

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/ED32/840/277V/EX39

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ24060009f

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/ED32/840/277V/EX39**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
190.3	10001.5	52.57	0.9945
CCT (K)	CRI	Stabilization Time (Light & Power)	
4052	82.1	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

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SAMPLE PHOTO



Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Lamp
Model	: 54FHIDDIM/ED32/840/277V/EX39
Electrical Ratings	: 120-277V, 50/60Hz, 54W
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)	0.441	0.205
Power Factor	0.9945	0.9217
Test Power (W)	52.57	52.33
THD A%	3.45	12.71
Luminous Efficacy (lm/W)	190.3	192.2
Total Luminous Flux (lm)	10001.5	10055.6
Color Rendering Index (CRI)	82.1	
R9	6.9	
Correlated Color Temperature (CCT)(K)	4052	
Chromaticity Chroma x	0.3801	
Chromaticity Chroma y	0.3830	
Chromaticity Chroma u	0.2224	
Chromaticity Chroma v	0.3362	
Duv	0.0030	
Chromaticity Chroma u'	0.2224	
Chromaticity Chroma v'	0.5043	

Special Color Rendering Indices	
R1	80.3
R2	90.2
R3	95.6
R4	77.5
R5	79.1
R6	85.4
R7	85.3
R8	63.3
R9	6.9
R10	75
R11	74.7
R12	57.2
R13	83.1
R14	97.8

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)	0.440
Power Factor	0.9971
Power (W)	52.65
Luminous Efficacy (lm/W)	191.6
Total Luminous Flux (lm)	10086.0
Beam Angle (°)	349.3 (0°-180°) / 348.0 (90°-270°)
Center Beam Candle Power (cd)	66.7
Maximum Beam Candle Power (cd)	1057 (At: C=315.0, Gamma=90.5)
Spacing Criteria	5.24 (0°-180°) / 5.35 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	20.17%
Zonal Lumens in the 60 °-90 °Zone	30.56%
Zonal Lumens in the 90 °-120 °Zone	30.24%
Zonal Lumens in the 120 °-180 °Zone	19.03%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

