

LM-79-19 TEST REPORT

for

GREEN CREATIVE LTD

Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL,
Hong Kong

LED Lamp

Model: 8.8FA19DIM/9CCTS

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, YuhangDist,
Hangzhou, Zhejiang Province, China 311100

Tel: +86571 86376106

www.ltlqa.com

Report No.: HZ24110023a

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Review by:

Wei Fei

Approved by:



April Zou

Engineer: Wei Fei
Nov. 19, 2024

Manager: April Zou
Nov. 19, 2024

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

TEST SUMMARY

Tested Model	8.8FA19DIM/9CCTS 2700K Setting	8.8FA19DIM/9CCTS 3000K Setting	8.8FA19DIM/9CCTS 4000K Setting
Luminous Efficacy (Lumens /Watt)	112.8	122.4	122.7
Total Luminous Flux (Lumens)	867.7	945.2	958.6
Power (Watts)	7.69	7.72	7.81
Power Factor	0.7746	0.7673	0.7422
CCT (K)	2691	3054	3895
CRI	92.9	95.0	95.5
Stabilization Time(Light & Power)	50	50	50
Note	2700K	3000K	4000K

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Nov. 14, 2024

Date of Test : Nov. 15, 2024

Test item : Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters

Reference Standard : IESNA LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products
ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

TABLE OF CONTENT

LM-79-19 TEST REPORT.....	1
TEST SUMMARY	2
SAMPLE PHOTO	5
TEST RESULTS (2700K Setting)	6
Sphere-Spectroradiometer Method.....	6
Spectral Power Distribution - Sphere Spectroradiometer Method	7
Chromaticity Diagram - Sphere Spectroradiometer Method.....	8
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	9
Color Rendition Report – Sphere Spectroradiometer Method	10
Goniophotometer Method	11
Zonal Lumen Tabulation- Goniophotometer Method	12
Illuminance Plots- Goniophotometer Method	13
Luminous Intensity Distribution Plots- Goniophotometer Method.....	14
Luminous Intensity Data- Goniophotometer Method	15
TEST RESULTS (3000K Setting)	16
Sphere-Spectroradiometer Method.....	16
Spectral Power Distribution - Sphere Spectroradiometer Method	17
Chromaticity Diagram - Sphere Spectroradiometer Method.....	18
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	19
Color Rendition Report – Sphere Spectroradiometer Method	20
TEST RESULTS (4000K Setting)	21
Sphere-Spectroradiometer Method.....	21
Spectral Power Distribution - Sphere Spectroradiometer Method	22
Chromaticity Diagram - Sphere Spectroradiometer Method.....	23
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	24
Color Rendition Report – Sphere Spectroradiometer Method	25
EQUIPMENT LIST	26

TEST METHODS	26
Seasoning of SSL Product.....	26
Sphere-Spectroradiometer Method- Photometric and Electrical Measurements.....	26
Goniophotometer Method	27
Photometric and Electrical Measurements	27
Color Characteristics Measurements.....	27

SAMPLE PHOTO



Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Lamp
Model	: 8.8FA19DIM/9CCTS
Electrical Ratings	: 120, 60Hz, 8.8W
Product Description	: Color- Tunable 2700K/3000K/4000K
Manufacturer	: GREEN CREATIVE LTD
Address	: Room 3603, Level 36, Tower 1, Enterprise Square Five, 38 Wang Chiu Road, Kowloon Bay, KL, Hong Kong

TEST RESULTS (2700K Setting)

Test ambient temperature was 26.0 °C.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.083
Power Factor	0.7746
Test Power (W)	7.69
THD A%	62.38
Luminous Efficacy (lm/W)	112.8
Total Luminous Flux (lm)	867.7
Color Rendering Index (CRI)	92.9
R9	57.6
Correlated Color Temperature (CCT)(K)	2691
Chromaticity Chroma x	0.4578
Chromaticity Chroma y	0.4060
Chromaticity Chroma u	0.2632
Chromaticity Chroma v	0.3502
Duv	-0.0015
Chromaticity Chroma u'	0.2632
Chromaticity Chroma v'	0.5253

Special Color Rendering Indices	
R1	93.7
R2	97.6
R3	98.4
R4	93
R5	93.6
R6	96.8
R7	90.3
R8	79.9
R9	57.6
R10	93.3
R11	94.5
R12	85.2
R13	95.1
R14	99.1

Table 2: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u', v') diagram, $u' = u = 4x/(-2x+12y+3)$, $v' = 3v/2 = 9y/(-2x+12y+3)$.

Spectral Power Distribution - Sphere Spectroradiometer Method

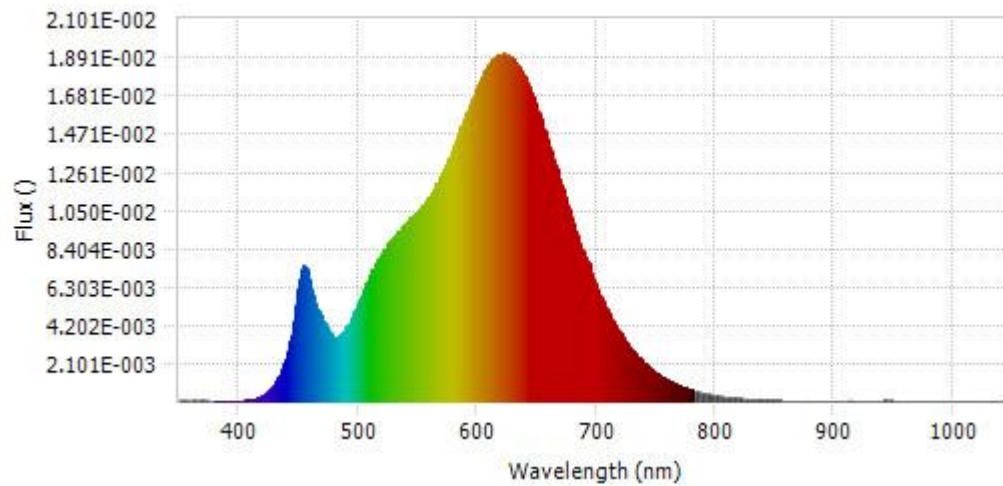
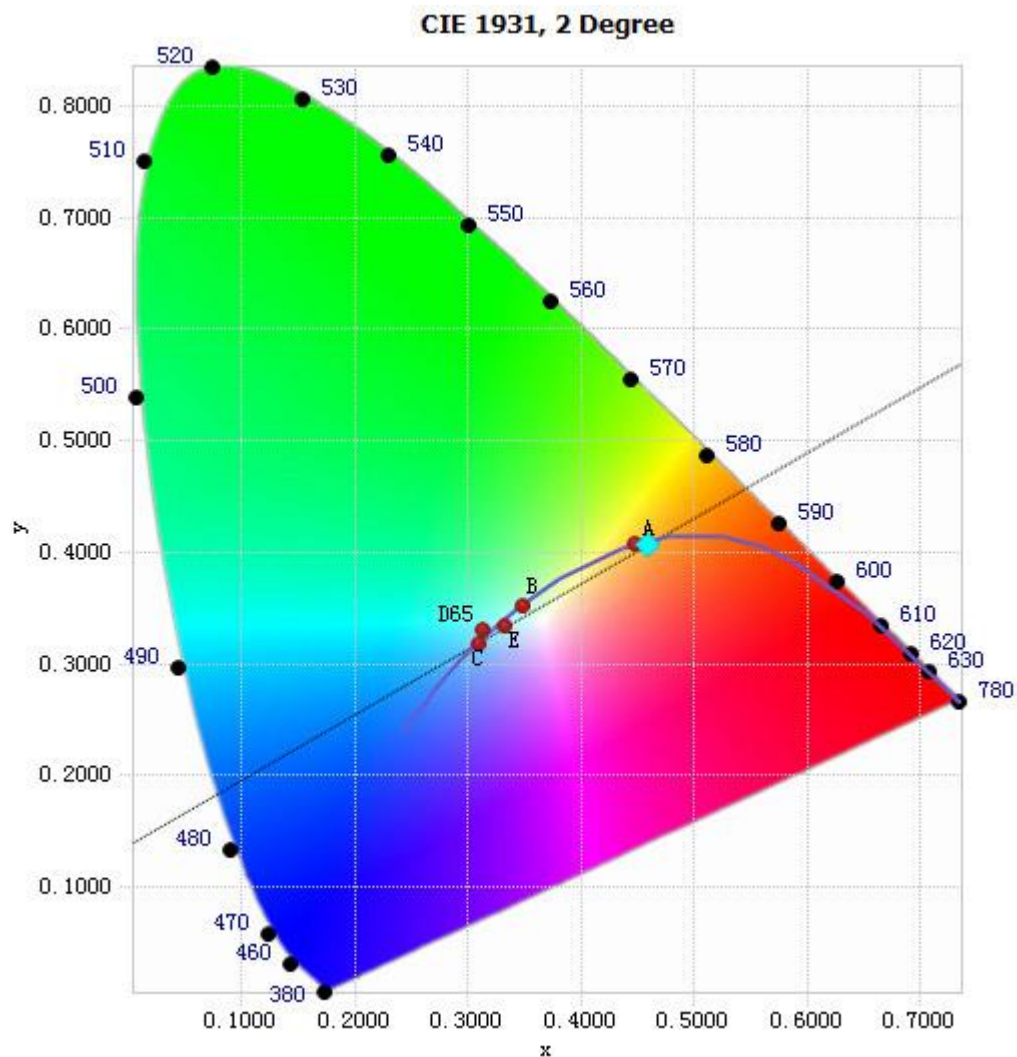


