986	17846.853	0.00%	99.85%
155.0	46.569	14.457	17861.309	0.00%	99.93%
160.0	25.578	7.567	17868.876	0.00%	99.97%
165.0	11.925	3.091	17871.967	0.00%	99.99%
170.0	5.680	1.044	17873.011	0.00%	100.00%
175.0	4.992	0.382	17873.393	0.00%	100.00%
180.0	5.257	0.123	17873.516	0.00%	100.00%



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Intensity Data(cd)

C/γ(°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	3703.84	4090.50	4003.01	4477.17	4663.45	4894.89	5112.21	5569.44	5549.68
22.5	3675.61	4003.01	3819.55	4539.27	4406.61	4784.81	4824.33	4866.66	5284.38
45.0	3596.02	3941.48	3742.22	4375.00	4133.40	4240.37	4550.84	4340.00	4242.91
67.5	3525.18	3916.36	3868.95	3710.04	3528.56	3956.72	3748.71	3541.83	3412.28
90.0	3610.70	3641.46	3530.82	3321.68	3198.34	3012.63	2875.74	2617.21	2411.18
112.5	3400.99	3095.61	2998.80	2745.91	2532.26	2218.69	1938.71	1547.52	1306.77
135.0	3355.55	3148.95	2688.34	2373.92	1937.58	1522.97	1204.60	939.86	727.33
157.5	3653.03	3037.75	2614.39	2038.62	1516.48	1086.34	816.52	617.26	489.97
180.0	3703.84	3037.75	2594.63	1897.50	1400.76	960.46	685.84	533.72	416.59
202.5	3675.61	3032.10	2532.54	2044.26	1482.61	1036.95	766.28	579.16	454.12
225.0	3596.02	3047.06	2673.10	2297.15	1870.40	1430.96	1097.63	860.27	669.76
247.5	3525.18	3024.48	3007.27	2704.14	2515.89	2181.72	1827.22	1465.11	1173.84
270.0	3610.70	3353.58	3143.31	3016.58	2988.36	2881.67	2733.49	2487.38	2179.46
292.5	3400.99	3629.04	4052.68	3953.05	3892.94	3696.21	3538.16	3398.45	3285.27
315.0	3355.55	4021.92	4080.06	3771.86	4439.07	4272.55	4220.05	4313.19	4377.26
337.5	3653.03	4008.65	3856.25	4324.76	4477.17	4621.12	4892.07	4767.88	5146.08
360.0	3703.84	4090.50	4003.01	4477.17	4663.45	4894.89	5112.21	5569.44	5549.68
C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	5761.36	6469.79	6176.26	5594.84	5809.35	6743.56	5769.83	5425.50	5640.00
22.5	5346.47	5789.59	5812.17	5182.77	5227.93	5908.13	5377.80	4842.39	5246.56
45.0	4526.28	4590.35	4321.38	4015.99	3988.62	4100.38	3940.35	3440.79	3526.87
67.5	3206.25	3118.19	3069.92	2953.08	2990.90	2603.10	2474.12	2375.90	2051.60
90.0	2202.04	2020.56	1866.45	1673.68	1446.76	1185.41	894.70	621.49	418.28
112.5	1087.75	896.39	756.97	645.20	534.85	423.08	329.37	264.46	218.74
135.0	569.28	460.05	364.94	278.29	204.62	146.48	104.43	76.77	60.68
157.5	390.90	297.76	223.53	156.64	100.48	53.06	23.14	15.24	11.57
180.0	324.29	250.91	197.00	155.51	95.12	40.08	12.42	9.60	9.60
202.5	364.94	276.31	209.99	163.98	108.38	54.76	16.65	10.16	9.88
225.0	536.26	435.50	338.69	257.97	185.43	127.86	79.59	49.96	38.95
247.5	943.81	779.27	654.23	545.29	445.38	359.86	290.99	234.26	195.59
270.0	1953.95	1729.28	1530.59	1327.94	1106.95	854.06	610.20	441.71	329.94
292.5	3170.12	2909.33	2957.59	2758.61	2603.38	2328.48	2299.97	1938.71	1769.08
315.0	4200.86	4065.38	4265.78	4139.61	3739.68	3575.13	3861.61	3443.61	3132.30
337.5	5312.60	5501.70	5541.22	5185.60	5038.83	5115.04	5471.50	4642.28	4760.54
360.0	5761.36	6469.79	6176.26	5594.84	5809.35	6743.56	5769.83	5425.50	5640.00
C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	5377.52	4978.71	3875.44	2802.93	2310.98	2003.62	1749.89	1210.53	795.92
22.5	5350.42	4330.41	3433.73	2437.99	1937.01	1597.20	1309.31	922.93	637.86
45.0	3385.19	2802.08	2305.05	1804.08	1403.30	1073.92	795.35	589.04	447.63
67.5	1854.32	1463.70	1226.33	930.83	695.16	537.95	421.67	313.29	229.46
90.0	346.87	323.17	295.79	280.83	261.92	224.95	188.25	141.68	99.91
112.5	190.79	167.09	149.31	136.04	114.31	88.06	65.76	47.70	36.13
135.0	47.13	37.54	31.05	25.68	21.45	17.50	15.52	13.27	11.01
157.5	9.03	8.19	8.19	7.90	8.47	8.75	8.19	8.19	7.90
180.0	9.03	9.88	9.60	10.16	10.44	10.44	9.88	9.60	9.31
202.5	9.03	10.16	10.16	10.73	11.29	11.01	10.44	10.73	10.16
225.0	32.46	26.53	22.30	19.19	16.65	15.24	13.55	12.14	11.29
247.5	170.19	148.74	128.70	104.71	78.18	58.14	44.59	33.59	26.81
270.0	261.64	247.52	225.51	208.58	208.29	194.46	158.90	122.49	88.06
292.5	1487.69	1193.88	928.29	696.85	571.25	459.20	353.36	274.62	198.13
315.0	3382.08	2734.91	2209.94	1740.57	1333.30	961.87	708.42	511.42	390.34
337.5	4488.18	4196.91	3196.65	2333.00	1843.87	1494.18	1224.36	889.62	636.73
360.0	5377.52	4978.71	3875.44	2802.93	2310.98	2003.62	1749.89	1210.53	795.92