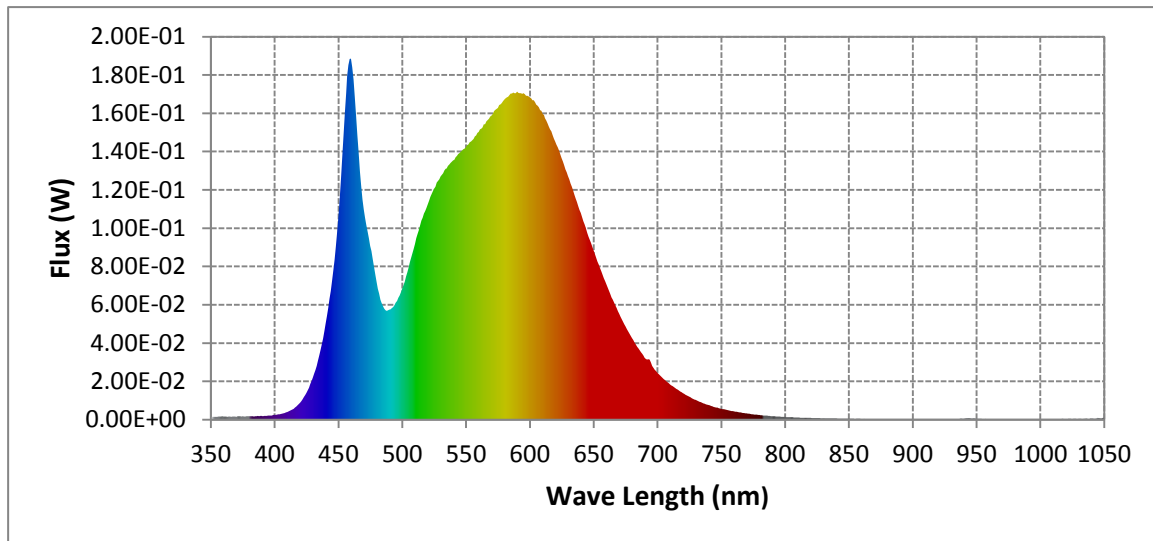
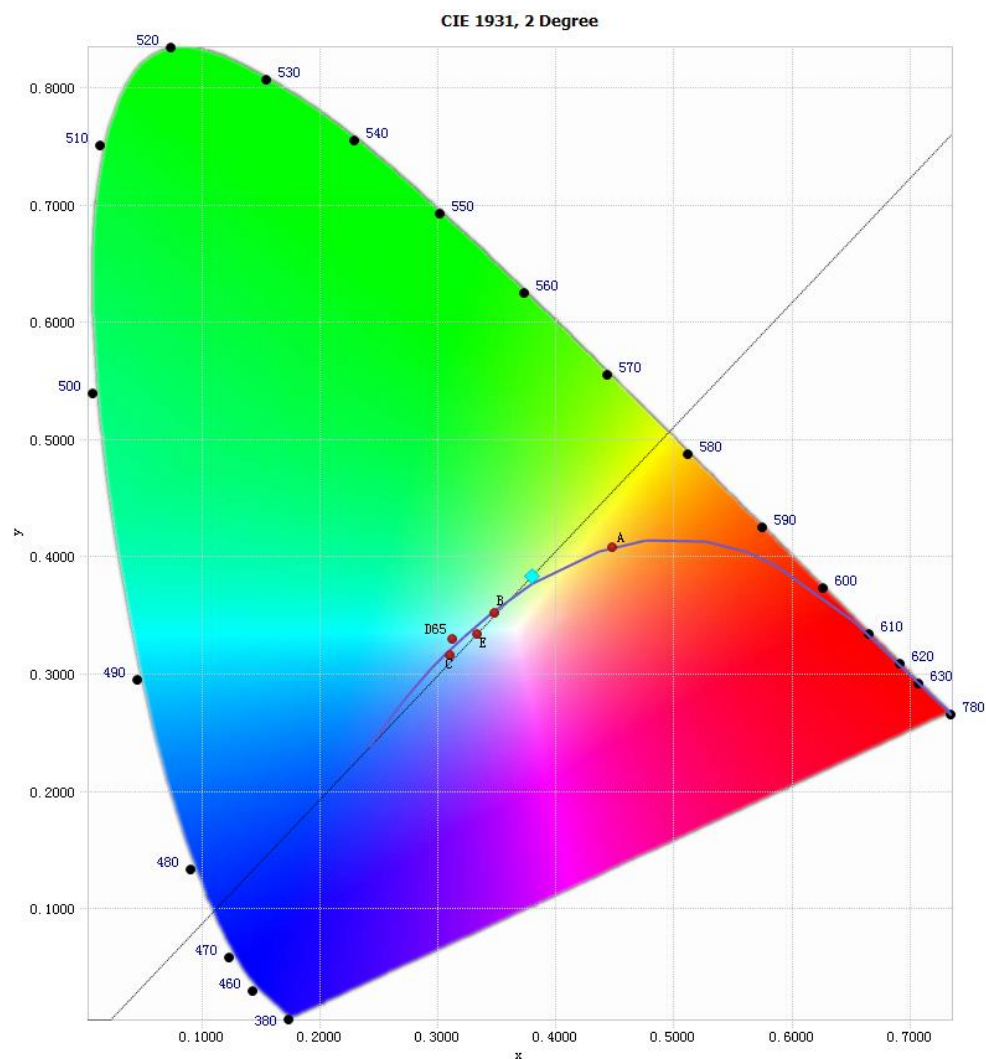