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	7.26E-05	485	3.68E-03	590	1.57E-02	695	7.36E-03
385	5.92E-05	490	4.04E-03	595	1.65E-02	700	6.36E-03
390	6.20E-05	495	4.65E-03	600	1.73E-02	705	5.62E-03
395	5.71E-05	500	5.37E-03	605	1.80E-02	710	4.96E-03
400	5.59E-05	505	6.15E-03	610	1.85E-02	715	4.36E-03
405	6.93E-05	510	6.92E-03	615	1.89E-02	720	3.80E-03
410	1.24E-04	515	7.62E-03	620	1.90E-02	725	3.31E-03
415	1.95E-04	520	8.16E-03	625	1.90E-02	730	2.88E-03
420	3.25E-04	525	8.69E-03	630	1.88E-02	735	2.49E-03
425	5.90E-04	530	9.08E-03	635	1.84E-02	740	2.16E-03
430	9.72E-04	535	9.42E-03	640	1.78E-02	745	1.87E-03
435	1.60E-03	540	9.78E-03	645	1.71E-02	750	1.61E-03
440	2.55E-03	545	1.02E-02	650	1.62E-02	755	1.39E-03
445	4.05E-03	550	1.04E-02	655	1.53E-02	760	1.20E-03
450	6.22E-03	555	1.08E-02	660	1.42E-02	765	1.03E-03
455	7.49E-03	560	1.13E-02	665	1.31E-02	770	8.92E-04
460	6.45E-03	565	1.18E-02	670	1.20E-02	775	7.66E-04
465	5.23E-03	570	1.24E-02	675	1.10E-02	780	6.47E-04
470	4.57E-03	575	1.32E-02	680	1.00E-02		
475	3.89E-03	580	1.40E-02	685	9.00E-03		
480	3.55E-03	585	1.49E-02	690	8.07E-03		

Table 3: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4578, 0.4060)

Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

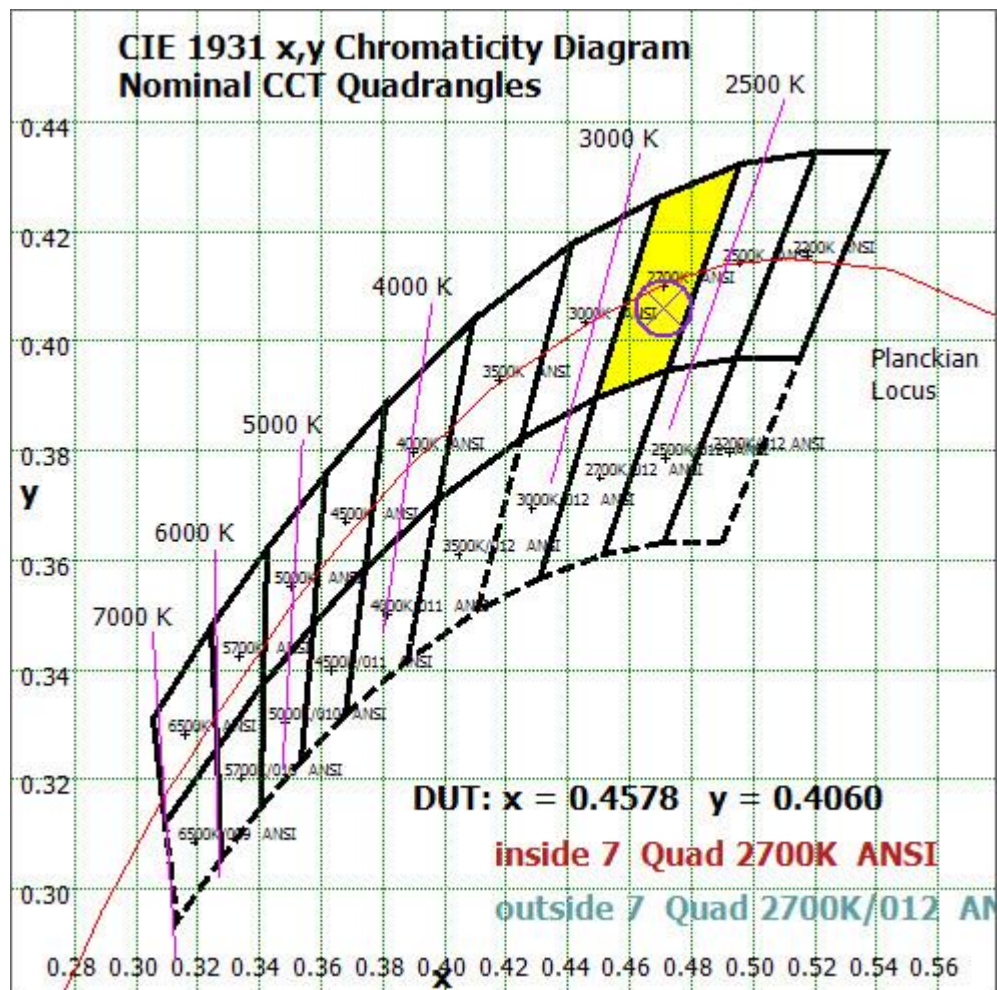


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

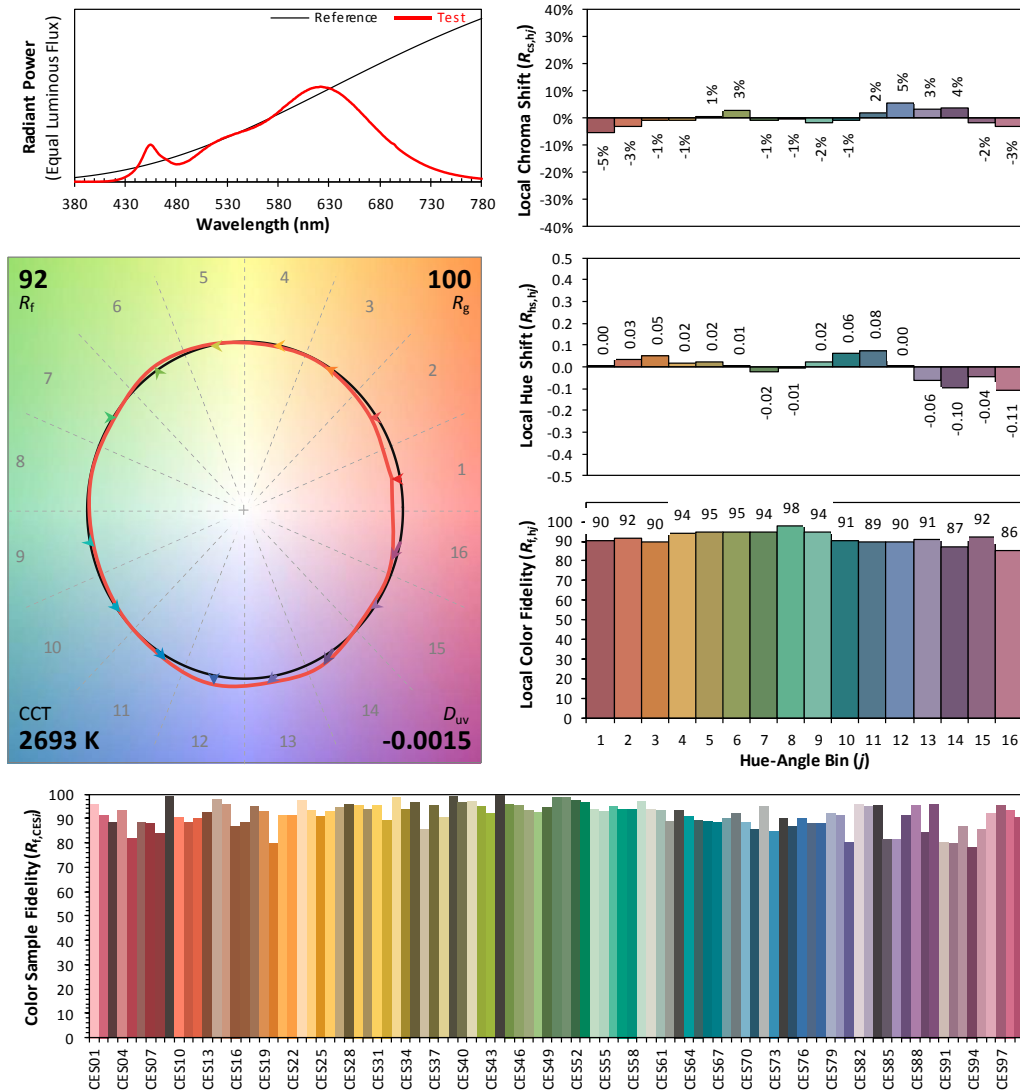
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/11/15

Model: 8.8FA19DIM/9CCTS



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

x 0.4578
 y 0.4060
 u' 0.2632
 v' 0.5253

CIE 13.3-1995
(CRI)
 R_a 93
 R_g 58

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

Chart 4: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 2 due to rounding.

Goniophotometer Method

Test ambient temperature was 25.0 °C.

The photometric distance is 2.47 m.

Luminous data was taken at 0.5 vertical intervals and 10 horizontal intervals.

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.083
Power Factor	0.7716
Power (W)	7.72
Luminous Efficacy (lm/W)	113.7
Total Luminous Flux (lm)	877.9
Beam Angle (°)	316.7 (0°-180°) / 318.0 (90°-270°)
Center Beam Candle Power (cd)	36.1
Maximum Beam Candle Power (cd)	91.56 (At: C=225.0, Gamma=77.5)
Spacing Criteria	2.49 (0°-180°) / 2.46 (90°-270°)
Zonal Lumens in the 0°-60° Zone	22.88%
Zonal Lumens in the 60°-90° Zone	30.29%
Zonal Lumens in the 90°-120° Zone	29.68%
Zonal Lumens in the 120°-180° Zone	17.14%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	3.725	0.42%
10- 20	12.966	1.48%
20- 30	25.085	2.86%
30- 40	38.006	4.33%
40- 50	53.085	6.05%
50- 60	68.027	7.75%
60- 70	80.927	9.22%
70- 80	90.283	10.28%
80- 90	94.714	10.79%
90-100	94.175	10.73%
100-110	88.399	10.07%
110-120	77.98	8.88%
120-130	63.272	7.21%
130-140	46.192	5.26%
140-150	27.934	3.18%
150-160	11.675	1.33%
160-170	1.422	0.16%
170-180	0.008	0.00%
Total	877.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0-130	790.644	90.06%
130-180	87.231	9.94%
0-180	877.9	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

