Original Data

Relevant Standards

☑IES LM-79-2019
☑ANSI C82.77:2014

Prepared For

RAB lighting INC

408 W 14th St New York, NY 10014 United States

Prepared By

RAB lighting INC

Project Number
2025052702

Data Number
2025/5/27

Test Date
2025/5/27

1.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2025/5/27	PLC-9-O-8FA-HYB-GX32D	A1
2	Goniophotometer Test	2025/5/27	PLC-9-O-8FA-HYB-GX32D	A1
3	THD and PF Test	2025/5/27	PLC-9-O-8FA-HYB-GX32D	A1

1.1 Test Summary

Requirement Category	Test Method	Requirements		Test value
Integrating Sphere system				
Power (W)	IES LM-79-2008	9 ±10%		8.58
Lamp Output for bare lamp (lm)	IES LM-79-2008	1050 ±10%		1043
Lamp Efficacy (lm/W)	IES LM-79-2008	> 105.0		119.06
Allowable CCTs* (K)	IES LM-79-2019	4 step	2725 ± 83	2714
		7 step	2725 ± 145	
		4 step	3045±100	3048
		7 step	3045±175	
		4 step	3465±124	3399
		7 step	3465±245	
		4 step	3985±154	3829
		7 step	3985±275	
		4 step	5029±220	
		7 step	5029±283	
		4 step	6532±340	
		7 step	6532±510	
CRI	IES LM-79-2019 CIE 13.3-1995	>80		82.50
R9	IES LM-79-2019 CIE 13.3-1995	>0		6.00
Rf	ANSI/IES TM-30-18	>70		83.00
Rg	ANSI/IES TM-30-18	>89		96.00
Rcs,h1	ANSI/IES TM-30-18	Rcs=>-12%,h1<=23%		-12%
Power Factor	ANSI C82.77:2014	>0.9		0.90
Total Harmonic Distortion (A%)	ANSI C82.77:2014	<25%		22.60%
Goniophotometer system				
Lamp Output (lm)	IES LM-79-2019	1050 ±10%		1158.3
Luminaire Efficacy(lm/W)	IES LM-79-2019	> 105.0		133.0
Beam Angle	IES LM-79-2019			343.8

2.0 Production Description

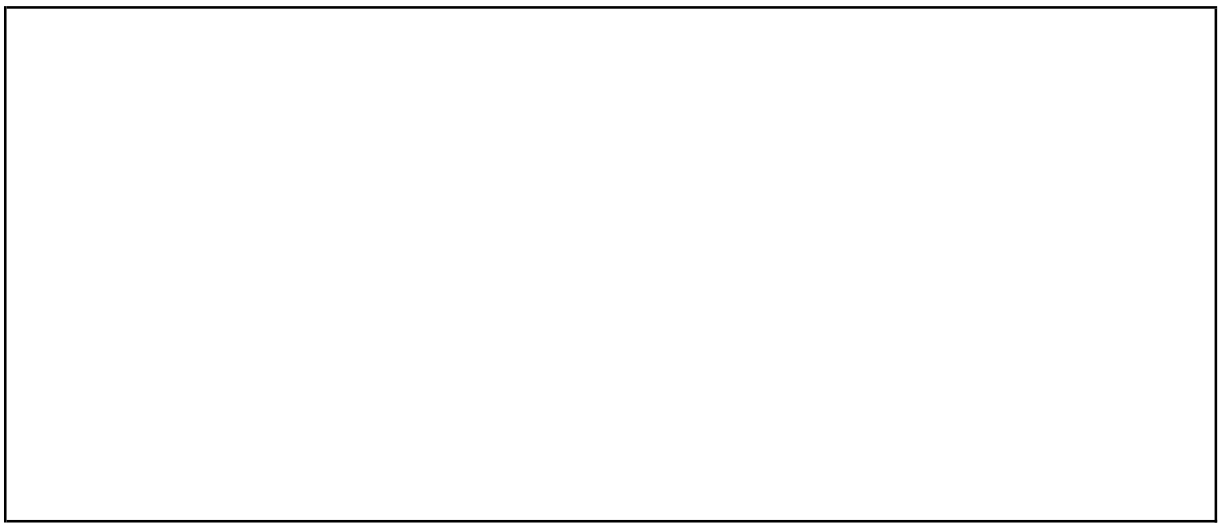
Luminaire Description: PLC-9-O-8FA-HYB-GX32D

Electrical Specification: 120V~277V,50/60HZ

Light source:

Manufacturer Of Light Source: Seoul Semiconductor Co.,LTD

Photos of Luminaire Characteristics



3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	PLC-9-O-8FA-HYB-GX32D	Sample ID.	A1
Opreate time (Min.)	15	Stabilization time (Min.)	15
Temperature（℃）	25.3	Humidity %	55

Test Method
The samples were tested according to the IES LM-79-2008. Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load. The sample was measured using 4π geometry and 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.

Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Flux (lm)	Efficacy (lm/W)
25.3	120.00	60.00	0.036	9.026	0.9024	1100.0	121.9
25.3	277.02	60.00	0.074	8.760	0.9888	1043.0	119.1

