

# 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

**2025010901**

## Data Number

**2025/1/9**

## Test Date

**2025/1/9**

## 1.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2025/1/9	PLC-5-O-8FA-HYB-GX23	A1
2	Goniophotometer Test	2025/1/9	PLC-5-O-8FA-HYB-GX23	A1
3	THD and PF Test	2025/1/9	PLC-5-O-8FA-HYB-GX23	A1

### 1.1 Test Summary

Requirement Category	Test Method	Requirements	Test value
<b>Integrating Sphere system</b>			
Power (W)	IES LM-79-2008	5.5 ±10%	5.77
Lamp Output for bare lamp (lm)	IES LM-79-2008	720 ±10%	738.1
Lamp Efficacy (lm/W)	IES LM-79-2008	> 117.8	126.39
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	81.80
R9	IES LM-79-2019 CIE 13.3-1995	>0	4.50
Rf	ANSI/IES TM-30-18	>70	83.00
Rg	ANSI/IES TM-30-18	>89	94.00
Rcs,h1	ANSI/IES TM-30-18	Rcs=>-12%,h1<=23%	-13%
Power Factor	ANSI C82.77:2014	>0.9	0.95
Total Harmonic Distortion (A%)	ANSI C82.77:2014	<25%	21.20%
<b>Goniophotometer system</b>			
Lamp Output (lm)	IES LM-79-2019	720 ±10%	770.3
Luminaire Efficacy(lm/W)	IES LM-79-2019	> 117.8	134.0
Beam Angle	IES LM-79-2019		339.2

## 2.0 Production Description

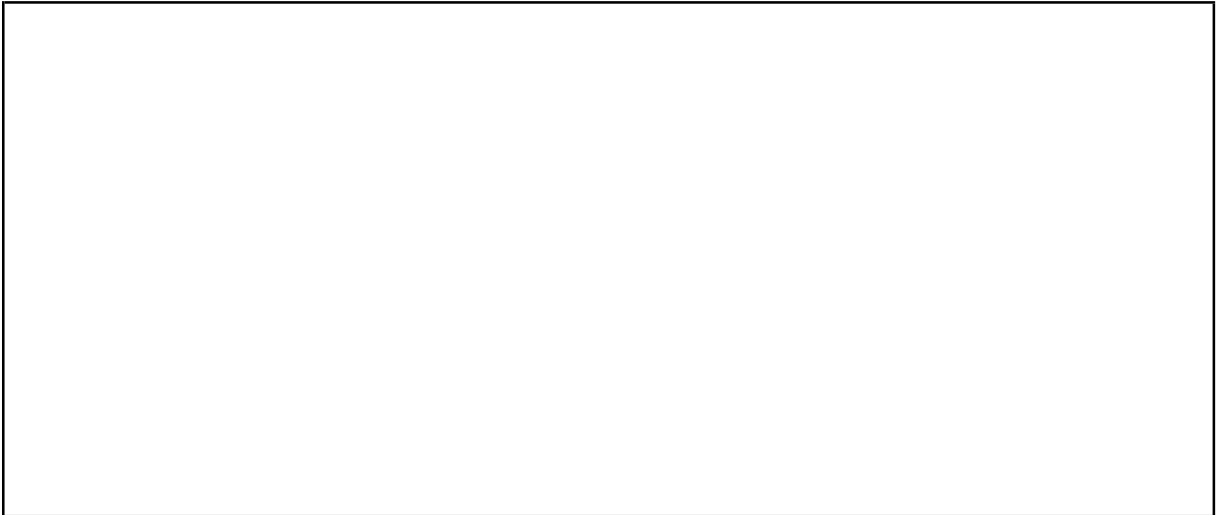
**Luminaire Description:** PLC-5-O-8FA-HYB-GX23

**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-5-O-8FA-HYB-GX23	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	0.049	5.845	0.9924	742.2	127.0
25.3	277.02	60.00	0.022	5.840	0.9510	738.1	126.4

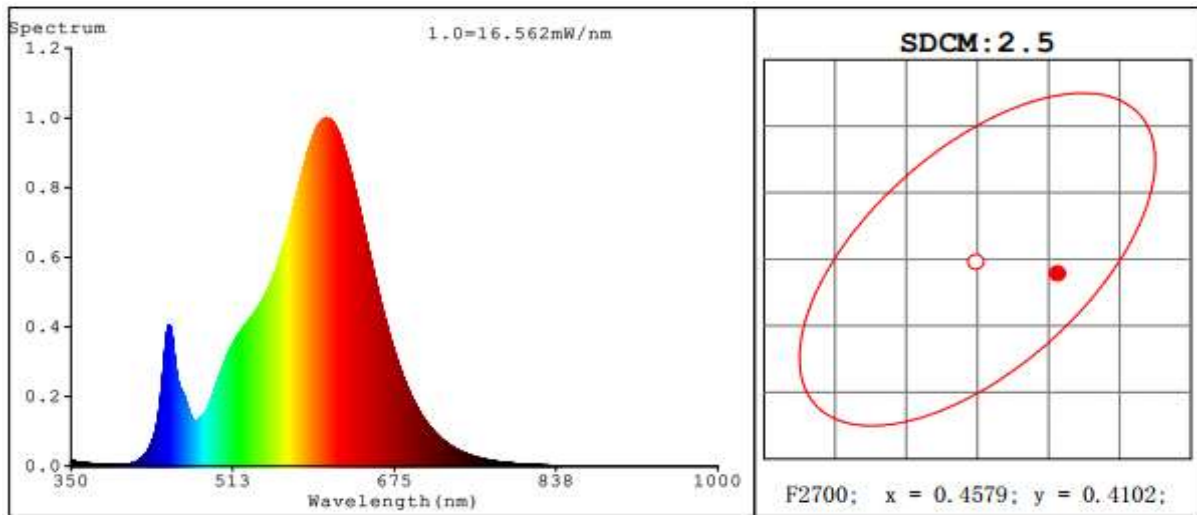
#### Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
2667	-5.0E-04	83	97	81.9	4.8	2.5
2670	-6.0E-04	83	97	81.8	4.5	2.4