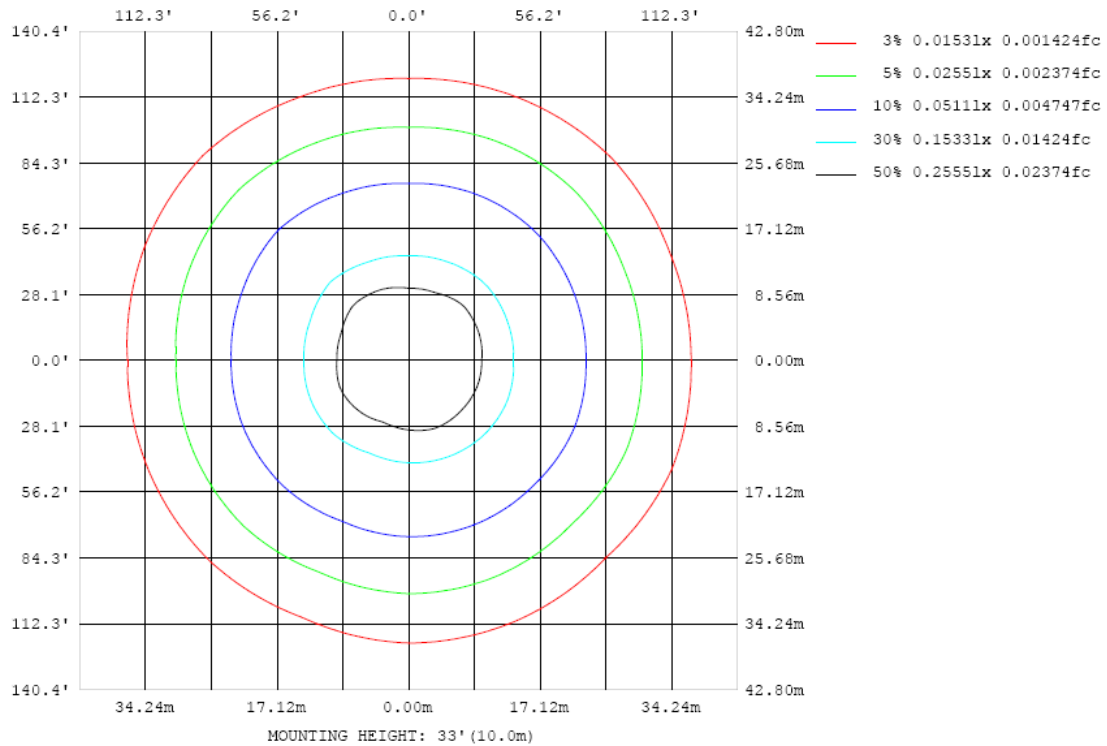


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

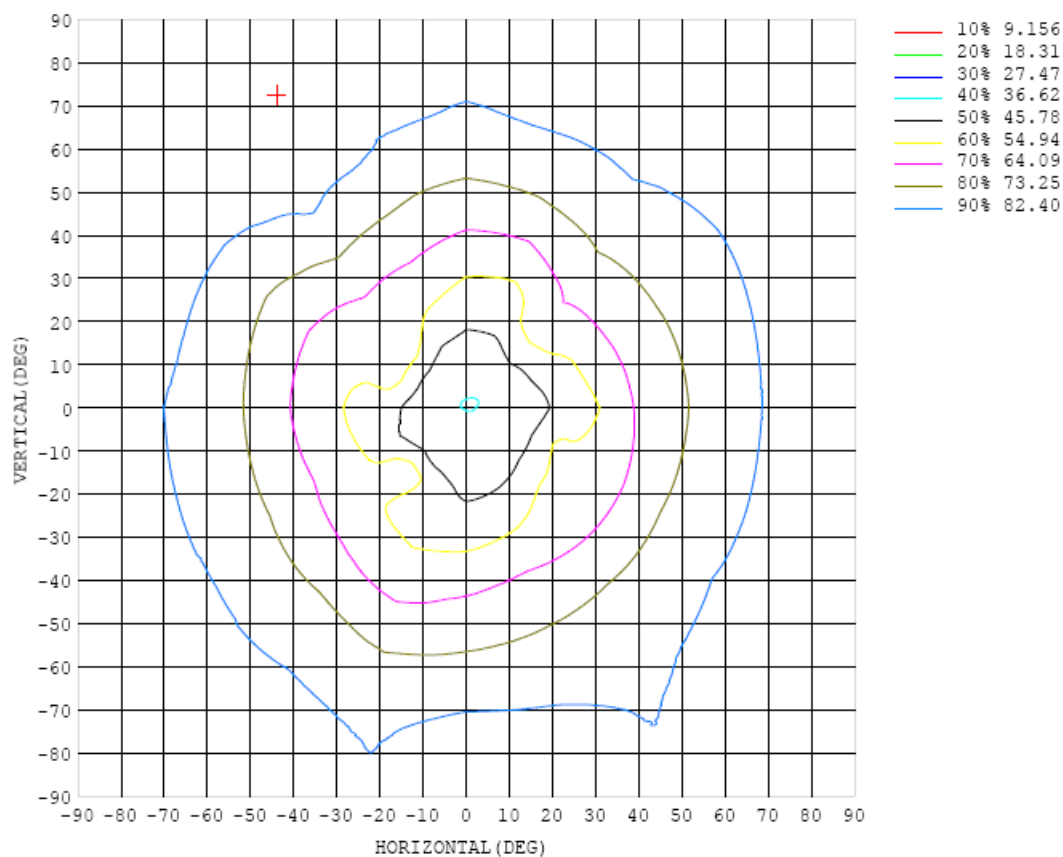


Chart 6: Isocandela Plot

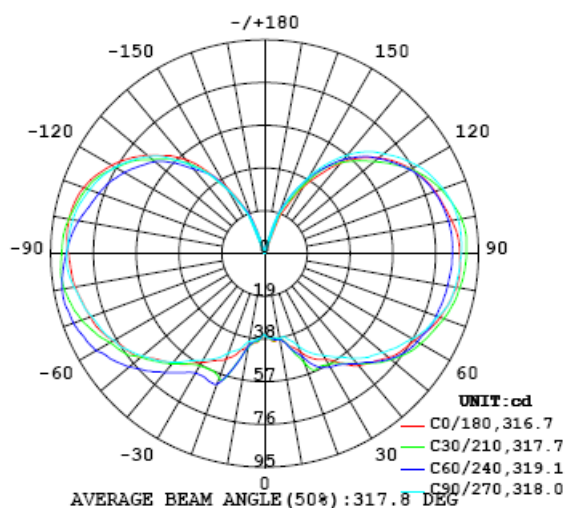


Chart 7: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1 UNIT: cd

C (DEG) γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5			
0	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1			
5	39.0	38.6	38.0	37.5	37.6	38.5	39.6	40.0	39.7	39.3	38.7	38.4	38.3	38.2	38.4	37.8			
10	38.6	38.4	39.0	39.0	38.4	39.8	43.0	41.9	42.0	42.5	41.9	39.7	39.7	40.6	40.7	39.0			
15	42.6	43.0	43.4	39.6	39.4	44.0	47.8	44.2	45.8	52.0	52.2	45.5	44.3	44.4	46.4	44.2			
20	46.7	51.7	48.7	45.8	43.7	51.0	59.8	48.8	49.9	59.0	61.7	50.1	47.1	47.1	52.6	48.4			
25	51.5	56.1	55.5	50.5	48.8	50.4	57.1	54.2	52.6	57.0	61.4	55.5	51.6	49.8	62.1	52.9			
30	54.4	57.0	58.3	54.6	52.4	52.3	55.8	57.2	55.9	57.6	61.5	59.4	54.7	53.7	62.5	57.8			
35	59.4	59.8	60.1	59.2	56.2	55.2	58.8	60.9	59.9	60.0	64.7	63.4	58.2	58.4	65.6	63.2			
40	65.1	64.0	64.0	64.0	61.0	58.7	62.9	65.2	63.5	64.1	69.2	67.8	63.1	63.4	69.5	67.6			
45	68.2	68.9	68.3	68.1	65.3	62.2	66.3	69.4	66.8	67.9	73.8	71.2	67.4	68.3	72.7	70.6			
50	71.9	73.4	72.8	71.1	68.5	66.6	70.4	72.8	71.7	71.7	78.4	74.1	70.9	72.8	76.0	74.0			
55	74.9	77.3	76.4	74.1	72.3	70.3	75.7	75.9	74.8	76.6	82.5	76.4	74.5	76.3	78.8	76.4			
60	76.9	80.0	78.3	77.8	75.9	74.0	78.9	79.3	77.6	79.3	86.4	81.0	77.4	79.8	81.5	78.7			
65	80.3	82.3	80.1	80.4	79.5	76.7	81.1	82.0	80.7	83.1	88.4	82.6	80.0	81.9	83.9	81.6			
70	83.0	84.8	81.1	82.3	82.1	79.6	83.1	83.5	82.4	86.4	90.4	85.9	81.8	85.2	86.2	83.6			
75	84.8	86.8	81.9	84.2	84.9	81.3	84.8	84.7	83.7	88.7	91.3	86.5	84.0	86.3	88.0	84.6			
80	86.5	88.0	82.5	85.0	86.0	82.2	85.7	85.0	85.5	90.4	91.3	87.6	85.9	87.6	88.7	85.4			
85	87.1	89.2	83.1	85.3	86.7	83.1	85.5	84.6	86.2	90.8	89.9	88.0	87.7	88.0	89.4	85.4			
90	86.7	89.6	83.5	86.0	87.4	83.3	85.2	84.4	87.2	90.2	88.1	88.0	87.8	87.8	89.2	85.2			
95	86.2	89.9	83.5	86.1	87.7	83.4	84.7	83.7	88.1	89.7	86.4	87.0	87.4	87.1	88.1	84.3			
100	84.4	88.8	83.0	85.4	87.2	83.6	83.5	82.9	88.2	88.4	83.8	85.0	86.5	86.1	86.4	82.4			
105	82.3	86.4	81.9	83.7	86.3	83.3	81.4	81.4	87.5	86.4	80.7	82.3	85.1	84.7	84.4	80.3			
110	80.6	83.4	80.2	81.4	84.3	82.4	78.9	79.1	85.5	84.3	78.3	78.9	82.7	82.8	81.8	77.9			
115	78.4	79.7	77.9	78.2	81.6	80.8	75.7	76.4	82.6	81.2	75.7	76.2	80.2	80.3	78.4	75.7			
120	75.2	74.9	74.7	75.1	78.3	78.3	71.2	72.2	78.4	76.5	72.0	72.9	76.7	77.3	73.9	72.5			
125	71.1	69.3	70.3	71.0	74.0	74.8	65.5	68.0	73.7	71.6	67.8	68.3	72.2	73.3	68.9	68.7			
130	66.3	63.6	65.8	67.0	69.0	70.6	60.2	63.3	67.7	65.1	63.6	63.5	67.2	68.4	62.9	63.9			
135	59.9	58.4	60.9	62.9	64.0	64.3	54.9	58.8	61.4	59.2	56.9	58.7	60.0	61.6	55.5	57.9			
140	52.6	52.8	54.6	57.0	57.1	56.4	49.1	51.3	54.5	52.0	49.3	50.3	51.2	53.2	48.9	50.5			
145	43.0	46.2	46.6	48.1	48.8	48.3	41.9	42.9	44.7	43.2	43.2	40.6	43.0	44.5	41.8	42.6			
150	34.0	35.7	38.4	39.5	39.4	38.5	33.7	29.7	34.6	32.7	32.7	31.9	32.9	33.0	33.5	34.2			
155	22.8	26.1	29.2	31.1	29.6	26.2	18.9	18.3	24.2	23.1	23.2	23.2	22.4	23.7	25.2	24.2			
160	14.9	17.4	19.7	19.9	19.3	14.4	12.7	8.81	15.2	12.3	13.4	12.8	12.0	11.2	12.0	14.7			
165	1.45	3.25	4.06	3.60	6.27	4.75	1.15	1.29	0.92	0.81	0.55	0.44	0.45	0.48	0.62	1.14			
170	0.17	0.18	0.20	0.21	0.20	0.16	0.10	0.09	0.10	0.12	0.11	0.11	0.11	0.12	0.13	0.16			
175	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.06	0.06	0.07	0.06			
180	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06			

Table 6: Luminous Intensity Data

TEST RESULTS (3000K Setting)

Test ambient temperature was 26.0 °C.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.084
Power Factor	0.7673
Test Power (W)	7.72
THD A%	63.28
Luminous Efficacy (lm/W)	122.4
Total Luminous Flux (lm)	945.2
Color Rendering Index (CRI)	95.0
R9	70.6
Correlated Color Temperature (CCT)(K)	3054
Chromaticity Chroma x	0.4300
Chromaticity Chroma y	0.3964
Chromaticity Chroma u	0.2494
Chromaticity Chroma v	0.3448
Duv	-0.0021
Chromaticity Chroma u'	0.2494
Chromaticity Chroma v'	0.5173

Special Color Rendering Indices	
R1	96.3
R2	98.1
R3	97.6
R4	95.5
R5	95.7
R6	96.2
R7	93.4
R8	86.8
R9	70.6
R10	93.9
R11	96
R12	81.1
R13	97.2
R14	97.9

Table 7: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u', v') diagram, $u' = u / (-2x + 12y + 3)$, $v' = 3v / 2 = 9y / (-2x + 12y + 3)$.

