

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/ED23/850/277V/EX39

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ24060009b

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

Approve 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/ED23/850/277V/EX39**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
176.5	4136.3	23.43	0.9938
CCT (K)	CRI	Stabilization Time (Light & Power)	
5085	82.4	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/ED23/850/277V/EX39
Electrical Ratings	: 120-277V, 50/60Hz, 25W
Product Description	: 5000K
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	0.9938	0.9123
Test Power (W)	23.43	23.24
THD A%	4.63	9.98
Luminous Efficacy (lm/W)	176.5	177.0
Total Luminous Flux (lm)	4136.3	4112.8
Color Rendering Index (CRI)	82.4	
R9	8.1	
Correlated Color Temperature (CCT)(K)	5085	
Chromaticity Chroma x	0.3430	
Chromaticity Chroma y	0.3537	
Chromaticity Chroma u	0.2092	
Chromaticity Chroma v	0.3236	
Duv	0.0019	
Chromaticity Chroma u'	0.2092	
Chromaticity Chroma v'	0.4854	

Special Color Rendering Indices	
R1	80.8
R2	88.1
R3	91.6
R4	81
R5	80.7
R6	82.3
R7	87
R8	67.3
R9	8.1
R10	70
R11	78.8
R12	58.8
R13	82.9
R14	95.4

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	0.9960
Power (W)	23.49
Luminous Efficacy (lm/W)	177.2
Total Luminous Flux (lm)	4163.4
Beam Angle (°)	333.6 (0°-180°) / 336.0 (90°-270°)
Center Beam Candle Power (cd)	26.2
Maximum Beam Candle Power (cd)	542.1 (At: C=22.5, Gamma=94.5)
Spacing Criteria	5.63 (0°-180°) / 5.47 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	19.73%
Zonal Lumens in the 60 °-90 °Zone	30.47%
Zonal Lumens in the 90 °-120 °Zone	31.06%
Zonal Lumens in the 120 °-180 °Zone	18.74%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