### 3.1 Integrating Sphere Test

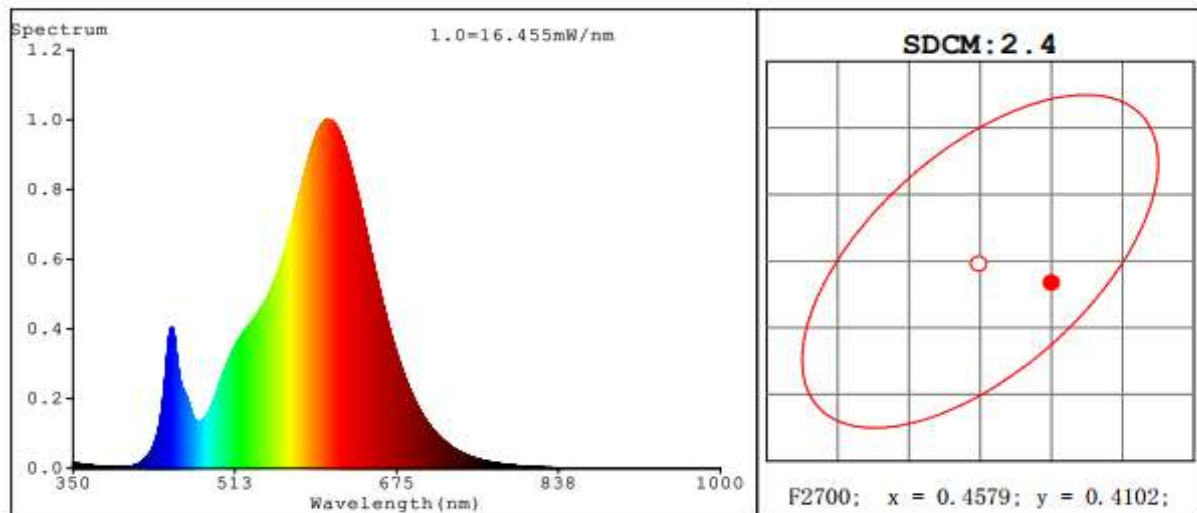
#### Spectroradiometric Parameters

120V



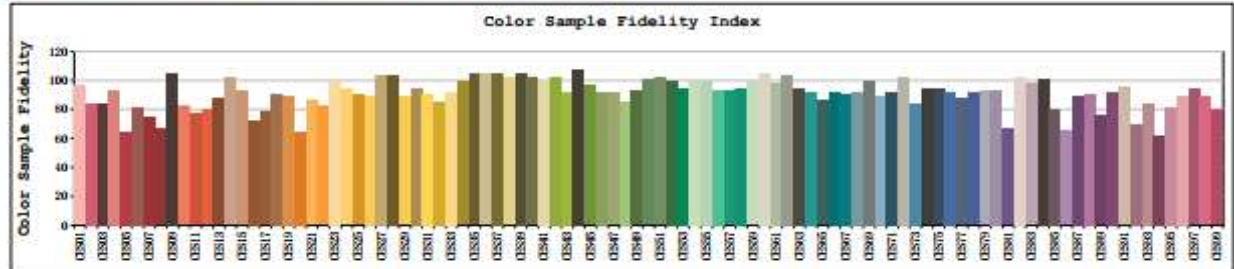
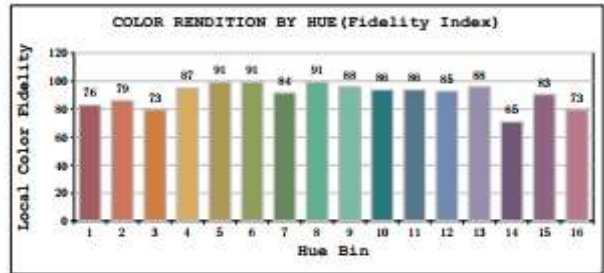
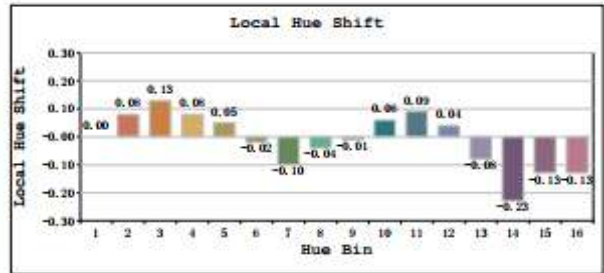
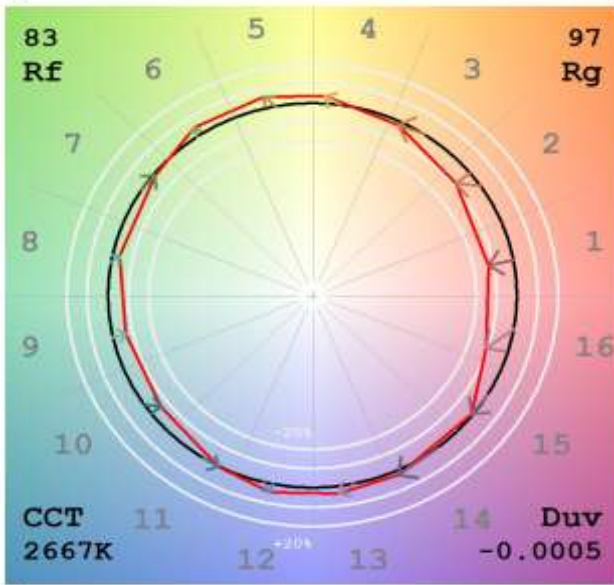
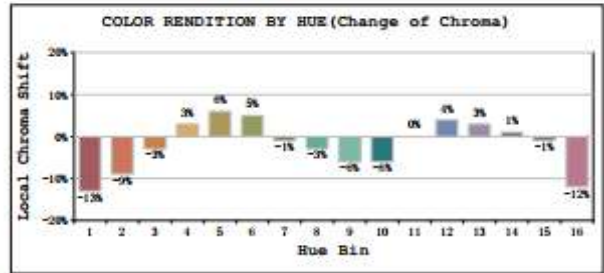
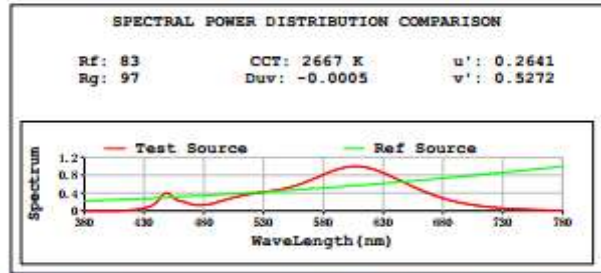
R1 =80.4 R2 =91.3 R3 =95.4 R4 =80.0 R5 =80.9 R6 =90.7 R7 =80.8  
 R8 =55.9 R9 =4.8 R10=81.0 R11=80.2 R12=76.4 R13=82.9 R14=98.2 R15=72.2

