

Original Data

Relevant Standards

- IES LM-79-2019
- ANSI C82.77:2014

Prepared For

RAB lighting INC

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Prepared By

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Project Number

2025052703

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	7 ±10%	6.79
Lamp Output for bare lamp (lm)	IES LM-79-2008	860 ±10%	873.8
Lamp Efficacy (lm/W)	IES LM-79-2008	> 110.6	122.76
Allowable CCTs* (K)	IES LM-79-2019	4 step	2725 ± 83
		7 step	2725 ± 145
		4 step	3045±100
		7 step	3045±175
		4 step	3465±124
		7 step	3465±245
		4 step	3985±154
		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	83.30
R9	IES LM-79-2019 CIE 13.3-1995	>0	10.00
Rf	ANSI/IES TM-30-18	>70	84.00
Rg	ANSI/IES TM-30-18	>89	95.00
Rcs,h1	ANSI/IES TM-30-18	Rcs=>-12%,h1<=23%	-12.00%
Power Factor	ANSI C82.77:2014	>0.9	0.89
Total Harmonic Distortion (A%)	ANSI C82.77:2014	<25%	13.62%
Goniophotometer system			

Lamp Output (lm)	IES LM-79-2019	860 ±10%	937.2
Luminaire Efficacy(lm/W)	IES LM-79-2019	> 110.6	135.4
Beam Angle	IES LM-79-2019		336.4

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
Operate time (Min.)	15	Stabilization time (Min.)	15
Temperature (°C)	25.3	Humidity %	55

Test Method
<p>The samples were tested according to the IES LM-79-2008.</p> <p>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.</p> <p>The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.</p> <p>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.</p> <p>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.</p>

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	0.059	6.976	0.9892	899.1	128.9
25.3	277.02	60.00	0.029	7.118	0.8940	873.8	122.8

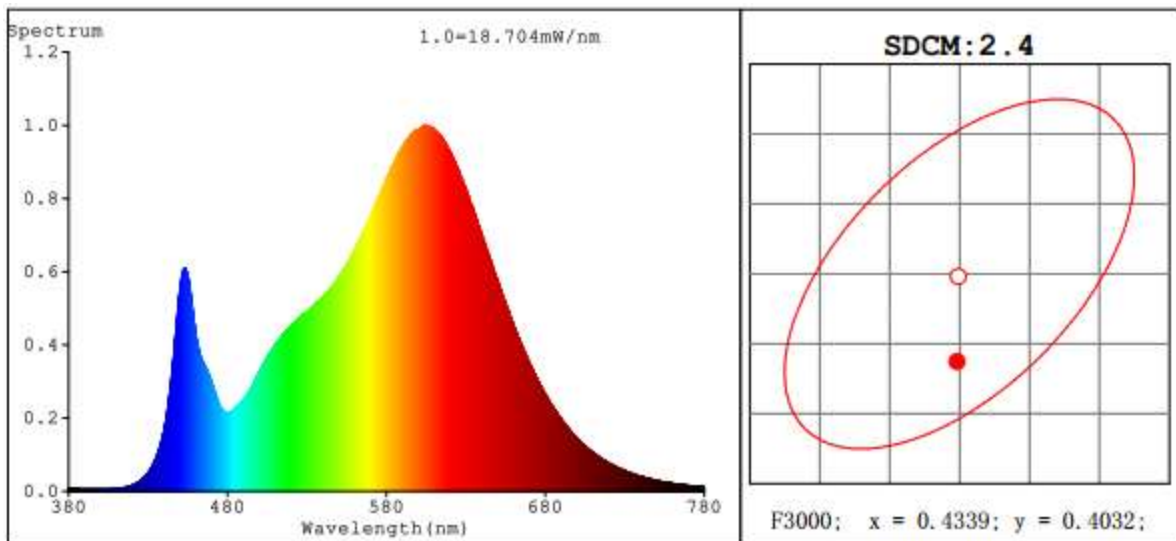
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3008	-1.7E-03	84	96	83.5	10.0	2.4
3018	-2.0E-03	84	96	83.3	10.0	2.6