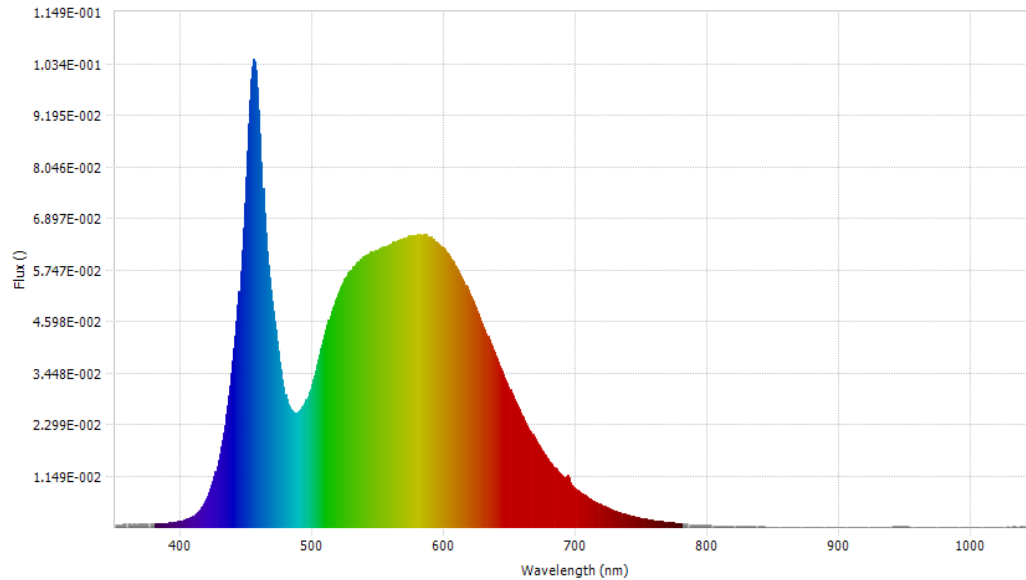
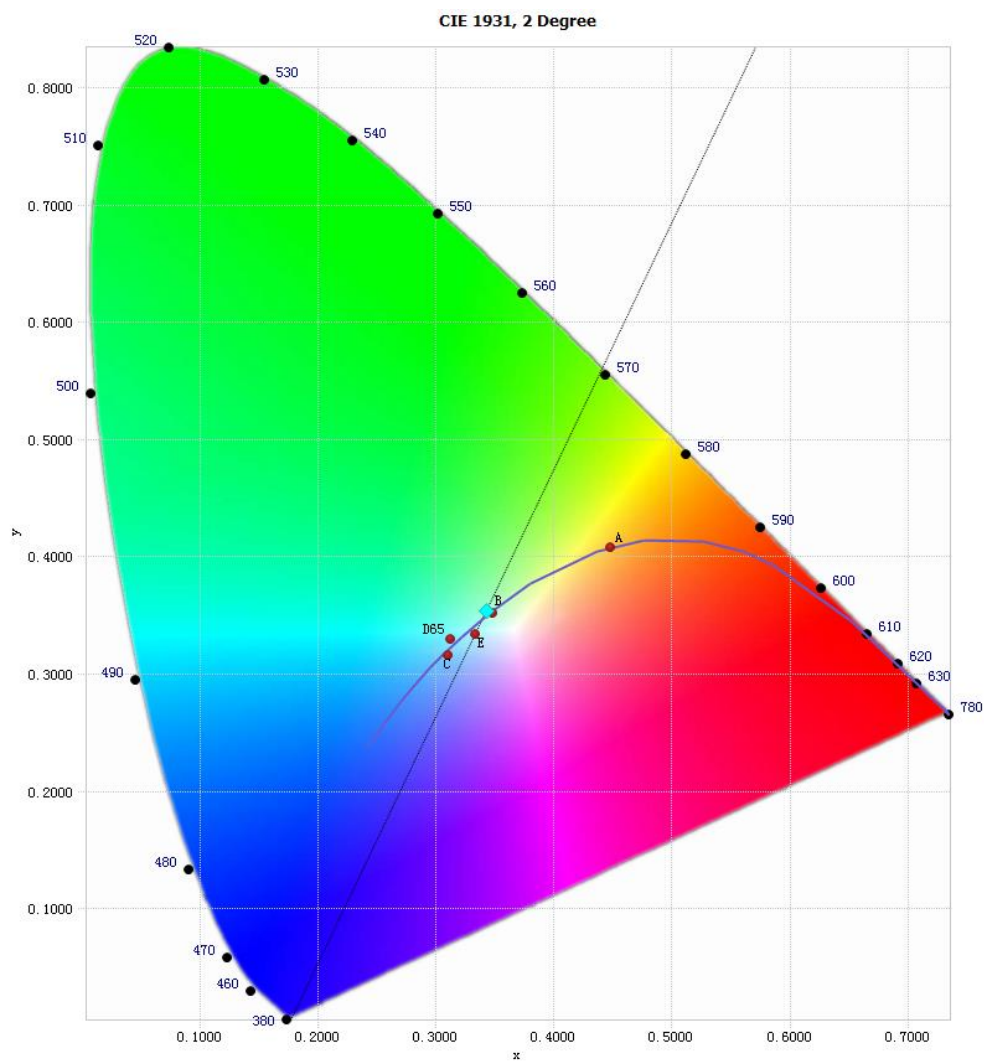


