

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: 54FHIDDIM/ED32/850/277V/EX39

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ24060009g

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: 54FHIDDIM/ED32/850/277V/EX39

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
187.3	10068.8	53.76	0.9925
CCT (K)	CRI	Stabilization Time (Light & Power)	
5029	82.6	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. 14, 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	4
TEST RESULTS	5
Sphere-Spectroradiometer Method.....	5
Goniophotometer 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
Zonal Lumen Tabulation- Goniophotometer Method	11
Illuminance Plots- Goniophotometer Method	12
Luminous Intensity Distribution Plots- Goniophotometer Method.....	13
Luminous Intensity Data- Goniophotometer Method	14
EQUIPMENT LIST	15
TEST METHODS	15
Seasoning of SSL Product.....	15
Sphere-Spectroradiometer Method- Photometric and Electrical Measurements.....	15
Goniophotometer Method	16
Photometric and Electrical Measurements	16
Color Characteristics Measurements.....	16

SAMPLE PHOTO

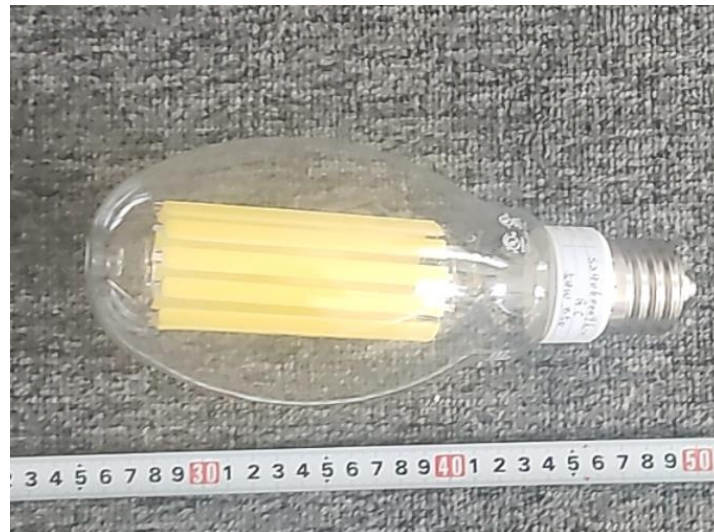


Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Lamp
Model	: 54FHIDDIM/ED32/850/277V/EX39
Electrical Ratings	: 120-277V, 50/60Hz, 54W
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)	0.452	0.205
Power Factor	0.9925	0.9299
Test Power (W)	53.76	52.74
THD A%	3.69	11.84
Luminous Efficacy (lm/W)	187.3	191.4
Total Luminous Flux (lm)	10068.8	10095.8
Color Rendering Index (CRI)	82.6	
R9	6.4	
Correlated Color Temperature (CCT)(K)	5029	
Chromaticity Chroma x	0.3446	
Chromaticity Chroma y	0.3559	
Chromaticity Chroma u	0.2094	
Chromaticity Chroma v	0.3244	
Duv	0.0023	
Chromaticity Chroma u'	0.2094	
Chromaticity Chroma v'	0.4867	

Special Color Rendering Indices	
R1	80.8
R2	87.6
R3	92.1
R4	82.5
R5	81.6
R6	82.7
R7	86.7
R8	67
R9	6.4
R10	70.3
R11	81.5
R12	63.2
R13	82.4
R14	95.8

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)	0.450
Power Factor	0.9971
Power (W)	53.80
Luminous Efficacy (lm/W)	188.7
Total Luminous Flux (lm)	10153.8
Beam Angle (°)	348.5 (0°-180°) / 347.6 (90°-270°)
Center Beam Candle Power (cd)	70.4
Maximum Beam Candle Power (cd)	1110 (At: C=337.5, Gamma=90.0)
Spacing Criteria	5.28 (0°-180°) / 5.28 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	20.27%
Zonal Lumens in the 60 °-90 °Zone	30.51%
Zonal Lumens in the 90 °-120 °Zone	30.25%
Zonal Lumens in the 120 °-180 °Zone	18.97%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