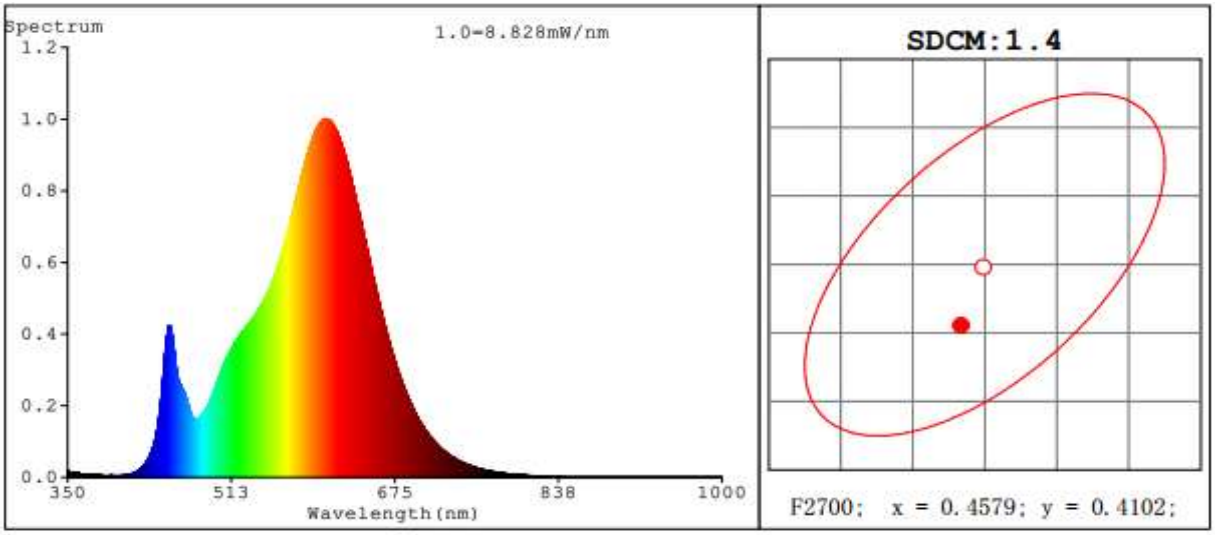
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
2714	-1.1E-03	84	96	82.6	7.3	1.4
2715	-1.1E-03	84	96	82.6	7.2	1.5

3.1 Integrating Sphere Test

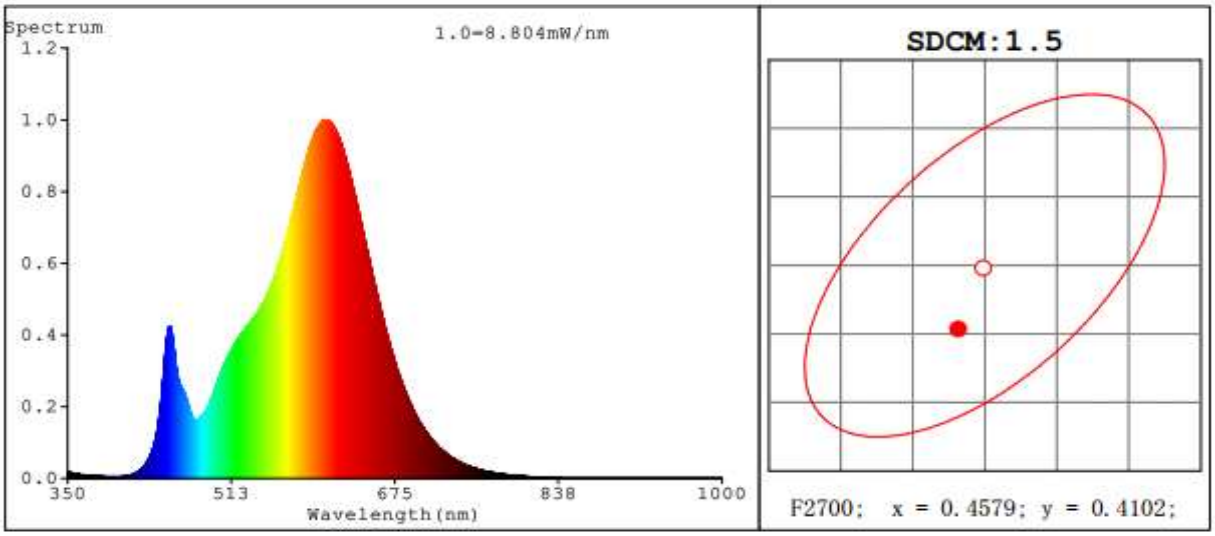
Spectroradiometric Parameters

120V



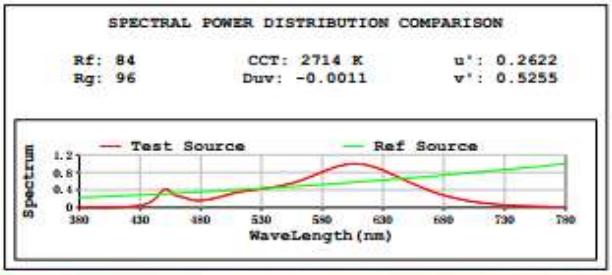
R1 =82	R2 =93	R3 =94	R4 =80	R5 =82	R6 =92	R7 =81	
R8 =57	R9 =7	R10=84	R11=81	R12=78	R13=85	R14=98	R15=74

