

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

25111123

Data Number

2025/11/12

Test Date

2025/11/12

1.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2025/11/12	T10EM-48	A1
2	Goniophotometer Test	2025/11/12	T10EM-48	A1
3	THD and PF Test	2025/11/12	T10EM-48	A1

1.1 Test Summary

Requirement Category	Test Method	Requirements	Test value
Integrating Sphere system			
Power (W)	IES LM-79-2008	12 ±10%	15.86
Lamp Output for bare lamp (lm)	IES LM-79-2008	1600 ±10%	2038
Lamp Efficacy (lm/W)	IES LM-79-2008	> 120.0	123.67
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	82.10
R9	IES LM-79-2019 CIE 13.3-1995	>0	5.90
Rf	ANSI/IES TM-30-18	>70	82.00
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	0.93
Total Harmonic Distortion (A%)	ANSI C82.77:2014	<25%	17.48%
Goniophotometer system			
Lamp Output (lm)	IES LM-79-2019	1600 ±10%	2265.0
Luminaire Efficacy(lm/W)	IES LM-79-2019	> 120.0	140.7
Beam Angle	IES LM-79-2019		137.7

2.0 Production Description

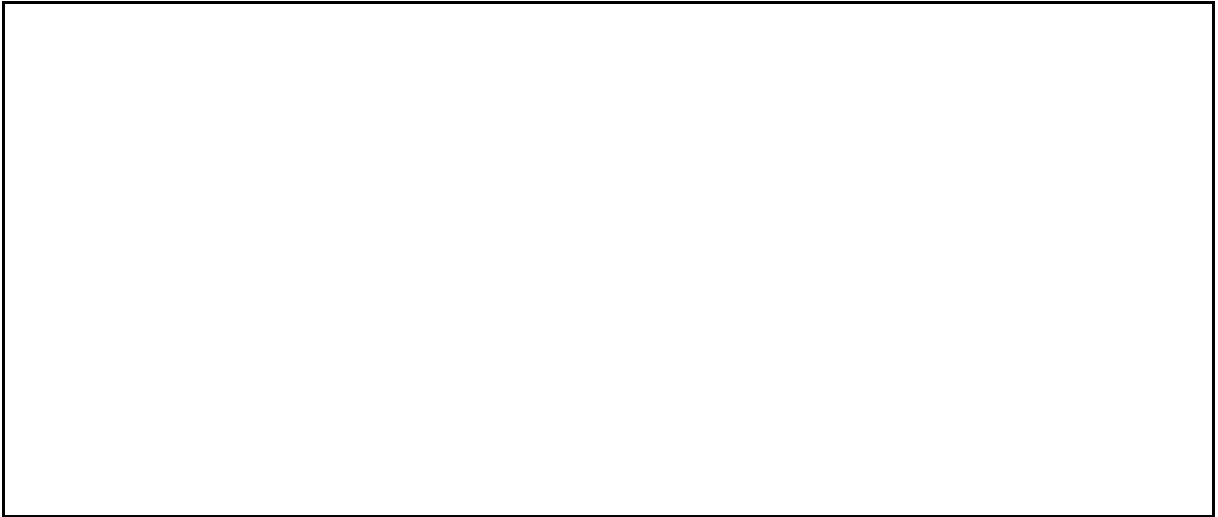
Luminaire Description: T10EM-48

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.	T10EM-48	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	0.136	16.180	0.9853	2040.0	126.1
25.3	277.02	60.00	0.063	16.480	0.9368	2038.0	123.7

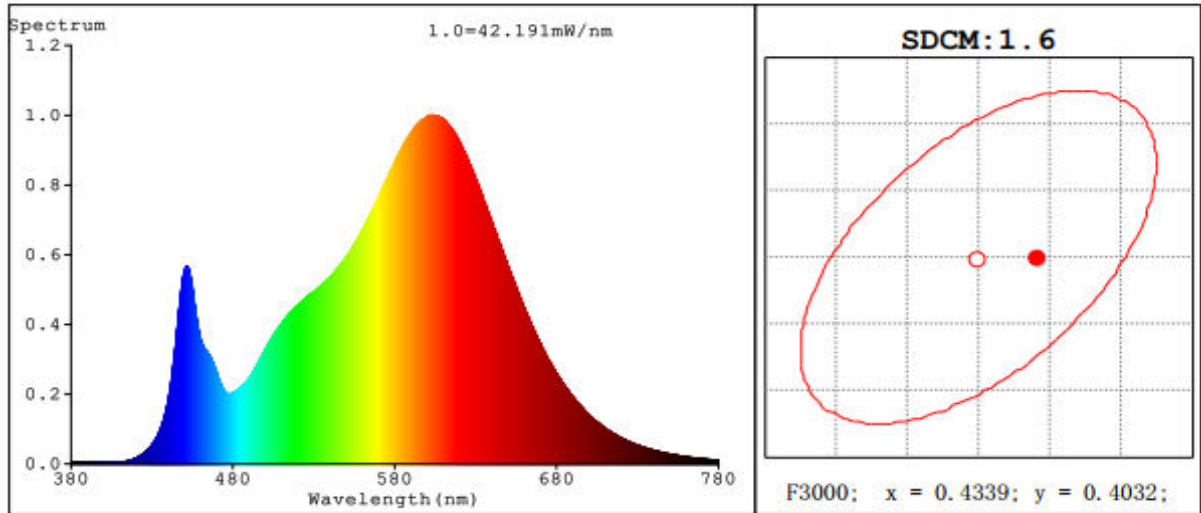
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
2999	-3.0E-04	84	95	82.6	5.9	1.6
2999	-3.0E-04	84	95	82.7	6.0	1.6