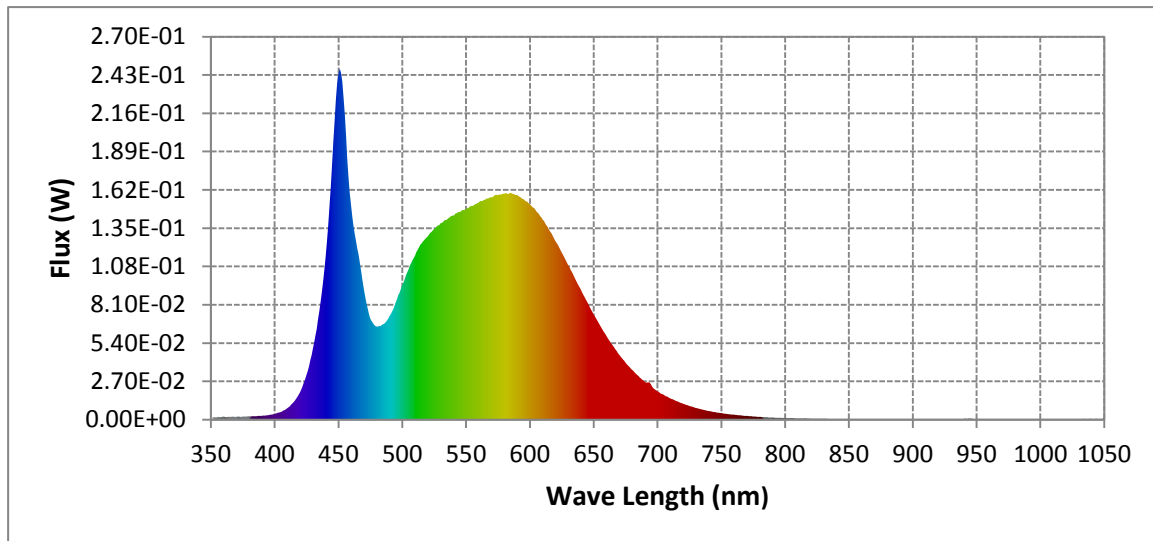
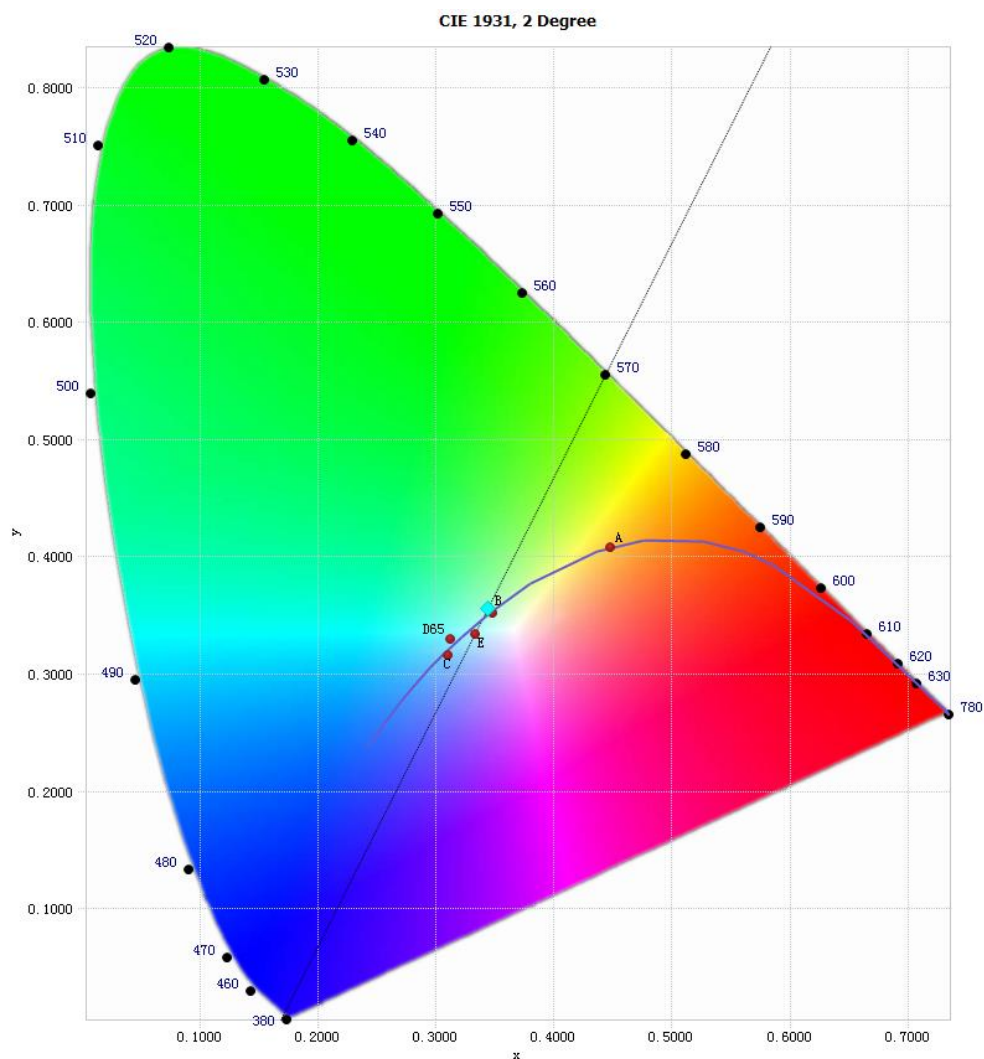