Spectral Power Distribution - Sphere Spectroradiometer Method

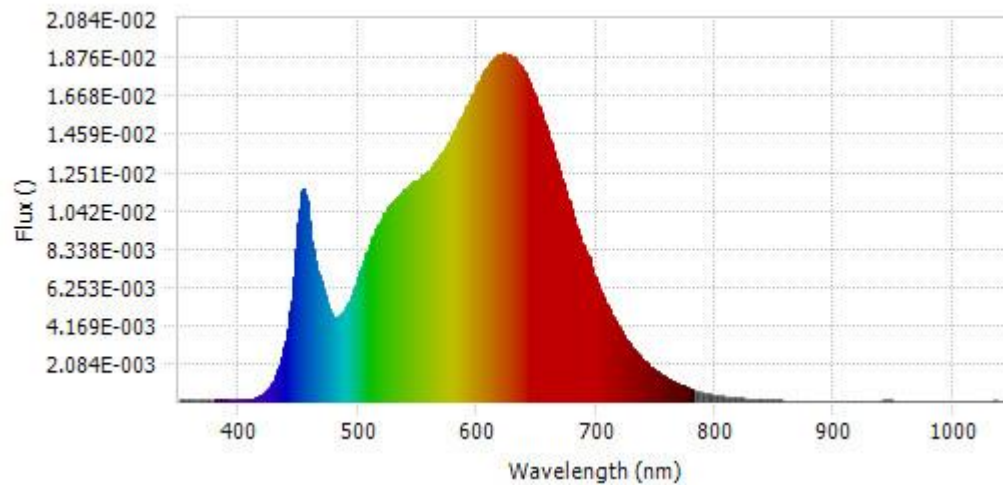
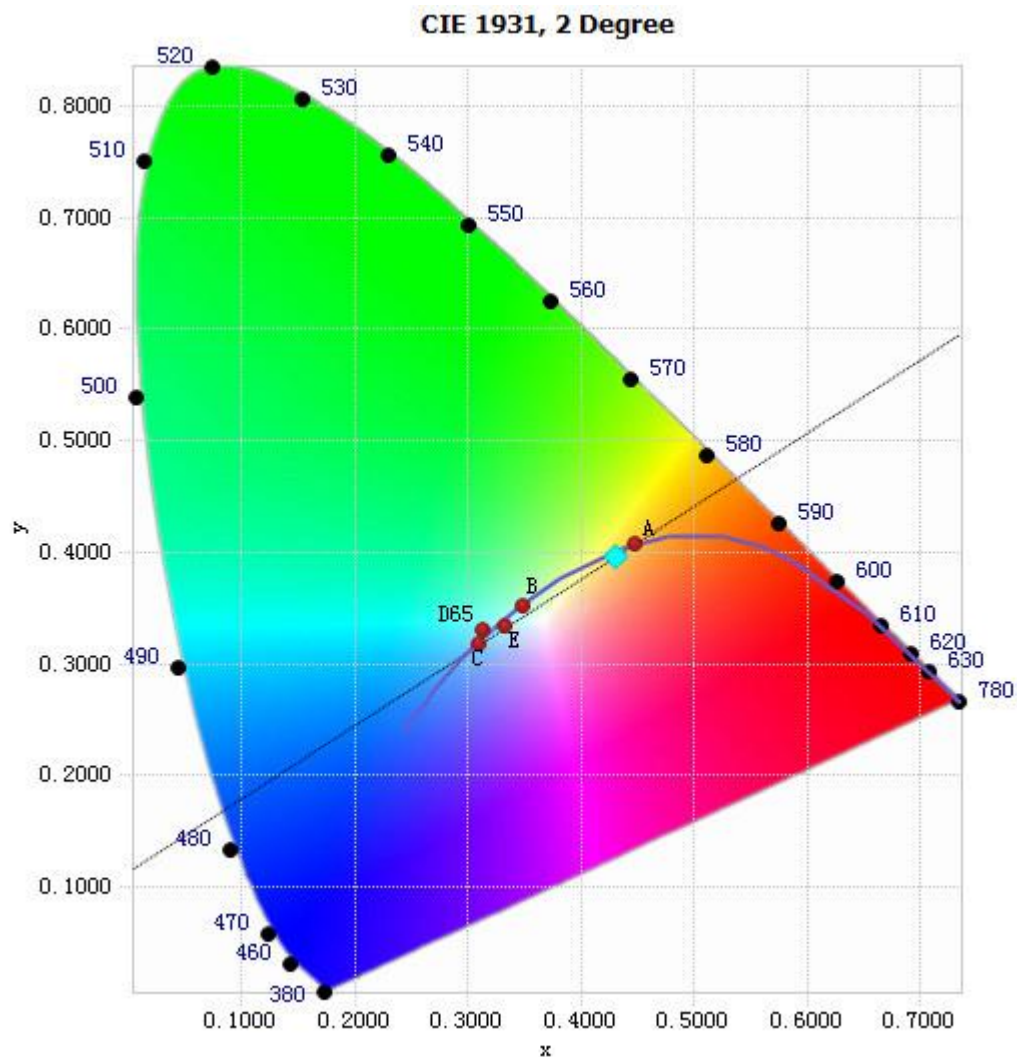


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	8.12E-05	485	4.67E-03	590	1.59E-02	695	7.58E-03
385	7.86E-05	490	5.10E-03	595	1.66E-02	700	6.58E-03
390	7.09E-05	495	5.82E-03	600	1.73E-02	705	5.82E-03
395	5.24E-05	500	6.73E-03	605	1.79E-02	710	5.12E-03
400	7.33E-05	505	7.69E-03	610	1.84E-02	715	4.50E-03
405	8.12E-05	510	8.55E-03	615	1.87E-02	720	3.93E-03
410	1.23E-04	515	9.41E-03	620	1.88E-02	725	3.42E-03
415	2.22E-04	520	1.00E-02	625	1.89E-02	730	2.98E-03
420	3.82E-04	525	1.06E-02	630	1.87E-02	735	2.58E-03
425	7.21E-04	530	1.10E-02	635	1.84E-02	740	2.23E-03
430	1.25E-03	535	1.13E-02	640	1.79E-02	745	1.92E-03
435	2.19E-03	540	1.16E-02	645	1.72E-02	750	1.66E-03
440	3.66E-03	545	1.19E-02	650	1.64E-02	755	1.43E-03
445	6.13E-03	550	1.20E-02	655	1.55E-02	760	1.24E-03
450	9.77E-03	555	1.23E-02	660	1.45E-02	765	1.06E-03
455	1.16E-02	560	1.26E-02	665	1.34E-02	770	9.15E-04
460	9.27E-03	565	1.30E-02	670	1.23E-02	775	7.87E-04
465	7.37E-03	570	1.35E-02	675	1.13E-02	780	6.66E-04
470	6.31E-03	575	1.40E-02	680	1.03E-02		
475	5.13E-03	580	1.46E-02	685	9.25E-03		
480	4.56E-03	585	1.53E-02	690	8.31E-03		

Table 8: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4300, 0.3964)