3.1 Integrating Sphere Test

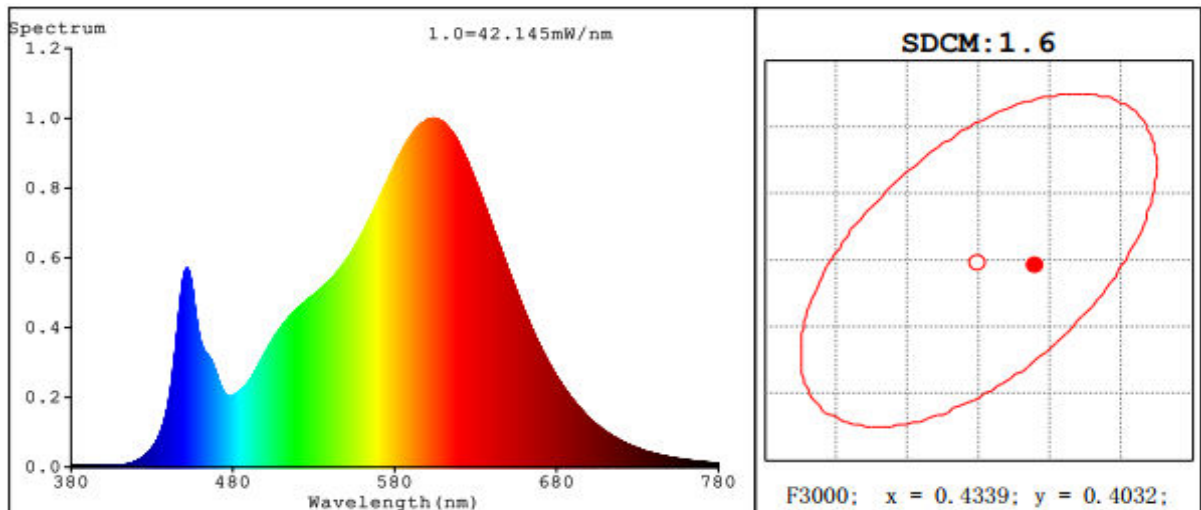
Spectroradiometric Parameters

120V



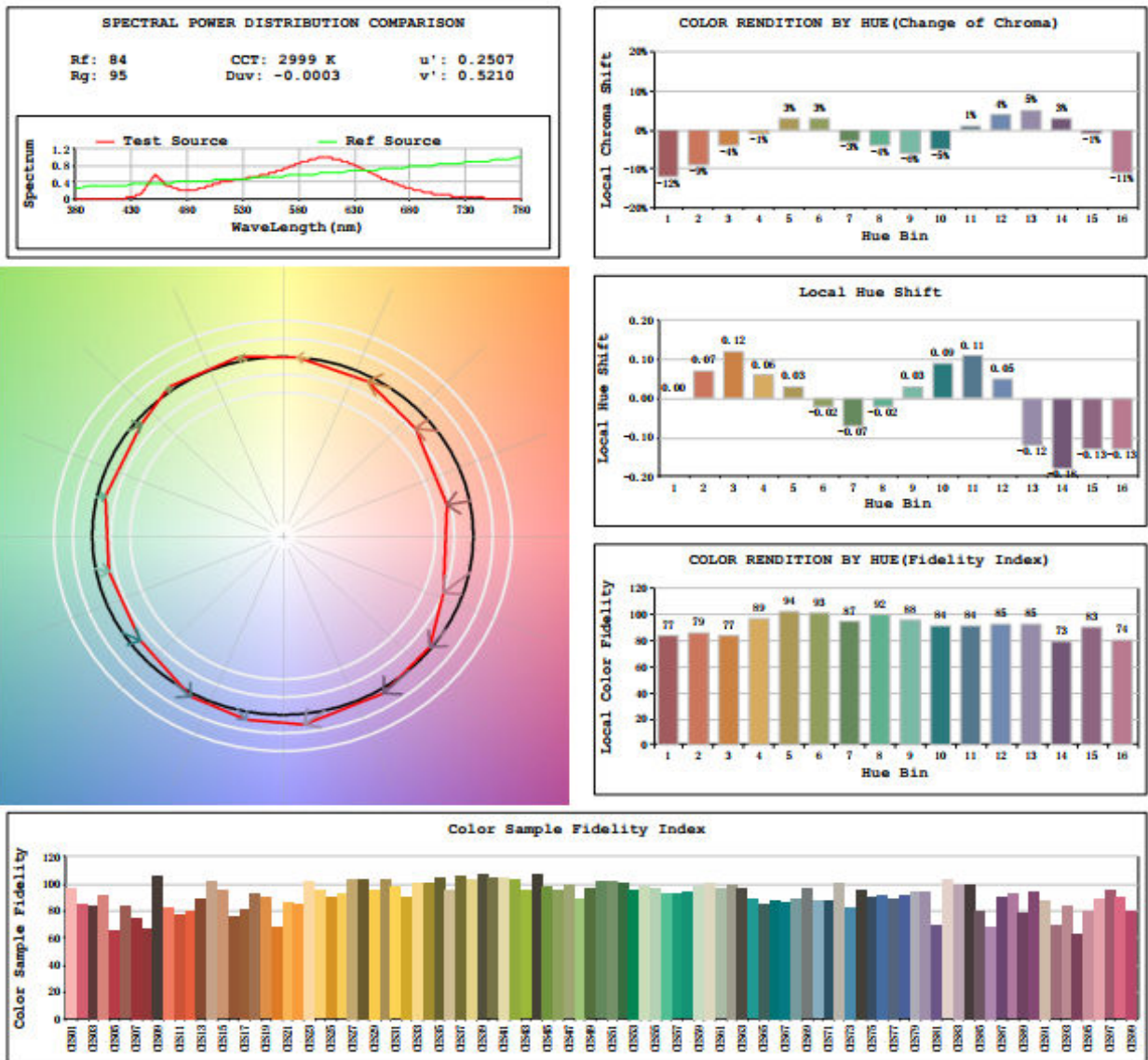
R1 =81.3 R2 =91.9 R3 =95.3 R4 =80.4 R5 =81.8 R6 =90.5 R7 =81.9
R8 =58.0 R9 =5.9 R10=81.8 R11=80.1 R12=72.4 R13=84.0 R14=98.1 R15=73.5

277V



R1 =81.4 R2 =92.0 R3 =95.3 R4 =80.4 R5 =81.9 R6 =90.6 R7 =81.8
R8 =58.0 R9 =6.0 R10=81.9 R11=80.1 R12=72.4 R13=84.0 R14=98.1 R15=73.5

3.2 Integrating Sphere Test - Minimum CCT



3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	T10EM-48	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	0.135	16.010	0.9856	2091.0	130.6
25.3	277.02	60.00	0.063	16.350	0.9349	2092.0	128.0

