



LM-79-08 Test Report

for

GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

BR30

Model: 9.5BR30DIM/927/R

9.5BR30DIM/927/GU24

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17120049a

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

Review by:

Engineer: April Zou
Dec. 27, 2017

Approved by:



Manager: Jim Zhang
Dec. 27, 2017

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: **9.5BR30DIM/927/R**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
85.0	785.0	9.24	0.9236
CCT (K)	CRI	Stabilization Time (Light & Power)	
2685	93.6	60	

Table 1: Executive Data Summary

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

Test specifications:

Date of Receipt : Dec. 22, 2017

Date of Test : Dec. 25, 2017

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

Reference Standard : IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

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Sample Photos



9.5BR30DIM/927/R



9.5BR30DIM/927/GU24

Equipment Under Test (EUT)

Name	: BR30
Model	: 9.5BR30DIM/927/R, 9.5BR30DIM/927/GU24
Electrical Ratings	: 120V, 60Hz, 9.5W
Product Description	: 2700K, CRI90
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

Note: Model 9.5BR30DIM/927/R and model 9.5BR30DIM/927/GU24 are identical except their different screw base. Model 9.5BR30DIM/927/R is E26 base. 9.5BR30DIM/927/GU24 is GU24 base.
Model 9.5BR30DIM/927/R was chosen to be representative model in this report.

TEST RESULTS

Test ambient temperature was 24.9°C.

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

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 70 minutes.

Sphere-Spectroradiometer Method

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.083
Power Factor	0.9236
Test Power (W)	9.24
THD A%	30.63
Luminous Efficacy (lm/W)	85.0
Total Luminous Flux (lm)	785.0
Color Rendering Index (CRI)	93.6
R9	65.8
Correlated Color Temperature (CCT)(K)	2685
Chromaticity Chroma x	0.4594
Chromaticity Chroma y	0.4081
Chromaticity Chroma u	0.2633
Chromaticity Chroma v	0.3509
Duv	0.0013
Chromaticity Chroma u'	0.2633
Chromaticity Chroma v'	0.5263

Special Color Rendering Indices	
R1	94.1
R2	96.8
R3	97.3
R4	93.7
R5	93.5
R6	96
R7	92.8
R8	84.3
R9	65.8
R10	91
R11	94.2
R12	83.9
R13	94.9
R14	97.6
Rf	91
Rg	100

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 24.9°C.

The photometric distance is 2.47m.

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)	0.085
Power Factor	0.9245
Test Power (W)	9.38
Luminous Efficacy (lm/W)	84.6
Total Luminous Flux (lm)	793.2
Beam Angle (°)	112.7
Center Beam Candle Power (cd)	244
Spacing Criteria	1.23 (0°-180°)/ 1.24 (90°-270°)
Zonal Lumens in the 0°-60°Zone	68.15%
Zonal Lumens in the 60°-90°Zone	24.77%
Zonal Lumens in the 90°-120°Zone	5.79%
Zonal Lumens in the 120°-180°Zone	1.29%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

