

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: 25FHIDDIM/ED23/840/277V/EX39

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ24060009a

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

Review by:

Wei Fei

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Jun. 19, 2024

Approved by:



April Zou

1 Manager: April Zou
Jun. 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

Sample Tested: 25FHIDDIM/ED23/840/277V/EX39

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
178.4	4177.7	23.42	0.9932
CCT (K)	CRI	Stabilization Time (Light & Power)	
3896	82.0	50	

Table 1: Executive Data Summary

Note: The above results are recorded/ derived from measurements made using an Integrating Sphere.

Test specifications:

Date of Receipt	: Jun. 13, 2024
Date of Test	: Jun. 13, 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

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SAMPLE PHOTO



Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Lamp
Model	: 25FHIDDIM/ED23/840/277V/EX39
Electrical Ratings	: 120-277V, 50/60Hz, 25W
Product Description	: 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

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	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.197	0.092
Power Factor	0.9932	0.9115
Test Power (W)	23.42	23.25
THD A%	5.15	10.43
Luminous Efficacy (lm/W)	178.4	178.7
Total Luminous Flux (lm)	4177.7	4153.7
Color Rendering Index (CRI)	82.0	
R9	6.7	
Correlated Color Temperature (CCT)(K)	3896	
Chromaticity Chroma x	0.3871	
Chromaticity Chroma y	0.3869	
Chromaticity Chroma u	0.2255	
Chromaticity Chroma v	0.3380	
Duv	0.0028	
Chromaticity Chroma u'	0.2255	
Chromaticity Chroma v'	0.5069	

Special Color Rendering Indices	
R1	80
R2	88.4
R3	94.5
R4	79.8
R5	79.3
R6	83.7
R7	86.5
R8	63.8
R9	6.7
R10	71.7
R11	77.5
R12	58.1
R13	82.1
R14	96.9

Table 2: Test data per Sphere-Spectroradiometer Method

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

Goniophotometer Method

Test ambient temperature was 24.8 °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)	0.197
Power Factor	0.9957
Power (W)	23.51
Luminous Efficacy (lm/W)	179.3
Total Luminous Flux (lm)	4215.9
Beam Angle (°)	332.2 (0°-180°) / 333.2 (90°-270°)
Center Beam Candle Power (cd)	41.7
Maximum Beam Candle Power (cd)	567.3 (At: C=180.0, Gamma=83.0)
Spacing Criteria	5.17 (0°-180°) / 4.57 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	20.20%
Zonal Lumens in the 60 °-90 °Zone	30.90%
Zonal Lumens in the 90 °-120 °Zone	30.85%
Zonal Lumens in the 120 °-180 °Zone	18.05%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