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.40E-03	485	6.72E-02	590	1.58E-01	695	2.50E-02
385	2.37E-03	490	7.28E-02	595	1.56E-01	700	2.01E-02
390	2.73E-03	495	8.27E-02	600	1.52E-01	705	1.75E-02
395	3.17E-03	500	9.49E-02	605	1.47E-01	710	1.51E-02
400	4.01E-03	505	1.06E-01	610	1.41E-01	715	1.31E-02
405	5.49E-03	510	1.16E-01	615	1.34E-01	720	1.13E-02
410	8.16E-03	515	1.24E-01	620	1.26E-01	725	9.75E-03
415	1.23E-02	520	1.29E-01	625	1.18E-01	730	8.40E-03
420	1.95E-02	525	1.35E-01	630	1.09E-01	735	7.22E-03
425	3.16E-02	530	1.38E-01	635	1.00E-01	740	6.16E-03
430	5.00E-02	535	1.41E-01	640	9.19E-02	745	5.38E-03
435	7.64E-02	540	1.44E-01	645	8.29E-02	750	4.62E-03
440	1.15E-01	545	1.46E-01	650	7.41E-02	755	4.04E-03
445	1.80E-01	550	1.48E-01	655	6.65E-02	760	3.48E-03
450	2.44E-01	555	1.51E-01	660	5.91E-02	765	3.06E-03
455	2.15E-01	560	1.53E-01	665	5.23E-02	770	2.63E-03
460	1.52E-01	565	1.55E-01	670	4.58E-02	775	2.25E-03
465	1.20E-01	570	1.57E-01	675	4.02E-02	780	2.00E-03
470	9.26E-02	575	1.58E-01	680	3.51E-02		
475	7.14E-02	580	1.59E-01	685	3.08E-02		
480	6.57E-02	585	1.60E-01	690	2.68E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3446, 0.3559)