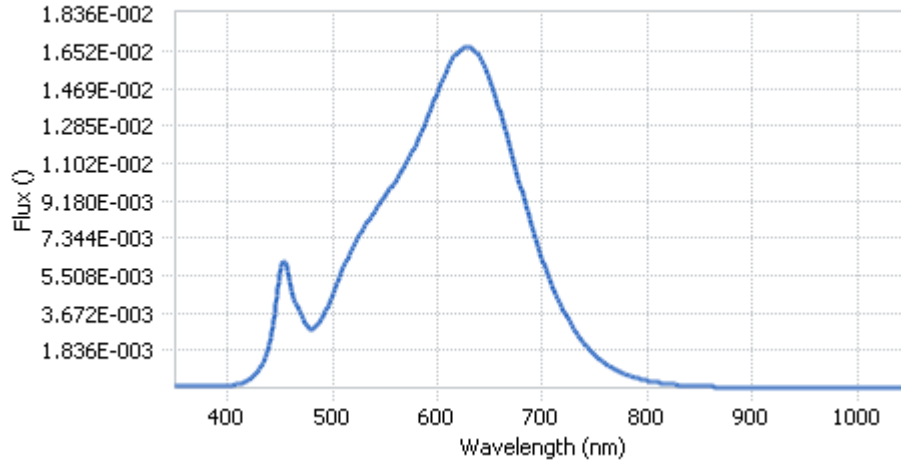


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.26E-04	485	3.18E-03	590	1.37E-02	695	7.34E-03
385	1.24E-04	490	3.55E-03	595	1.44E-02	700	6.52E-03
390	1.21E-04	495	4.11E-03	600	1.51E-02	705	5.77E-03
395	1.28E-04	500	4.78E-03	605	1.57E-02	710	5.07E-03
400	1.34E-04	505	5.45E-03	610	1.63E-02	715	4.48E-03
405	1.53E-04	510	6.12E-03	615	1.68E-02	720	3.94E-03
410	1.91E-04	515	6.74E-03	620	1.72E-02	725	3.44E-03
415	2.83E-04	520	7.27E-03	625	1.73E-02	730	3.00E-03
420	4.19E-04	525	7.73E-03	630	1.73E-02	735	2.59E-03
425	6.39E-04	530	8.18E-03	635	1.72E-02	740	2.24E-03
430	9.70E-04	535	8.59E-03	640	1.68E-02	745	1.93E-03
435	1.49E-03	540	9.00E-03	645	1.63E-02	750	1.67E-03
440	2.35E-03	545	9.41E-03	650	1.56E-02	755	1.44E-03
445	3.82E-03	550	9.76E-03	655	1.49E-02	760	1.25E-03
450	5.84E-03	555	1.02E-02	660	1.40E-02	765	1.08E-03
455	6.34E-03	560	1.06E-02	665	1.30E-02	770	9.22E-04
460	5.16E-03	565	1.10E-02	670	1.20E-02	775	7.90E-04
465	4.31E-03	570	1.15E-02	675	1.11E-02	780	6.82E-04
470	3.82E-03	575	1.19E-02	680	1.01E-02		
475	3.22E-03	580	1.25E-02	685	9.13E-03		
480	3.00E-03	585	1.31E-02	690	8.21E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method