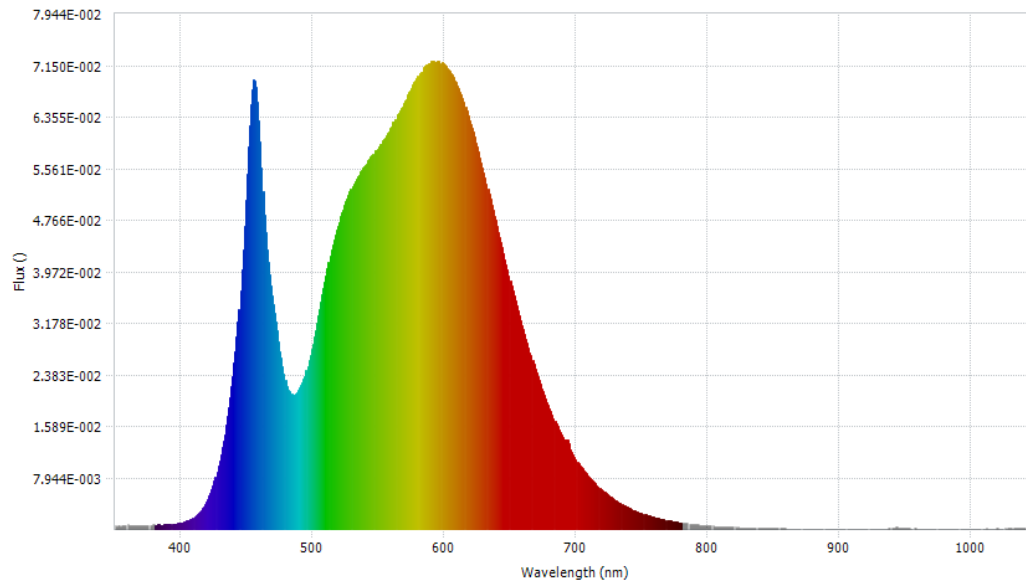
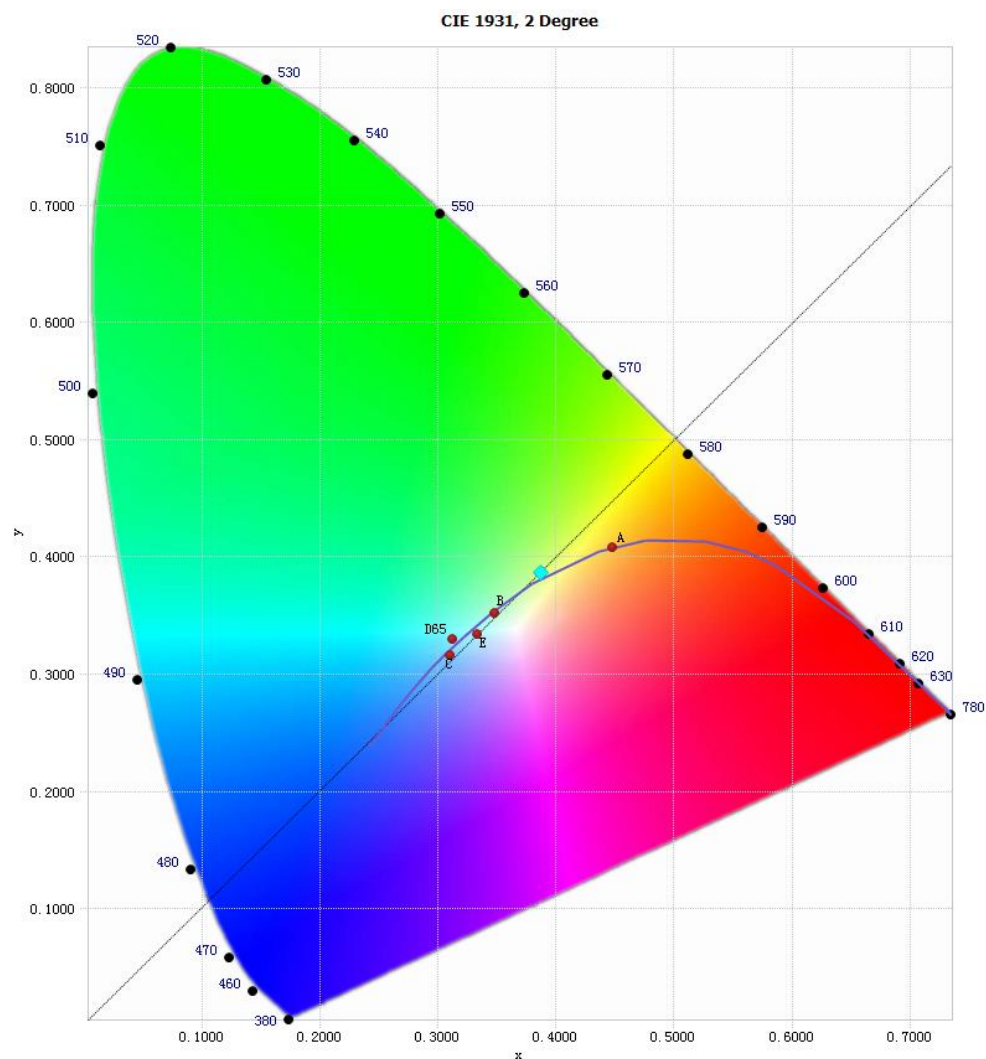