277V



R1 =80.3 R2 =91.3 R3 =95.3 R4 =79.9 R5 =80.9 R6 =90.7 R7 =80.7  
 R8 =55.7 R9 =4.5 R10=81.0 R11=79.9 R12=76.3 R13=82.8 R14=98.2 R15=72.1

### 3.2 Integrating Sphere Test - Minimum CCT



### 3.0 LM-79 Measurement and Test Results

#### 3.1 Integrating Sphere Test

Model No.	PLC-5-O-8FA-HYB-GX23	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	0.048	5.772	0.9922	753.9	130.6
25.3	277.02	60.00	0.022	5.782	0.9500	755.8	130.7

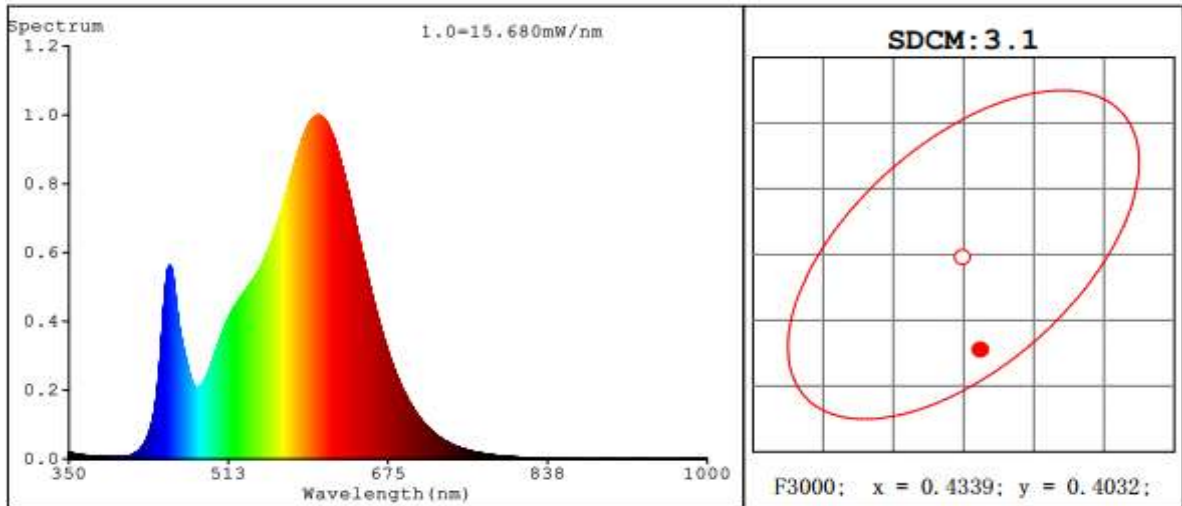
#### Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
2987	-2.1E-03	84	96	83.1	9.4	3.1
2989	-2.1E-03	84	96	83.1	9.4	3.0