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.74E-03	485	5.94E-02	590	1.71E-01	695	3.00E-02
385	1.80E-03	490	5.74E-02	595	1.70E-01	700	2.46E-02
390	1.99E-03	495	6.12E-02	600	1.68E-01	705	2.12E-02
395	2.13E-03	500	6.83E-02	605	1.65E-01	710	1.84E-02
400	2.42E-03	505	7.93E-02	610	1.60E-01	715	1.60E-02
405	3.03E-03	510	9.18E-02	615	1.53E-01	720	1.38E-02
410	4.03E-03	515	1.04E-01	620	1.45E-01	725	1.20E-02
415	5.74E-03	520	1.12E-01	625	1.37E-01	730	1.03E-02
420	8.85E-03	525	1.21E-01	630	1.27E-01	735	8.83E-03
425	1.41E-02	530	1.27E-01	635	1.18E-01	740	7.60E-03
430	2.20E-02	535	1.31E-01	640	1.08E-01	745	6.58E-03
435	3.37E-02	540	1.35E-01	645	9.76E-02	750	5.71E-03
440	5.03E-02	545	1.39E-01	650	8.84E-02	755	4.97E-03
445	7.26E-02	550	1.42E-01	655	7.92E-02	760	4.30E-03
450	1.06E-01	555	1.46E-01	660	7.07E-02	765	3.76E-03
455	1.60E-01	560	1.50E-01	665	6.27E-02	770	3.25E-03
460	1.89E-01	565	1.54E-01	670	5.53E-02	775	2.79E-03
465	1.49E-01	570	1.59E-01	675	4.86E-02	780	2.41E-03
470	1.10E-01	575	1.63E-01	680	4.27E-02		
475	9.07E-02	580	1.67E-01	685	3.73E-02		
480	7.20E-02	585	1.70E-01	690	3.25E-02		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3801, 0.3830)