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	7.12E-04	485	2.08E-02	590	7.23E-02	695	1.32E-02
385	6.90E-04	490	2.19E-02	595	7.23E-02	700	1.08E-02
390	8.17E-04	495	2.45E-02	600	7.17E-02	705	9.37E-03
395	9.32E-04	500	2.87E-02	605	7.03E-02	710	8.11E-03
400	1.08E-03	505	3.40E-02	610	6.85E-02	715	7.08E-03
405	1.41E-03	510	3.91E-02	615	6.58E-02	720	6.10E-03
410	1.94E-03	515	4.39E-02	620	6.24E-02	725	5.26E-03
415	2.94E-03	520	4.74E-02	625	5.89E-02	730	4.55E-03
420	4.64E-03	525	5.06E-02	630	5.49E-02	735	3.89E-03
425	7.45E-03	530	5.30E-02	635	5.09E-02	740	3.34E-03
430	1.16E-02	535	5.46E-02	640	4.67E-02	745	2.88E-03
435	1.75E-02	540	5.62E-02	645	4.25E-02	750	2.52E-03
440	2.57E-02	545	5.76E-02	650	3.83E-02	755	2.18E-03
445	3.69E-02	550	5.90E-02	655	3.46E-02	760	1.89E-03
450	5.48E-02	555	6.03E-02	660	3.08E-02	765	1.63E-03
455	6.94E-02	560	6.22E-02	665	2.73E-02	770	1.42E-03
460	5.98E-02	565	6.42E-02	670	2.41E-02	775	1.24E-03
465	4.32E-02	570	6.61E-02	675	2.13E-02	780	1.07E-03
470	3.47E-02	575	6.80E-02	680	1.86E-02		
475	2.75E-02	580	6.99E-02	685	1.64E-02		
480	2.21E-02	585	7.15E-02	690	1.43E-02		

Table 4: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3871, 0.3869)