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Intensity Data(cd)--continued

C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	559.96	415.74	303.97	215.63	156.08	87.78	35.00	9.03	4.80
22.5	477.55	369.45	275.18	204.34	147.33	81.85	32.46	8.19	5.65
45.0	350.26	265.31	196.72	136.89	95.68	45.44	16.93	6.49	5.93
67.5	173.30	129.55	95.40	62.38	35.56	12.70	6.21	5.65	5.93
90.0	70.00	49.67	34.43	22.02	12.42	5.36	3.67	4.23	3.67
112.5	27.38	20.32	14.96	10.44	6.77	4.52	3.95	3.95	3.95
135.0	9.31	7.34	6.21	5.93	5.65	5.08	4.52	3.95	3.95
157.5	7.90	7.62	7.34	7.34	7.06	6.21	5.65	4.80	5.08
180.0	9.31	8.75	8.19	7.90	7.62	7.06	6.21	5.93	5.93
202.5	10.16	9.60	9.03	8.19	7.62	7.62	6.49	6.49	6.21
225.0	10.16	9.31	9.03	8.47	7.62	7.06	7.06	6.49	6.49
247.5	21.17	16.93	13.55	10.16	7.62	6.77	6.49	5.93	5.65
270.0	61.53	43.47	31.89	21.45	12.14	5.08	4.80	4.52	4.52
292.5	142.25	103.30	73.38	47.42	24.56	7.62	5.36	3.39	3.67
315.0	300.59	230.87	168.22	120.80	74.51	41.21	16.65	3.95	3.95
337.5	476.70	365.78	276.03	193.33	136.89	77.90	29.35	7.90	4.52
360.0	559.96	415.74	303.97	215.63	156.08	87.78	35.00	9.03	4.80

C/γ(°)	180.0
0.0	5.65
22.5	6.21
45.0	6.49
67.5	6.21
90.0	4.52
112.5	3.67
135.0	4.23
157.5	5.08
180.0	5.65
202.5	6.21
225.0	6.49
247.5	6.21
270.0	4.52
292.5	3.67
315.0	4.23
337.5	5.08
360.0	5.65



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3.0 Integrating Sphere Measurement and Test Results

3.1 Test condition

Before measurements are taken, there is no seasoning for the LED luminaires, and LED luminaires in emitting-light surface down position was stabilized for 1 hour in the ambient temperature 25°C±1°C.

The AC Power Source DPS-1010 (Everfine) as used to generate 120V/60Hz to the tested samples for the mentioned tests which was measured by EVERFINE HAAS-2000 integrating sphere system.

The Color Characteristics of the light was measured by EVERFINE HAAS-2000 High accuracy array spectroradiometer integrated into 2 m integrating sphere with an interior coating reflectance of 98%; the 4 π geometry is used for photometric measurement.

3.2 Electrical Characteristics

Model	Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC]	120.04	60	1.014	121.39	0.997
	120.07	60	0.994	119.02	0.997
	120.06	60	1.019	122.10	0.998

3.3 Photometric and Color Characteristics

Model	Luminous Flux (lm)	Luminous Efficacy (lm/W)	CCT (K)	CRI	R9
SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC]	18014.38	148.4	3159	81.4	1
	18495.36	155.4	3845	83.1	9
	18376.19	150.5	5270	83.5	10

Model	Rf	Rg	Rcs,h1(%)	-
SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC]	83	97	-12	-
	83	97	-12	-
	83	97	-13	-



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3.4 Chromaticity Coordinate

Model	Duv	x	y	u'	v'
SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC]	-0.00129	0.4244	0.3963	0.2458	0.5164
	-0.00296	0.3852	0.3733	0.2296	0.5008
	-0.00329	0.3376	0.3391	0.2112	0.4773