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

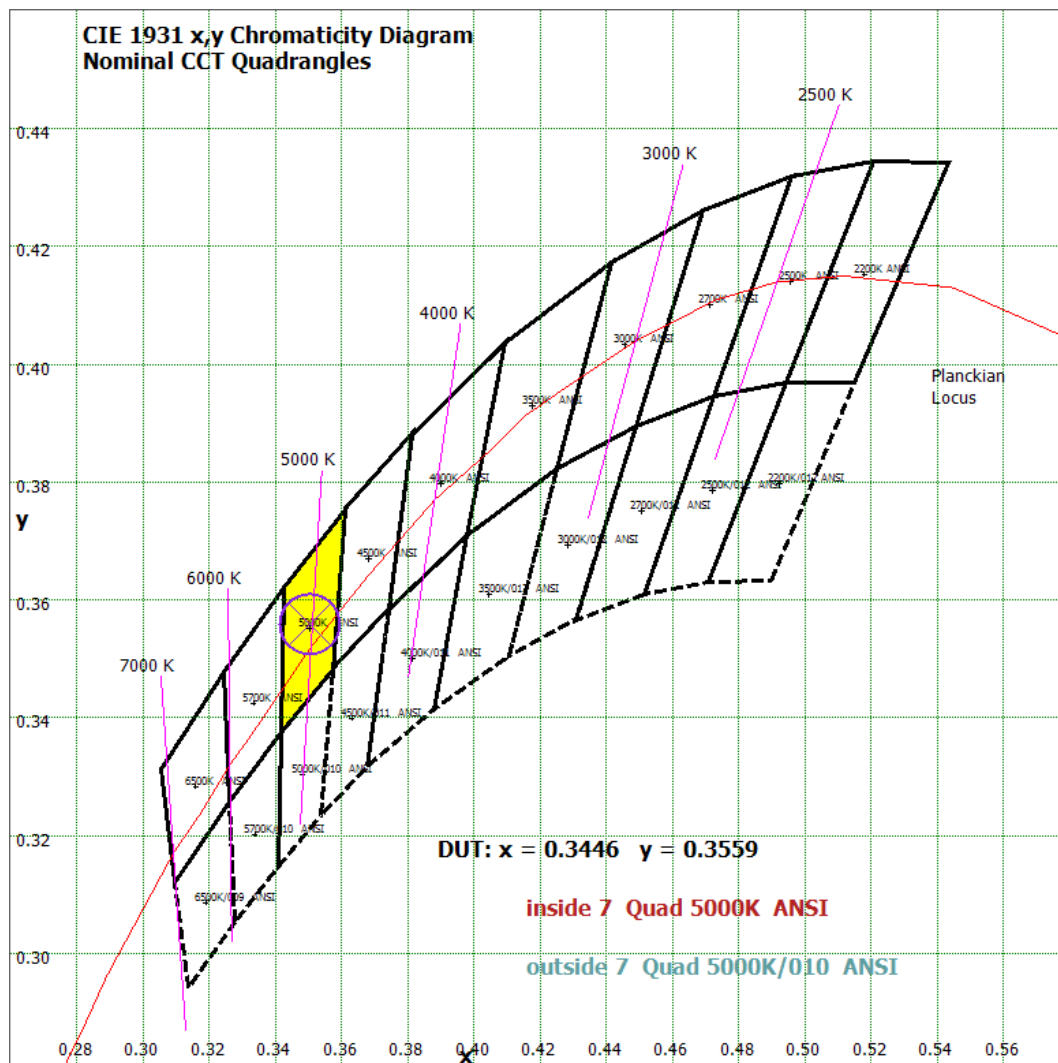


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