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

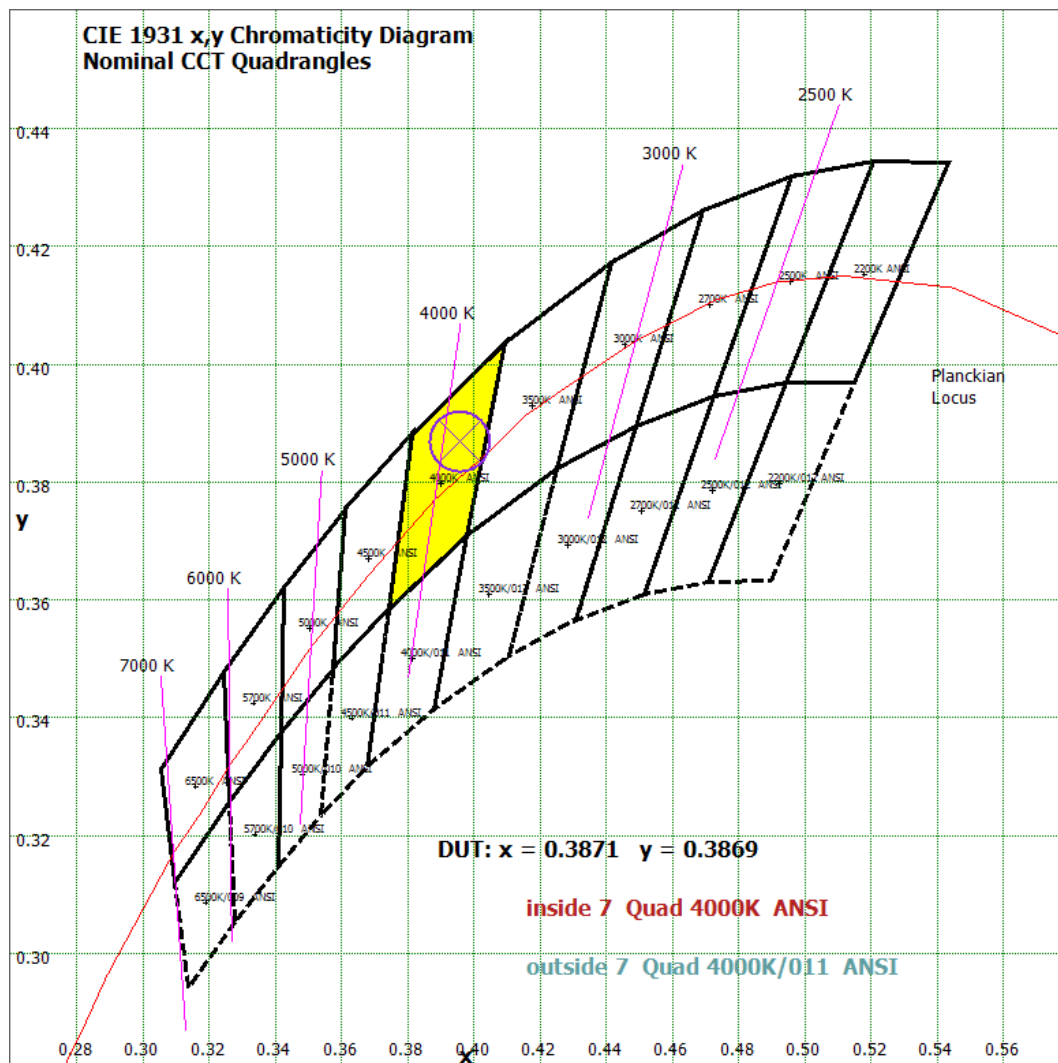


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

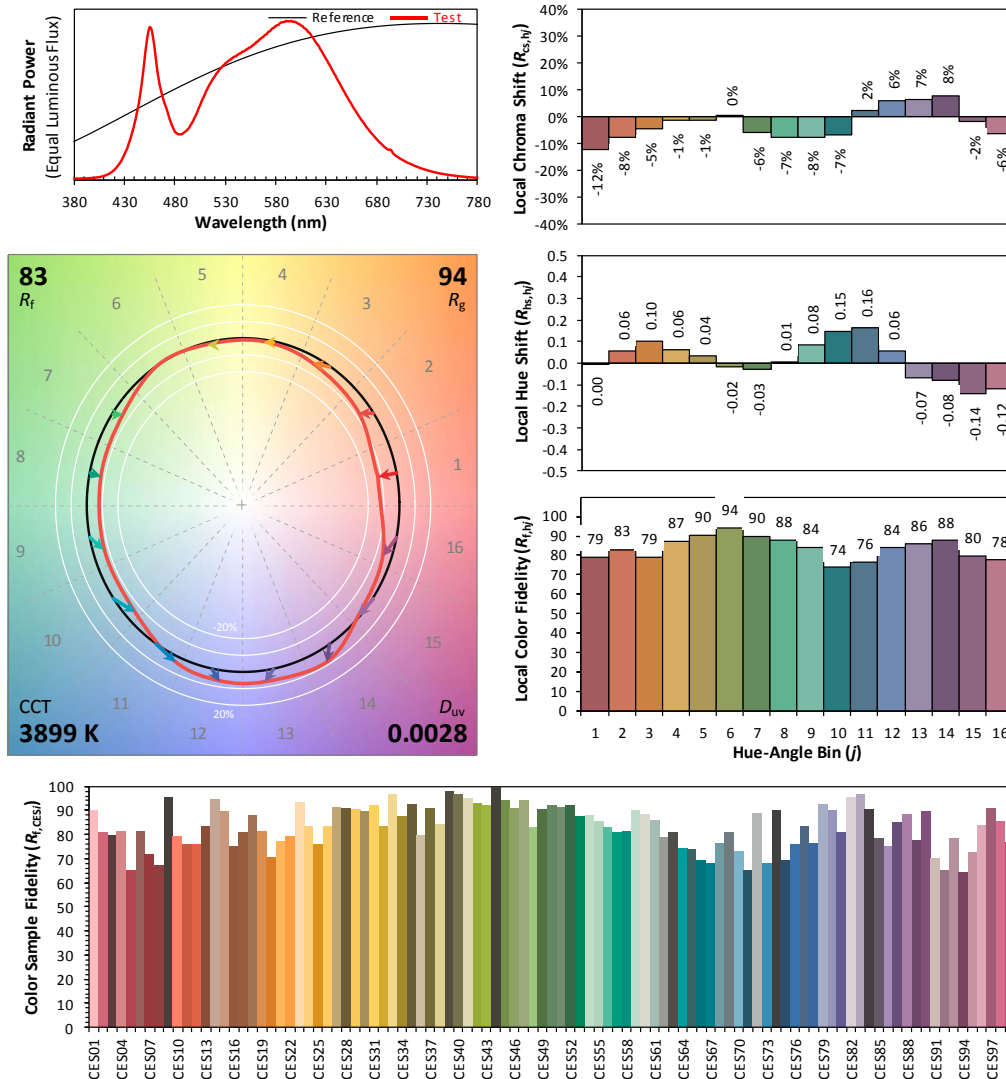
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/06/13

Model: 25FHIDDIM/ED23/840/277V/EX39



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

 x 0.3871 y 0.3869 u' 0.2255 v' 0.5069CIE 13.3-1995
(CRI) R_a 82 R_9 7

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.