### 3.1 Integrating Sphere Test

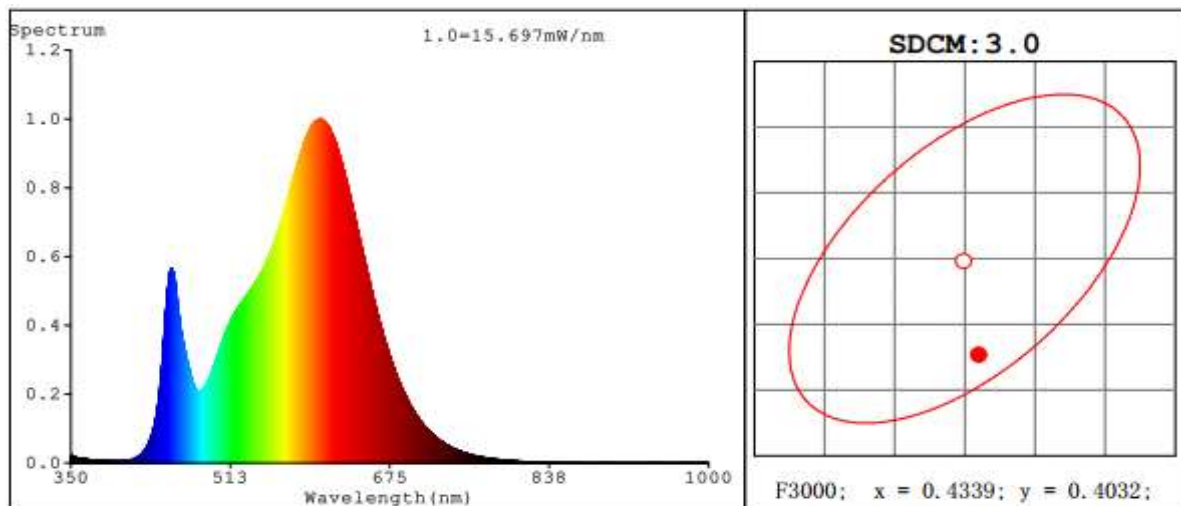
#### Spectroradiometric Parameters

120V



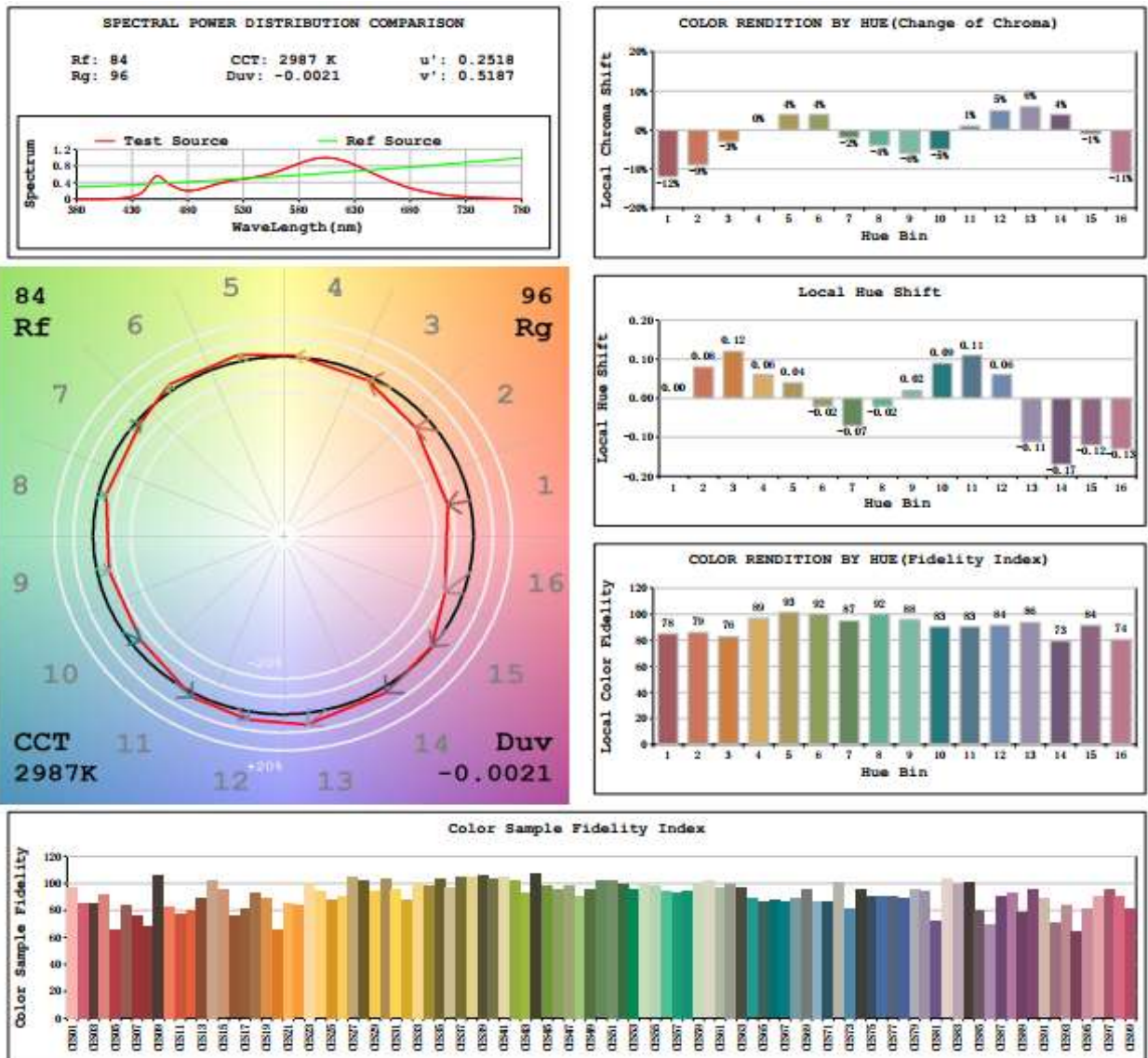
R1 =82.3 R2 =92.8 R3 =94.7 R4 =80.6 R5 =82.7 R6 =91.3 R7 =81.6  
 R8 =59.0 R9 =9.4 R10=83.5 R11=80.2 R12=74.1 R13=85.1 R14=97.9 R15=75.0