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	9.38E-04	485	2.59E-02	590	6.48E-02	695	1.11E-02
385	8.77E-04	490	2.62E-02	595	6.36E-02	700	8.64E-03
390	1.03E-03	495	2.86E-02	600	6.20E-02	705	7.53E-03
395	1.23E-03	500	3.29E-02	605	5.99E-02	710	6.52E-03
400	1.49E-03	505	3.85E-02	610	5.76E-02	715	5.74E-03
405	1.98E-03	510	4.40E-02	615	5.48E-02	720	4.90E-03
410	2.86E-03	515	4.90E-02	620	5.15E-02	725	4.21E-03
415	4.41E-03	520	5.26E-02	625	4.83E-02	730	3.64E-03
420	6.99E-03	525	5.58E-02	630	4.47E-02	735	3.18E-03
425	1.15E-02	530	5.81E-02	635	4.12E-02	740	2.73E-03
430	1.80E-02	535	5.94E-02	640	3.77E-02	745	2.36E-03
435	2.73E-02	540	6.06E-02	645	3.41E-02	750	2.05E-03
440	3.99E-02	545	6.14E-02	650	3.07E-02	755	1.79E-03
445	5.72E-02	550	6.20E-02	655	2.75E-02	760	1.54E-03
450	8.41E-02	555	6.26E-02	660	2.46E-02	765	1.36E-03
455	1.05E-01	560	6.33E-02	665	2.18E-02	770	1.18E-03
460	8.78E-02	565	6.40E-02	670	1.92E-02	775	1.02E-03
465	6.16E-02	570	6.45E-02	675	1.69E-02	780	8.98E-04
470	4.83E-02	575	6.49E-02	680	1.48E-02		
475	3.70E-02	580	6.54E-02	685	1.30E-02		
480	2.86E-02	585	6.56E-02	690	1.14E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3430, 0.3537)