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	5.724	0.14%
10- 20	32.273	0.77%
20- 30	86.855	2.06%
30- 40	161.754	3.84%
40- 50	243.147	5.77%
50- 60	321.859	7.63%
60- 70	390.774	9.27%
70- 80	442.089	10.49%
80- 90	469.651	11.14%
90-100	470.264	11.15%
100-110	442.049	10.49%
110-120	388.404	9.21%
120-130	315.656	7.49%
130-140	229.939	5.45%
140-150	139.872	3.32%
150-160	60.828	1.44%
160-170	13.973	0.33%
170-180	0.757	0.02%
Total	4215.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0-130	3770.5	89.44%
130-180	445.369	10.56%
0-180	4215.9	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

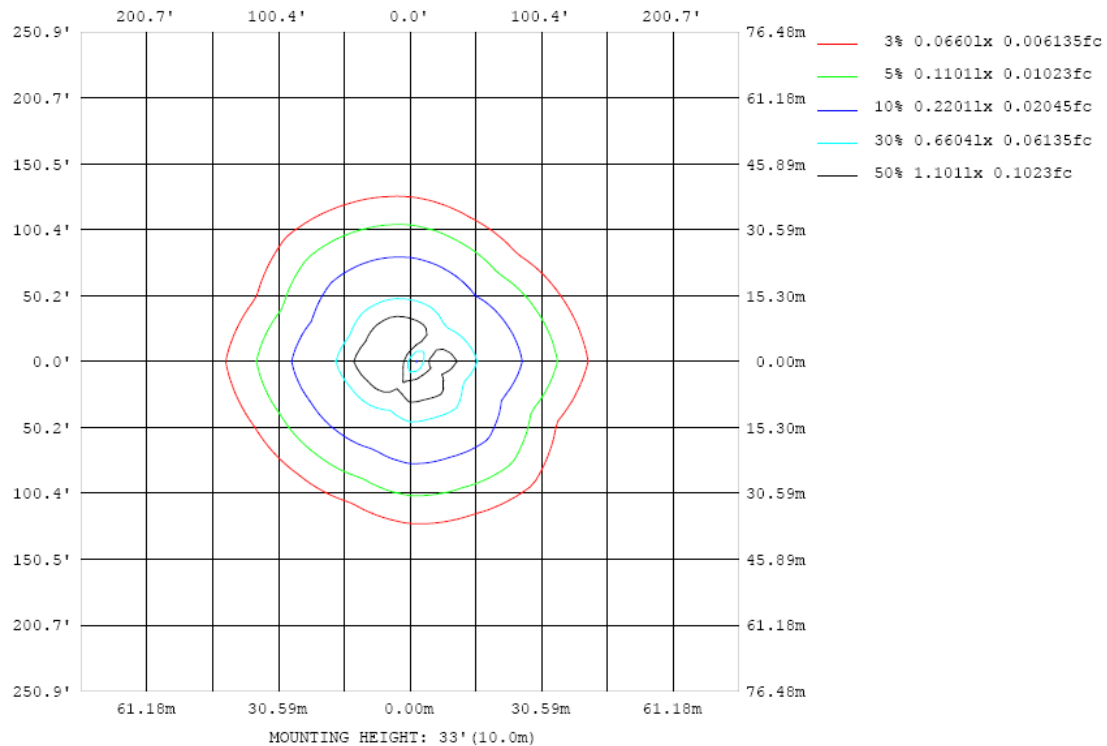


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

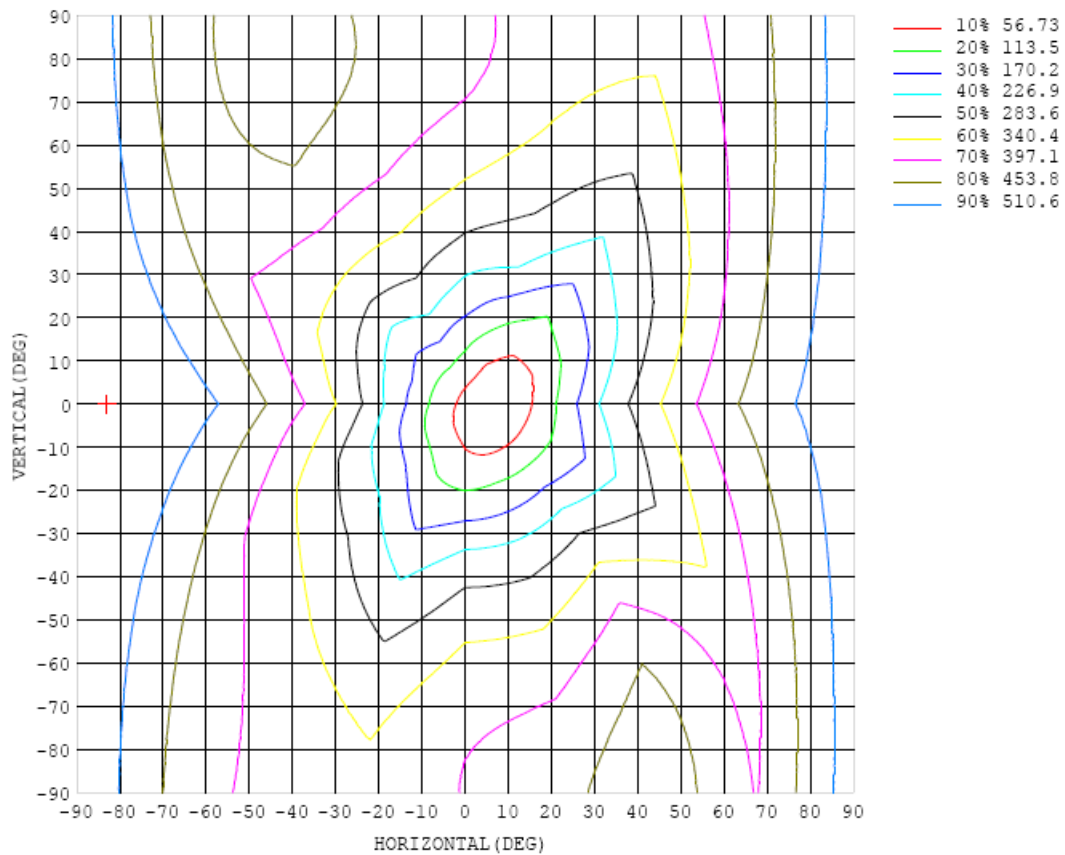


Chart 6: Isocandela Plot

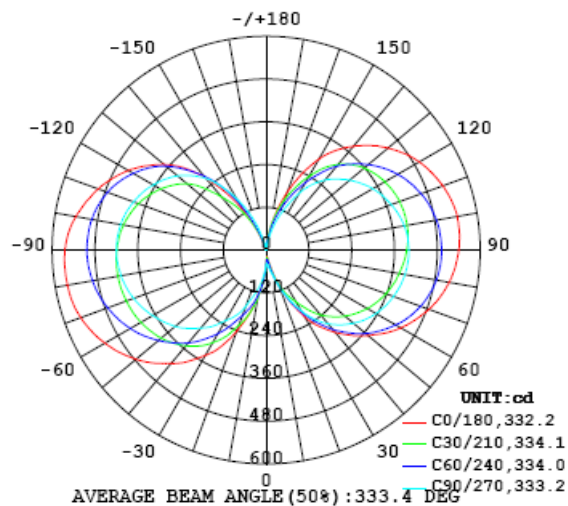


Chart 7: Polar Candela Distribution

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	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7			
5	21.0	22.1	26.4	32.5	40.3	51.4	62.7	74.1	81.6	84.6	83.9	78.3	65.5	49.7	32.8	24.3			
10	23.0	27.9	34.7	43.5	55.4	78.9	96.4	112	130	136	126	121	99.9	63.1	36.4	25.1			
15	52.3	61.8	68.3	73.2	74.7	102	137	157	186	186	163	165	130	91.1	53.7	44.2			
20	102	102	112	117	113	123	173	202	242	224	196	207	168	120	77.2	79.1			
25	161	138	157	156	153	142	205	237	297	267	231	245	203	157	100	121			
30	215	168	203	199	196	164	234	270	341	300	271	277	229	200	126	159			
35	262	204	248	237	237	190	260	300	381	328	306	305	260	235	159	201			
40	301	237	291	269	270	213	283	326	415	351	340	330	286	259	189	235			