3.1 Integrating Sphere Test

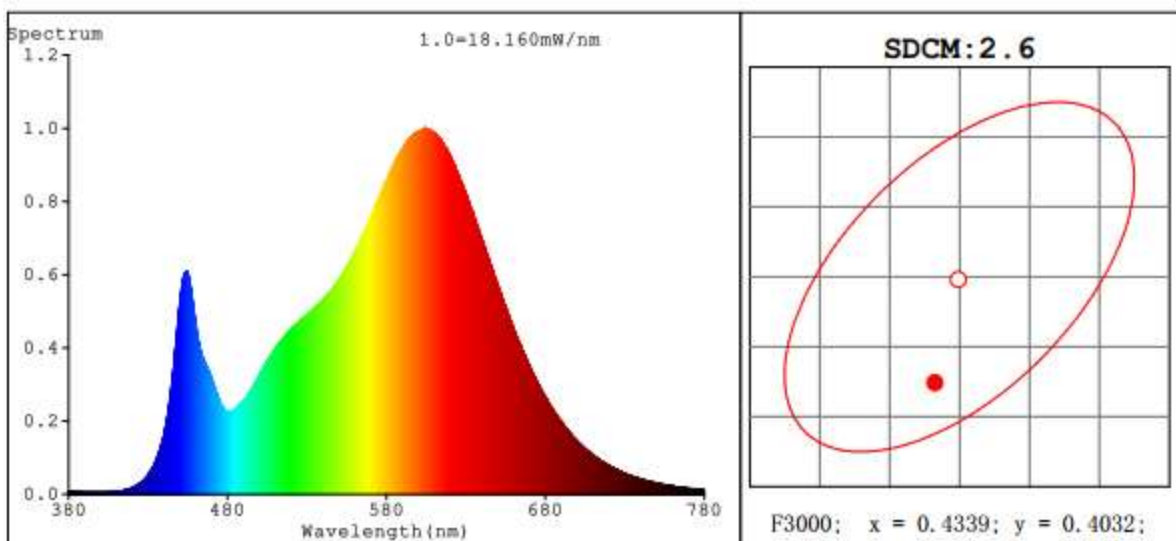
Spectroradiometric Parameters

120V



R1 =83 R2 =93 R3 =94 R4 =81 R5 =83 R6 =92 R7 =82
 R8 =59 R9 =10 R10=85 R11=81 R12=74 R13=86 R14=98 R15=75

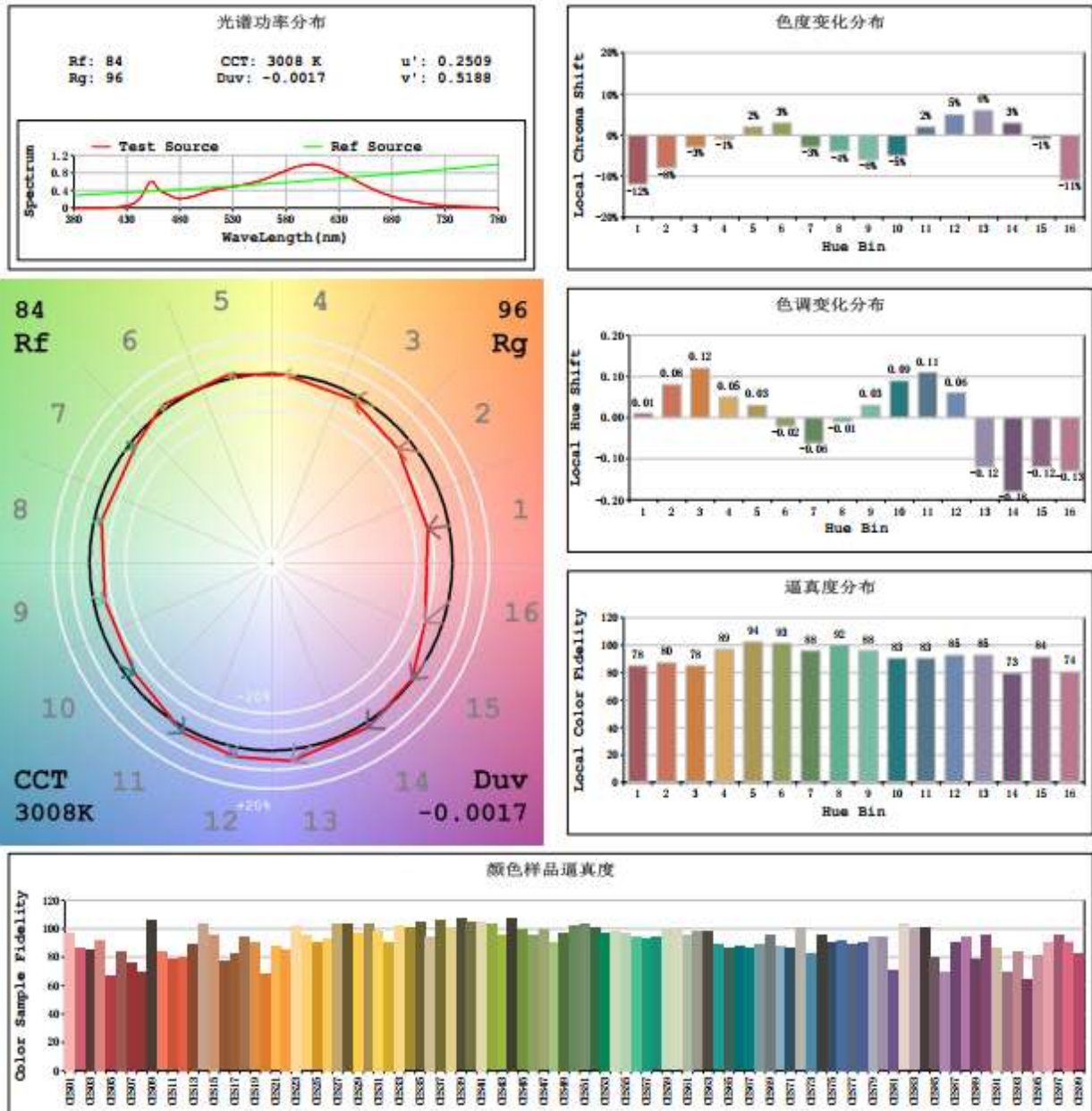
277V



R1 =83 R2 =94 R3 =94 R4 =81 R5 =83 R6 =92 R7 =81

R8 =59 R9 =10 R10=85 R11=80 R12=74 R13=86 R14=97 R15=75

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 (°C)	25.3	Humidity %	55

Test Method
<p>The samples were tested according to the IES LM-79-2008.</p> <p>Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C ± 1° C.</p> <p>The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.</p> <p>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.</p> <p>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.</p>