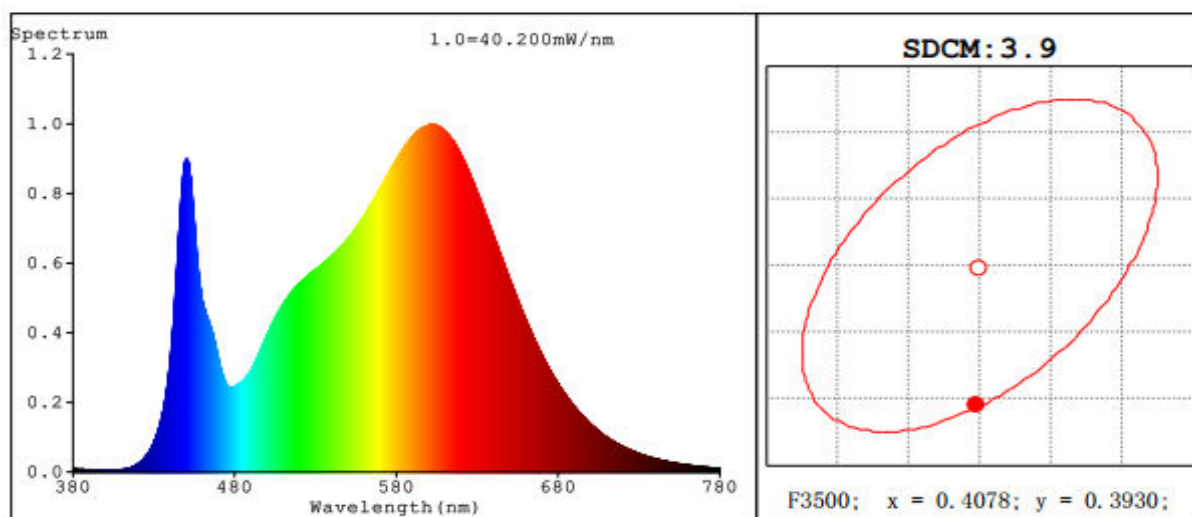
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3406	-2.7E-03	85	97	84.6	14.6	3.9
3407	-2.8E-03	85	97	84.7	14.7	3.9

3.1 Integrating Sphere Test

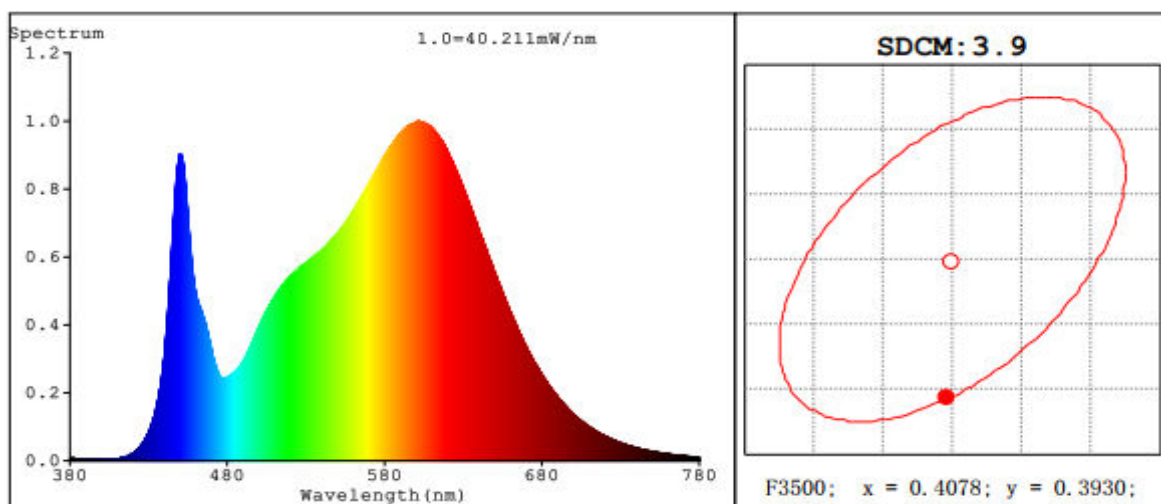
Spectroradiometric Parameters

120V



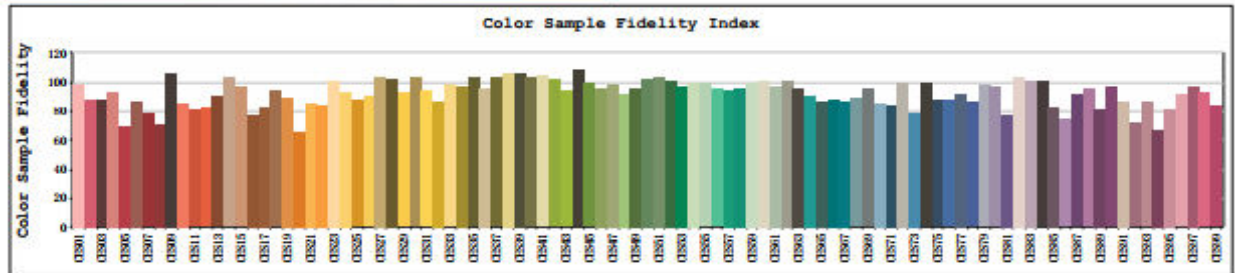
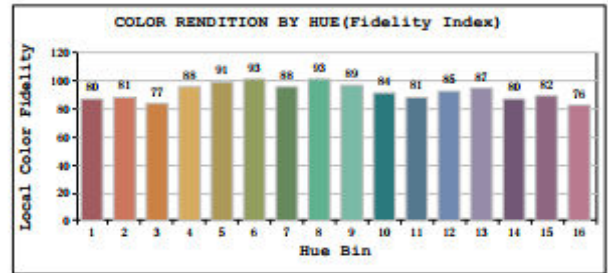
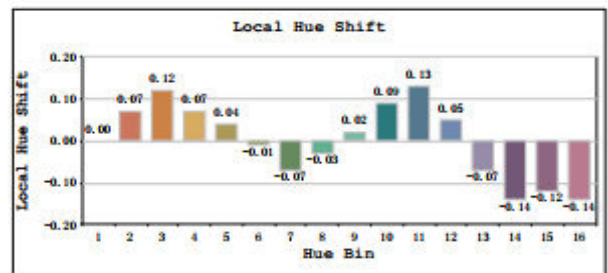
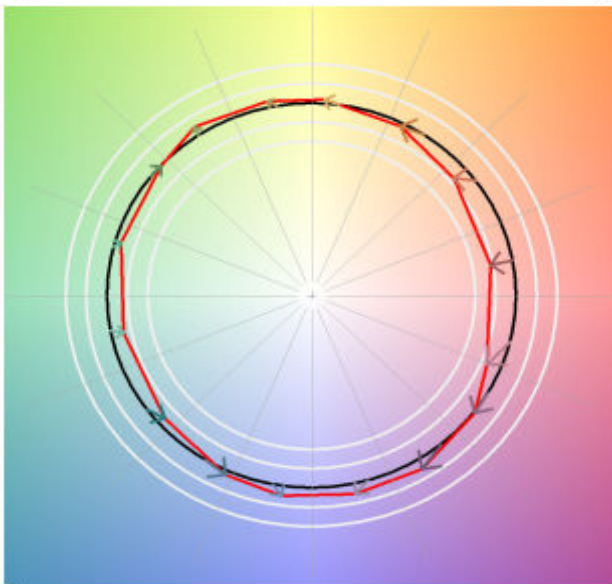
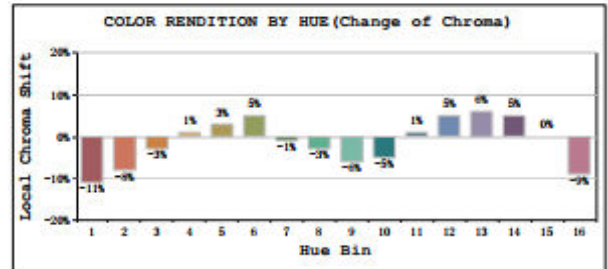
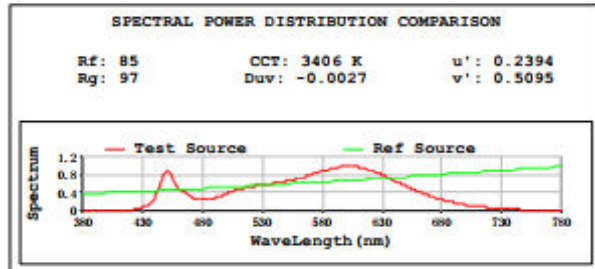
R1 =83.9 R2 =92.4 R3 =96.1 R4 =83.1 R5 =84.1 R6 =89.7 R7 =84.1
 R8 =63.6 R9 =14.6 R10=81.9 R11=82.9 R12=70.6 R13=86.2 R14=98.6 R15=77.5