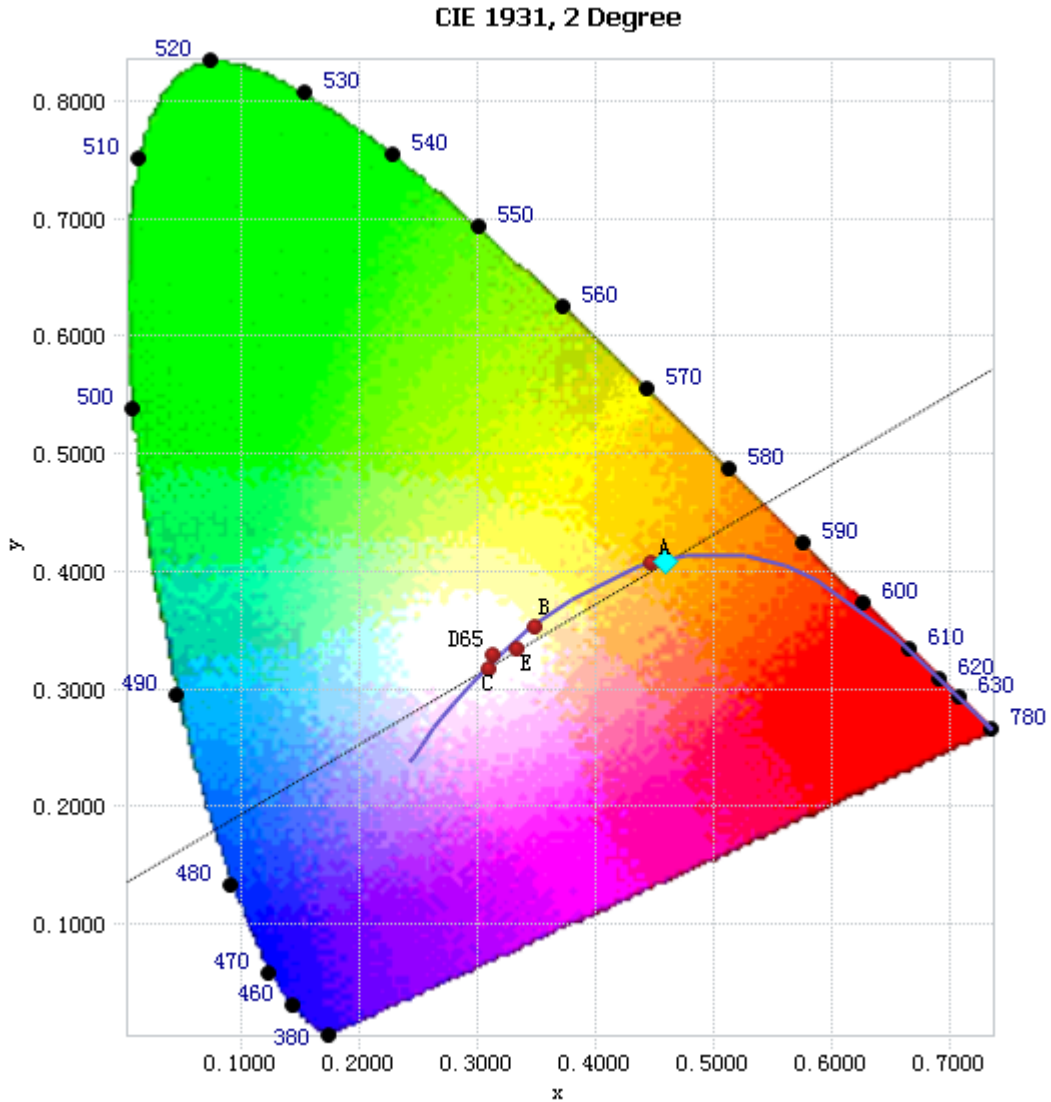


Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

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

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

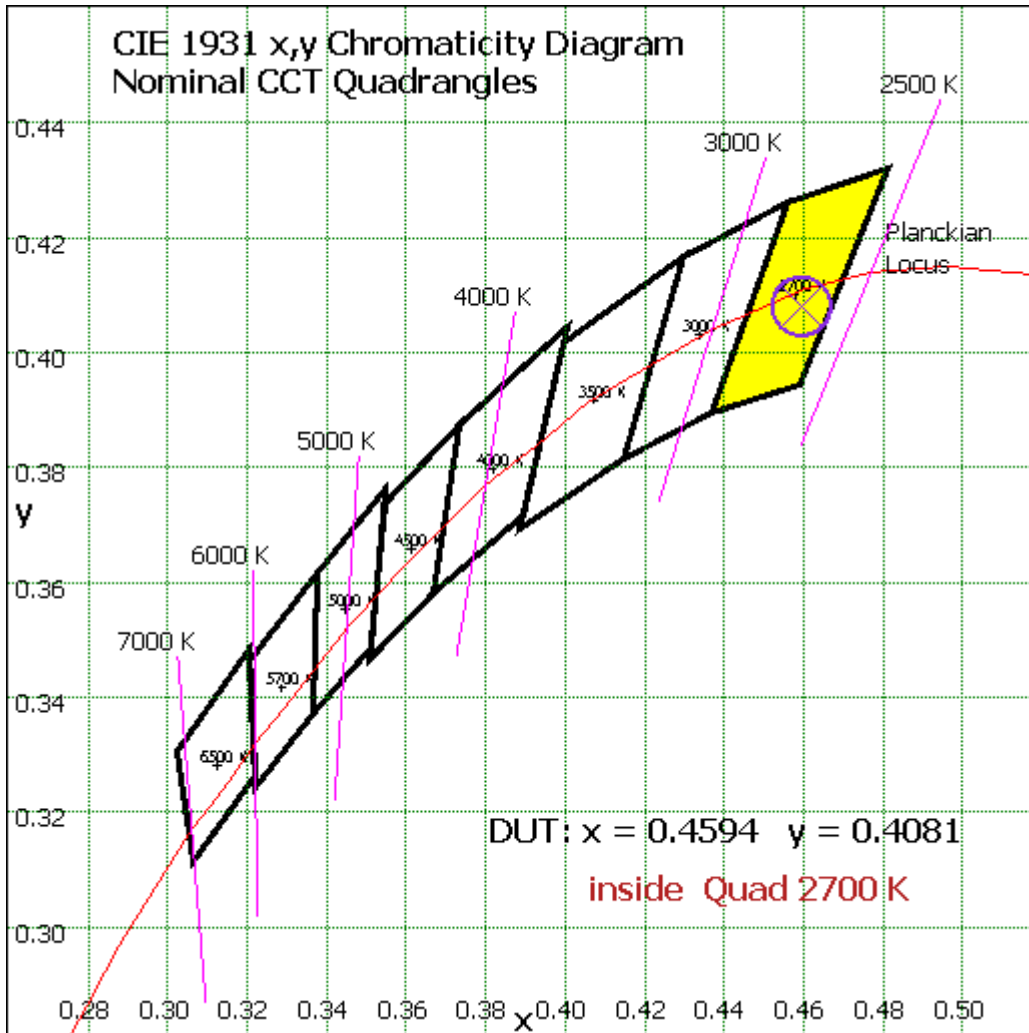


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	23.053	2.91%
10- 20	65.616	8.27%
20- 30	98.479	12.42%
30- 40	117.755	14.85%
40- 50	122.392	15.43%
50- 60	113.257	14.28%
60- 70	92.775	11.70%
70- 80	65.3	8.23%
80- 90	38.388	4.84%
90-100	22.12	2.79%
100-110	14.518	1.83%
110-120	9.316	1.17%
120-130	5.481	0.69%
130-140	2.889	0.36%
140-150	1.285	0.16%
150-160	0.437	0.06%
160-170	0.124	0.02%
170-180	0.035	0.00%
Total	793.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	540.552	68.15%
60- 90	196.463	24.77%
0-90	737.015	92.91%
90- 180	56.205	7.09%
0- 180	793.2	100%