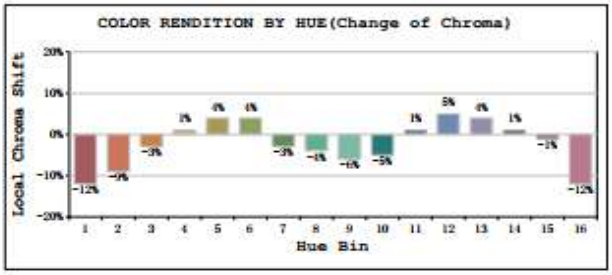
277V

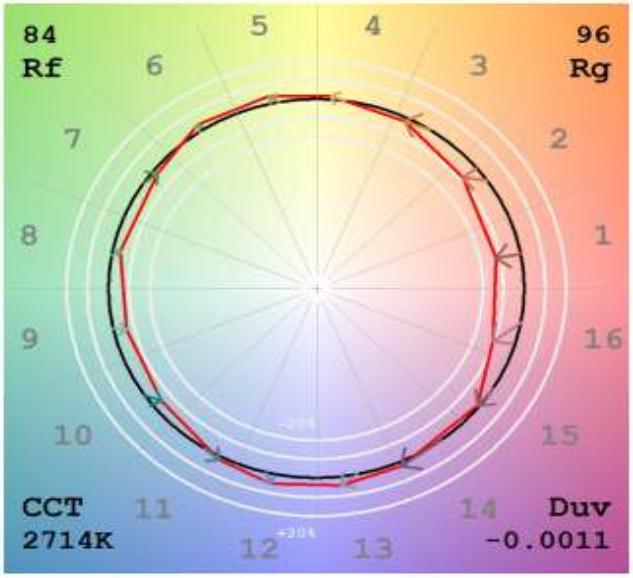


R1 =82	R2 =93	R3 =94	R4 =80	R5 =82	R6 =92	R7 =81	
R8 =57	R9 =7	R10=84	R11=81	R12=78	R13=84	R14=97	R15=73

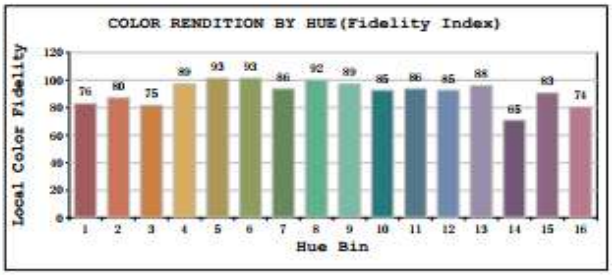
3.2 Integrating Sphere Test - Minimum CCT

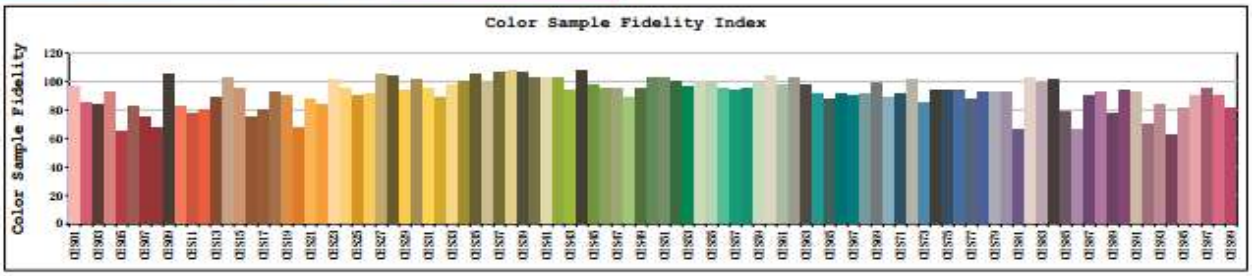

SPECTRAL POWER DISTRIBUTION COMPARISON
Rf: 84
Rg: 96
CCT: 2714 K
Duv: -0.0011
u': 0.2622
v': 0.5255
Test Source
Ref Source
Spectrum
WaveLength(nm)


COLOR RENDITION BY HUE(Change of Chroma)
Local Chroma Shift
Hue Bin


84
Rf
96
Rg
CCT
2714K
Duv
-0.0011


Local Hue Shift
Local Hue Shift
Hue Bin


COLOR RENDITION BY HUE(Fidelity Index)
Local Color Fidelity
Hue Bin


Color Sample Fidelity Index
Color Sample Fidelity

3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	PLC-9-O-8FA-HYB-GX32D	Sample ID.	A1
Opreate time (Min.)	15	Stabilization time (Min.)	15
Temperature（℃）	25.3	Humidity %	55

Test Method
The samples were tested according to the IES LM-79-2008. Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load. The sample was measured using 4π geometry and 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.

Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Flux (lm)	Efficacy (lm/W)
25.3	120.00	60.00	0.036	9.026	0.9024	1110.0	123.0
25.3	277.02	60.00	0.074	8.760	0.9888	1093.0	124.8

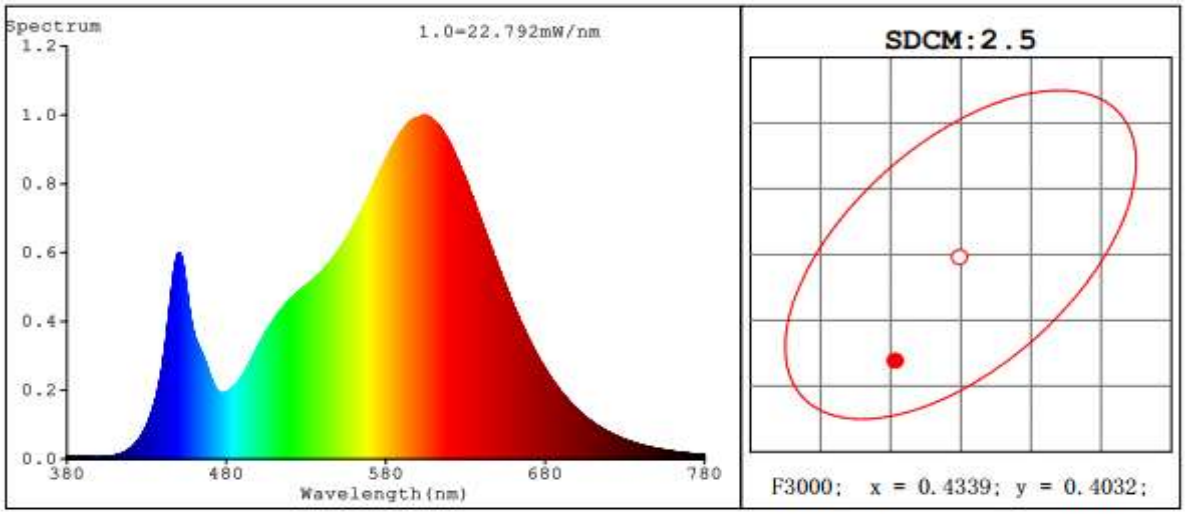
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3048	-1.8E-03	84	97	82.6	6.0	2.5
3057	-2.0E-03	83	96	82.5	6.0	2.8