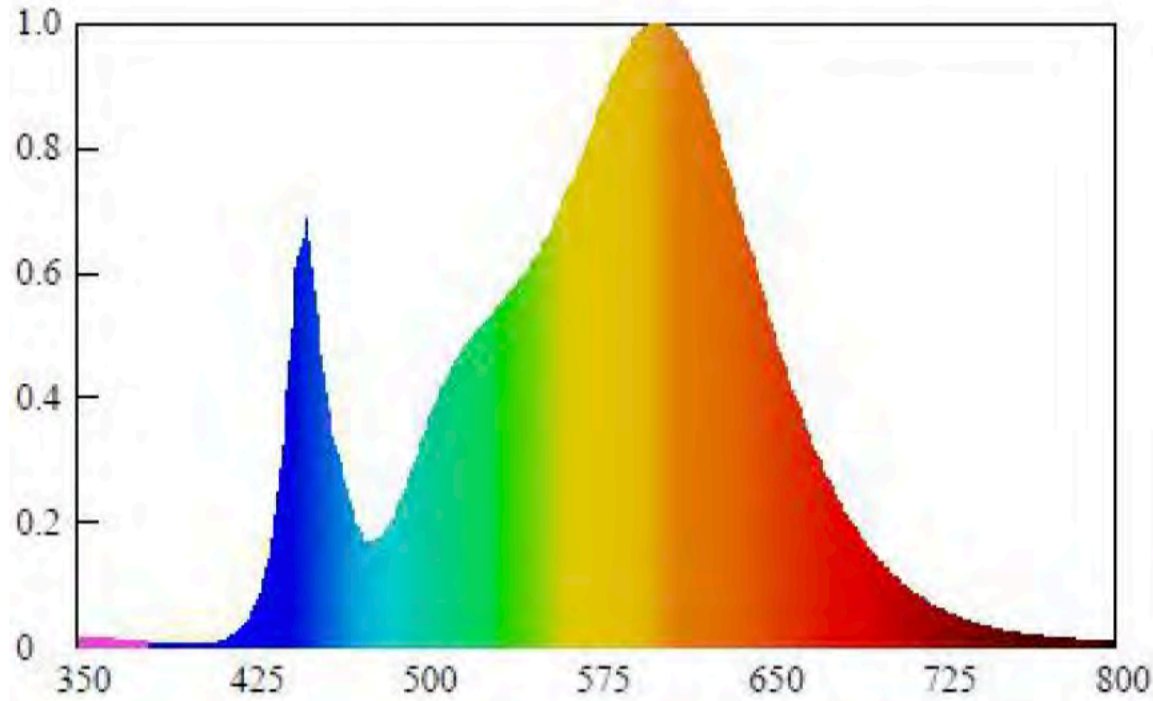
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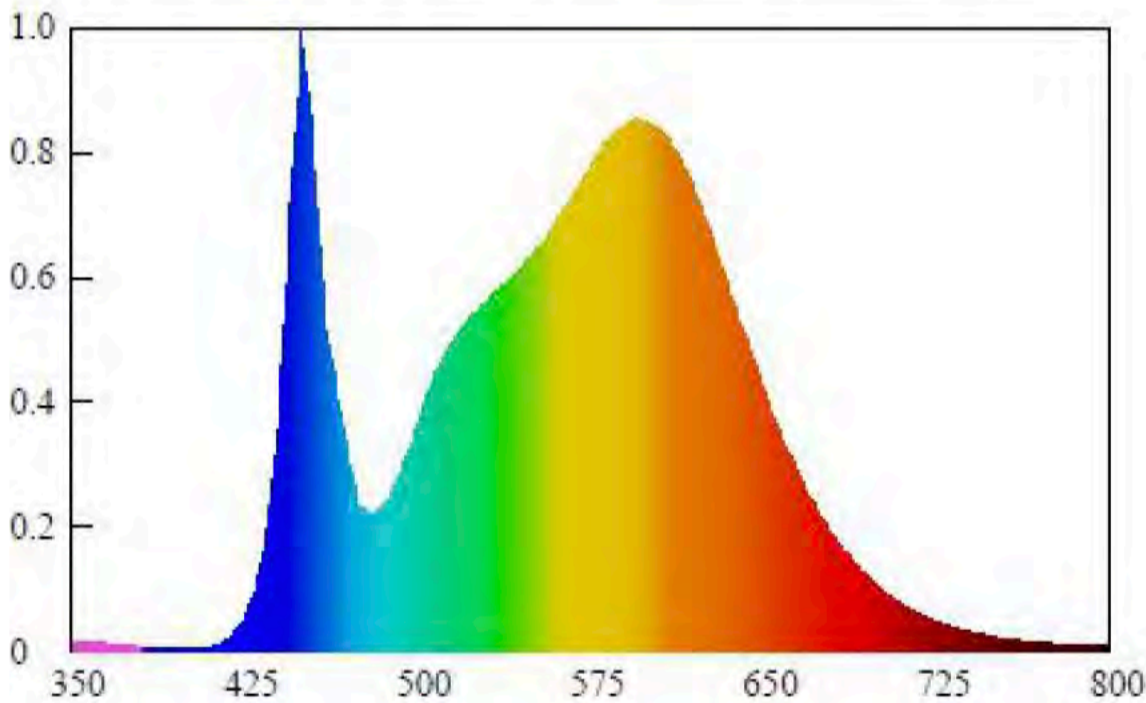
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Spectrum

SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC], 3000K



SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC], 4000K



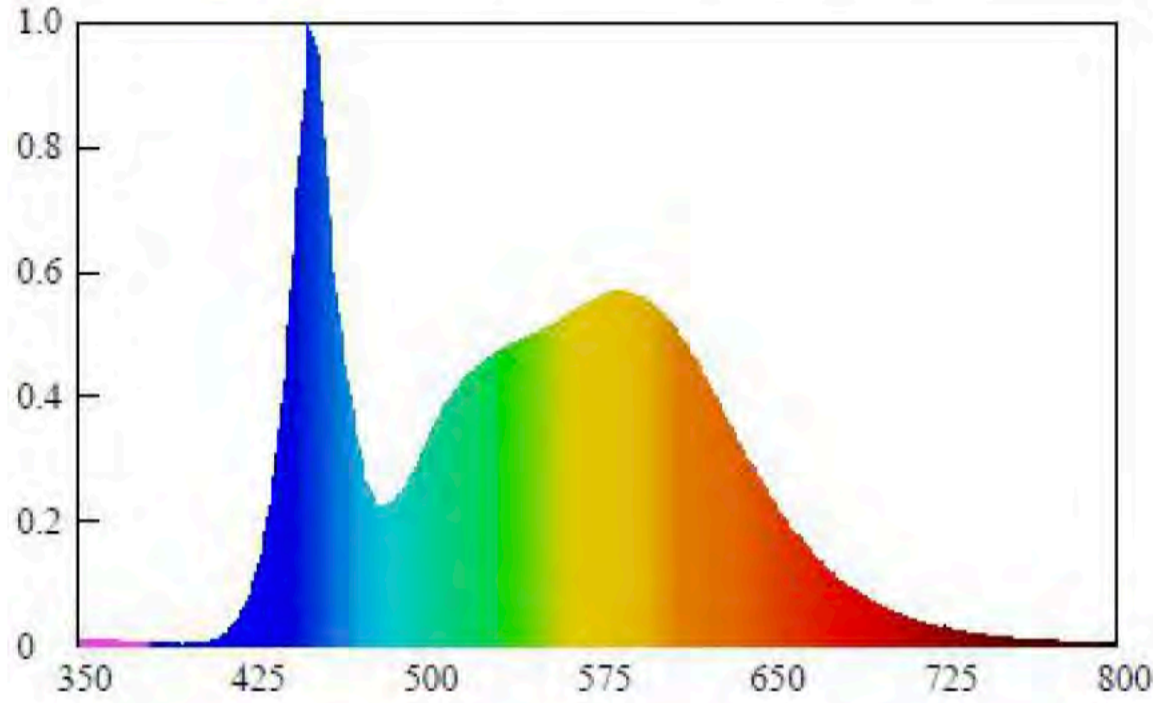
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Member of the SGS Group (SGS SA)

SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC], 5000K



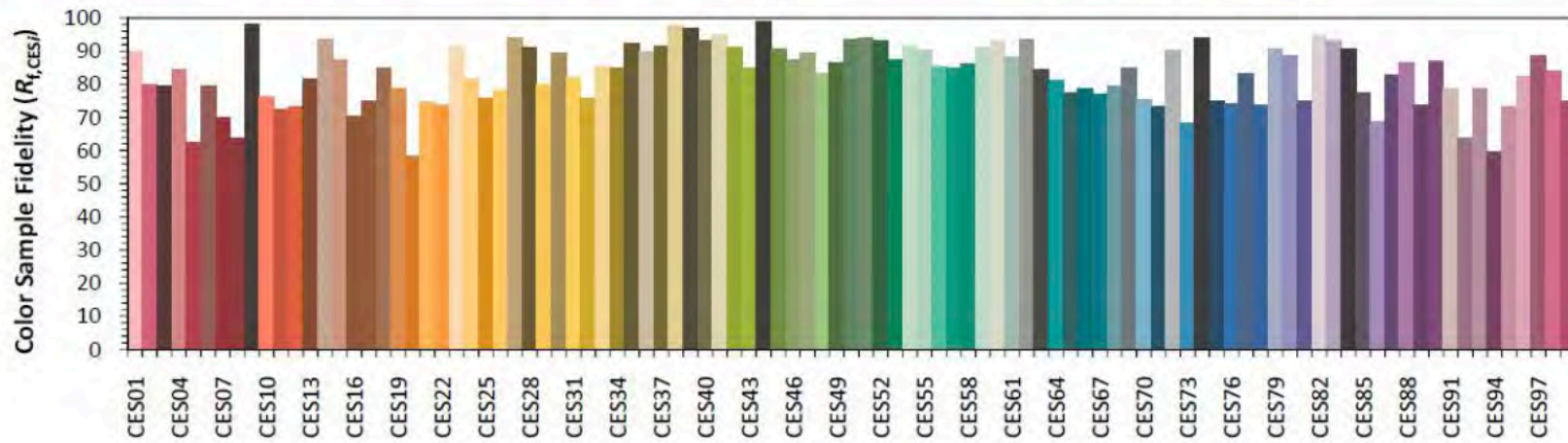
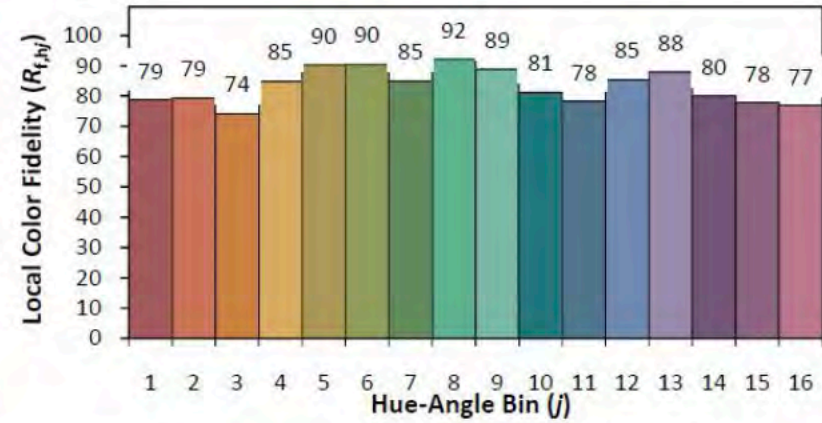
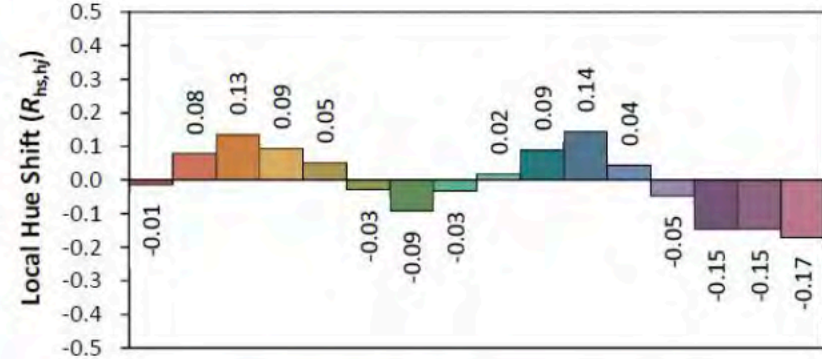