Chart 9: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

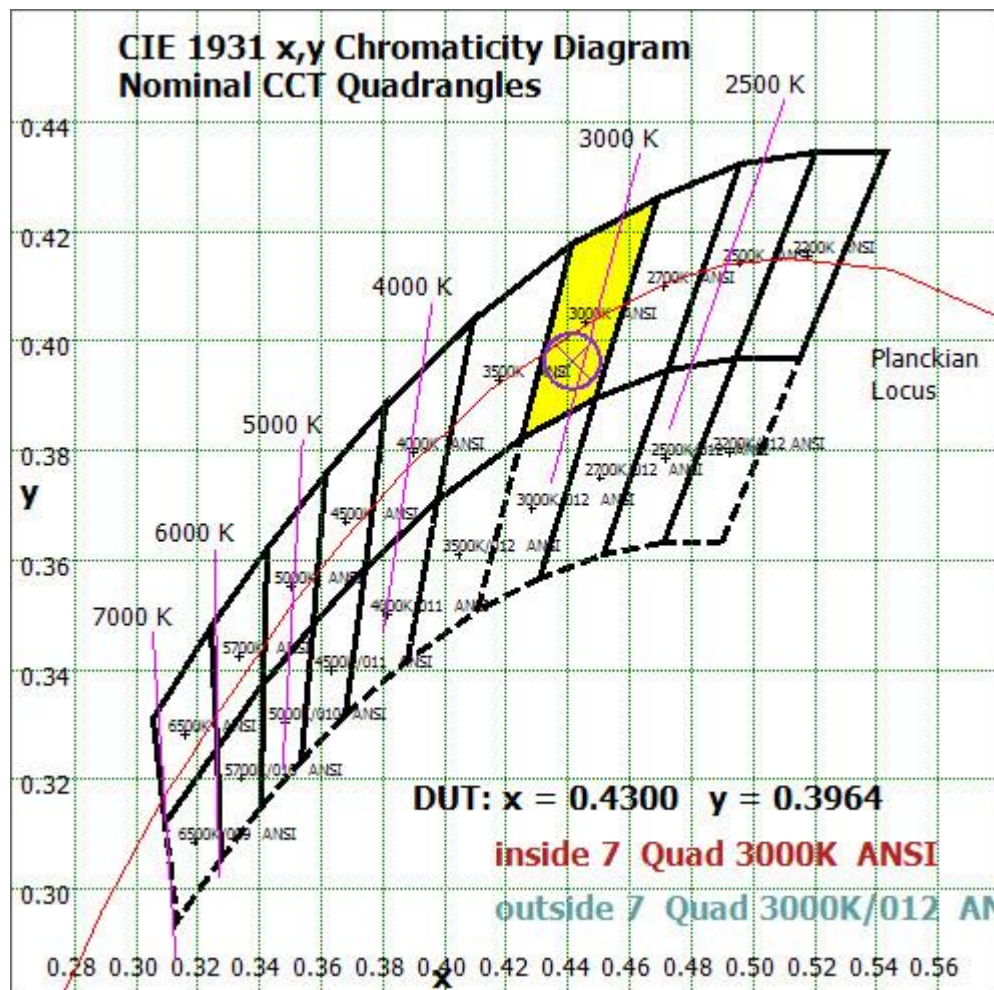


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

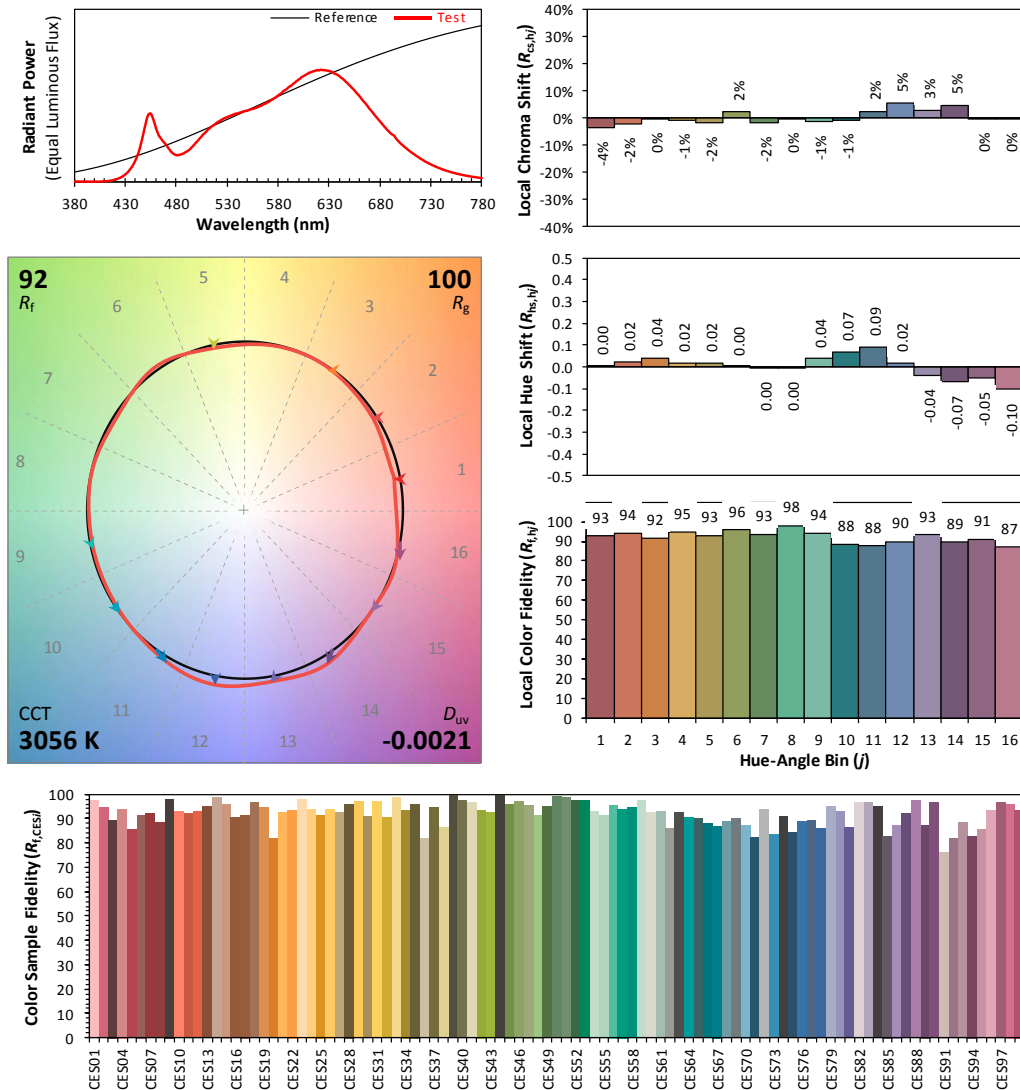
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/11/15

Model: 8.8FA19DIM/9CCTS



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

x 0.4300
 y 0.3964
 u' 0.2494
 v' 0.5173

CIE 13.3-1995
(CRI)
 R_a 95
 R_9 71

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

Chart 11: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 7 due to rounding.

TEST RESULTS (4000K Setting)

Test ambient temperature was 26.0 °C.

Base orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 50 minutes, and the total operating time including stabilization was 55 minutes.

Sphere-Spectroradiometer Method

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.088
Power Factor	0.7422
Test Power (W)	7.81
THD A%	66.34
Luminous Efficacy (lm/W)	122.7
Total Luminous Flux (lm)	958.6
Color Rendering Index (CRI)	95.5
R9	82.1
Correlated Color Temperature (CCT)(K)	3895
Chromaticity Chroma x	0.3846
Chromaticity Chroma y	0.3781
Chromaticity Chroma u	0.2273
Chromaticity Chroma v	0.3352
Duv	-0.0006
Chromaticity Chroma u'	0.2273
Chromaticity Chroma v'	0.5028

Special Color Rendering Indices	
R1	96.8
R2	97.2
R3	95
R4	95.9
R5	95
R6	94.1
R7	97
R8	93
R9	82.1
R10	91.1
R11	95.4
R12	72.7
R13	97.3
R14	96.5

Table 9: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u', v') diagram, $u' = u = 4x/(-2x+12y+3)$, $v' = 3v/2 = 9y/(-2x+12y+3)$.