277V



R1 =83.9 R2 =92.4 R3 =96.1 R4 =83.1 R5 =84.2 R6 =89.7 R7 =84.1
 R8 =63.6 R9 =14.7 R10=82.0 R11=82.9 R12=70.6 R13=86.2 R14=98.6 R15=77.6

3.2 Integrating Sphere Test - Minimum CCT



3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	T10EM-48	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	0.134	15.860	0.9858	2128.0	134.2
25.3	277.02	60.00	0.063	16.220	0.9336	2129.0	131.3

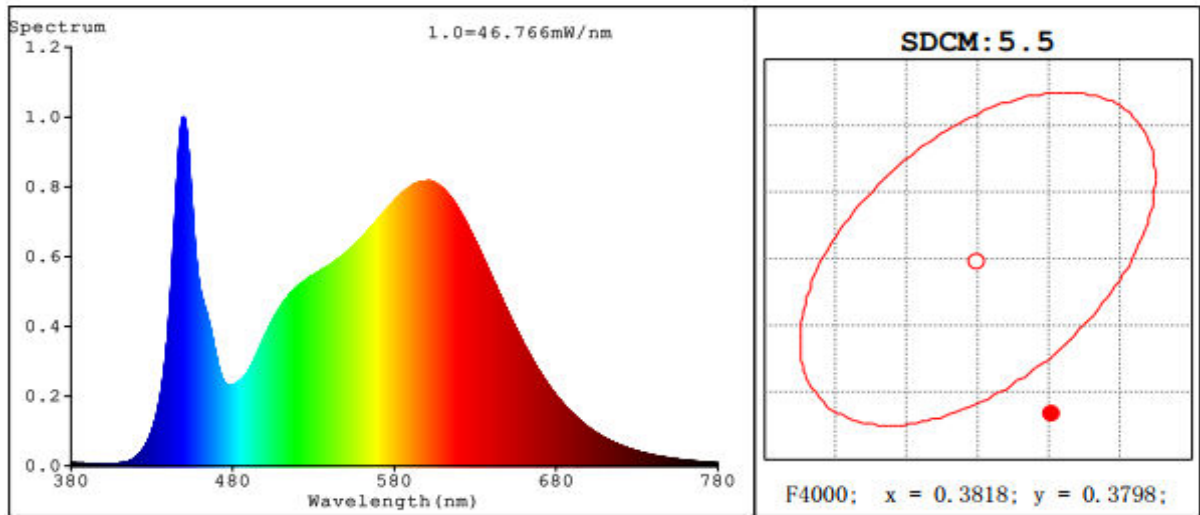
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
3840	-3.6E-03	85	98	85.5	20.0	5.5
3841	-3.6E-03	85	98	85.6	20.1	5.5