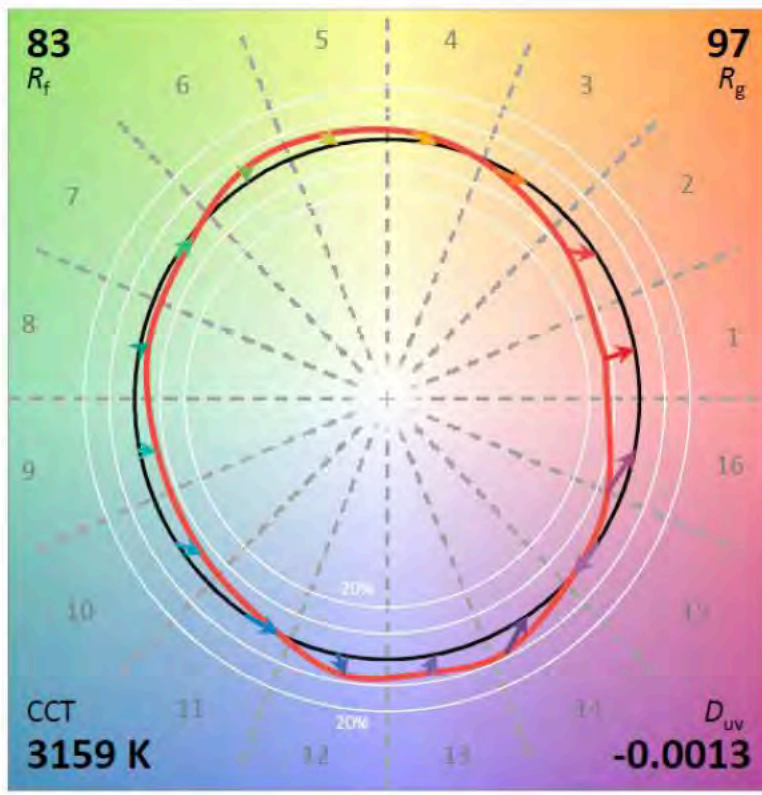
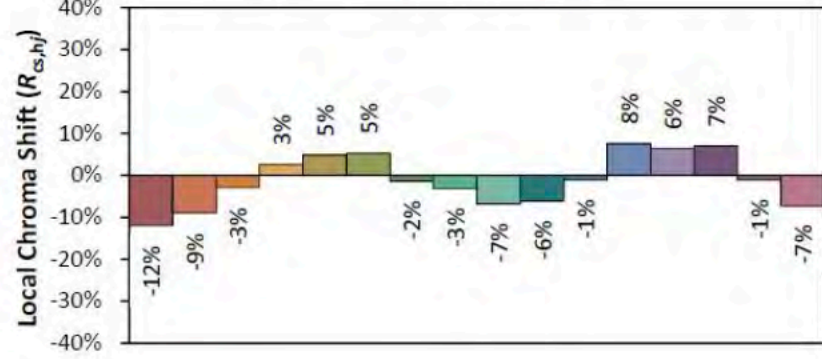
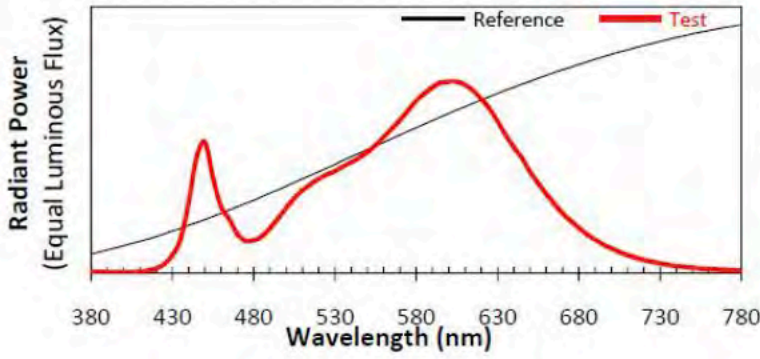
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ANSI/IES TM-30-18 Color Rendition Report