45	338	265	329	296	296	235	303	350	448	369	369	355	311	279	213	265			
50	373	288	364	320	319	255	321	371	477	384	395	377	333	297	232	294			
55	406	309	394	343	339	275	335	389	501	396	419	396	351	312	254	321			
60	437	328	420	363	355	294	348	406	522	406	440	411	367	324	275	347			
65	462	344	442	381	369	310	358	419	540	413	458	424	383	336	293	371			
70	486	357	461	398	380	323	365	430	553	417	473	434	395	345	311	392			
75	506	369	474	412	389	334	370	437	562	421	486	441	406	350	327	408			
80	521	379	484	424	395	342	374	441	566	422	494	446	413	352	340	422			
85	532	387	490	434	399	350	373	442	567	422	501	447	418	351	352	432			
90	540	394	492	440	400	356	369	440	564	419	504	444	420	345	361	439			
95	544	399	489	443	399	359	364	433	557	415	500	437	419	338	367	442			
100	544	401	485	442	393	360	354	422	542	406	497	428	415	328	370	442			
105	538	401	475	438	385	356	343	409	523	395	488	415	407	315	369	438			
110	527	398	462	429	374	347	328	393	502	381	473	400	396	302	364	431			
115	513	393	446	418	360	335	311	372	476	364	455	382	382	286	354	419			
120	495	384	425	405	345	319	291	348	447	342	431	361	366	267	343	405			
125	473	372	401	386	326	302	268	322	412	319	402	338	347	246	328	388			
130	446	359	374	362	306	282	243	293	374	289	367	311	324	224	310	367			
135	416	339	342	335	282	258	213	261	326	245	320	280	296	203	288	344			
140	380	314	307	303	257	229	176	223	264	196	271	247	262	179	265	315			
145	342	281	263	271	225	192	140	172	196	153	218	204	217	153	238	285			
150	294	238	218	232	184	148	103	116	129	110	154	150	168	128	206	248			