277V



R1 =82.3 R2 =92.8 R3 =94.7 R4 =80.7 R5 =82.8 R6 =91.3 R7 =81.6  
 R8 =59.0 R9 =9.4 R10=83.5 R11=80.3 R12=74.1 R13=85.1 R14=97.9 R15=75.0

### 3.2 Integrating Sphere Test - Minimum CCT



### 3.0 LM-79 Measurement and Test Results

#### 3.1 Integrating Sphere Test

Model No.	PLC-5-O-8FA-HYB-GX23	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	0.048	5.770	0.9923	771.3	133.7
25.3	277.02	60.00	0.022	5.786	0.9499	773.4	133.7

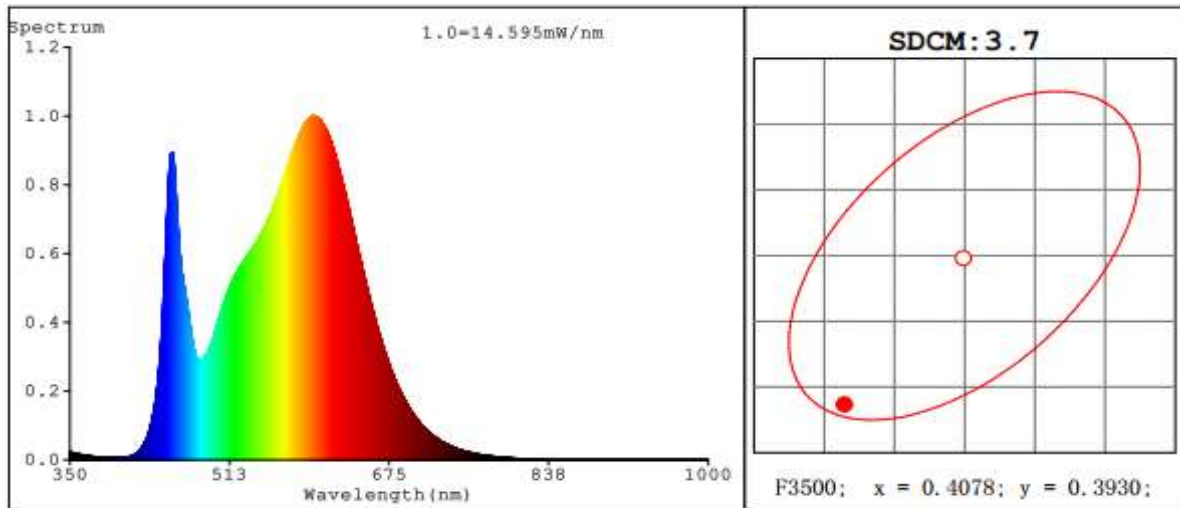
#### Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3515	-1.9E-03	84	95	83.5	10.1	3.7
3514	-1.9E-03	84	95	83.6	10.2	3.7