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

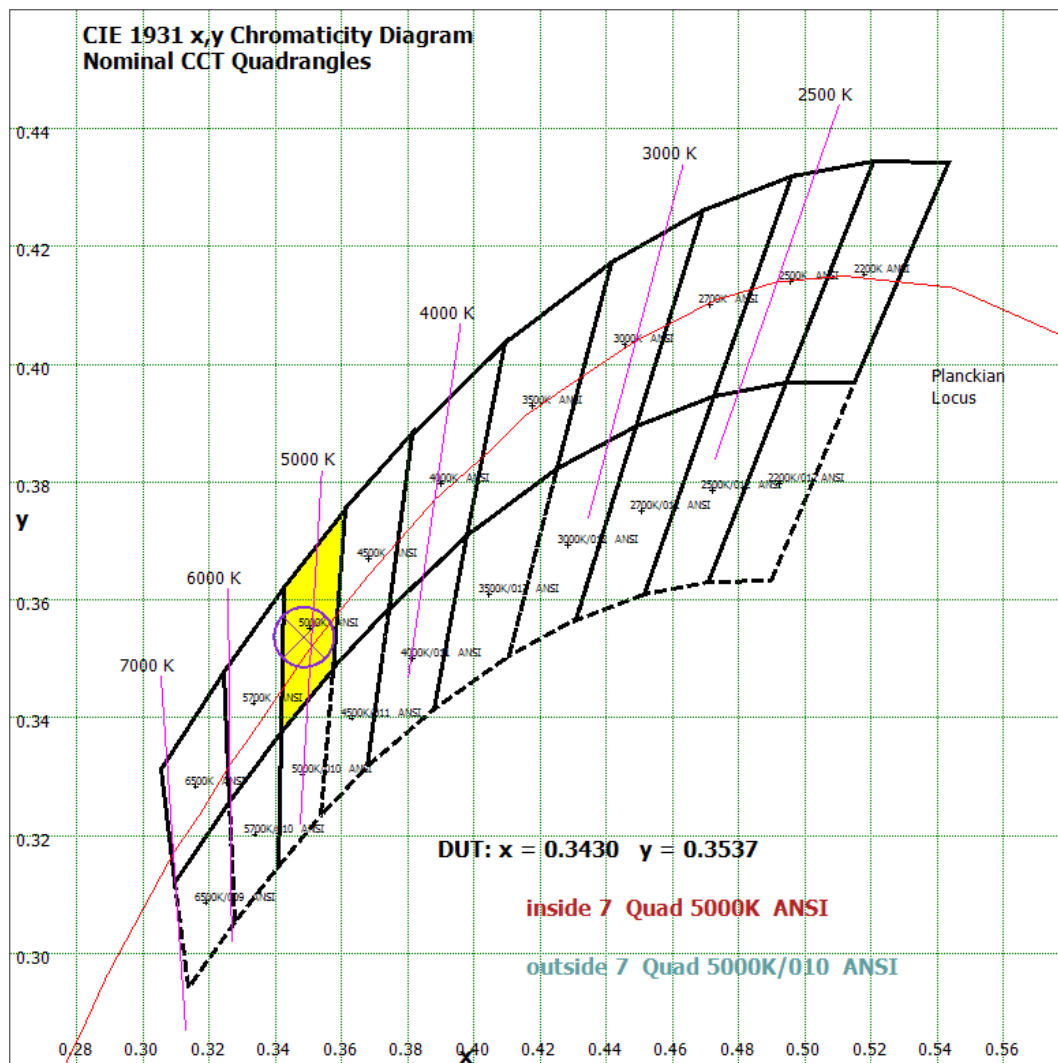


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

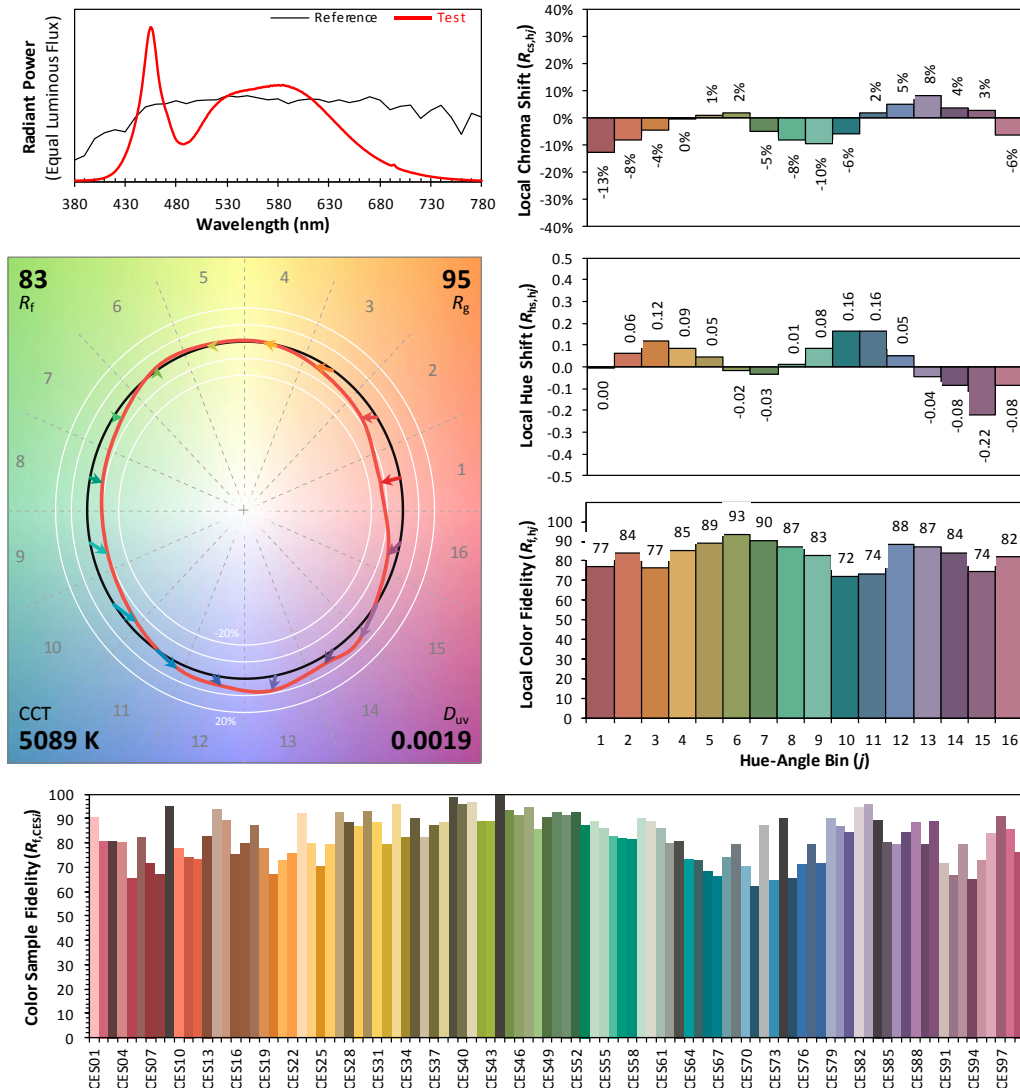
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/06/13