Source: SHEE2202000052LM
Date: 2022/03/10

Manufacturer: P.Q.L. Inc
Model: SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC], 3000K



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

x 0.4244
 y 0.3963
 u' 0.2458
 v' 0.5164

CIE 13.3-1995 (CRI)
 R_a 81
 R_g 0

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

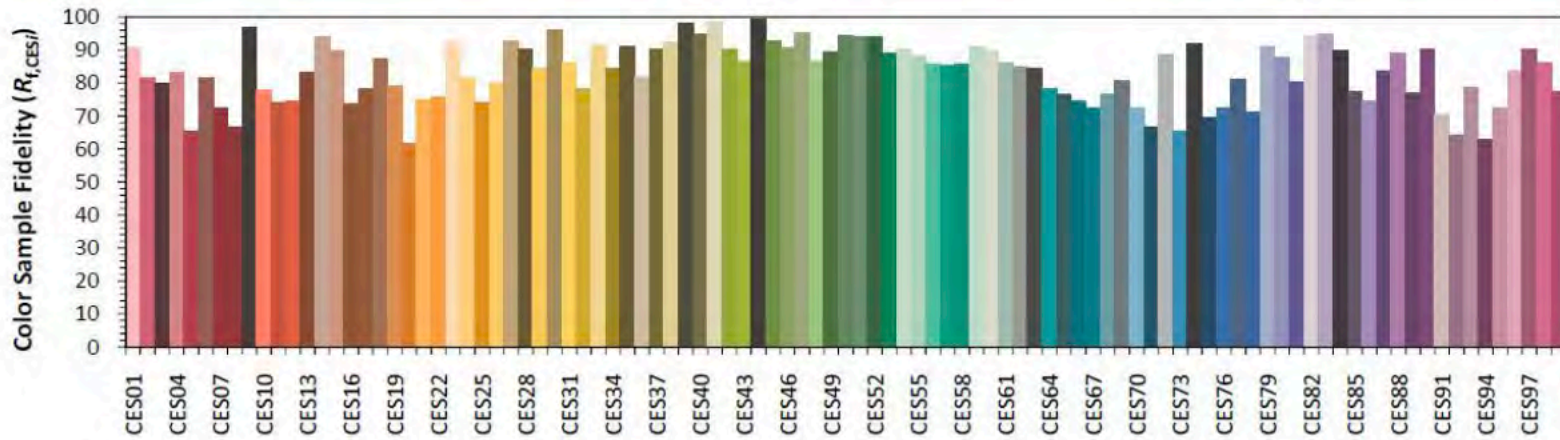
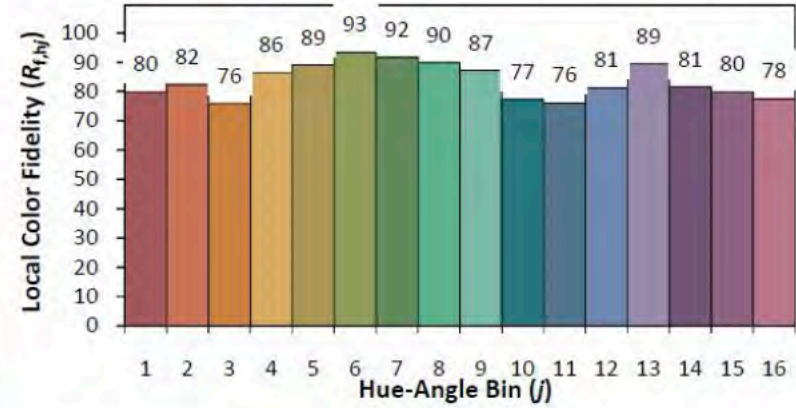
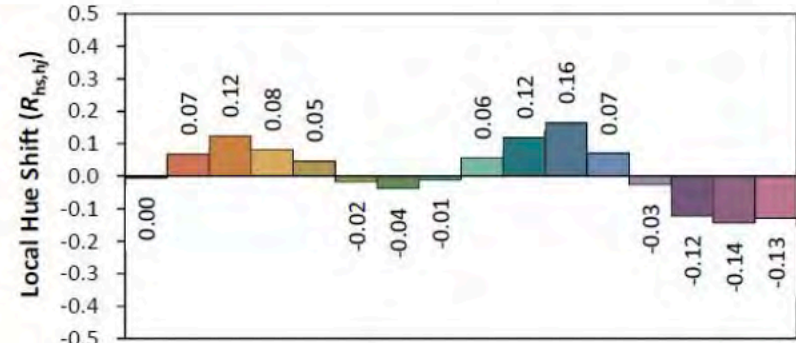
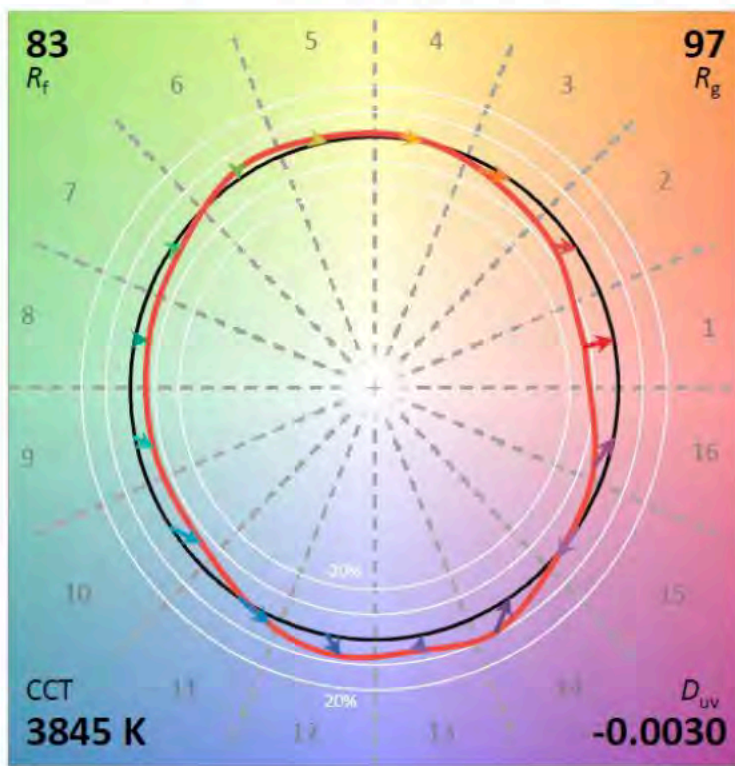
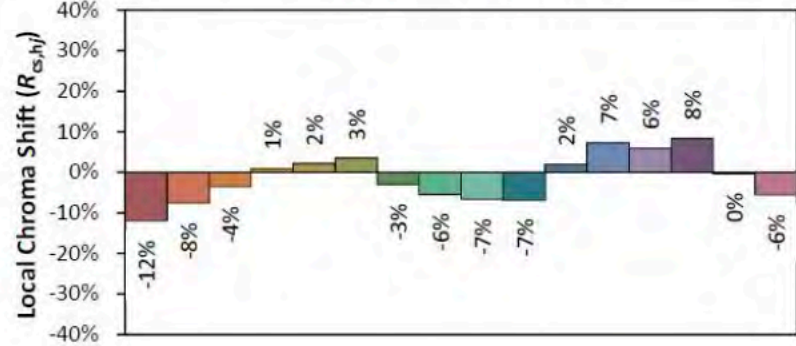
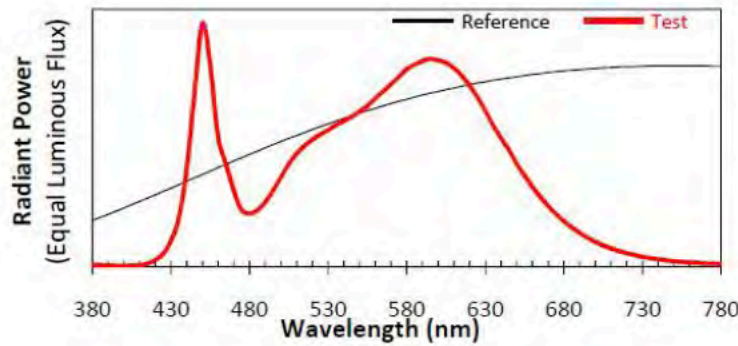