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

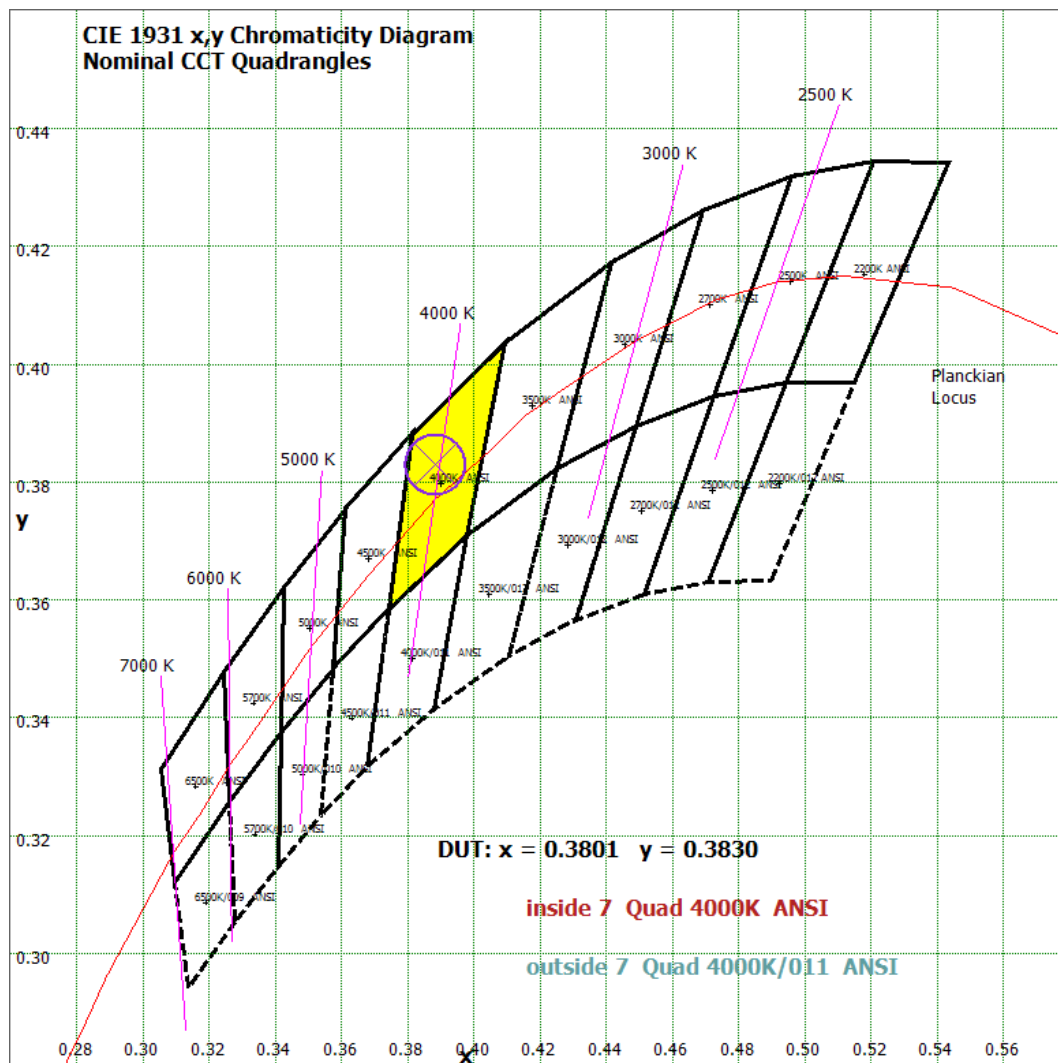


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