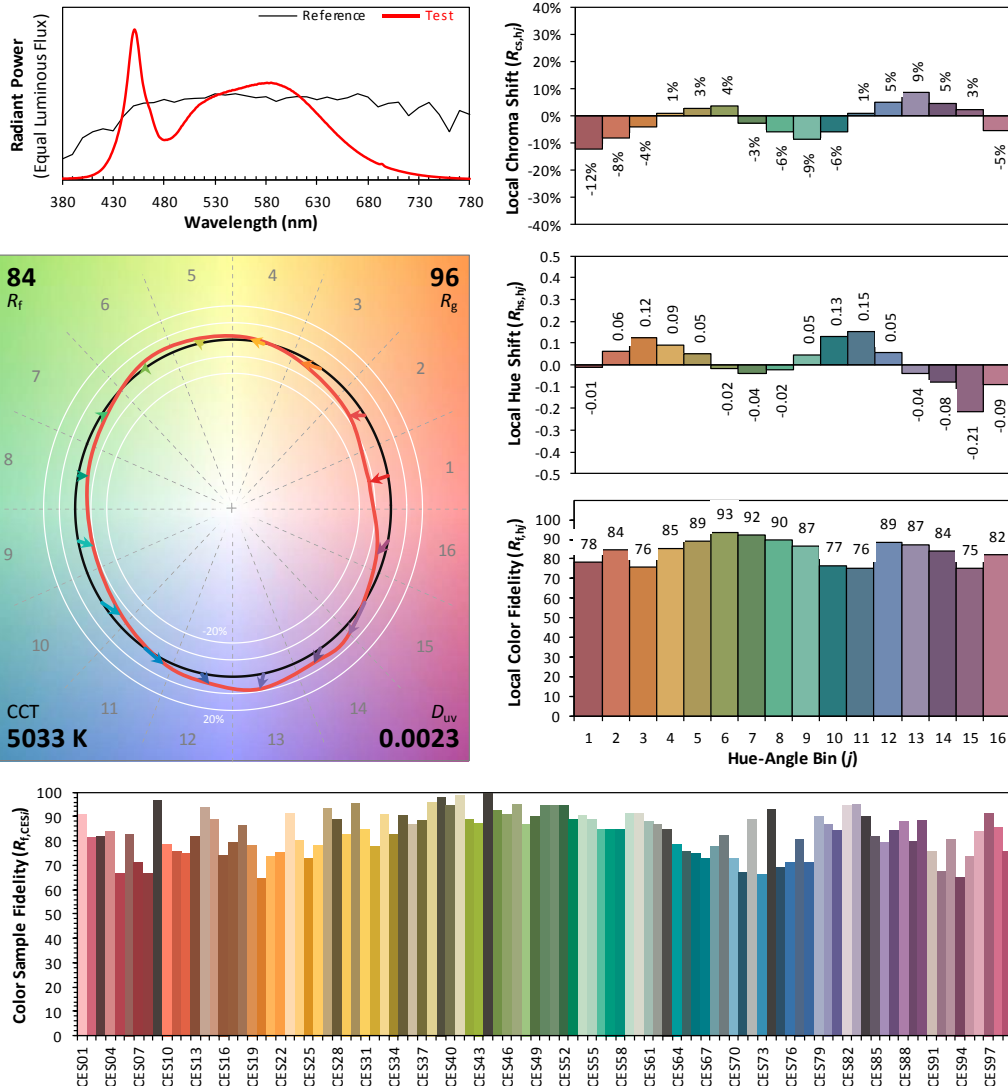
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/06/14