Model: 25FHIDDIM/ED23/850/277V/EX39



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

x 0.3430
 y 0.3537
 u' 0.2092
 v' 0.4854

CIE 13.3-1995
(CRI)

R_a 82
 R_9 8

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	4.485	0.11%
10- 20	30.436	0.73%
20- 30	83.655	2.01%
30- 40	155.68	3.74%
40- 50	234.892	5.64%
50- 60	312.317	7.50%
60- 70	379.321	9.11%
70- 80	429.866	10.32%
80- 90	459.225	11.03%
90-100	463.824	11.14%
100-110	439.612	10.56%
110-120	389.711	9.36%
120-130	320.161	7.69%
130-140	236.993	5.69%
140-150	145.792	3.50%
150-160	64.186	1.54%
160-170	12.87	0.31%
170-180	0.346	0.01%
Total	4163.4	100%

$\gamma(^{\circ})$	Lumens	% Total
0-130	3703.19	88.95%
130-180	460.187	11.05%
0-180	4163.4	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

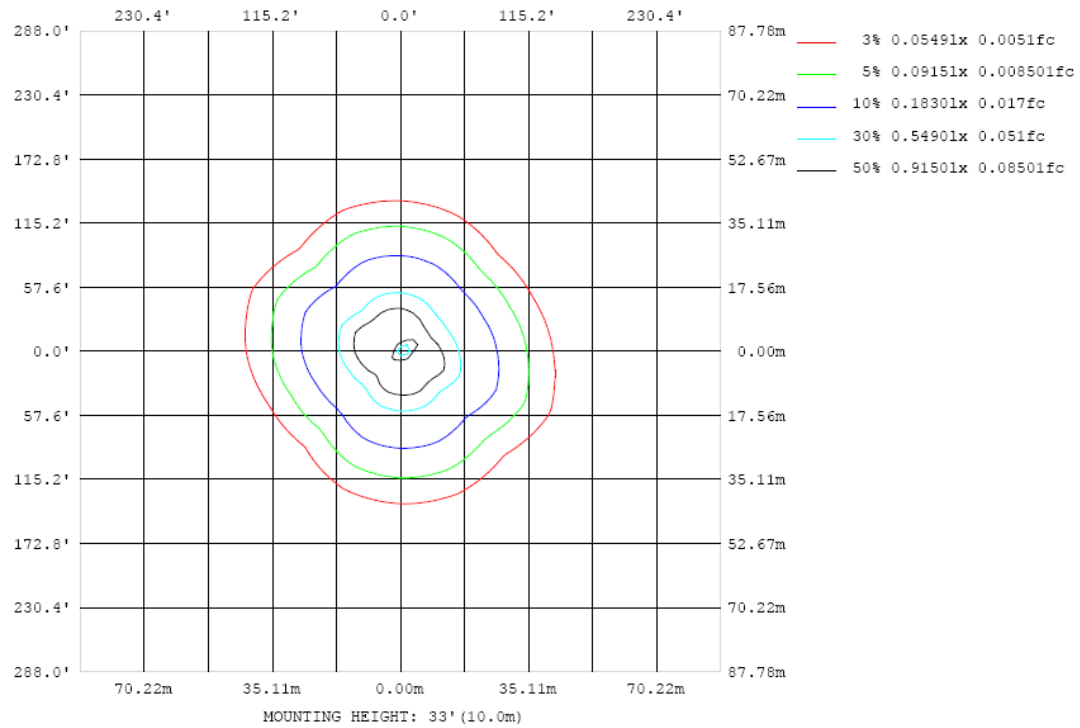


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

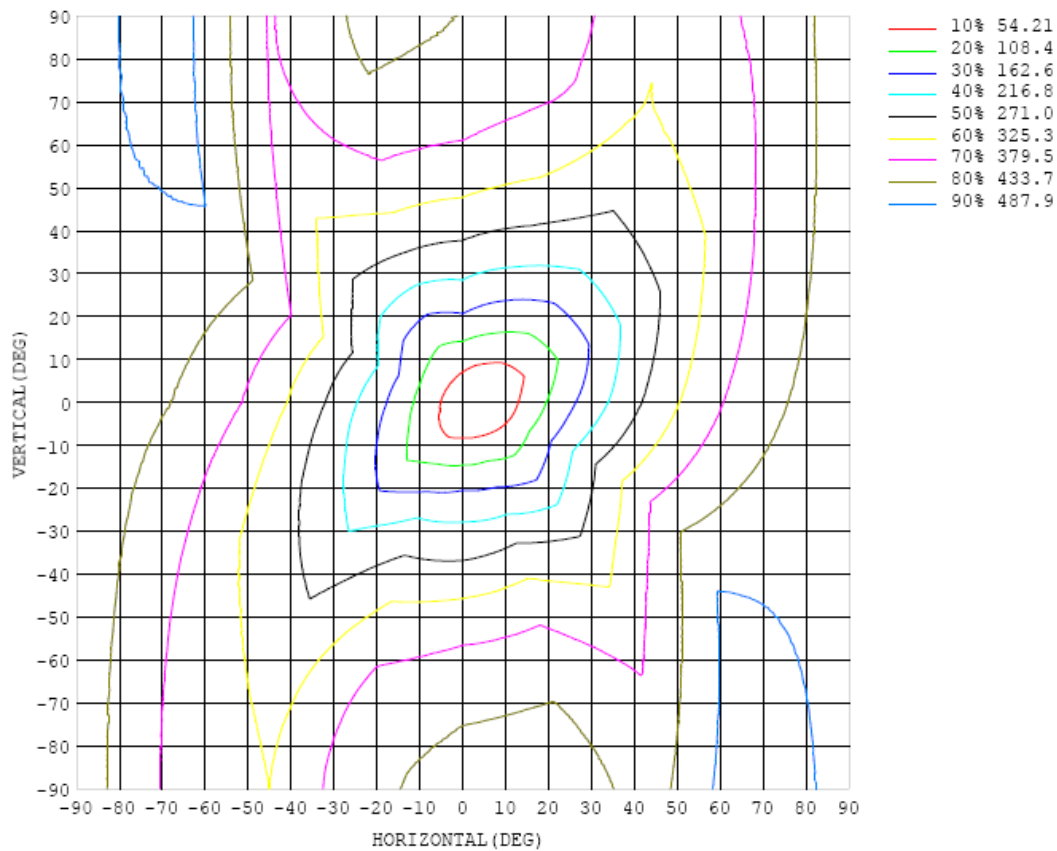


Chart 6: Isocandela Plot

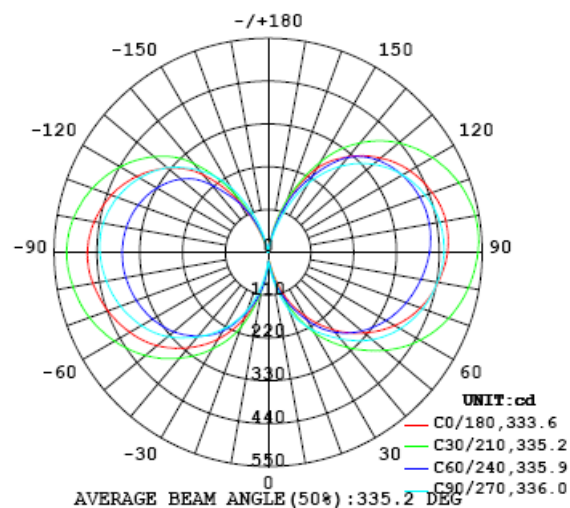


Chart 7: Polar Candela Distribution

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	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2			
5	20.7	22.8	26.6	30.9	32.9	35.9	41.9	48.9	53.2	56.0	54.8	49.9	42.6	33.1	25.8	21.7			
10	32.9	44.3	55.5	64.9	67.7	63.4	65.7	83.5	93.9	100	96.3	82.3	73.9	58.2	40.1	30.4			