3.1 Integrating Sphere Test

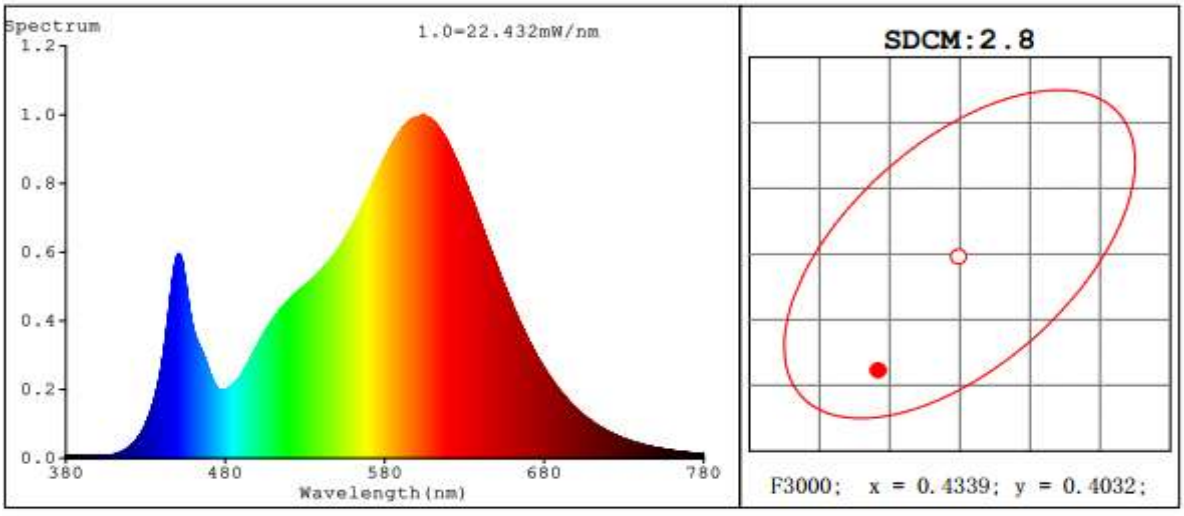
Spectroradiometric Parameters

120V



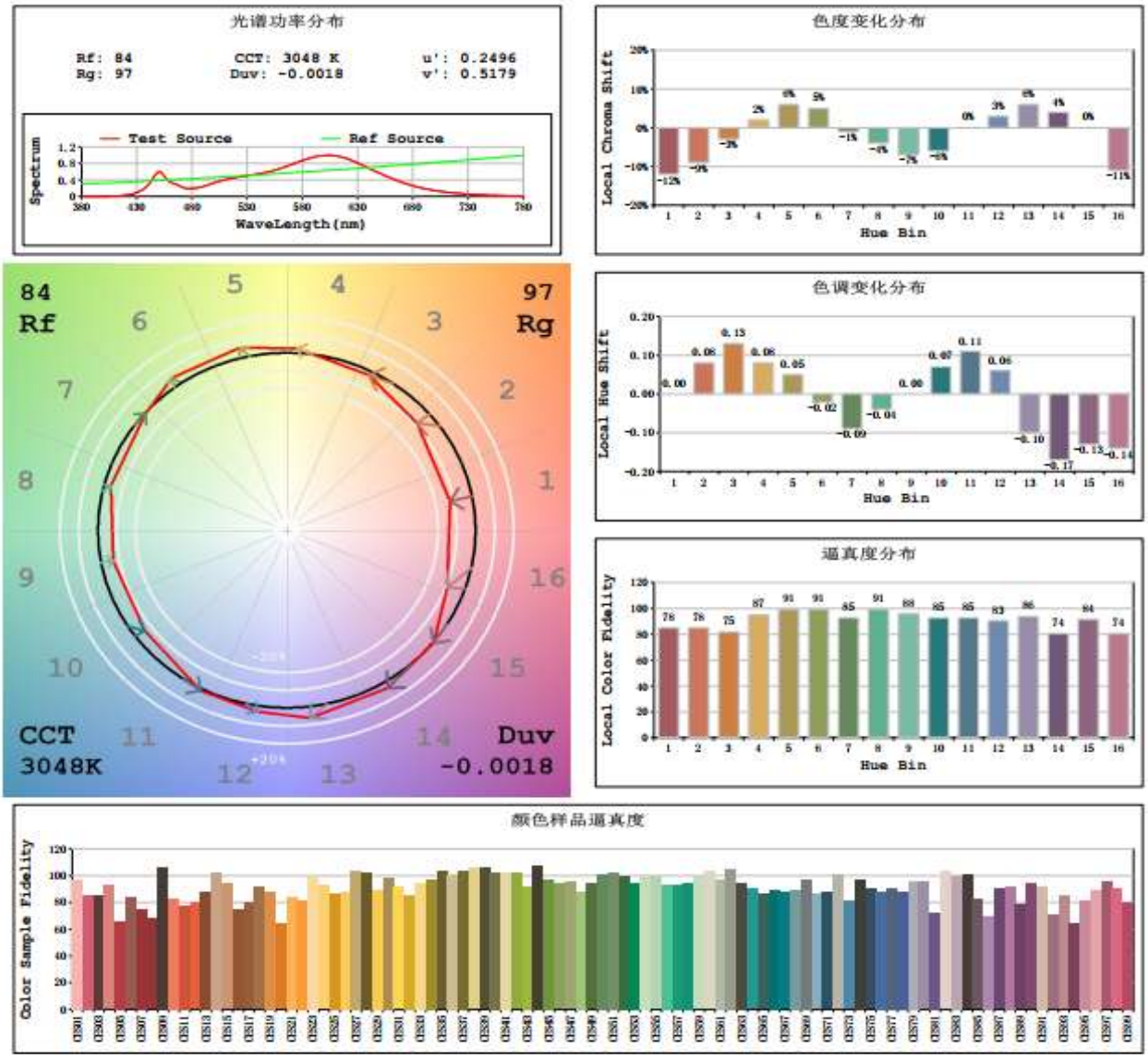
R1 =81	R2 =91	R3 =96	R4 =81	R5 =82	R6 =90	R7 =82	
R8 =59	R9 =6	R10=80	R11=80	R12=73	R13=84	R14=98	R15=74