Table 5: Zonal Lumen Data

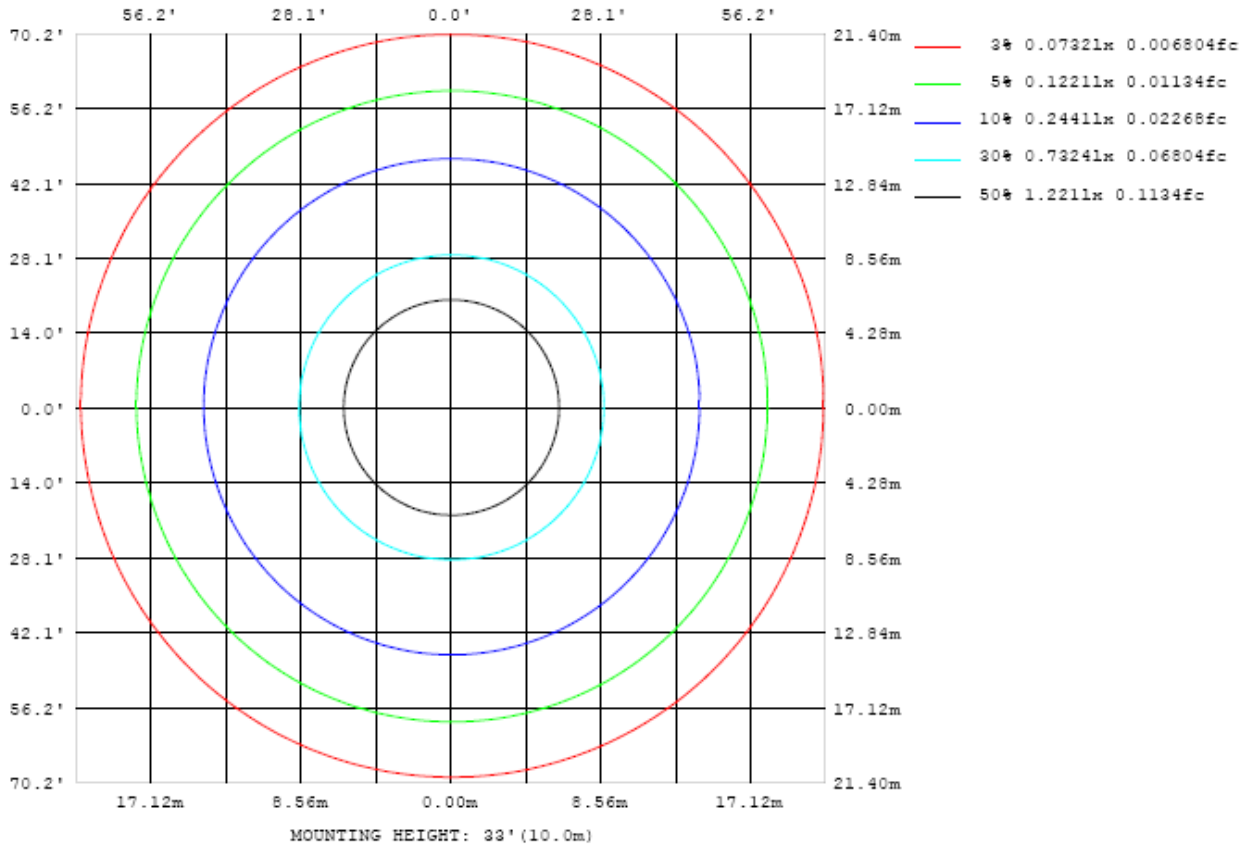


Chart 4: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

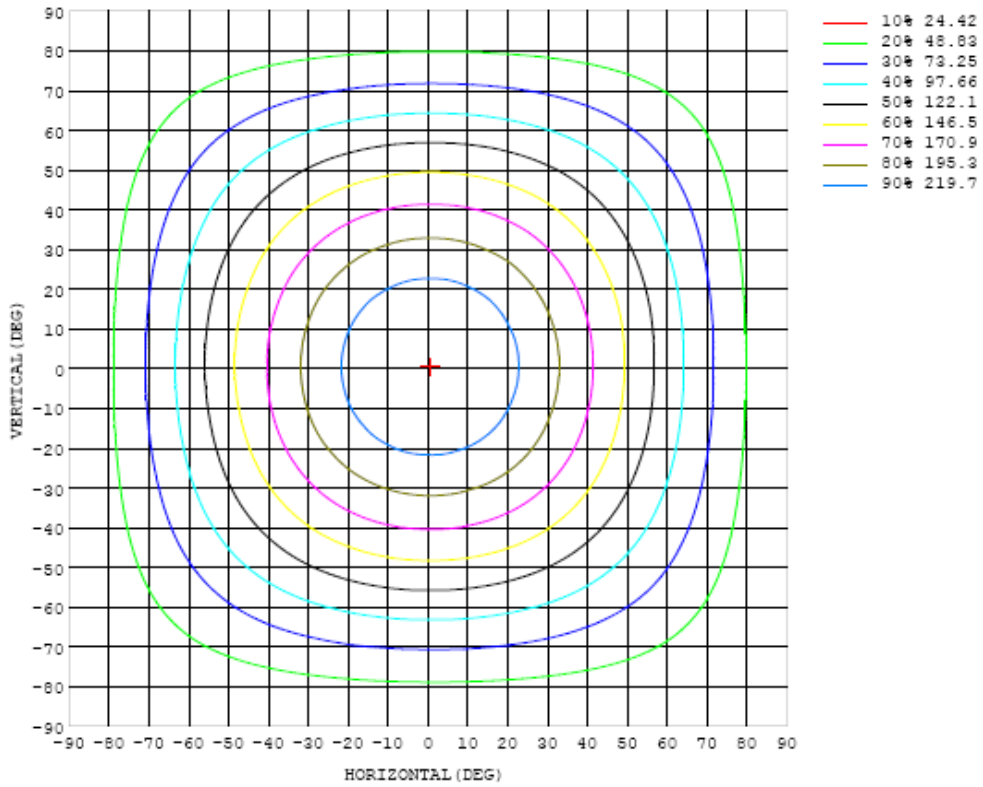


Chart 5: Isocandela Plot

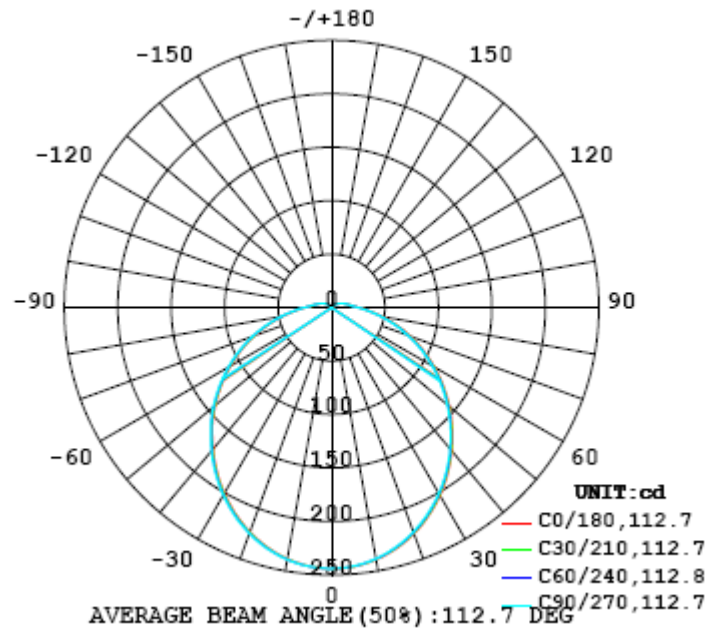


Chart 6: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1 UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
5	243	243	243	243	243	243	243	242	243	242	243	242	242	243	242	242	242	243	243
10	239	239	239	239	239	239	239	238	239	238	238	238	238	238	238	238	238	238	239
15	233	233	233	233	233	232	232	232	232	232	232	232	232	232	231	232	232	232	232
20	225	225	224	224	224	224	224	223	223	223	223	223	223	223	223	223	223	223	223
25	215	215	214	214	214	213	213	213	213	212	213	212	212	212	212	212	212	212	213
30	203	203	202	202	202	201	201	201	201	200	200	200	200	200	200	200	200	200	200
35	189	189	189	189	188	188	188	187	187	187	187	186	186	186	186	186	187	187	187
40	175	175	174	174	174	173	173	173	173	172	172	172	172	172	172	172	172	172	172
45	160	159	159	159	158	158	158	157	157	157	157	156	156	156	156	156	157	157	158
50	144	144	143	143	142	142	142	141	141	141	141	141	141	141	140	141	141	141	142
55	128	127	127	127	126	126	126	125	125	125	125	124	124	124	124	124	124	125	126