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	0.057	6.807	0.9892	904.7	132.9
25.3	277.02	60.00	0.028	7.031	0.8918	904.1	128.6

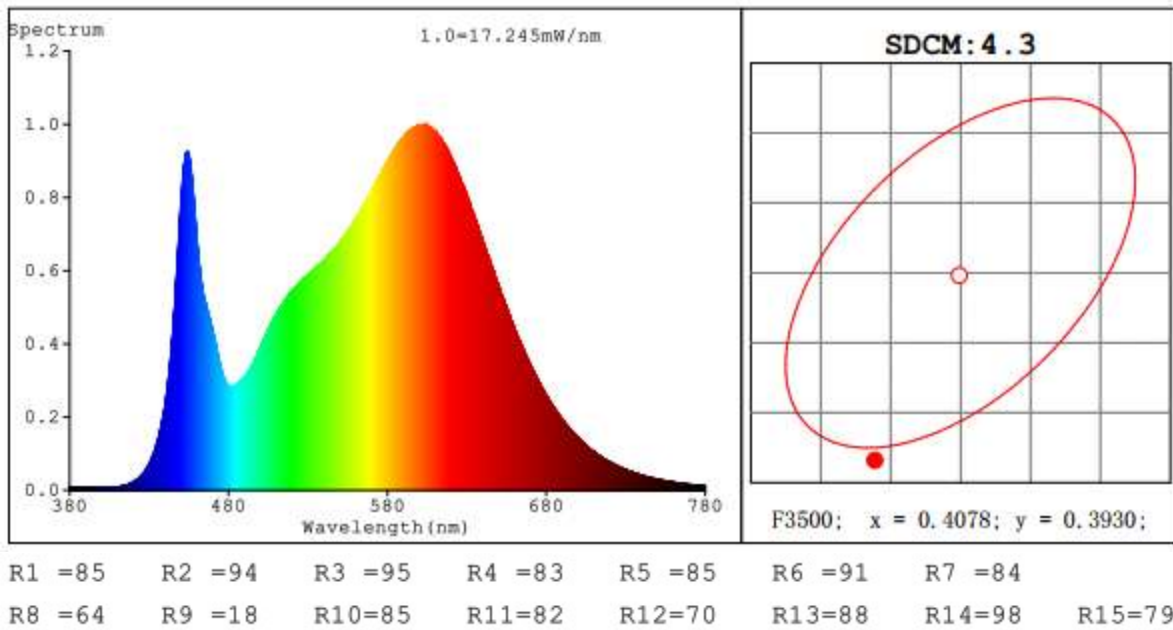
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3468	-2.9E-03	85	96	85.2	18.0	4.3
3469	-2.9E-03	85	96	85.2	18.0	4.3