277V



R1 =81	R2 =91	R3 =96	R4 =80	R5 =82	R6 =90	R7 =82	
R8 =58	R9 =6	R10=81	R11=80	R12=73	R13=84	R14=98	R15=74

3.2 Integrating Sphere Test - Minimum CCT



3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	PLC-9-O-8FA-HYB-GX32D	Sample ID.	A1
Opreate time (Min.)	15	Stabilization time (Min.)	15
Temperature（℃）	25.3	Humidity %	55

Test Method
The samples were tested according to the IES LM-79-2008. Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load. The sample was measured using 4π geometry and 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.

Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Flux (lm)	Efficacy (lm/W)
25.3	120.00	60.00	0.073	8.661	0.9889	1131.0	130.6
25.3	277.02	60.00	0.036	8.866	0.8990	1133.0	127.8

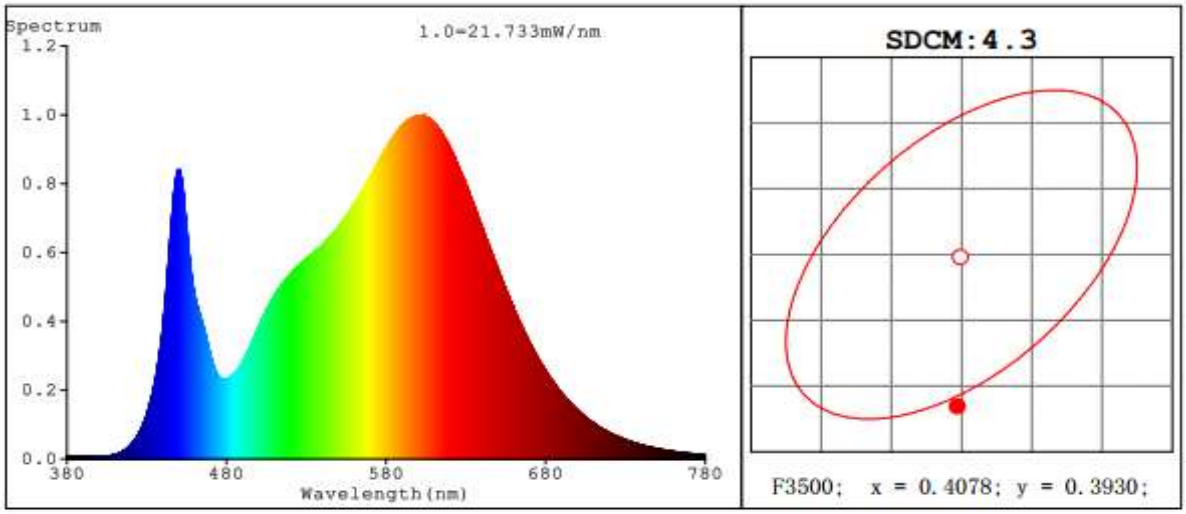
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3399	-3.1E-03	84	97	83.9	12.0	4.3
3401	-3.1E-03	84	97	84.0	12.0	4.3