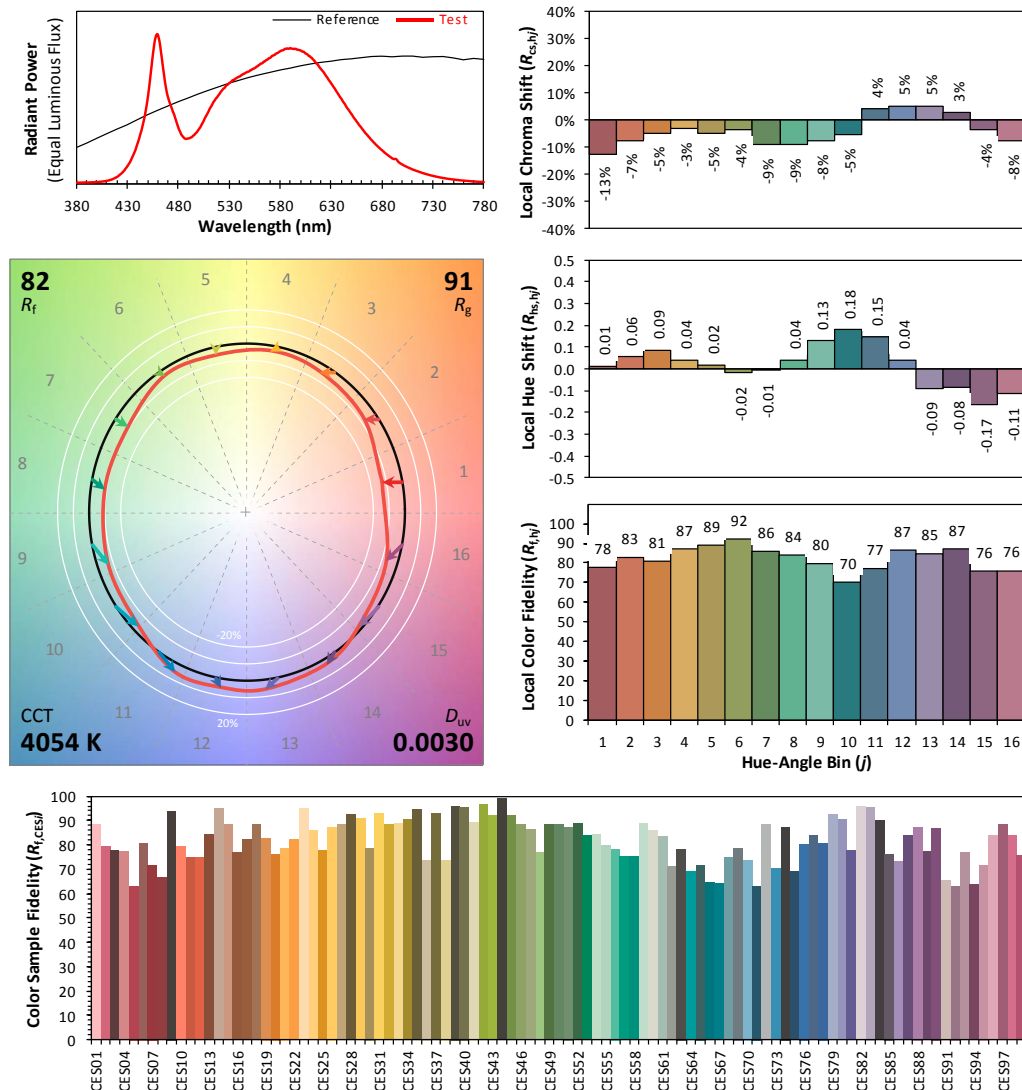
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/06/14