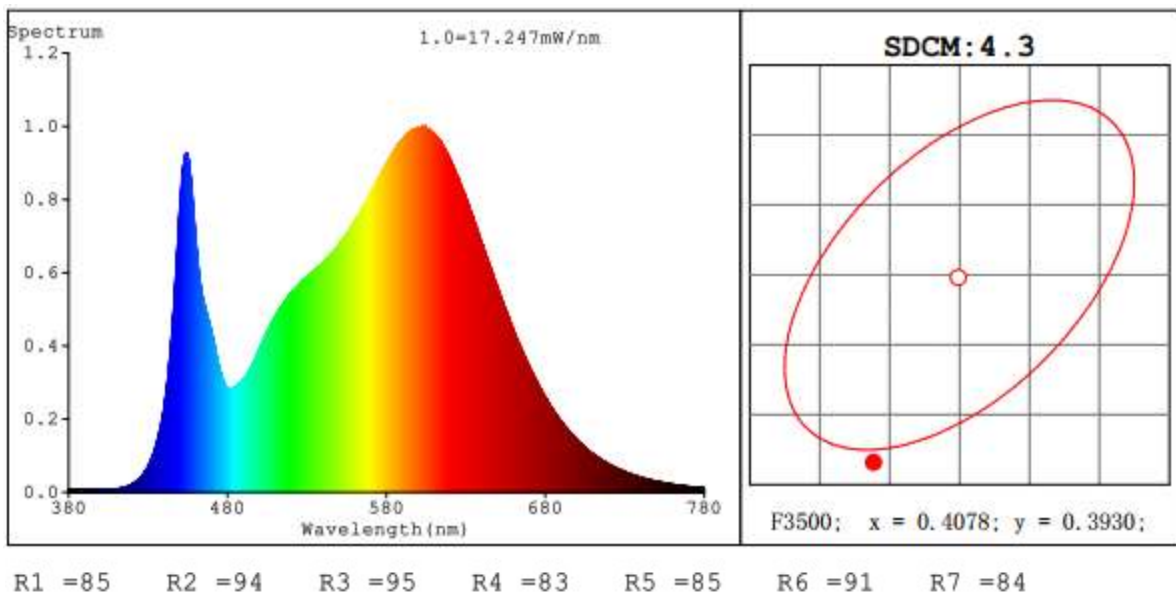
3.1 Integrating Sphere Test

Spectroradiometric Parameters

120V

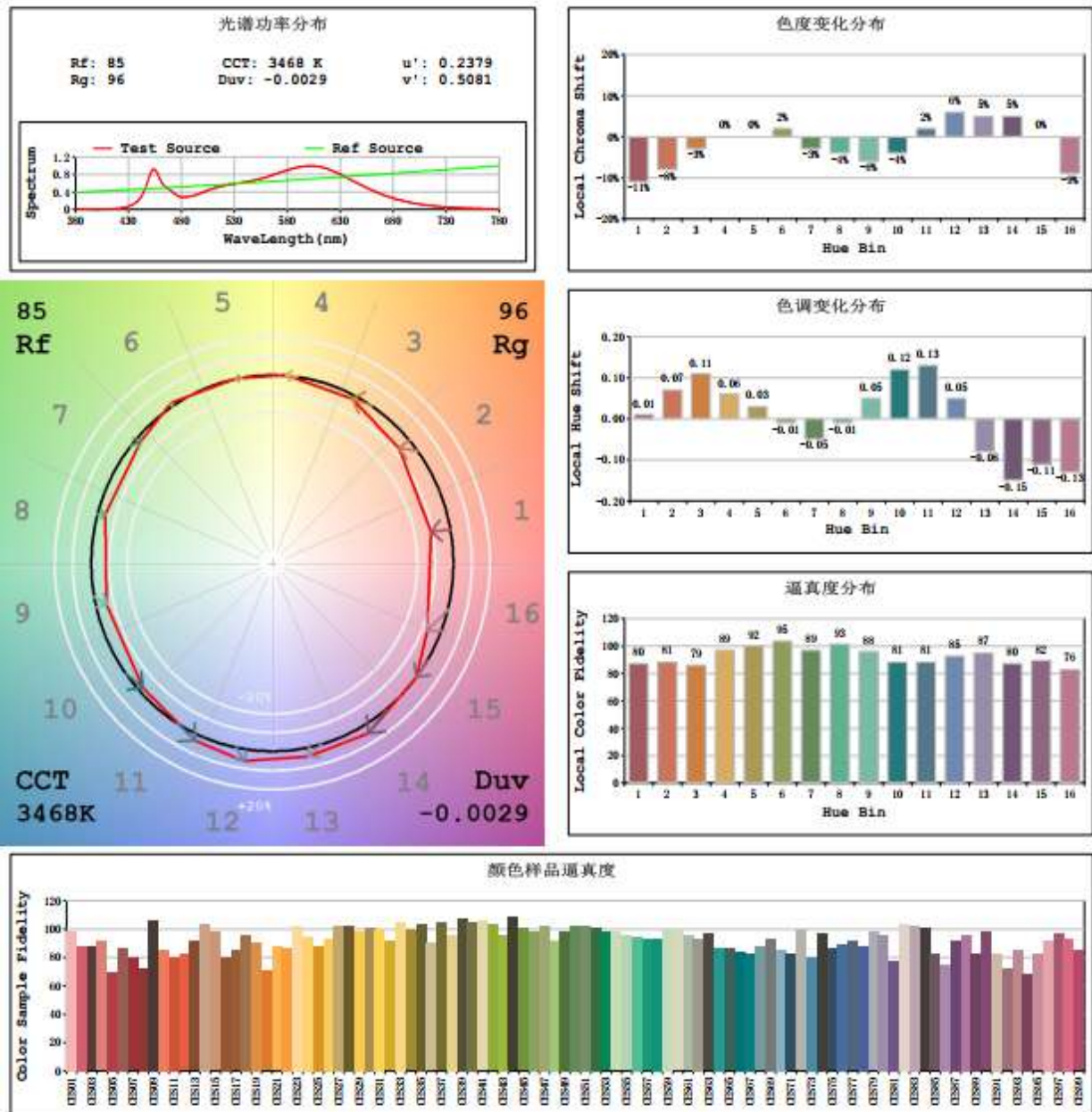


277V



R8 =64 R9 =18 R10=85 R11=82 R12=69 R13=88 R14=98 R15=79

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
Operate time (Min.)	15	Stabilization time (Min.)	15
Temperature (°C)	25.3	Humidity %	55

Test Method
<p>The samples were tested according to the IES LM-79-2008.</p> <p>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.</p> <p>The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.</p> <p>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.</p> <p>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.</p>

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	0.057	6.788	0.9891	916.1	135.0
25.3	277.02	60.00	0.028	7.053	0.8929	931.4	132.1