3.1 Integrating Sphere Test

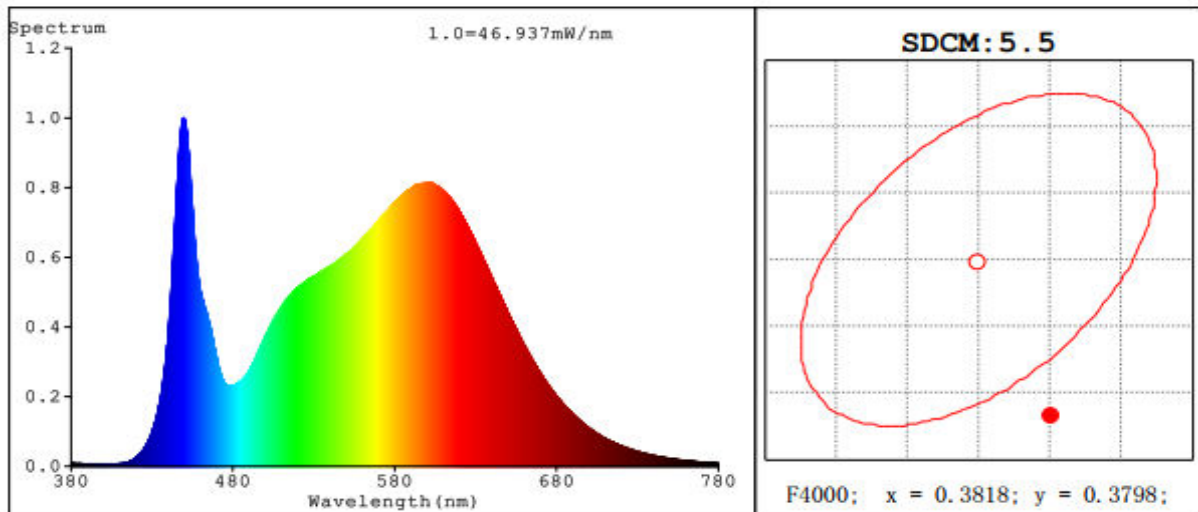
Spectroradiometric Parameters

120V



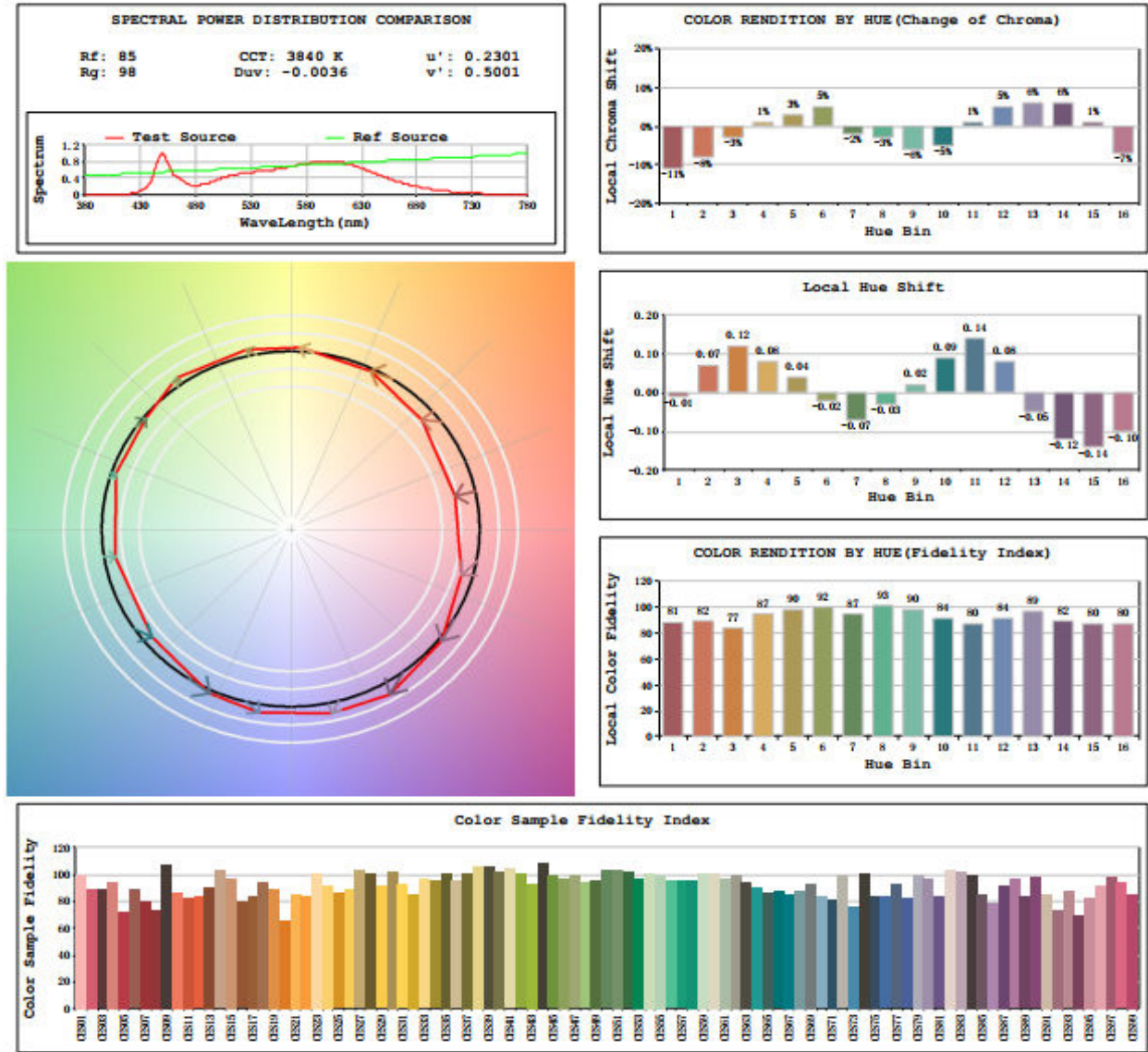
R1 =85.1 R2 =91.9 R3 =95.5 R4 =84.8 R5 =85.2 R6 =88.1 R7 =86.0
 R8 =67.7 R9 =20.0 R10=80.1 R11=84.6 R12=67.6 R13=87.0 R14=97.8 R15=79.8

277V



R1 =85.1 R2 =91.9 R3 =95.5 R4 =84.8 R5 =85.2 R6 =88.2 R7 =86.1
 R8 =67.8 R9 =20.1 R10=80.2 R11=84.6 R12=67.6 R13=87.0 R14=97.9 R15=79.9

3.2 Integrating Sphere Test - Minimum CCT



3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	T10EM-48	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	0.135	15.980	0.9857	2147.0	134.4
25.3	277.02	60.00	0.063	16.310	0.9344	2146.0	131.6

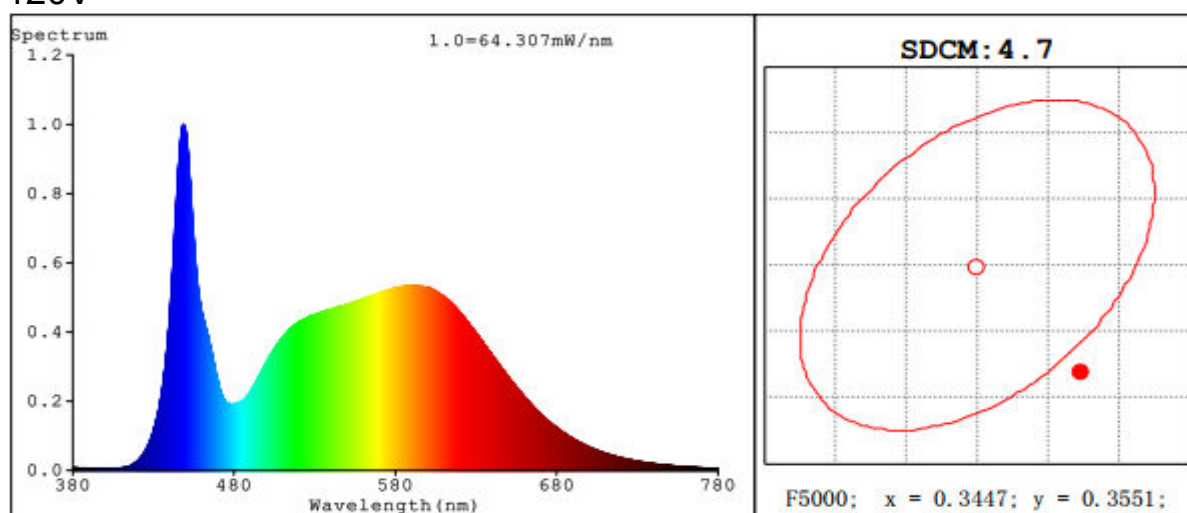
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
4850	-2.3E-03	84	98	85.1	22.0	4.7
4845	-2.3E-03	84	98	85.1	22.1	4.7