15	70.6	89.4	93.6	111	112	104	89.6	119	140	151	131	114	116	92.8	66.0	51.3			
20	113	138	128	153	158	144	115	152	182	203	164	149	157	127	96.4	80.4			
25	153	188	164	193	198	187	144	186	220	249	199	184	193	161	126	114			
30	188	239	201	233	231	225	174	218	258	286	233	223	226	195	156	148			
35	224	280	237	272	260	254	200	244	289	322	259	257	255	226	189	183			
40	259	319	268	305	290	284	219	266	320	355	281	289	284	253	215	215			
45	292	356	293	335	321	308	237	286	348	385	300	318	310	281	237	241			
50	321	391	315	361	349	331	253	302	372	412	317	342	337	305	256	265			
55	351	424	333	383	372	351	270	316	393	435	331	366	358	327	273	288			
60	376	451	350	402	392	369	283	329	411	456	343	385	377	346	288	309			
65	398	475	365	418	409	384	294	340	425	474	353	403	391	361	301	327			
70	417	494	377	432	422	397	303	349	438	489	360	417	404	375	313	343			
75	431	510	389	442	433	407	310	356	449	501	367	429	414	389	323	359			
80	443	523	399	450	441	414	317	362	457	509	372	438	423	396	326	369			
85	454	532	407	454	448	420	322	365	464	516	375	444	429	402	330	379			
90	461	539	415	459	452	424	325	366	465	518	375	449	433	407	332	386			
95	464	542	419	458	451	422	325	363	461	515	374	449	433	408	333	390			
100	464	541	421	454	448	417	322	357	455	508	370	447	431	407	331	392			