155	235	194	172	187	136	103	66.4	63.9	61.1	63.8	87.3	94.1	118	103	164	198			
160	173	149	127	137	93.9	60.1	36.0	21.3	14.4	23.3	29.6	42.0	66.8	73.0	117	145			
165	110	103	83.6	76.4	54.2	27.7	10.0	3.98	3.12	3.08	4.24	8.69	24.8	42.5	70.1	90.4			
170	54.9	53.9	34.1	8.43	4.20	2.22	2.23	1.79	1.65	1.68	2.44	2.81	6.30	15.3	29.2	41.7			
175	8.18	9.00	5.54	2.09	1.18	0.68	0.37	0.29	0.29	0.31	0.92	1.55	1.70	2.45	4.26	6.69			
180	0.27	0.27	0.27	0.27	0.27	0.25	0.24	0.23	0.27	0.28	0.26	0.27	0.26	0.26	0.24	0.24			

Table 6: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Feb. 18, 2024	-
Digital Power Meter	PF2010A	HZTE028-01	Aug. 01, 2023	Jul. 31, 2024
AC Power Supply	DPS1060	HZTE001-06	Aug. 01, 2023	Jul. 31, 2024
DC Power Supply	WY12010	HZTE004-03	Aug. 01, 2023	Jul. 31, 2024
Temperature recorder	JM624U	HZTE018-08	Aug. 04, 2023	Aug. 03, 2024
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 04, 2023	Aug. 03, 2024
Standard source	D908	HZTE012-01	Aug. 14, 2018	-
Integrate Sphere system	3M	HZTE015-04	Feb. 18, 2024	-
Digital Power Meter	WT210	HZTE008-01	Aug. 01, 2023	Jul. 31, 2024
AC Power Supply	PCR 500L	HZTE001-07	Aug. 01, 2023	Jul.31, 2024
DC Power Supply	IT6154	HZTE004-04	Aug. 01, 2023	Jul. 31, 2024
Standard source	SCL-1400	HZTE012-06	Nov. 04, 2021	-
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 04, 2023	Aug. 03, 2024
Temperature Meter	TES1310	HZTE017-01	Aug. 04, 2023	Aug. 03, 2024

Table 7: 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 ***

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