3.1 Integrating Sphere Test

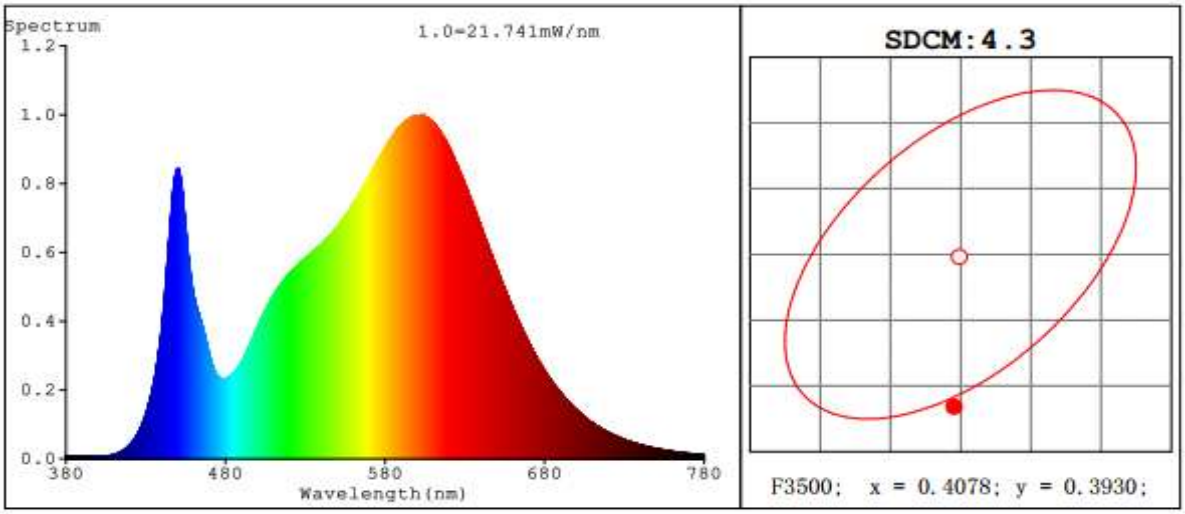
Spectroradiometric Parameters

120V



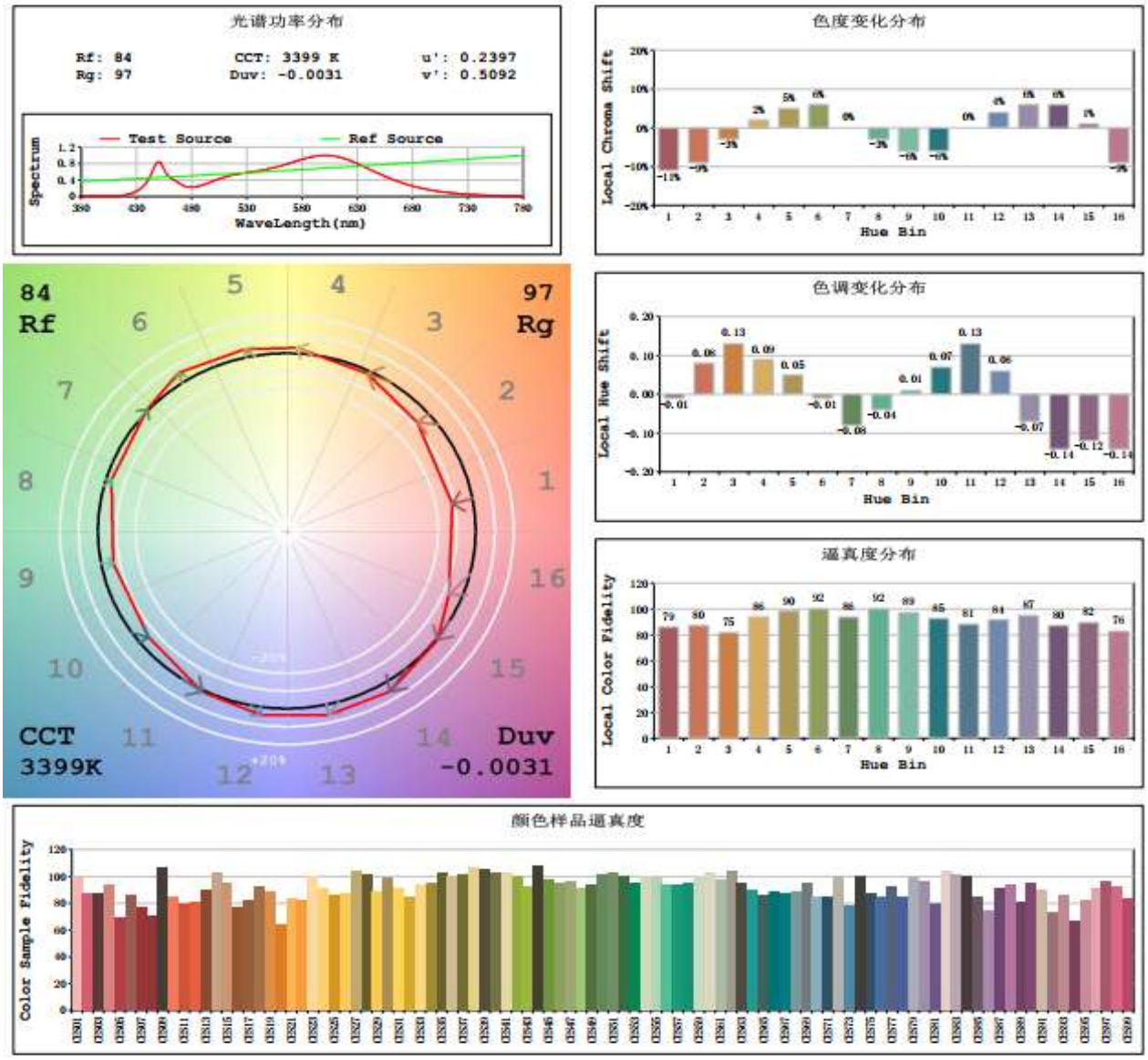
R1 =83	R2 =91	R3 =96	R4 =82	R5 =83	R6 =89	R7 =84	
R8 =63	R9 =12	R10=80	R11=82	R12=71	R13=85	R14=98	R15=77

277V



R1 =83	R2 =91	R3 =96	R4 =83	R5 =83	R6 =89	R7 =84	
R8 =63	R9 =12	R10=80	R11=82	R12=71	R13=85	R14=98	R15=77

3.2 Integrating Sphere Test - Minimum CCT



3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	PLC-9-O-8FA-HYB-GX32D	Sample ID.	A1
Opreate time (Min.)	15	Stabilization time (Min.)	15
Temperature（℃）	25.3	Humidity %	55

Test Method
The samples were tested according to the IES LM-79-2008. Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load. The sample was measured using 4π geometry and 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.

Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Flux (lm)	Efficacy (lm/W)
25.3	120.00	60.00	0.072	8.577	0.9886	1157.0	134.9
25.3	277.02	60.00	0.035	8.797	0.8982	1159.0	131.7