60	111	111	110	110	110	109	109	109	108	108	108	108	108	108	108	108	108	108	109
65	94.7	94.3	94.0	93.7	93.3	93.0	92.6	92.2	92.0	91.8	91.6	91.5	91.5	91.5	91.5	91.6	91.6	91.9	92.6
70	78.4	78.0	77.6	77.3	76.9	76.6	76.3	75.9	75.7	75.5	75.4	75.2	75.1	75.2	75.2	75.4	75.5	75.6	76.4
75	62.9	62.6	62.2	61.9	61.6	61.2	60.8	60.6	60.4	60.2	60.1	59.9	59.9	60.0	60.0	60.1	60.2	60.4	60.6
80	48.0	47.7	47.4	47.2	46.9	46.6	46.3	46.0	45.8	45.6	45.3	45.4	45.4	45.5	45.5	45.6	45.7	45.9	46.0
85	35.4	35.2	34.9	34.7	34.6	34.4	34.2	33.9	33.8	33.6	33.6	33.5	33.4	33.6	33.6	33.7	33.8	33.8	34.0
90	26.1	26.0	25.8	25.7	25.6	25.5	25.3	25.1	25.1	25.0	24.9	25.0	24.9	25.0	25.1	25.1	25.1	25.2	25.2
95	20.1	20.1	20.0	20.0	19.9	19.9	19.8	19.7	19.6	19.6	19.6	19.6	19.6	19.7	19.6	19.7	19.6	19.7	19.7
100	16.5	16.5	16.5	16.4	16.4	16.4	16.3	16.3	16.3	16.2	16.2	16.2	16.2	16.2	16.3	16.3	16.3	16.2	16.2
105	13.8	13.8	13.8	13.8	13.7	13.7	13.7	13.6	13.6	13.6	13.6	13.5	13.5	13.6	13.6	13.6	13.6	13.6	13.5
110	11.5	11.5	11.4	11.4	11.4	11.4	11.3	11.3	11.3	11.3	11.2	11.2	11.2	11.3	11.2	11.3	11.3	11.3	11.2
115	9.45	9.44	9.42	9.42	9.41	9.37	9.32	9.28	9.26	9.23	9.20	9.21	9.22	9.22	9.25	9.26	9.28	9.27	9.23