3.1 Integrating Sphere Test

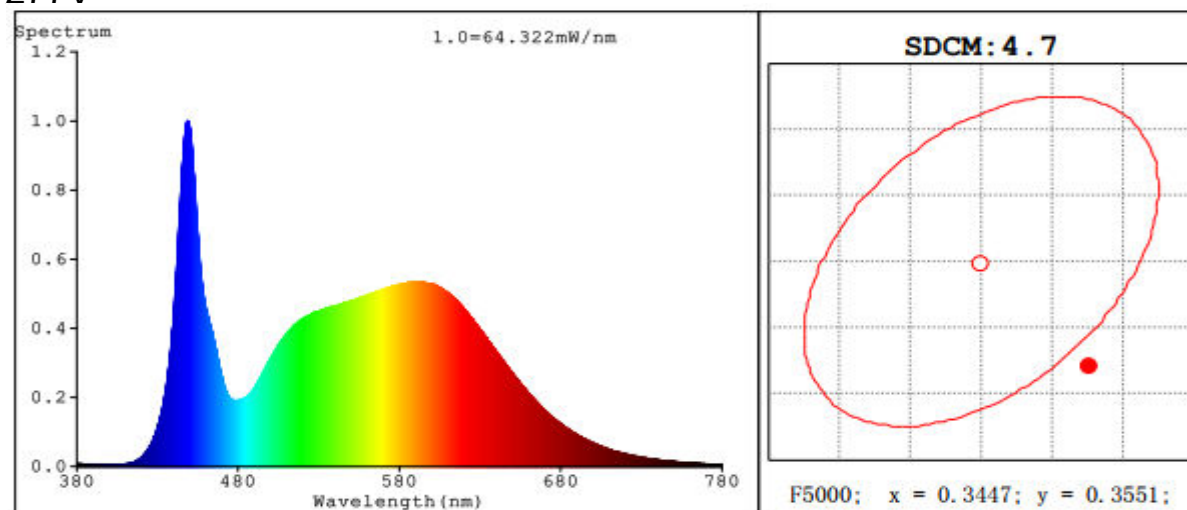
Spectroradiometric Parameters

120V



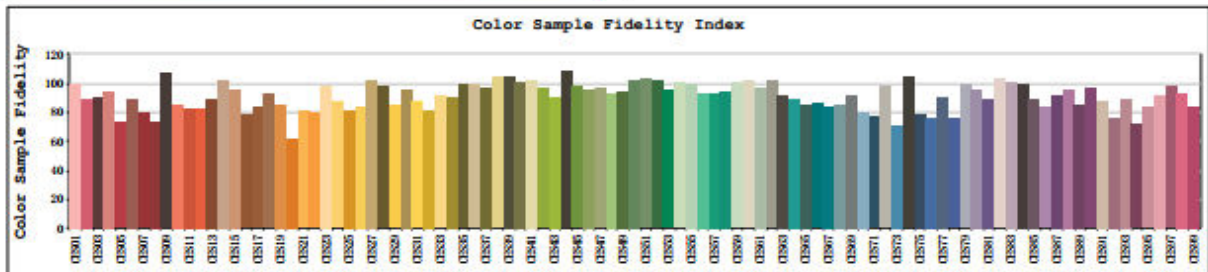
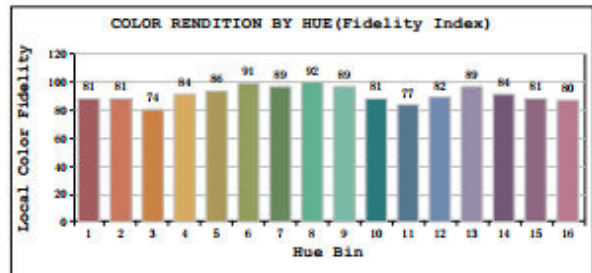
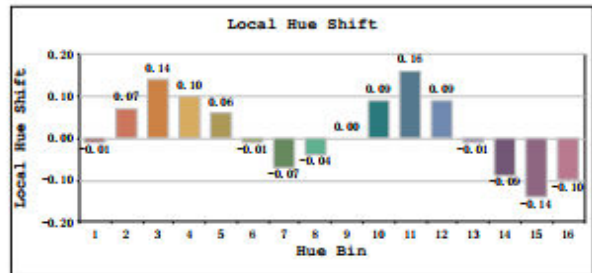
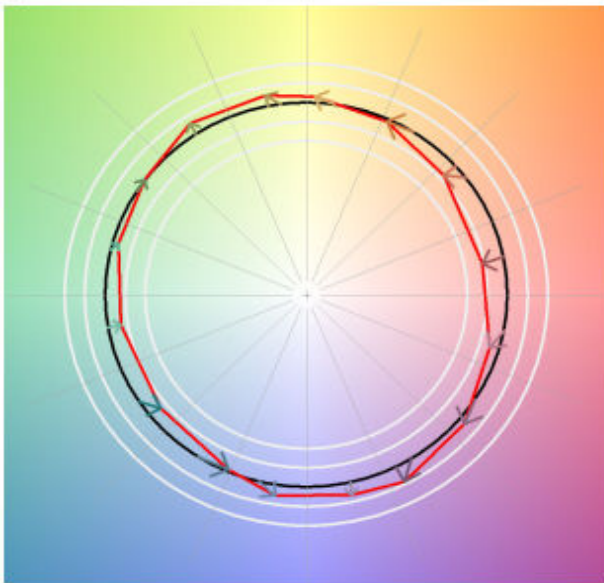
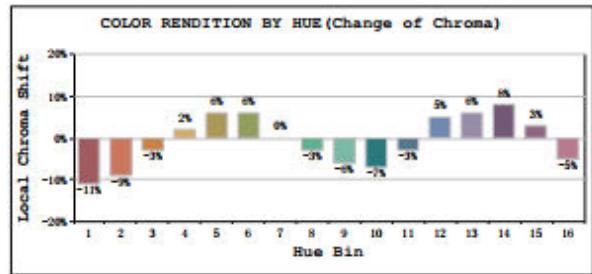
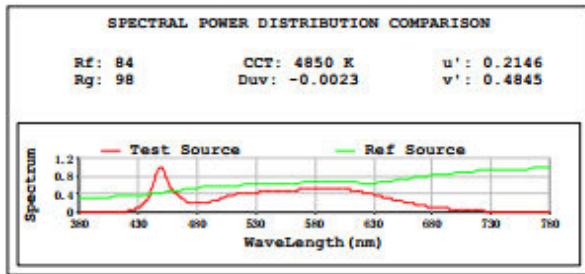
R1 =84.7 R2 =89.5 R3 =91.8 R4 =85.6 R5 =84.6 R6 =84.1 R7 =88.4
R8 =72.1 R9 =22.0 R10=73.9 R11=85.1 R12=60.5 R13=86.0 R14=95.5 R15=80.6

277V



R1 =84.7 R2 =89.5 R3 =91.8 R4 =85.6 R5 =84.6 R6 =84.2 R7 =88.4
R8 =72.1 R9 =22.1 R10=74.1 R11=85.1 R12=60.4 R13=86.1 R14=95.5 R15=80.7