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ANSI/IES TM-30-18 Color Rendition Report

Source: SHEE2202000052LM
Date: 2022/03/10

Manufacturer: P.Q.L. Inc
Model: SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC], 4000K



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

x 0.3852
 y 0.3733
 u' 0.2296
 v' 0.5008

CIE 13.3-1995
(CRI)
 R_a 83
 R_g 8

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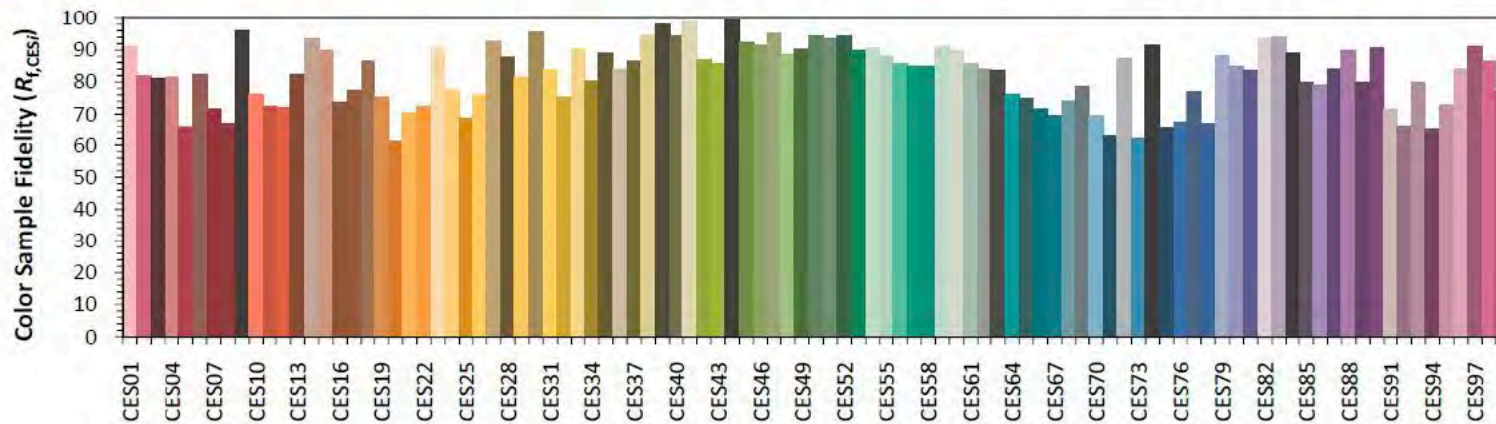
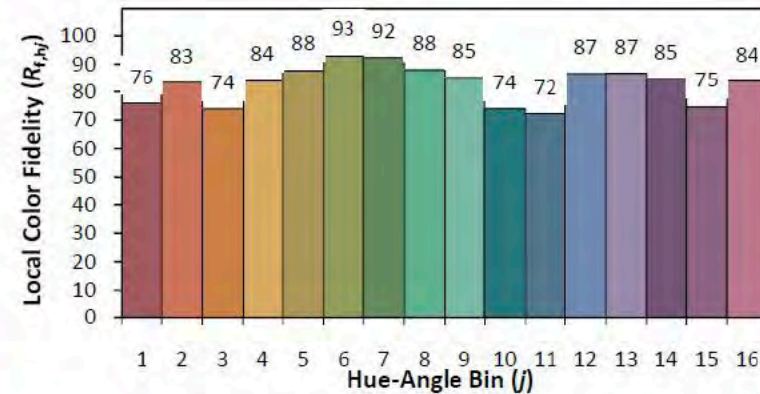
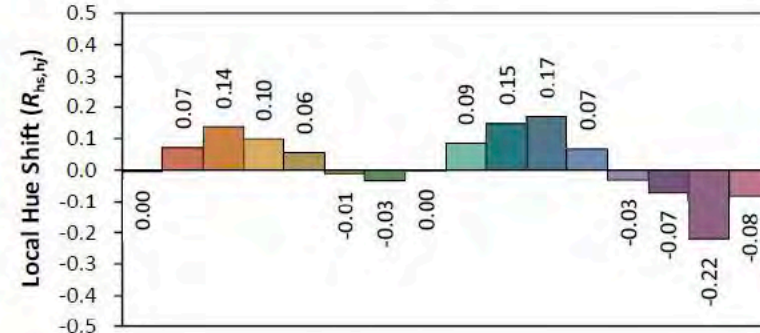
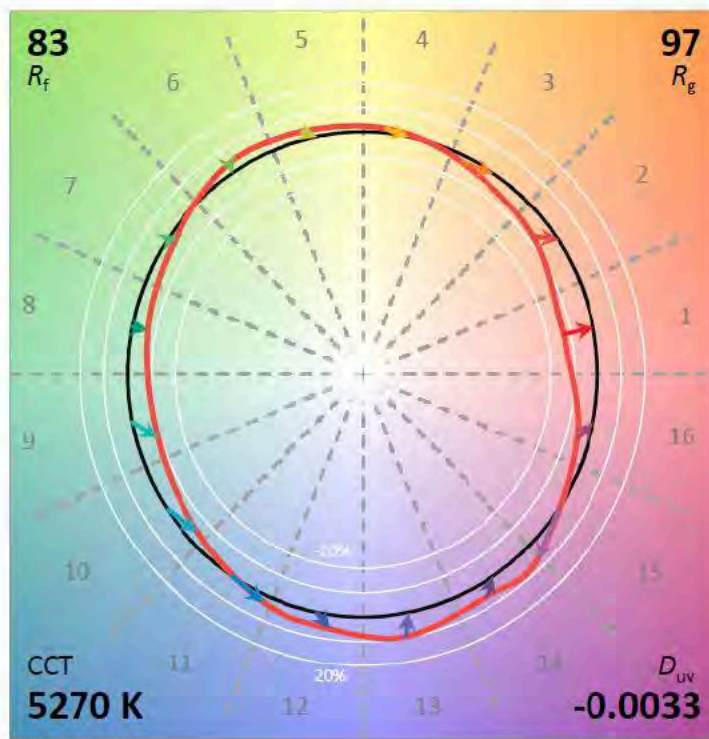
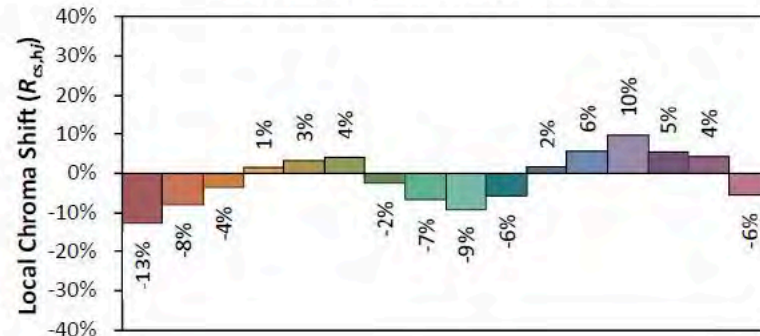
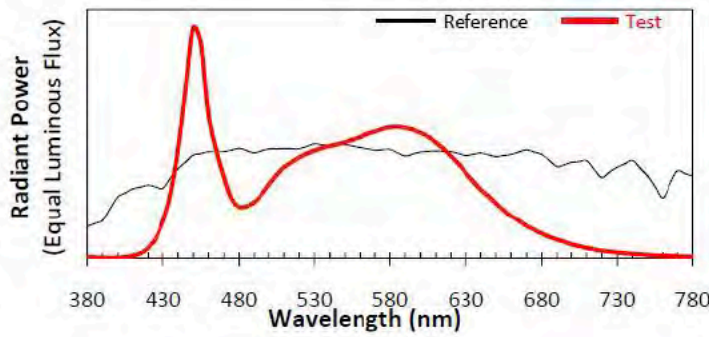
ANSI/IES TM-30-18 Color Rendition Report