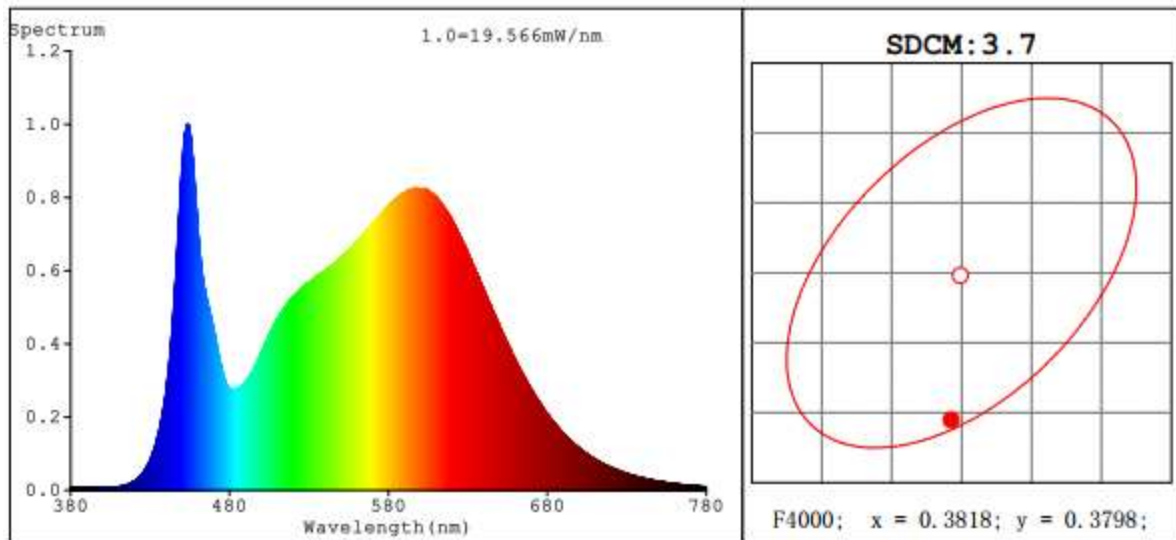
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3943	-2.2E-03	85	96	85.7	21.0	3.7
3924	-1.9E-03	85	96	85.7	21.0	3.4