3.2 Integrating Sphere Test - Minimum CCT



3.0 LM-79 Measurement and Test Results

3.1 Integrating Sphere Test

Model No.	T10EM-48	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	0.137	16.270	0.9851	2108.0	129.6
25.3	277.02	60.00	0.064	16.590	0.9369	2108.0	127.1

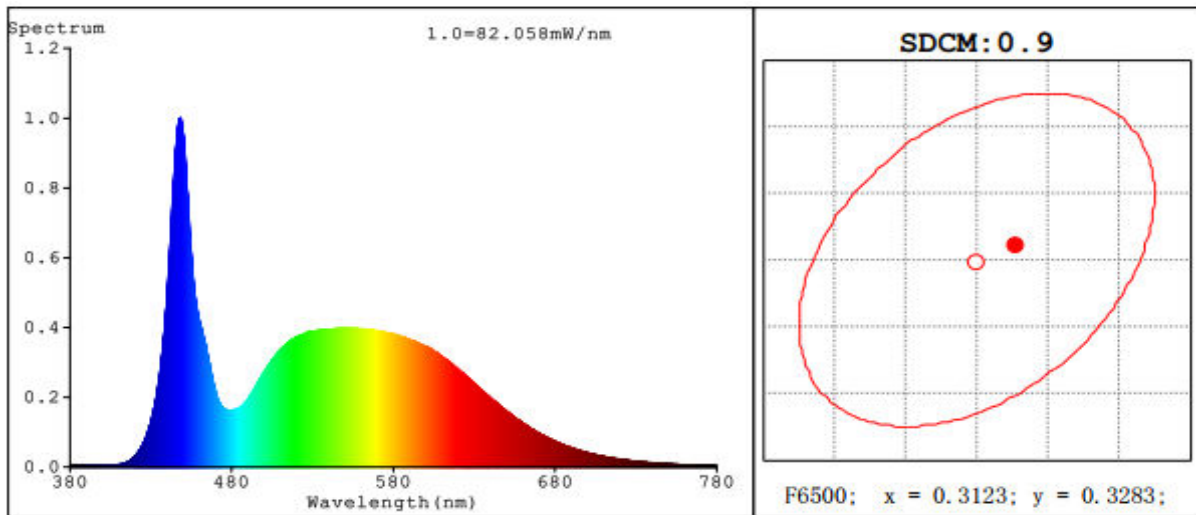
Test Result

Tc(K)	色差(Duv)	Rf	Rg	Ra	R9	SDCM
6446	2.7E-03	82	96	82.1	10.2	0.9
6446	2.7E-03	82	96	82.1	10.3	0.9