120	7.68	7.66	7.65	7.64	7.64	7.60	7.55	7.51	7.49	7.46	7.45	7.44	7.43	7.45	7.46	7.47	7.49	7.52	7.50
125	6.13	6.12	6.10	6.09	6.07	6.05	6.00	5.98	5.95	5.93	5.91	5.91	5.90	5.91	5.92	5.94	5.95	5.98	6.01
130	4.82	4.82	4.80	4.80	4.78	4.75	4.72	4.69	4.67	4.66	4.64	4.63	4.61	4.62	4.63	4.65	4.66	4.69	4.72
135	3.72	3.71	3.70	3.69	3.68	3.65	3.63	3.59	3.59	3.56	3.55	3.55	3.53	3.53	3.53	3.55	3.57	3.59	3.64
140	2.80	2.79	2.77	2.76	2.75	2.73	2.70	2.68	2.67	2.65	2.64	2.63	2.62	2.61	2.61	2.63	2.65	2.67	2.73
145	2.02	2.01	2.00	2.00	1.99	1.96	1.94	1.92	1.91	1.89	1.88	1.87	1.85	1.85	1.85	1.87	1.88	1.90	1.97
150	1.39	1.39	1.38	1.37	1.36	1.34	1.32	1.30	1.29	1.28	1.27	1.25	1.24	1.24	1.24	1.25	1.26	1.27	1.35
155	0.91	0.90	0.90	0.89	0.88	0.86	0.85	0.83	0.82	0.81	0.80	0.79	0.78	0.78	0.78	0.78	0.77	0.79	0.86
160	0.58	0.57	0.57	0.57	0.56	0.55	0.53	0.51	0.50	0.49	0.49	0.48	0.48	0.48	0.47	0.46	0.44	0.46	0.48
165	0.40	0.40	0.40	0.41	0.41	0.40	0.39	0.37	0.36	0.35	0.35	0.34	0.34	0.35	0.35	0.32	0.30	0.31	0.37
170	0.38	0.38	0.39	0.39	0.40	0.39	0.39	0.37	0.36	0.34	0.33	0.33	0.33	0.33	0.33	0.32	0.30	0.31	0.37
175	0.39	0.39	0.38	0.39	0.40	0.40	0.40	0.39	0.38	0.36	0.35	0.34	0.33	0.33	0.34	0.33	0.33	0.33	0.31
180	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