3.1 Integrating Sphere Test

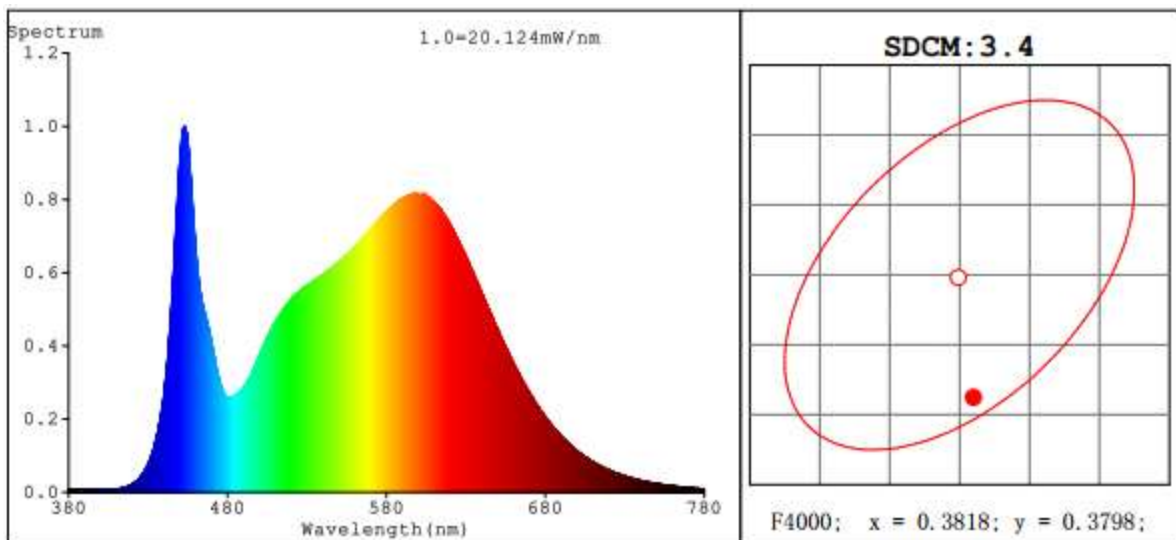
Spectroradiometric Parameters

120V



R1 =85	R2 =93	R3 =96	R4 =83	R5 =85	R6 =89	R7 =86		
R8 =68	R9 =21	R10=82	R11=83	R12=64	R13=88	R14=98	R15=80	

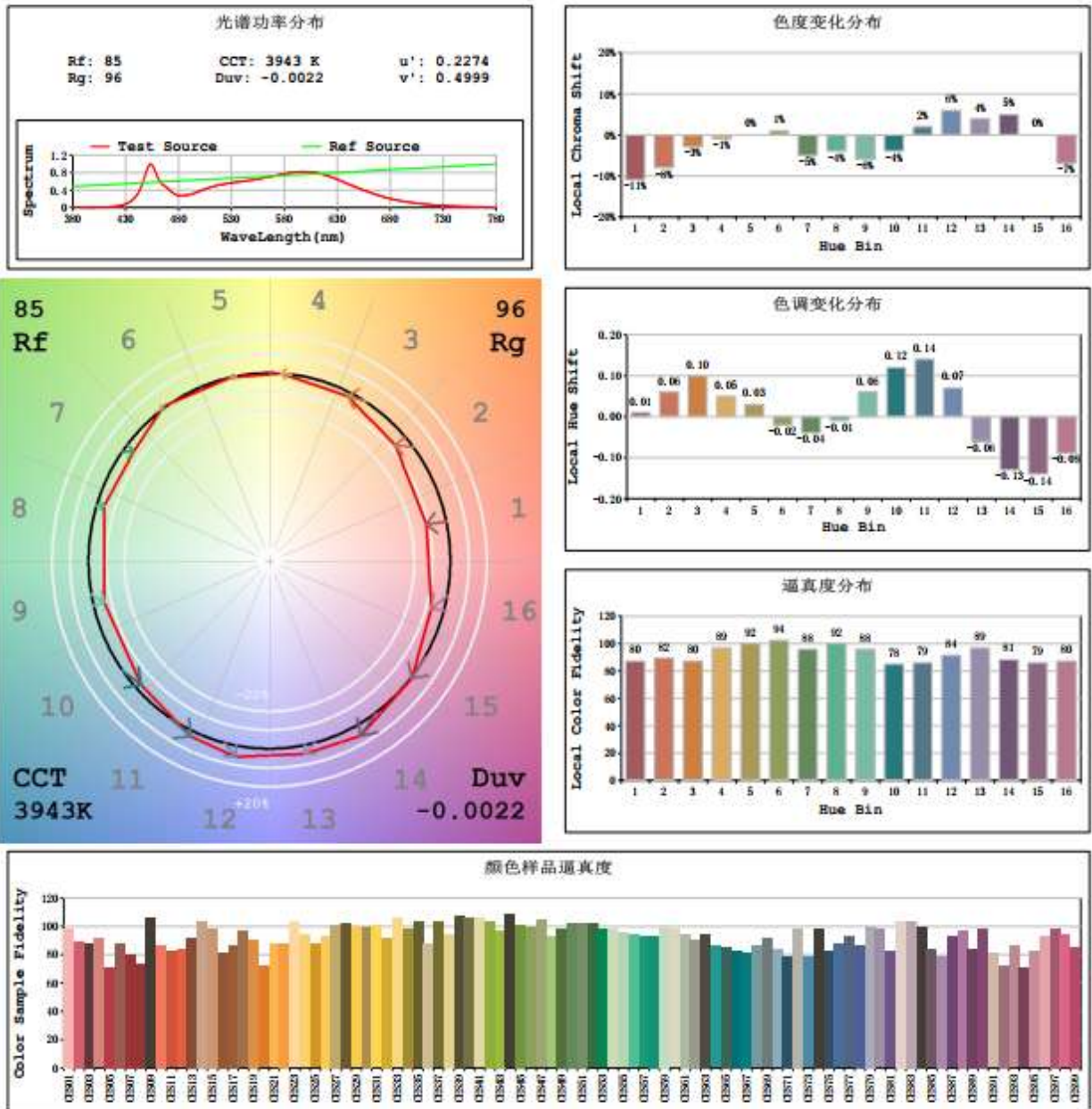
277V



R1 =85	R2 =93	R3 =96	R4 =84	R5 =85	R6 =89	R7 =86		
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R8 =68 R9 =21 R10=81 R11=83 R12=64 R13=87 R14=98 R15=80

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 (°C)	25.3	Humidity %	55

Test Method
<p>The samples were tested according to the IES LM-79-2008.</p> <p>Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C ± 1° C.</p> <p>The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.</p> <p>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.</p> <p>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.</p>

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	0.058	6.905	0.9889	893.6	129.4
25.3	277.02	60.00	0.029	7.109	0.8934	891.3	125.4

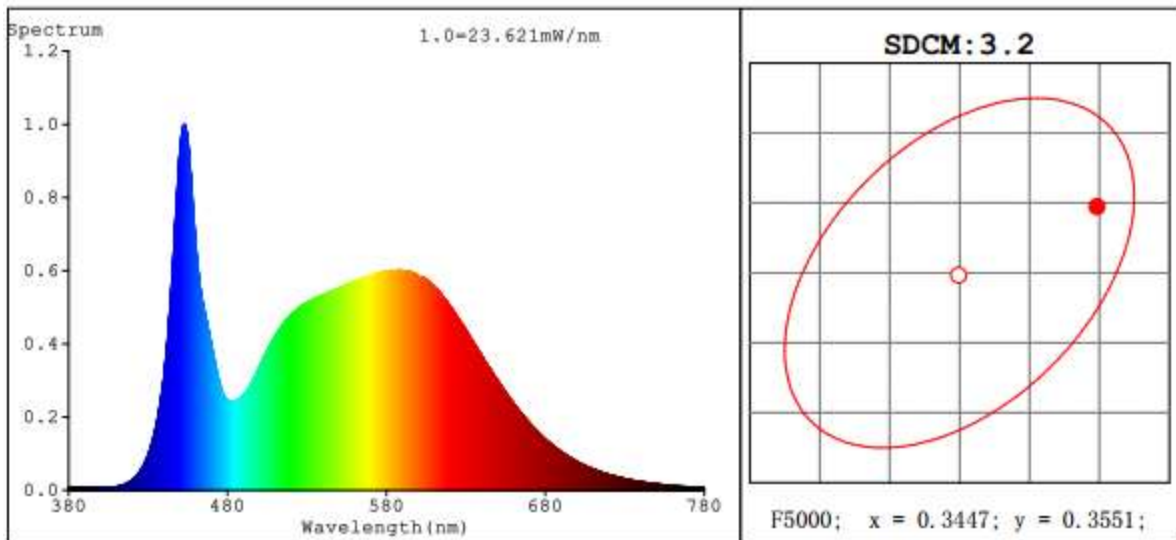
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
4831	1.2E-03	84	95	84.1	16.0	3.2
4833	1.2E-03	84	95	84.1	16.0	3.1