Spectral Power Distribution - Sphere Spectroradiometer Method

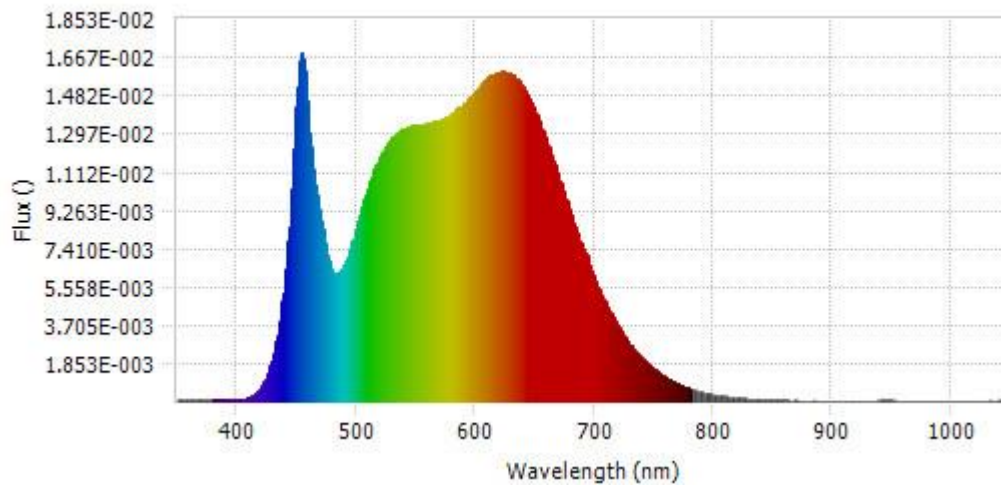
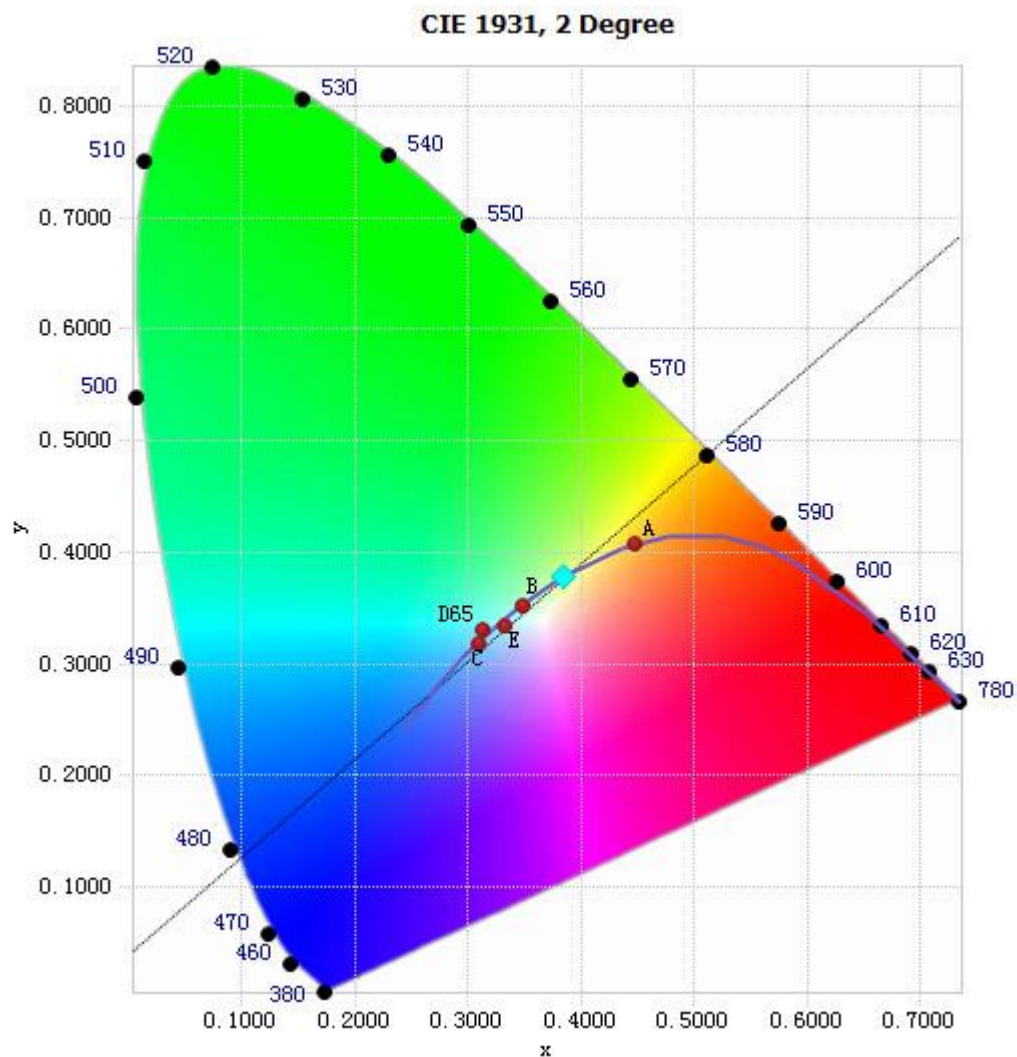


Chart 12: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	8.28E-05	485	6.22E-03	590	1.44E-02	695	6.87E-03
385	8.34E-05	490	6.62E-03	595	1.47E-02	700	5.99E-03
390	7.53E-05	495	7.34E-03	600	1.50E-02	705	5.32E-03
395	8.30E-05	500	8.33E-03	605	1.53E-02	710	4.71E-03
400	9.21E-05	505	9.38E-03	610	1.56E-02	715	4.15E-03
405	1.27E-04	510	1.03E-02	615	1.58E-02	720	3.64E-03
410	2.06E-04	515	1.12E-02	620	1.59E-02	725	3.19E-03
415	3.58E-04	520	1.18E-02	625	1.59E-02	730	2.77E-03
420	6.72E-04	525	1.24E-02	630	1.58E-02	735	2.43E-03
425	1.24E-03	530	1.28E-02	635	1.56E-02	740	2.11E-03
430	2.14E-03	535	1.30E-02	640	1.53E-02	745	1.81E-03
435	3.60E-03	540	1.32E-02	645	1.47E-02	750	1.57E-03
440	5.87E-03	545	1.33E-02	650	1.41E-02	755	1.37E-03
445	9.32E-03	550	1.33E-02	655	1.34E-02	760	1.17E-03
450	1.43E-02	555	1.34E-02	660	1.26E-02	765	1.01E-03
455	1.69E-02	560	1.35E-02	665	1.18E-02	770	8.71E-04
460	1.39E-02	565	1.36E-02	670	1.09E-02	775	7.39E-04
465	1.08E-02	570	1.36E-02	675	1.00E-02	780	6.36E-04
470	9.04E-03	575	1.37E-02	680	9.16E-03		
475	7.26E-03	580	1.39E-02	685	8.30E-03		
480	6.28E-03	585	1.42E-02	690	7.51E-03		

Table 10: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3846, 0.3781)