Model: 54FHIDDIM/ED32/850/277V/EX39



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

x 0.3446
 y 0.3559
 u' 0.2094
 v' 0.4867

CIE 13.3-1995
(CRI)

R_a 83
 R_9 6

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	11.473	0.11%
10- 20	76.704	0.76%
20- 30	211.365	2.08%
30- 40	391.241	3.85%
40- 50	588.351	5.79%
50- 60	778.792	7.67%
60- 70	937.795	9.24%
70- 80	1050.516	10.35%
80- 90	1109.132	10.92%
90-100	1106.893	10.90%
100-110	1042.438	10.27%
110-120	922.541	9.09%
120-130	757.133	7.46%
130-140	565.557	5.57%
140-150	364.089	3.59%
150-160	180.407	1.78%
160-170	54.089	0.53%
170-180	5.312	0.05%
Total	10153.8	100%

$\gamma(^{\circ})$	Lumens	% Total
0-130	8984.37	88.48%
130-180	1169.45	11.52%
0-180	10153.8	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

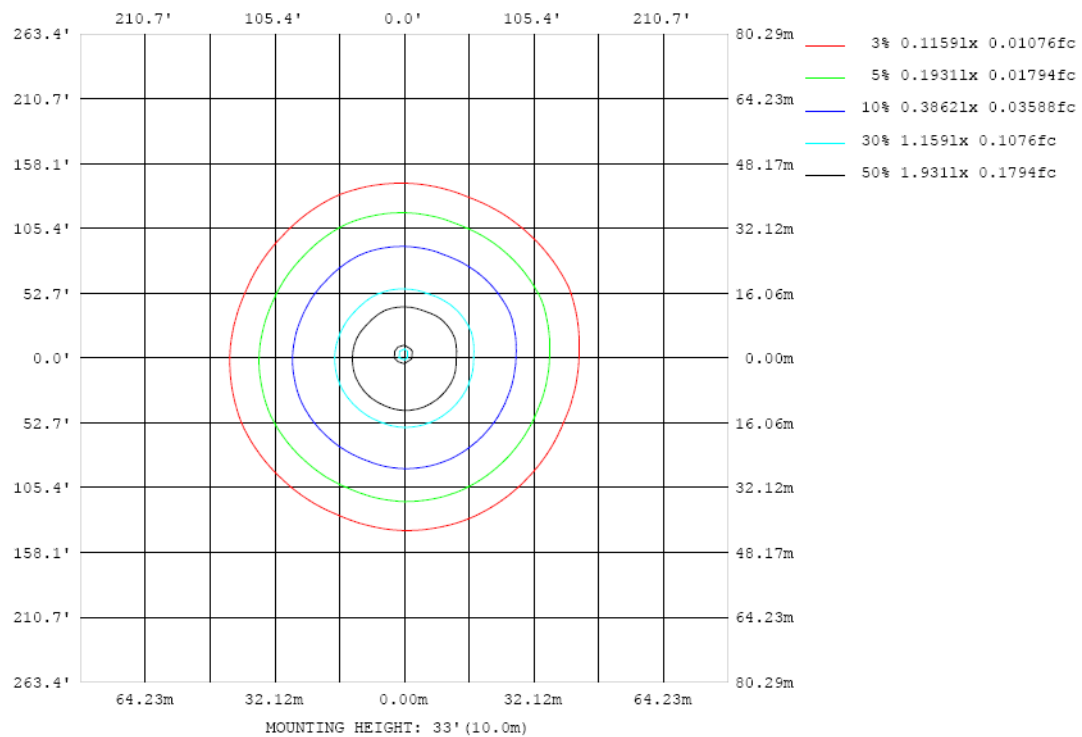


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

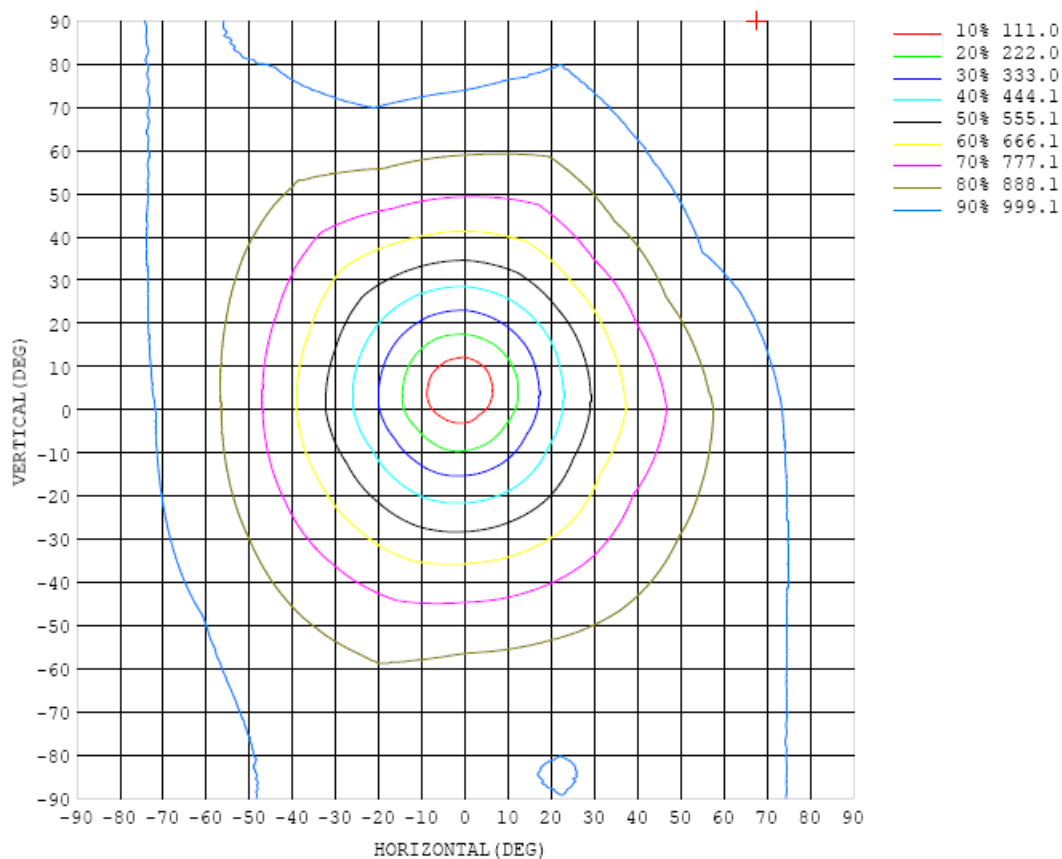


Chart 6: Isocandela Plot

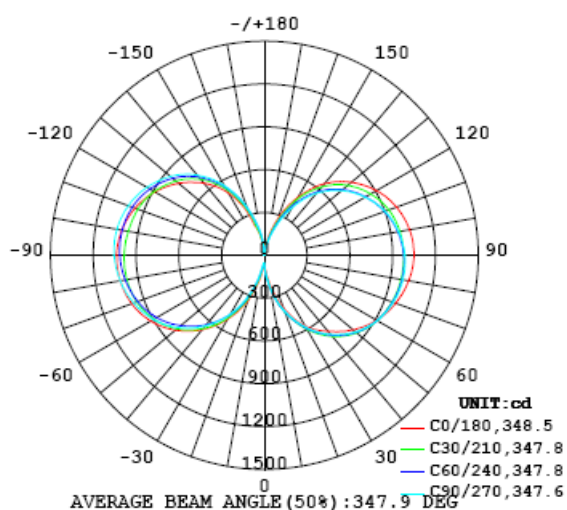


Chart 7: Polar Candela Distribution

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	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4			
5	113	132	140	143	142	134	123	106	83.5	71.4	59.5	52.1	52.5	57.0	68.8	90.0			
10	193	223	234	237	232	219	207	185	147	118	94.8	81.9	79.9	93.9	132	162			
15	298	327	330	333	328	313	302	280	236	212	185	169	173	190	221	256			
20	394	424	422	421	416	405	396	381	335	311	285	270	273	296	328	370			
25	490	512	509	507	502	490	487	472	428	407	387	374	374	398	427	464			
30	570	600	589	589	582	570	569	556	514	502	478	471	474	492	532	555			
35	639	676	663	662	656	642	645	633	602	590	558	564	563	577	623	641			
40	695	741	730	727	722	705	711	703	680	670	636	649	645	653	709	720			
45	756	799	788	786	782	762	769	766	751	739	702	726	721	720	783	796			
50	812	845	840	838	833	811	821	824	816	801	767	793	786	781	850	865			
55	865	883	880	881	878	851	865	877	873	852	823	857	847	837	903	925			