Source: SHEE2202000052LM

Manufacturer: P.Q.L. Inc

Date: 2022/03/10

Model: SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC], 5000K



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

x 0.3376
y 0.3391
u' 0.2112
v' 0.4773

CIE 13.3-1995 (CRI)	
R _a	84
R _g	10

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4.0 THD and PF Test

4.1 Test Conditions

The samples were tested according to the ANSI C82.77-10:2014.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at 25°C±1°C. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion was calculated.

4.2 Test Results

Model	CCT(K)	Voltage (V)	Frequency (Hz)	Power Factor	THDi
SSWP-C-FSC1-1-MV[-PC, -MS, -SP, Blank][-BLK, -WHT, -NA, -BRZ, -CC]	3000	120	60	0.997	4.7%
		277	60	0.980	3.8%
	4000	120	60	0.997	4.3%
		277	60	0.983	3.5%
	5000	120	60	0.998	3.9%
		277	60	0.985	3.0%



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Annex I Photo documentation



Overview



Overview



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Annex II: Standard Bulb Used for System Calibration

Everfine GO-R5000 system

Model	D908S
Intensity Distribution Type	Omni-Directional Type
Calibration current(A)	7,3200
Reference voltage (V)	90,30
Calibration CCT (K)	2856
Calibration luminous Flux (lm)	11270

Everfine HAAS-2000 integrating sphere system

Model	D204
Intensity Distribution Type	Omni-Directional Type
Calibration current (A)	3,9370
Reference voltage (V)	20,05
Calibration CCT (K)	2856
Calibration luminous Flux (lm)	1329



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SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing Center E&C Shanghai Laboratory

NO.588 West Jindu Road, Songjiang District, Shanghai, China 201612 t (86-21) 61915666 f (86-21) 61915678 www.sgs.com.cn
中国·上海·松江区金都西路 588 号 邮编: 201612 t (86-21) 61915666 f (86-21) 61915678 e sgs.china@sgs.com

Annex III: List of Equipment Used

Registration No	Equipment name	Model No	Manufacturer	Cal. Date	Due Date
SHES333401a	Goniophotometer	GO-R5000	Everfine	2021/12/27	2022/12/26
SHES333401b	The controller	CT500	Everfine	2021/12/27	2022/12/26
SHES333401c	Spectral radiometer	HAAS-2000	Everfine	2021/12/27	2022/12/26
SHES333401d	Standard light source for GO-R5000 system	D908S	Everfine	2021/7/3	2022/7/2
SHES333401h	AC Power source	DPS-1060	Everfine	2021/12/27	2022/12/26
SHES300310	Digital Power Meter	WT310	Yokogawa	2021/12/27	2022/12/26
SHES300311	Digital Power Meter	WT310	Yokogawa	2021/12/27	2022/12/26
SHES3333301	High-precision rapid spectral radiometer	HAAS-2000	Everfine	2021/12/27	2022/12/26
SHES3333301c	Power Meter	DPS1010	Everfine	2021/12/27	2022/12/26
SHES3333301d	Integrating sphere	AIS-2_2.0m	Everfine	2021/12/27	2022/12/26
SHES331506	Standard light source	D204	Everfine	2021/4/3	2022/4/2
SHES300304	Power meter	WT1800	Yokogawa	2021/7/2	2022/7/1

— End of report —



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SGS-CSTC Shanghai Technical Services Co., Ltd.
Testing Center & Calibration Laboratory

NO.588 West Jindu Road, Songjiang District, Shanghai, China 201612 t (86-21) 61915666 f (86-21) 61915678 www.sgs.com.cn
中国·上海·松江区金都西路588号 邮编: 201612 t (86-21) 61915666 f (86-21) 61915678 e sgs.china@sgs.com

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