Model: 54FHIDDIM/ED32/840/277V/EX39



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

x 0.3801
 y 0.3830
 u' 0.2224
 v' 0.5043

CIE 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	11.049	0.11%
10- 20	74.786	0.74%
20- 30	206.901	2.05%
30- 40	384.968	3.82%
40- 50	583.059	5.78%
50- 60	773.699	7.67%
60- 70	933.697	9.26%
70- 80	1045.76	10.37%
80- 90	1102.604	10.93%
90-100	1098.859	10.89%
100-110	1034.852	10.26%
110-120	916.701	9.09%
120-130	752.909	7.46%
130-140	561.433	5.57%
140-150	362.004	3.59%
150-160	180.143	1.79%
160-170	57.009	0.57%
170-180	5.594	0.06%
Total	10086.0	100%

$\gamma(^{\circ})$	Lumens	% Total
0-130	8919.84	88.44%
130-180	1166.18	11.56%
0-180	10086.0	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

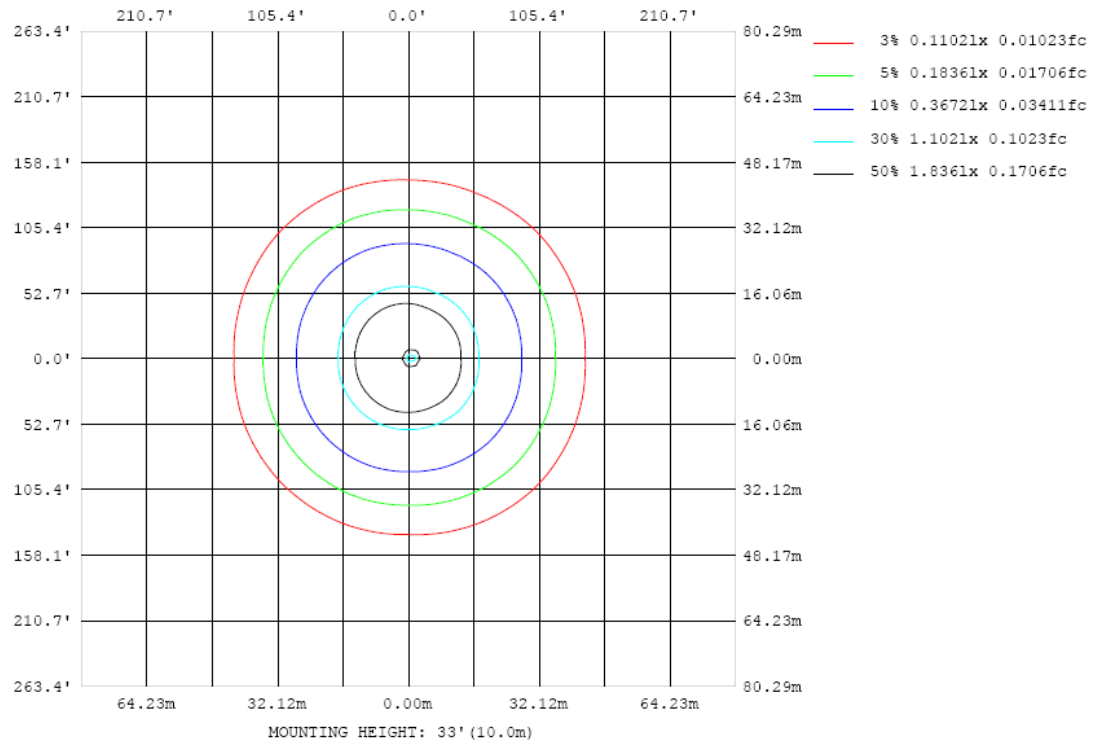


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

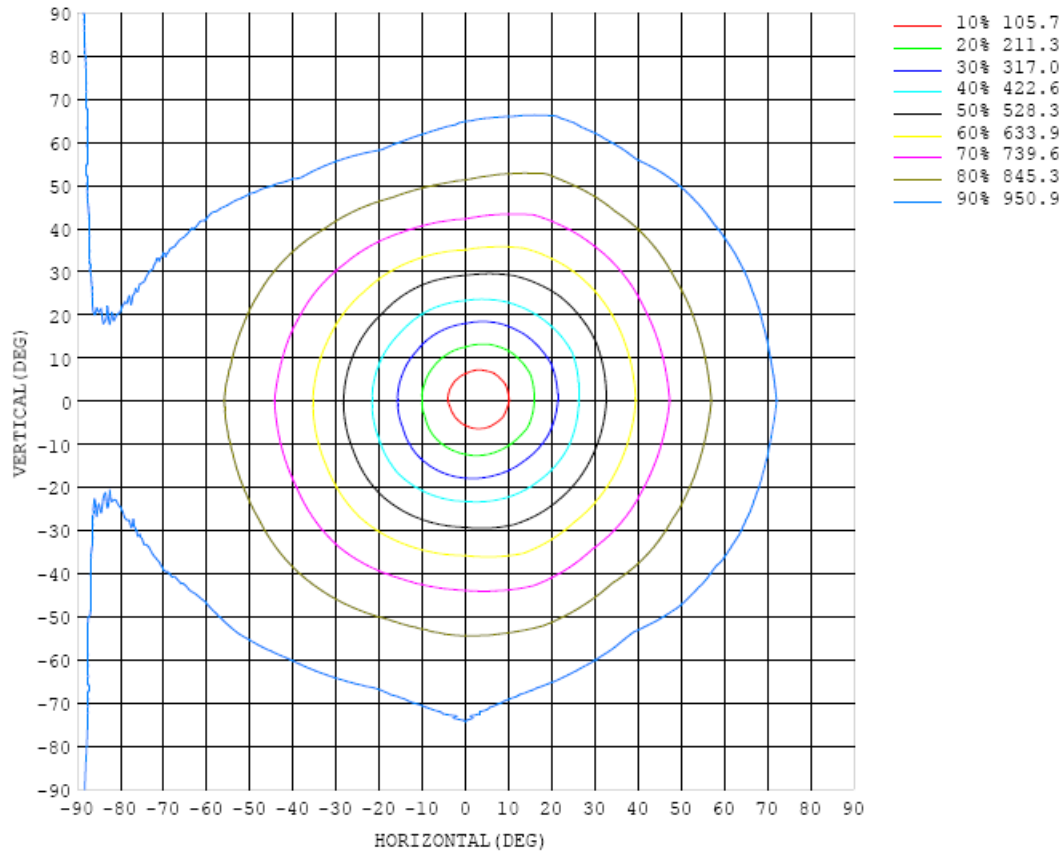


Chart 6: Isocandela Plot

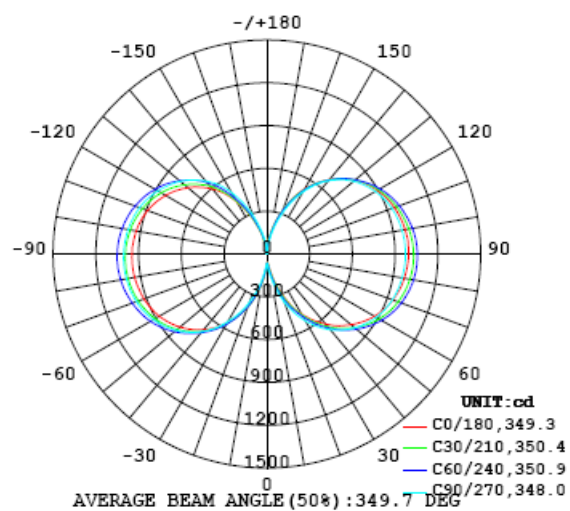


Chart 7: Polar Candela Distribution

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	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7			
5	62.9	64.8	72.5	83.3	97.0	110	117	123	120	117	111	99.5	89.7	78.4	69.5	63.7			
10	104	116	136	152	171	185	195	210	209	206	195	181	160	137	118	105			
15	193	201	225	246	262	275	287	303	302	299	294	277	259	227	202	188			
20	287	305	329	346	361	370	377	392	396	395	391	375	359	328	305	285			
25	396	404	424	436	453	457	462	476	477	477	481	464	454	429	407	386			
30	486	494	509	518	541	543	545	556	555	563	569	554	544	512	492	477			
35	565	585	600	597	622	623	623	630	628	640	649	642	634	596	577	566			
40	642	666	681	671	692	694	693	700	692	708	721	719	708	668	660	652			
45	712	738	754	739	752	759	757	760	747	768	787	789	776	735	734	729			
50	770	805	819	799	806	817	815	813	796	822	848	852	833	794	801	795			
55	825	860	878	853	848	864	863	859	838	869	899	905	881	845	860	851			
60	872	910	929	900	887	905	904	897	871	905	944	949	921	894	912	901			