105	459	533	420	446	442	408	317	348	443	496	364	440	423	402	327	388			
110	448	522	414	436	429	397	310	338	430	481	356	429	413	393	319	382			
115	436	507	408	420	415	383	300	324	412	462	345	415	398	381	310	371			
120	420	487	398	403	398	365	285	307	390	439	331	398	382	367	297	359			
125	401	465	385	381	377	345	268	287	366	413	313	375	362	349	281	344			
130	378	437	369	357	353	320	249	264	337	382	293	349	338	329	262	325			
135	351	406	347	328	323	293	227	235	303	347	266	316	309	304	241	303			
140	321	367	318	292	288	263	196	200	260	298	225	278	275	275	216	277			
145	288	324	275	245	249	222	158	158	206	238	182	237	238	242	188	248			
150	248	268	226	199	204	169	118	113	150	174	145	191	193	199	157	213			
155	194	207	177	154	150	116	75.9	67.8	92.1	110	101	137	141	151	127	171			
160	136	144	124	102	93.7	64.3	34.5	29.8	30.8	45.7	59.4	78.9	90.6	100	92.3	122			
165	82.0	79.0	64.8	52.2	41.1	15.8	7.06	5.47	4.17	10.2	21.1	27.2	35.3	48.3	56.4	71.5			
170	23.9	19.9	12.3	5.77	2.88	1.94	1.83	1.63	1.63	1.65	2.27	3.31	5.46	14.1	23.0	26.3			
175	2.02	1.82	1.41	0.92	0.66	0.44	0.27	0.28	0.62	0.81	1.11	1.32	1.51	1.71	1.97	2.30			
180	0.26	0.22	0.23	0.24	0.24	0.23	0.22	0.22	0.26	0.26	0.25	0.24	0.24	0.24	0.24	0.23			

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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