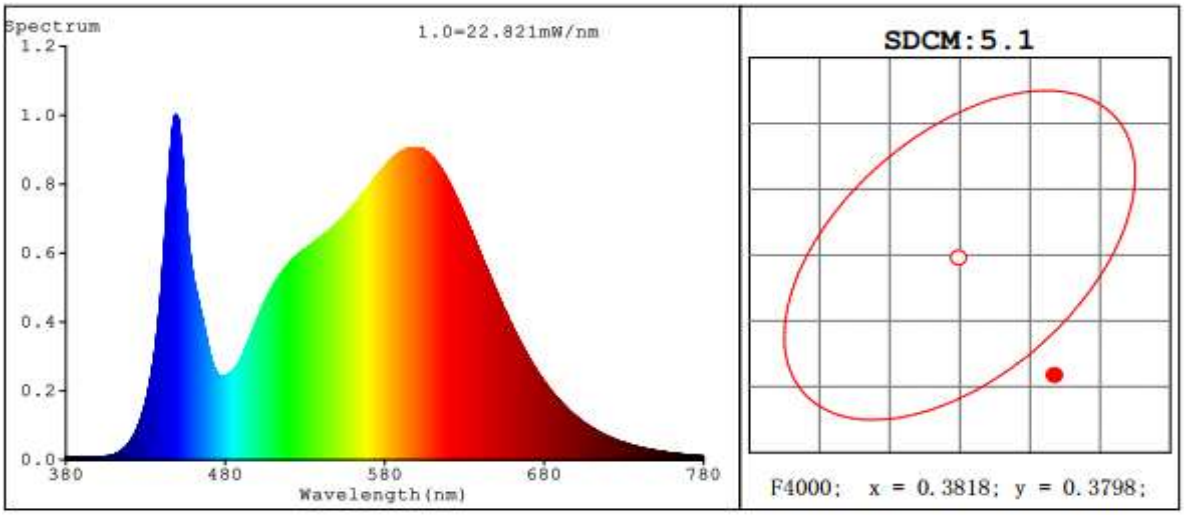
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3829	-3.0E-03	84	98	84.5	16.0	5.1
3829	-3.0E-03	84	98	84.5	16.0	5.1

3.1 Integrating Sphere Test

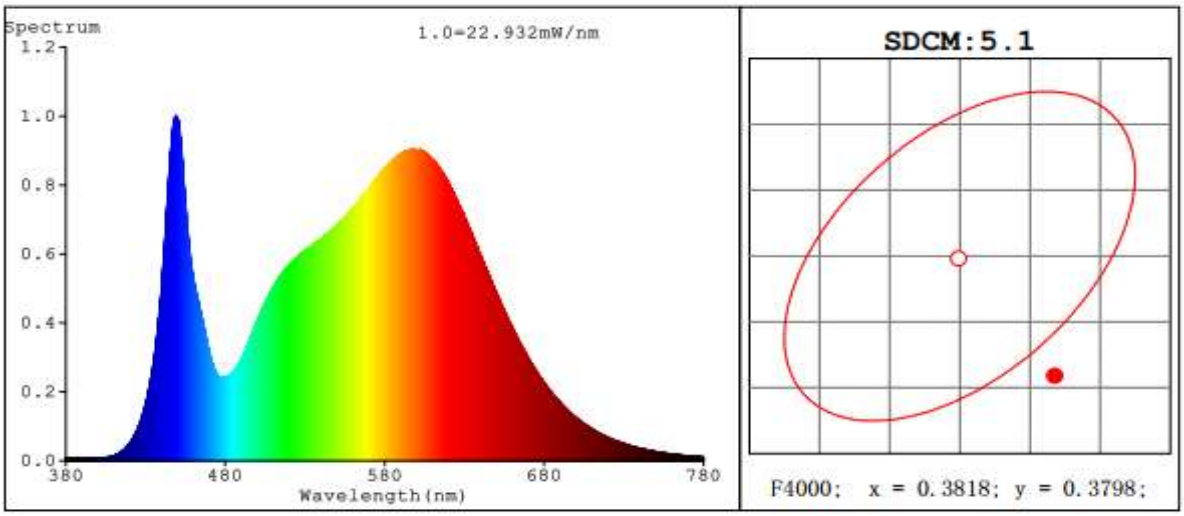
Spectroradiometric Parameters

120V



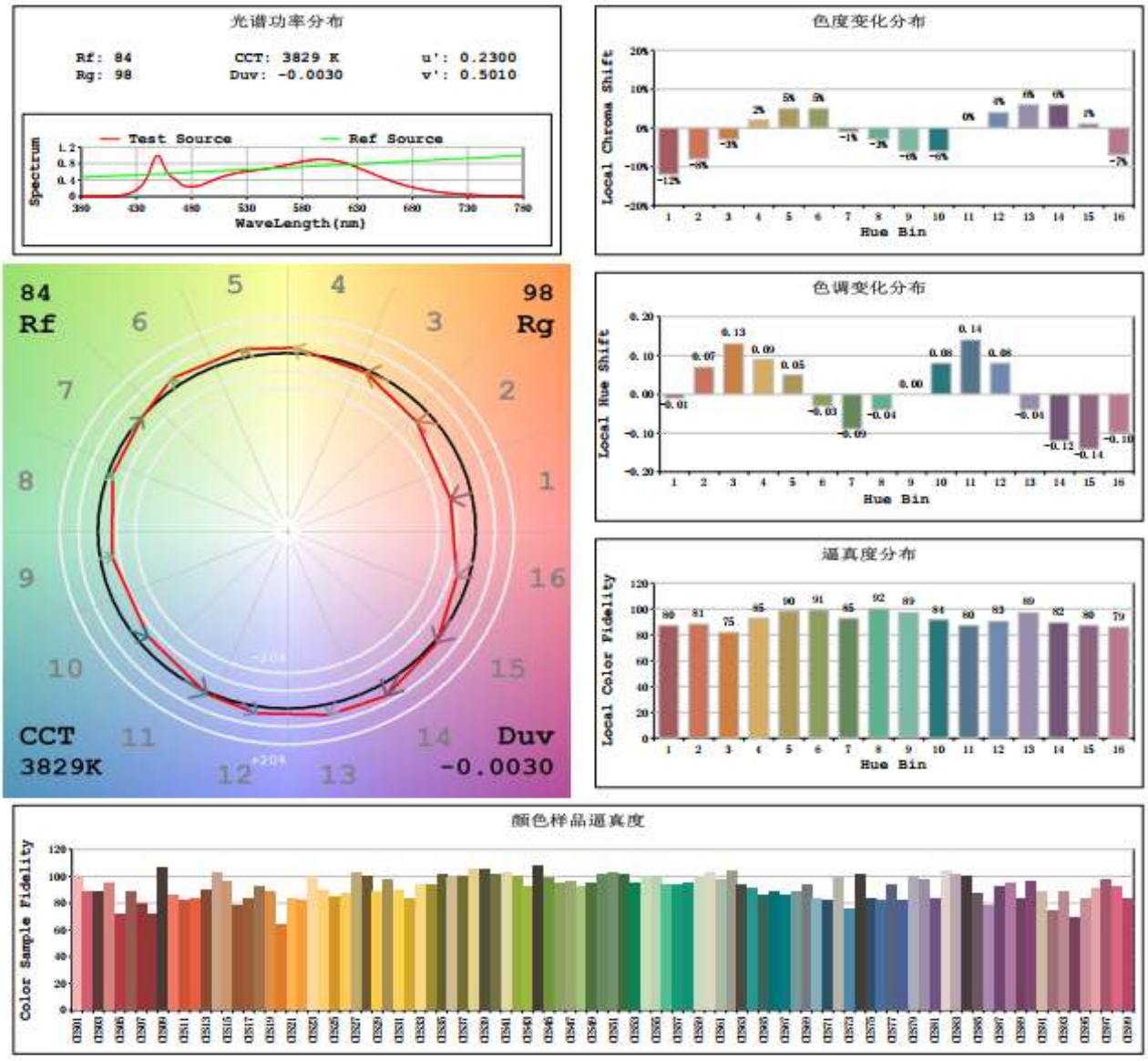
R1 =84	R2 =90	R3 =95	R4 =84	R5 =84	R6 =87	R7 =86	
R8 =67	R9 =16	R10=77	R11=84	R12=68	R13=85	R14=97	R15=78