3.1 Integrating Sphere Test

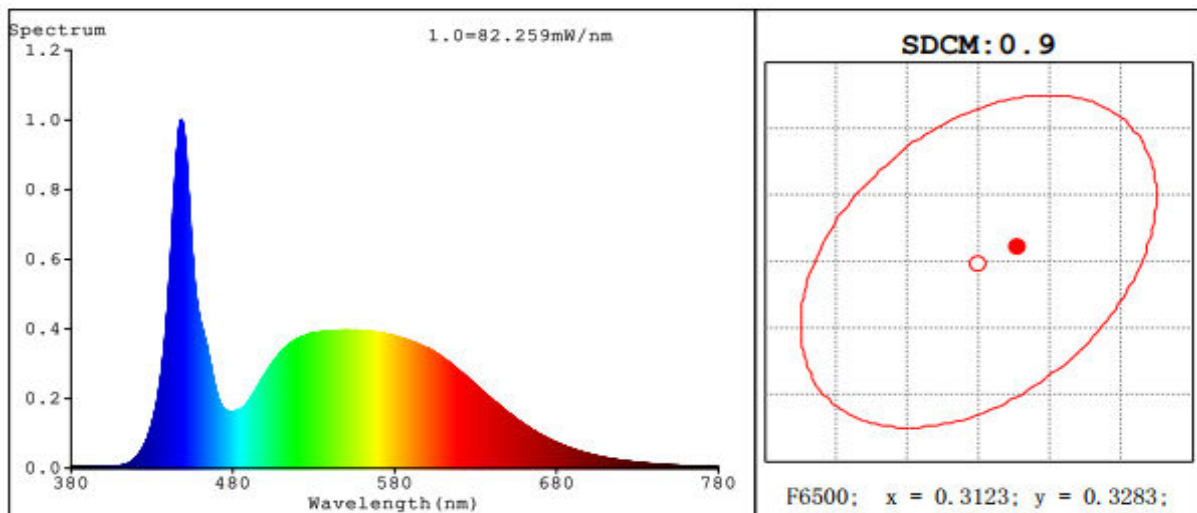
Spectroradiometric Parameters

120V



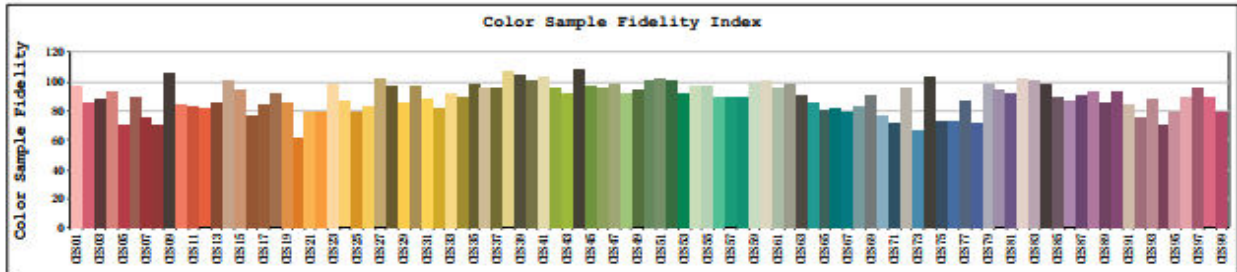
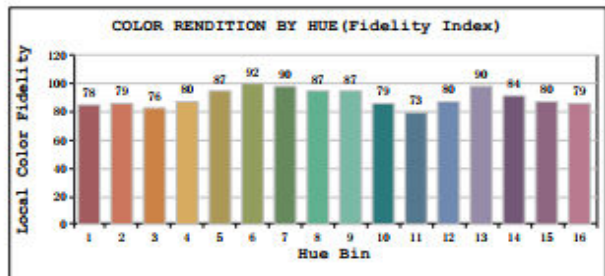
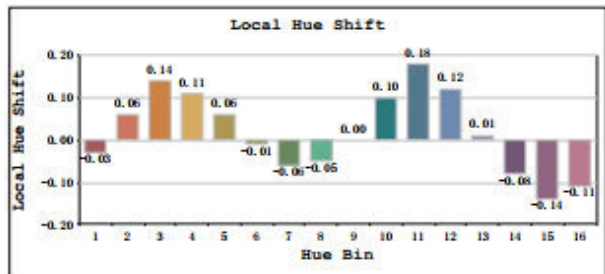
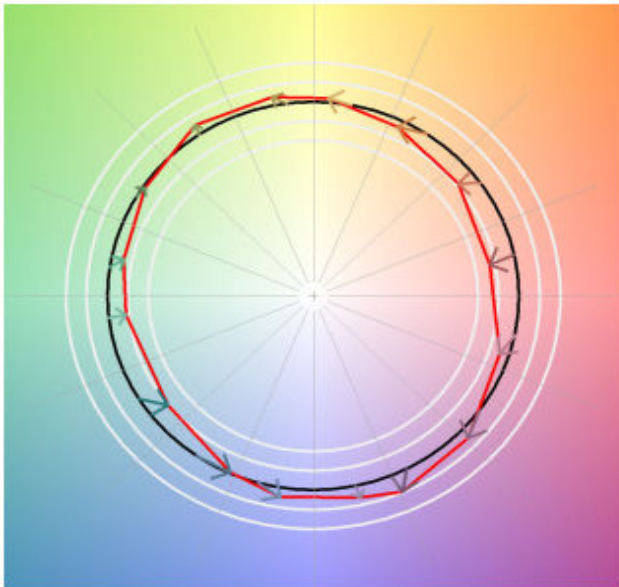
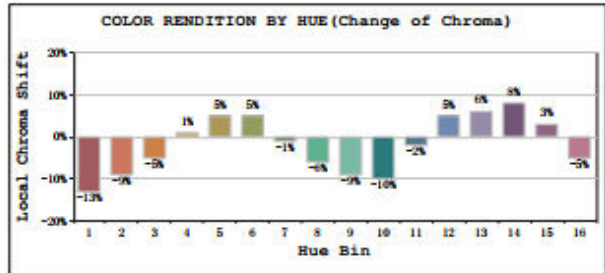
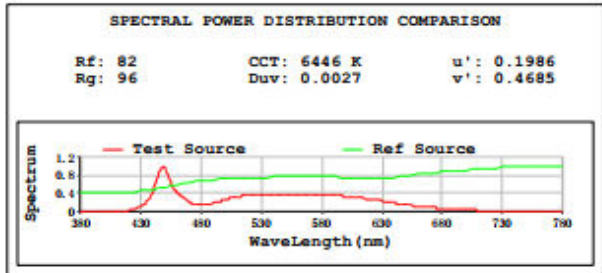
R1 =81.0 R2 =84.7 R3 =86.5 R4 =83.6 R5 =82.2 R6 =79.2 R7 =87.5
 R8 =71.9 R9 =10.2 R10=63.3 R11=83.4 R12=56.7 R13=81.7 R14=92.7 R15=77.1

277V



R1 =81.1 R2 =84.8 R3 =86.6 R4 =83.7 R5 =82.2 R6 =79.3 R7 =87.5
 R8 =71.9 R9 =10.3 R10=63.4 R11=83.4 R12=56.7 R13=81.8 R14=92.7 R15=77.1

3.2 Integrating Sphere Test - Minimum CCT



3.3 Goniophotometer Test

Model No.	T10EM-48	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

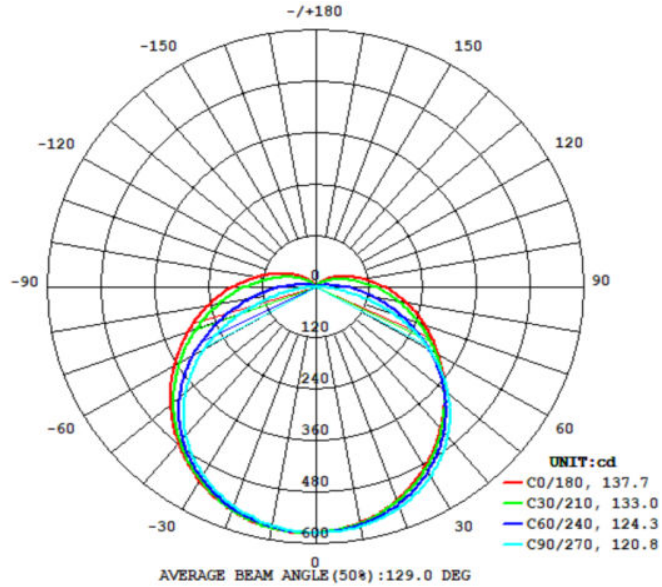
Temperature ($^{\circ}\text{C}$)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Flux(lm)
25.3	120.00	60.00	0.136	16.1	0.983	2265.0

Test Result

Beam Angle	Zonal Lumen Requirement(0° - 60°)	Efficacy (lm/W)
137.7	62.0%	140.7

3.3 Goniophotometer Test

Light Distribution Curve



Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	558.5	561.5	567.9	571.6	571.9	571.4	567.0	561.4
20	528.7	536.9	548.4	554.9	554.8	551.9	543.2	534.4
30	485.8	494.4	512.3	522.5	523.2	517.6	506.7	492.0
40	433.8	441.5	458.4	474.3	477.9	469.8	452.9	437.9
50	376.1	375.5	386.2	414.0	424.3	407.4	380.8	373.6
60	316.5	303.0	294.5	345.8	366.5	337.0	288.5	304.0
70	258.7	230.0	183.9	273.1	305.1	261.6	178.8	234.0
80	203.7	162.6	67.85	202.1	245.0	189.4	64.56	169.4
90	154.0	107.0	0.7669	139.9	188.4	127.3	0.7605	115.0
100	111.1	65.97	0.2126	90.57	137.8	79.92	0.1791	73.47
110	75.84	38.48	0.2929	55.46	95.38	47.44	0.2680	44.20
120	48.34	21.55	0.3700	32.38	61.63	27.18	0.3546	25.34
130	28.38	11.78	0.4461	18.10	37.04	15.22	0.4675	14.10
140	15.20	6.243	0.5090	9.643	20.27	8.354	0.5932	7.498
150	7.171	3.108	0.5484	4.926	9.932	4.623	0.6881	3.626
160	2.874	1.434	0.5918	2.337	4.274	2.672	0.7739	1.498
170	0.8980	0.6433	0.5647	1.022	1.528	1.289	0.7271	0.7390
180	0.5920	0.6395	0.6442	0.6362	0.5964	0.6403	0.6472	0.6428
DEG	LUMINOUS INTENSITY: cd							

5.0 THD and PF Test

Model No.	T10EM-48	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 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	0.136	16.2	0.985	17.48%
25.3	277.02	60.00	0.063	16.5	0.937	17.11%