60	909	915	913	917	913	885	899	924	921	895	873	909	899	883	947	978			
65	948	937	939	946	941	909	929	962	960	928	913	955	941	923	981	1019			
70	981	952	956	969	963	930	952	995	990	952	947	993	976	954	1007	1050			
75	1007	966	971	986	977	944	969	1020	1012	970	971	1020	1005	978	1027	1079			
80	1028	973	980	998	987	953	982	1040	1027	978	991	1044	1027	999	1039	1098			
85	1042	975	982	1002	989	958	987	1054	1034	985	1006	1059	1044	1008	1047	1107			
90	1049	977	977	998	986	955	989	1059	1037	983	1015	1068	1054	1018	1049	1110			
95	1046	973	967	987	973	949	983	1057	1030	979	1016	1071	1056	1017	1045	1102			
100	1033	966	951	970	956	933	967	1046	1016	968	1014	1062	1051	1010	1037	1086			
105	1014	951	927	944	932	916	951	1027	995	959	1002	1049	1035	999	1019	1061			
110	987	929	899	913	901	887	927	1002	966	944	987	1027	1015	979	996	1030			
115	952	900	861	874	862	855	896	967	930	924	961	998	989	955	970	992			
120	906	861	820	830	815	814	857	927	889	892	929	961	951	923	929	944			
125	855	816	771	777	764	769	813	875	839	854	887	915	909	883	884	889			
130	796	763	716	719	706	716	761	818	785	810	840	863	861	839	836	829			
135	730	701	654	653	640	652	700	749	724	759	783	804	802	787	777	763			
140	655	625	582	578	567	585	632	670	660	695	716	734	734	721	713	686			
145	564	542	499	488	480	502	547	578	588	621	639	655	656	645	636	605			
150	468	446	408	392	382	409	449	472	504	533	556	569	564	559	548	514			
155	369	340	309	288	282	308	344	342	406	434	458	470	464	458	448	424			
160	266	231	205	188	187	211	242	215	282	327	351	360	356	346	339	318			
165	171	142	121	111	111	126	150	90.5	188	192	246	253	250	242	235	214			
170	93.1	68.4	52.6	44.6	45.0	52.6	29.8	66.2	106	120	156	163	162	155	145	126			
175	19.2	9.63	10.2	7.65	7.12	7.20	7.57	13.8	32.9	39.3	56.8	64.3	65.7	61.6	52.2	38.1			
180	0.71	0.69	0.65	0.64	0.54	0.60	0.68	0.63	0.69	0.70	0.66	0.66	0.66	0.65	0.69	0.70			

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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