### 3.1 Integrating Sphere Test

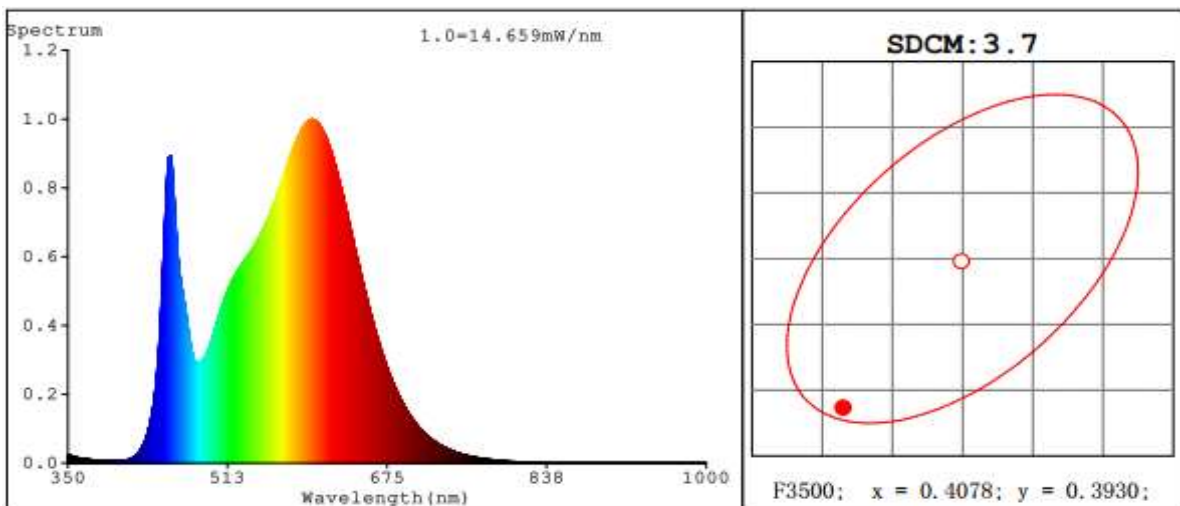
#### Spectroradiometric Parameters

120V



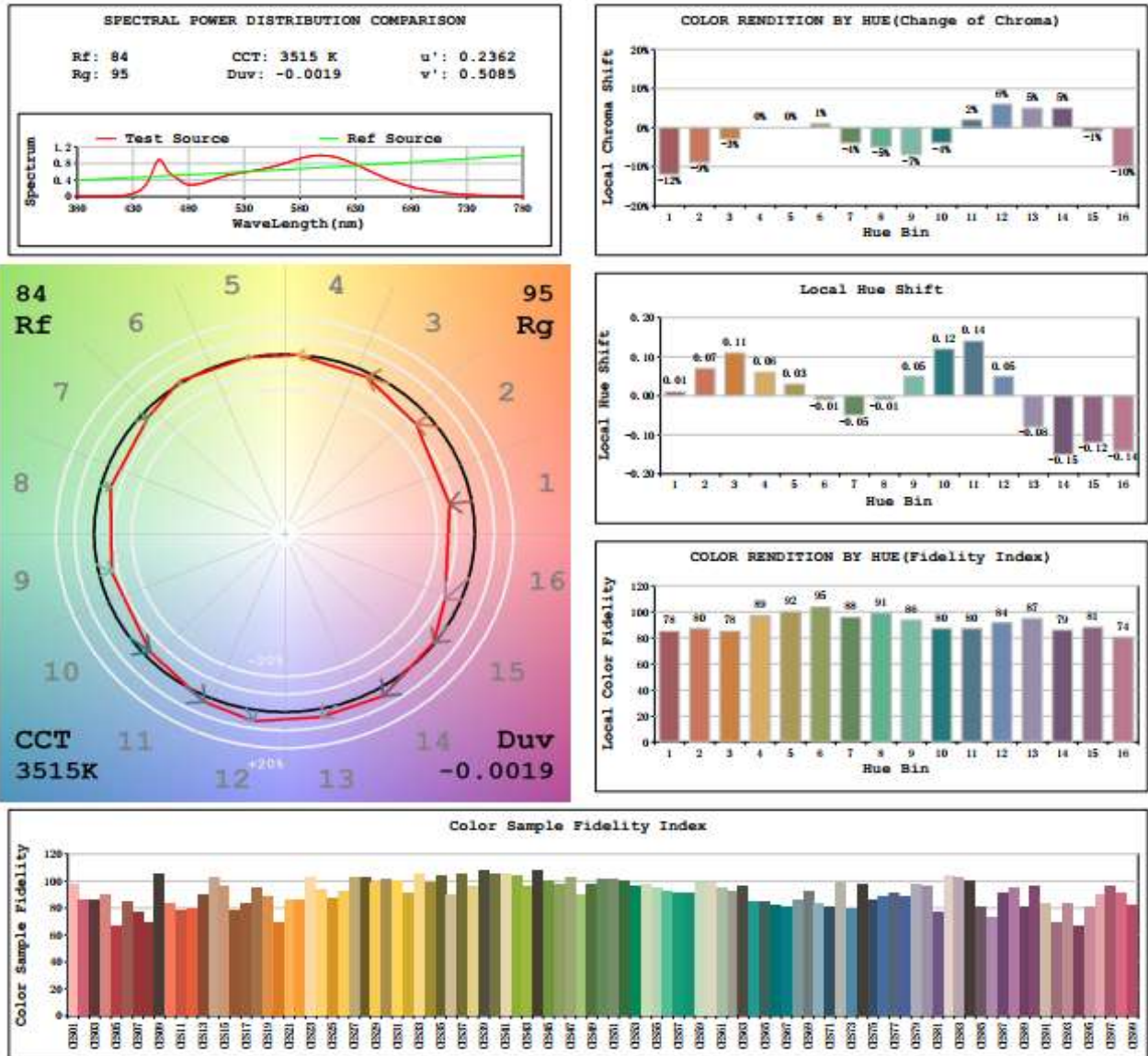
R1 =82.7 R2 =92.8 R3 =95.2 R4 =80.5 R5 =82.8 R6 =89.7 R7 =83.0  
 R8 =61.6 R9 =10.1 R10=82.4 R11=79.6 R12=67.4 R13=85.6 R14=98.2 R15=76.2

277V



R1 =82.8 R2 =92.8 R3 =95.2 R4 =80.5 R5 =82.8 R6 =89.7 R7 =83.1  
 R8 =61.6 R9 =10.2 R10=82.5 R11=79.6 R12=67.5 R13=85.6 R14=98.2 R15=76.2

### 3.2 Integrating Sphere Test - Minimum CCT



### 3.0 LM-79 Measurement and Test Results

#### 3.1 Integrating Sphere Test

Model No.	PLC-5-O-8FA-HYB-GX23	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	0.049	5.831	0.9922	780.5	133.9
25.3	277.02	60.00	0.022	5.838	0.9509	782.1	134.0