Table 6: Luminous Intensity Data

Table--2 UNIT: cd

C (DEG) y (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244		
5	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243		
10	239	238	239	239	239	239	239	239	239	240	240	240	240	240	240	240	240		
15	232	232	233	233	233	233	233	233	233	234	234	234	234	234	234	234	234		
20	224	224	224	224	224	225	225	225	225	225	225	226	226	226	225	225	225		
25	213	213	213	214	214	214	214	215	215	215	215	215	215	215	215	215	215		
30	201	201	201	202	202	202	202	203	203	203	203	203	204	203	203	203	203		
35	187	187	188	188	188	189	189	189	190	190	190	190	190	190	190	190	190		
40	173	173	173	174	174	174	175	175	175	175	176	176	176	176	176	176	175		
45	158	158	158	159	159	159	160	160	160	161	161	161	161	161	161	161	160		
50	142	142	143	143	144	144	144	145	145	145	145	145	145	145	145	145	145		
55	126	126	127	127	127	128	128	128	129	129	129	129	129	129	129	129	129		
60	110	110	110	110	111	111	112	112	112	112	112	113	113	113	112	112	112		
65	93.1	93.2	93.8	94.1	94.2	94.8	95.1	95.5	95.6	95.9	95.9	95.9	96.1	95.8	95.8	96.0	95.5		
70	76.8	77.0	77.2	77.6	78.0	78.3	78.7	78.9	79.1	79.3	79.2	79.5	79.6	79.5	79.4	79.2	79.0		
75	60.9	61.2	61.5	61.9	62.1	62.4	62.6	63.0	63.2	63.4	63.5	63.5	63.5	63.4	63.6	63.2	63.3		
80	46.3	46.6	47.0	47.0	47.4	47.8	47.9	48.2	48.3	48.3	48.4	48.5	48.6	48.5	48.4	48.4	48.1		
85	34.2	34.3	34.5	34.8	35.1	35.1	35.3	35.4	35.5	35.7	35.7	35.9	35.8	35.7	35.6	35.6	35.6		
90	25.4	25.4	25.6	25.7	25.7	25.8	25.9	26.0	26.0	26.2	26.2	26.3	26.3	26.2	26.2	26.1	26.1		
95	19.8	19.8	19.9	19.9	20.0	19.9	20.0	20.0	20.1	20.1	20.1	20.2	20.2	20.2	20.1	20.1	20.2		
100	16.3	16.3	16.3	16.3	16.3	16.4	16.4	16.4	16.4	16.4	16.4	16.5	16.5	16.5	16.5	16.5	16.5		
105	13.5	13.5	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.7	13.7	13.7	13.7	13.7		
110	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.4	11.4	11.4	11.4	11.4	11.4		
115	9.25	9.26	9.29	9.30	9.31	9.31	9.31	9.32	9.32	9.34	9.35	9.36	9.37	9.37	9.37	9.38	9.39		
120	7.53	7.54	7.56	7.57	7.58	7.58	7.59	7.60	7.60	7.61	7.61	7.62	7.63	7.63	7.63	7.63	7.65		
125	6.03	6.04	6.06	6.08	6.08	6.09	6.10	6.11	6.11	6.12	6.12	6.12	6.14	6.14	6.13	6.13	6.14		
130	4.75	4.77	4.79	4.80	4.81	4.82	4.83	4.84	4.84	4.85	4.84	4.85	4.85	4.85	4.85	4.85	4.86		
135	3.66	3.68	3.71	3.72	3.73	3.74	3.75	3.76	3.78	3.77	3.77	3.77	3.77	3.77	3.76	3.76	3.76		
140	2.75	2.77	2.79	2.81	2.82	2.83	2.84	2.86	2.86	2.86	2.86	2.85	2.86	2.85	2.85	2.85	2.85		
145	1.99	2.01	2.03	2.05	2.06	2.08	2.08	2.10	2.10	2.10	2.10	2.09	2.09	2.09	2.09	2.08	2.09		
150	1.37	1.39	1.41	1.41	1.44	1.46	1.47	1.48	1.48	1.48	1.48	1.47	1.47	1.47	1.47	1.46	1.46		
155	0.87	0.91	0.91	0.92	0.96	0.98	0.99	0.99	1.00	0.99	0.99	0.99	0.98	0.98	0.98	0.98	0.98		
160	0.50	0.51	0.57	0.59	0.62	0.63	0.65	0.65	0.65	0.66	0.65	0.65	0.65	0.64	0.64	0.64	0.64		
165	0.36	0.39	0.42	0.43	0.44	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.47	0.47	0.46	0.46		
170	0.37	0.39	0.40	0.41	0.40	0.41	0.42	0.41	0.41	0.41	0.41	0.42	0.42	0.43	0.43	0.43	0.42		
175	0.32	0.35	0.36	0.40	0.40	0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.41	0.41	0.41	0.41	0.41		
180	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		