Chart 13: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

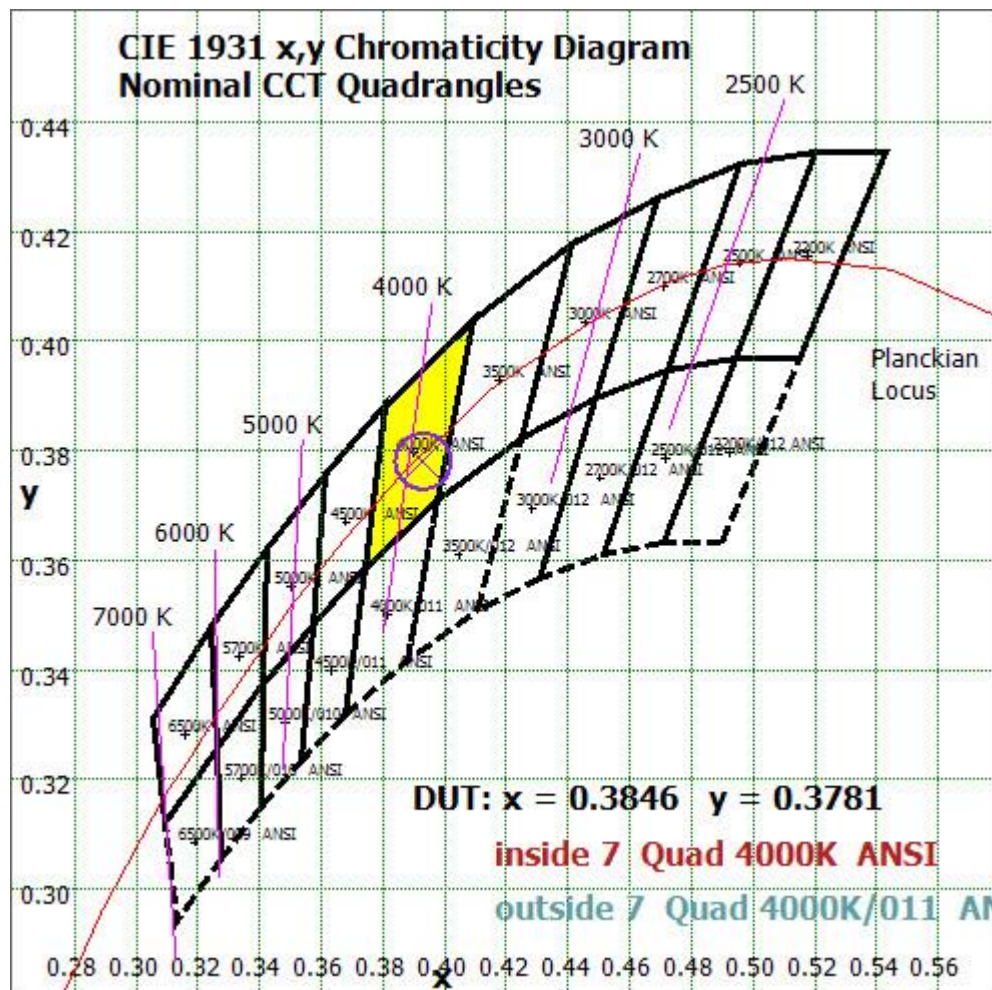


Chart 14: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

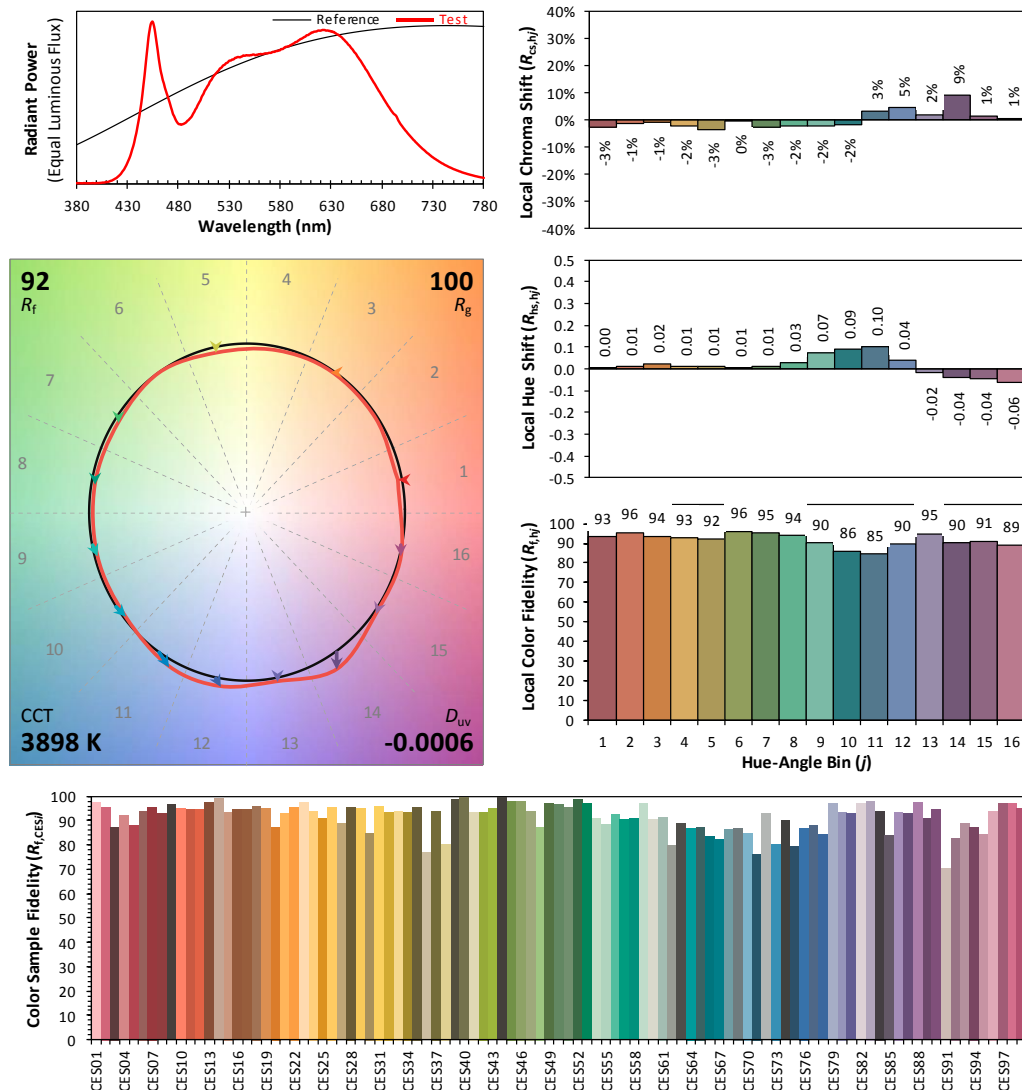
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/11/15

Model: 8.8FA19DIM/9CCTS



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

x 0.3846
 y 0.3781
 u' 0.2273
 v' 0.5028

CIE 13.3-1995
(CRI)
 R_a 96
 R_g 82

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

Chart 15: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 9 due to rounding.

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jun. 18, 2024	-
Digital Power Meter	PF2010A	HZTE028-01	Aug. 08, 2024	Aug. 07, 2025
AC Power Supply	DPS1060	HZTE001-06	Aug. 08, 2024	Aug. 07, 2025
DC Power Supply	WY12010	HZTE004-03	Aug. 08, 2024	Aug. 07, 2025
Temperature recorder	JM624U	HZTE018-08	Aug. 08, 2024	Aug. 07, 2025
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 08, 2024	Aug. 07, 2025
Standard source	D908	HZTE012-01	Aug. 14, 2018	-
Integrate Sphere system	3M	HZTE015-04	Jun. 18, 2024	-
Digital Power Meter	WT210	HZTE008-01	Aug. 08, 2024	Aug. 07, 2025
AC Power Supply	PCR 500L	HZTE001-07	Aug. 08, 2024	Aug. 07, 2025
DC Power Supply	IT6154	HZTE004-04	Aug. 08, 2024	Aug. 07, 2025
Standard source	SCL-1400	HZTE012-06	Nov. 04, 2021	-
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 08, 2024	Aug. 07, 2025
Temperature Meter	TES1310	HZTE017-01	Aug. 08, 2024	Aug. 07, 2025

Table 11: Test Equipment List

TEST METHODS

Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning. Therefore, no seasoning was performed.

Sphere-Spectroradiometer Method- Photometric and Electrical Measurements

A Labsphere Model CDS 2100 Spectroradiometer and 3 Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit. The coating reflectance of each sphere is 98%. The measure geometry is 4π . Self-absorption correction is conducted in testing. Bandwidth of spectroradiometer is 350nm-1050nm.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED Lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 20 min, taken 10 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

The standard reference of the integrated sphere system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Standards and Technology.

The uncertainty of integrating sphere system reported in this document is expanded uncertainty is 2.1% with a coverage factor $k=2$.

Goniophotometer Method

Photometric and Electrical Measurements

An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.

Ambient temperature was measured at the same height of the sample mounted on the Goniophotometer equipment. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED Lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 20 min, taken 10 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Everfine Digital Power Meter.

Some graphics were created with Photometric Plus software.

The standard reference of the Goniophotometer system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Metrology P.R. China.

The uncertainty of goniophotometer system reported in this document is expanded uncertainty is 2.3% with a coverage factor $k=2$.

Color Characteristics Measurements

The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as values that are spatially average, weighted to intensity, over the angular range where light is intentionally emitted from the SSL product. The color characteristics measurements are using gonio-spectroradiometer.

*** End of Report ***

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.