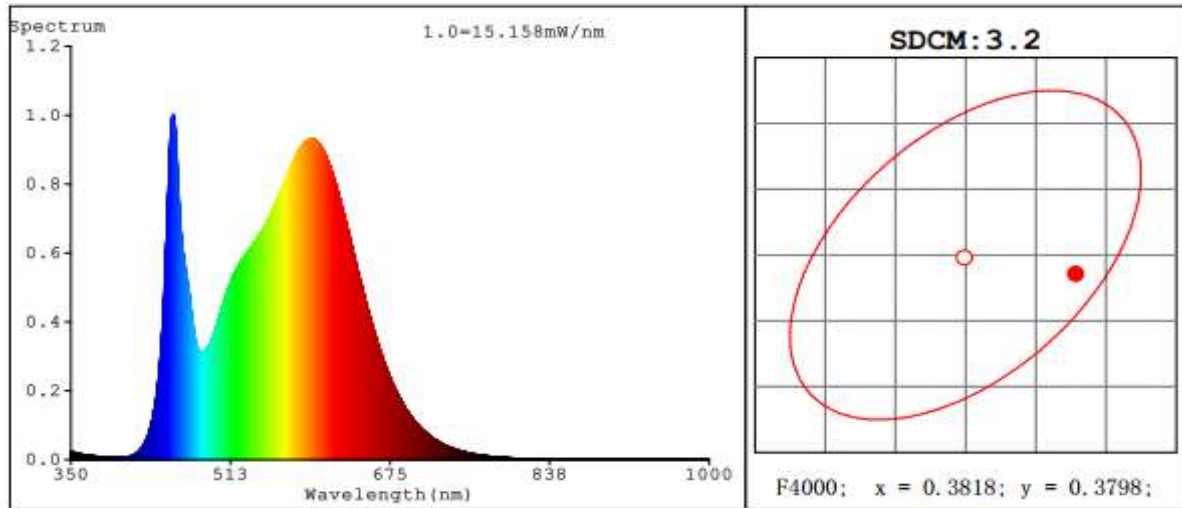
#### Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3853	-7.0E-04	83	94	83.0	7.0	3.2
3853	-7.0E-04	83	94	83.1	7.1	3.2