65	910	948	971	940	914	936	936	928	899	937	978	983	953	932	955	942			
70	941	980	1004	971	937	958	962	951	918	960	1006	1010	974	965	990	975			
75	963	1002	1028	995	953	976	982	968	932	979	1028	1028	991	990	1017	1000			
80	979	1020	1044	1012	963	985	995	980	942	990	1042	1043	1002	1009	1038	1019			
85	989	1028	1055	1024	970	985	1001	986	947	994	1051	1047	1007	1021	1051	1031			
90	995	1030	1055	1029	971	982	1000	987	948	994	1051	1046	1006	1025	1056	1035			
95	994	1023	1051	1029	969	972	992	983	941	986	1045	1039	1000	1024	1054	1032			
100	986	1011	1036	1020	963	954	976	971	932	974	1031	1025	988	1014	1042	1021			
105	972	992	1016	1004	950	934	957	953	914	955	1012	1004	974	1001	1025	1004			
110	952	969	990	981	934	909	927	927	891	930	984	976	951	979	1002	982			
115	926	940	956	951	910	875	892	893	860	897	951	940	922	952	970	953			
120	893	904	915	913	878	837	849	851	821	857	907	897	885	914	932	916			
125	852	859	865	867	841	793	800	803	777	811	859	846	841	870	884	871			
130	801	806	810	815	792	741	743	748	723	755	799	788	792	814	825	816			
135	745	749	747	754	739	683	680	685	664	692	733	723	733	755	759	756			
140	680	677	677	684	670	618	607	608	596	621	653	650	666	684	688	687			
145	606	606	600	604	592	544	524	525	517	533	563	564	592	608	611	612			
150	526	518	515	513	500	459	431	425	421	431	454	464	498	517	524	526			
155	431	425	415	412	396	362	336	320	325	332	354	365	393	413	423	427			
160	326	325	321	310	289	265	240	218	230	233	252	268	288	310	325	328			
165	230	231	222	207	192	176	159	144	152	151	163	175	190	210	229	234			
170	144	141	126	79.2	72.8	87.2	82.1	69.6	59.4	57.8	82.5	99.6	115	133	146	151			
175	71.9	64.9	55.7	35.7	15.0	10.3	5.98	5.98	8.72	18.3	28.5	36.3	46.0	58.5	72.7	76.2			
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.67	0.67	0.65	0.61	0.60	0.59	0.59			

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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