277V



R1 =84	R2 =90	R3 =95	R4 =84	R5 =84	R6 =87	R7 =86	
R8 =67	R9 =16	R10=77	R11=84	R12=68	R13=85	R14=97	R15=78

3.2 Integrating Sphere Test - Minimum CCT



3.3 Goniophotometer Test

Model No.	PLC-9-O-8FA-HYB-GX32D	Sample ID.	A1
Opreate time (Min.)	15	Stabilizatio n time	15

Test Method
The samples were tested according to the IES LM-79-2008. Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load. The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5o vertical intervals and 10o horizontal intervals.

Test Conditions

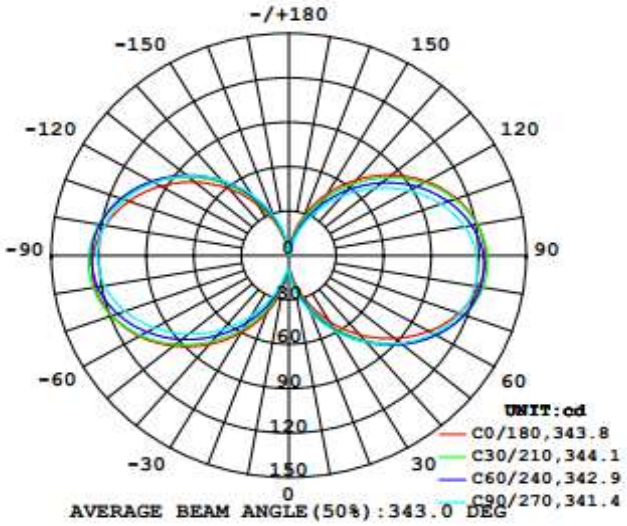
Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Flux(lm)
25.3	120.00	60.00	0.073	8.7	0.989	1158.3

Test Result

Beam Angle	Zonal Lumen Requirement(0°-60°)	SC (0°-180°)	SC (90°-270°)	Efficacy (lm/W)
343.8	33.2%	2.06	2.04	133.0

3.3 Goniophotometer Test

Light Distrubtion Curve



Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt	Zone	Lumens
0-20	21.14	N.A.	3.30	0-10	4.87
0-30	50.81	N.A.	7.90	10-20	16.27
0-40	94.18	N.A.	14.60	20-30	29.66
0-60	214.18	N.A.	33.20	30-40	43.38
0-80	351.40	N.A.	54.40	40-50	55.54
0-90	415.40	N.A.	64.30	50-60	64.47
10-90	410.53	N.A.	63.60	60-70	68.88
20-40	73.04	N.A.	11.30	70-80	68.33
20-50	128.58	N.A.	19.90	80-90	64.01
40-70	188.88	N.A.	29.30	90-100	58.54
60-80	137.21	N.A.	21.30	100-110	51.45
70-80	68.33	N.A.	10.60	110-120	42.46
80-90	64.01	N.A.	9.90	120-130	32.52
90-110	110.00	N.A.	17.00	130-140	22.65
90-120	152.46	N.A.	23.60	140-150	13.76
90-130	184.98	N.A.	28.60	150-160	6.66
90-150	221.38	N.A.	34.30	160-170	2.04
90-180	230.25	N.A.	35.70	170-180	0.17
110-180	120.26	N.A.	18.60		
0-180	645.66	N.A.	100.00		

5.0 THD and PF Test

Model No.	PLC-9-O-8FA-HYB-GX32D	Sample ID.	A1
Temperature（℃）	25.3	Humidity %	49

Test Method
The samples were tested according to the ANSI C82.77:2002. The total harmonic distortion shall be measured to the 40th order. The ambient temperature condition was maintained at 25º C ± 1º 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 were calculated.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
25.3	120.00	60.00	0.036	9.0	0.902	19.64%
25.3	277.02	60.00	0.074	8.8	0.989	22.60%