Table 7: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Aug. 23, 2017	Aug. 22, 2018
Digital Power Meter	PF2010A	HZTE028-01	Aug. 10, 2017	Aug. 09, 2018
AC Power Supply	DPS1060	HZTE001-06	Aug. 10, 2017	Aug. 09, 2018
DC Power Supply	WY12010	HZTE004-03	Aug. 10, 2017	Aug. 09, 2018
Temperature recorder	JM624U	HZTE018-08	Aug. 17, 2017	Aug. 16, 2018
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 16, 2017	Aug. 15, 2018
Standard source	D908	HZTE012-01	Aug. 20, 2017	Aug. 19, 2018
Integrate Sphere system	2M	HZTE015-01	Aug. 23, 2017	Aug. 22, 2018
Digital Power Meter	WT210	HZTE008-01	Aug. 10, 2017	Aug. 09, 2018
AC Power Supply	PCR 500L	HZTE001-07	Aug. 10, 2017	Aug. 09, 2018
DC Power Supply	IT6154	HZTE004-04	Aug. 10, 2017	Aug. 09, 2018
Standard source	SCL-1400	HZTE012-02	Aug. 20, 2017	Aug. 19, 2018
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 16, 2017	Aug. 15, 2018
Temperature Meter	TES1310	HZTE017-01	Aug. 17, 2017	Aug. 16, 2018

Table 8: 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 Two 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 FA19 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 30 min, taken 15 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 FA19 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 30 min, taken 15 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

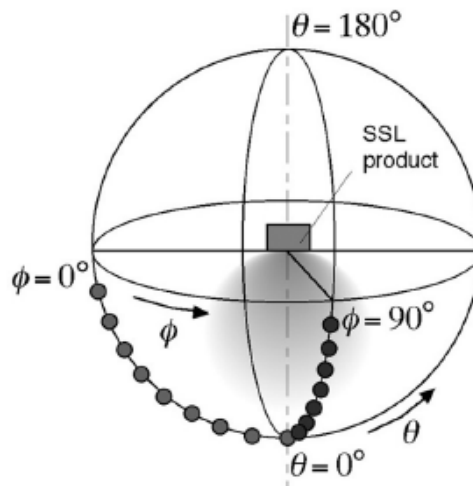
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as 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.

Color Spatial Uniformity

The characteristics of SSL products may be spatially non-uniform, the chromaticity coordinate shall be measured at two vertical planes ($C=0^\circ/180^\circ$ and $C=90^\circ/270^\circ$) and at 10° or less intervals for vertical angle until the light output dropped to below 10% of the peak intensity. The averaged weighted chromaticity coordinate

was calculated from these points. The data was then analyzed to check for delta color differences of the u' , v' chromaticity coordinates. The spatial non-uniformity of chromaticity, $\Delta u'v'$, is determined as the maximum deviation (distance on the CIE (u' , v') diagram) among all measured points from the spatially averaged chromaticity coordinate.

The geometry for the chromaticity measurement using gonio-spectroradiometer is shown as following.



*** End of Report ***

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