### 3.1 Integrating Sphere Test

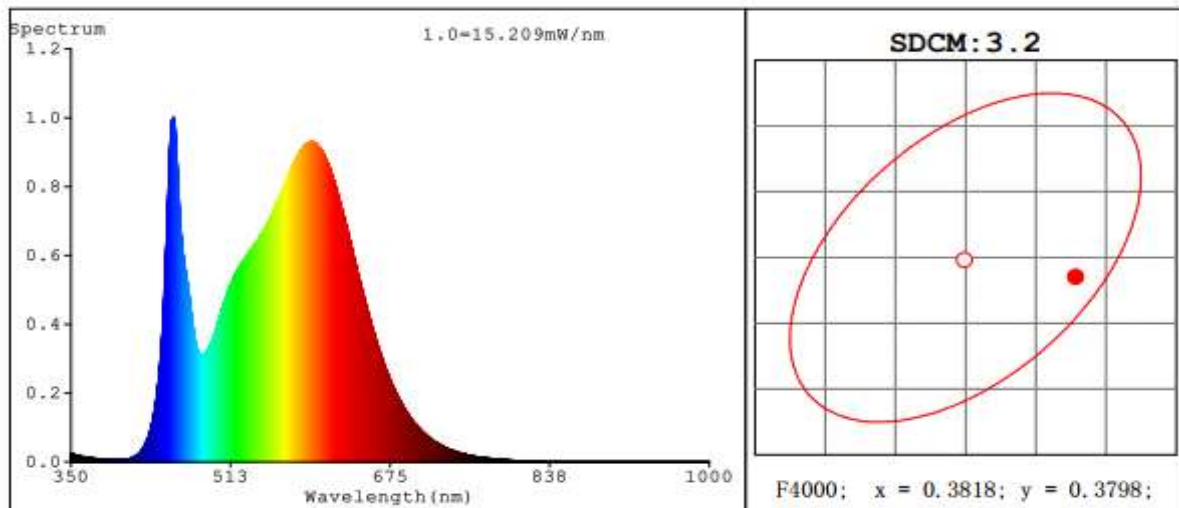
#### Spectroradiometric Parameters

120V



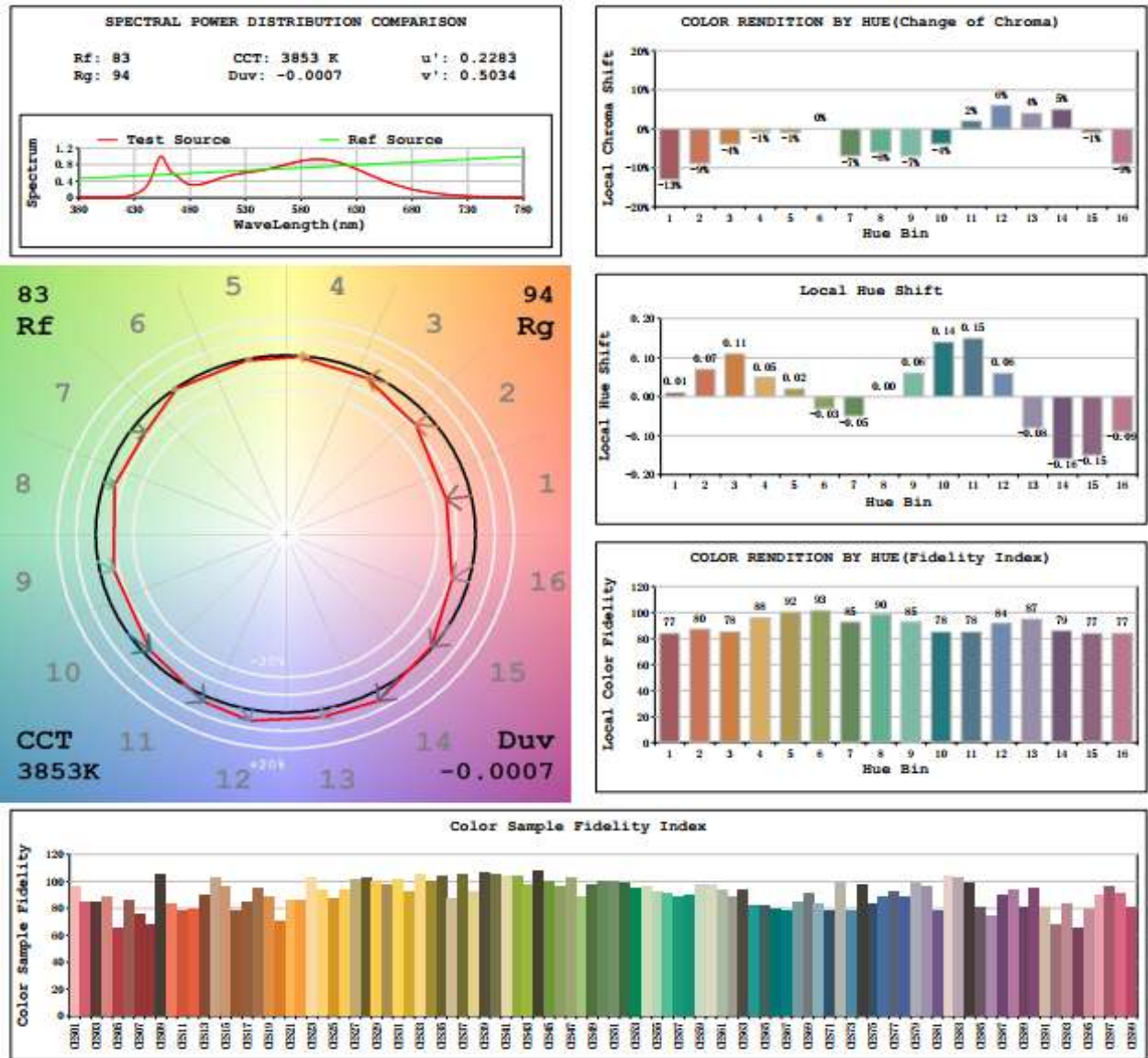
R1 =81.9 R2 =92.1 R3 =95.4 R4 =79.6 R5 =81.7 R6 =88.2 R7 =83.6  
 R8 =61.9 R9 =7.0 R10=80.4 R11=78.4 R12=63.2 R13=84.8 R14=98.2 R15=75.5

277V



R1 =81.9 R2 =92.1 R3 =95.4 R4 =79.6 R5 =81.7 R6 =88.2 R7 =83.6  
 R8 =61.9 R9 =7.1 R10=80.5 R11=78.4 R12=63.2 R13=84.9 R14=98.2 R15=75.5

### 3.2 Integrating Sphere Test - Minimum CCT



### 3.3 Goniophotometer Test

Model No.	PLC-5-O-8FA-HYB-GX23	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  $\pm 0.2$  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

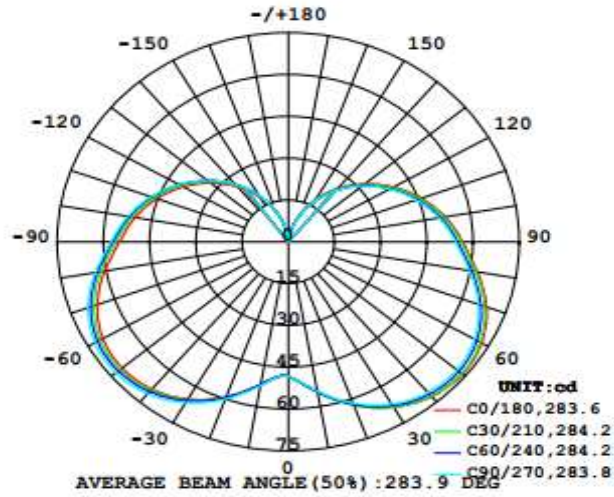
Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Flux(lm)
25.3	120.00	60.00	0.048	5.7	0.989	770.3

#### Test Result

Beam Angle	Zonal Lumen Requirement(0°-60°)	SC (0°-180°)	SC (90°-270°)	Efficacy (lm/W)
339.2	33.2%	2.06	2.04	134.0

### 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-5-O-8FA-HYB-GX23	Sample ID.	A1
Temperature (°C)	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 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.

### Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
25.3	120.00	60.00	0.049	5.85	0.992	18.74%
25.3	277.02	60.00	0.022	5.84	0.951	21.20%