3.1 Integrating Sphere Test

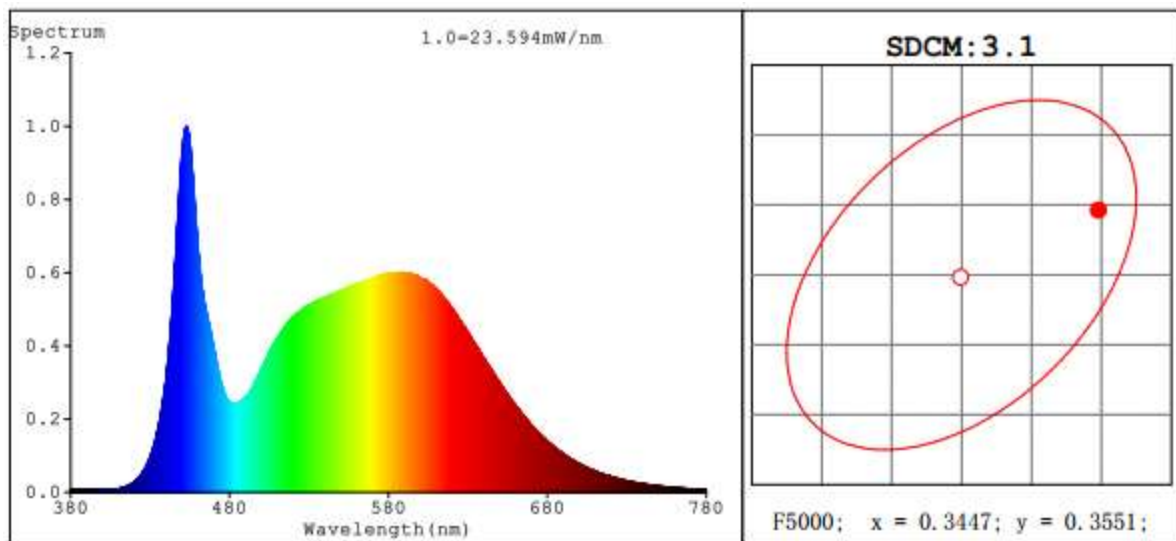
Spectroradiometric Parameters

120V



R1 =83 R2 =90 R3 =94 R4 =82 R5 =82 R6 =85 R7 =88
R8 =69 R9 =16 R10=75 R11=81 R12=56 R13=85 R14=97 R15=78

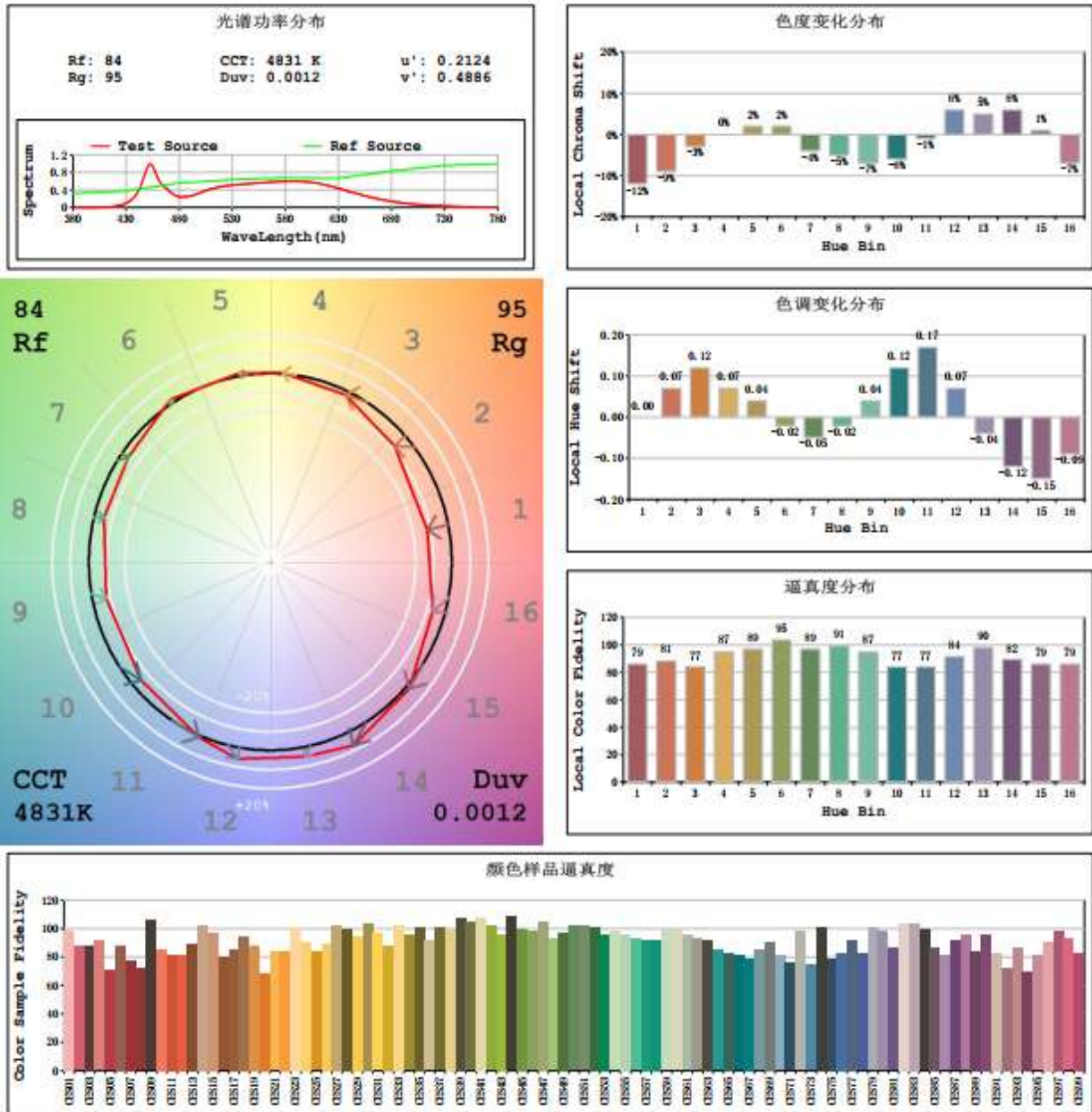
277V



R1 =83 R2 =90 R3 =94 R4 =82 R5 =82 R6 =85 R7 =88

R8 =69 R9 =16 R10=75 R11=81 R12=56 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
Operate time (Min.)	15	Stabilization time	15

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

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

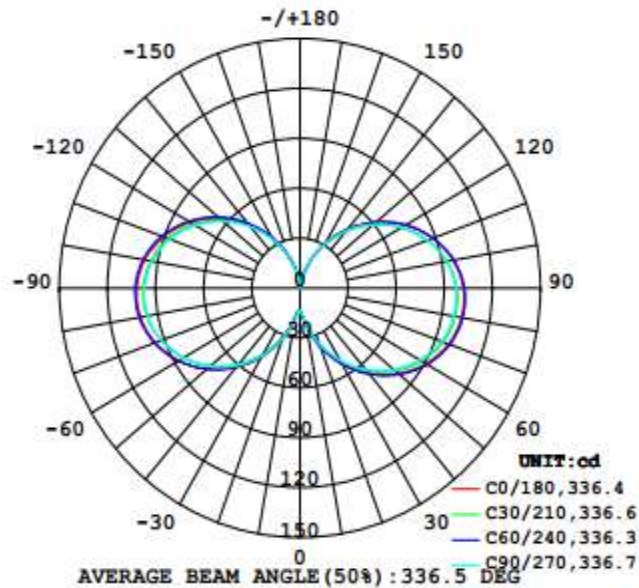
Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Flux(lm)
25.3	120.00	60.00	0.058	6.9	0.989	937.2

Test Result

Beam Angle	Zonal Lumen Requirement(0°-60°)	SC (0°-180°)	SC (90°-270°)	Efficacy (lm/W)
336.4	20.8%	4.11	4.04	135.4

3.3 Goniophotometer Test

Light Distribution Curve



Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt	Zone	Lumens
0-20	9.58	1.00	1.00	0-10	1.64
0-30	29.21	3.10	3.10	10-20	7.94
0-40	65.05	6.90	6.90	20-30	19.63
0-60	194.31	20.70	20.80	30-40	35.84
0-80	390.62	41.70	41.70	40-50	54.84
0-90	500.73	53.40	53.50	50-60	74.41
10-90	499.09	53.30	53.30	60-70	91.87
20-40	55.47	5.90	5.90	70-80	104.44
20-50	110.31	11.80	11.80	80-90	110.11
40-70	221.12	23.60	23.60	90-100	108.04
60-80	196.31	20.90	21.00	100-110	98.19
70-80	104.44	11.10	11.20	110-120	82.29
80-90	110.11	11.70	11.80	120-130	63.00
90-110	206.23	22.00	22.00	130-140	43.20
90-120	288.53	30.80	30.80	140-150	25.48
90-130	351.53	37.50	37.50	150-160	11.75
90-150	420.21	44.80	44.90	160-170	3.27
90-180	435.45	46.50	46.50	170-180	0.22
110-180	229.21	24.50	24.50		
0-180	936.18	99.90	100.00		

5.0 THD and PF Test

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

Test Method
<p>The samples were tested according to the ANSI C82.77:2002.</p> <p>The total harmonic distortion shall be measured to the 40th order.</p> <p>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 were calculated.</p>

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
25.3	120.00	60.00	0.059	7.0	0.989	11.03%
25.3	277.02	60.00	0.029	7.1	0.894	13.62%