

LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

Vertically-Mounted Lamps

Model: 16.5PLV/835/BYP

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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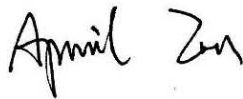
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Report No.: HZ18050048e

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

Review by:



Engineer: April Zou
Jun. 04, 2018

Approved by:



Manager: Jim Zhang
Jun. 04, 2018

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: 16.5PLV/835/BYP

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
116.1	1851.0	15.94	0.9645
CCT (K)	CRI	Stabilization Time (Light & Power)	
3405	84.6	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 : May 25, 2018

Date of Test : May 30, 2018

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



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: Vertically-Mounted Lamps
Model	: 16.5PLV/835/BYP
Electrical Ratings	: 120-277V, 50/60Hz, 16.5W
Product Description	: 3500K
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 24.9°C.

Base orientation was light down. 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	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.138	0.060
Power Factor	0.9645	0.9589
Test Power (W)	15.94	15.98
THD A%	26.28	19.21
Luminous Efficacy (lm/W)	116.1	116.2
Total Luminous Flux (lm)	1851.0	1857.0
Color Rendering Index (CRI)	84.6	
R9	14.2	
Correlated Color Temperature (CCT)(K)	3405	
Chromaticity Chroma x	0.4105	
Chromaticity Chroma y	0.3932	
Chromaticity Chroma u	0.2381	
Chromaticity Chroma v	0.3420	
Duv	0.0005	
Chromaticity Chroma u'	0.2381	
Chromaticity Chroma v'	0.5131	

Special Color Rendering Indices	
R1	83.1
R2	91.5
R3	96.8
R4	83.4
R5	83.5
R6	89.1
R7	85.2
R8	64
R9	14.2
R10	80.2
R11	83.1
R12	71.5
R13	85.2
R14	98.7
Rf	85
Rg	96

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 24.7°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)	0.139
Power Factor	0.9635
Test Power (W)	16.03
Luminous Efficacy (lm/W)	118.2
Total Luminous Flux (lm)	1895.4
Beam Angle (°)	96.8
Center Beam Candle Power (cd)	787
Spacing Criteria	1.20 (0°-180°)/ 1.20 (90°-270°)
Zonal Lumens in the 0°-60°Zone	83.15%
Zonal Lumens in the 60°-90°Zone	16.60%
Zonal Lumens in the 90°-120°Zone	0.16%
Zonal Lumens in the 120°-180°Zone	0.09%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

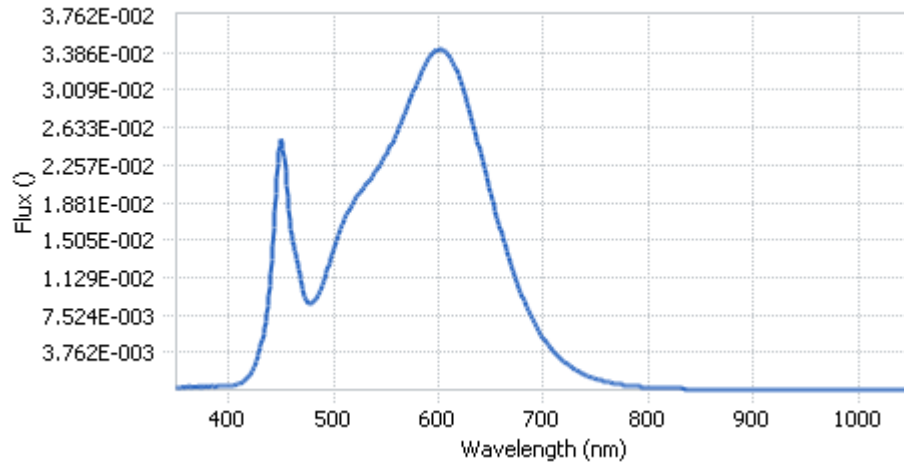


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	3.23E-04	485	9.45E-03	590	3.32E-02	695	6.03E-03
385	3.07E-04	490	1.07E-02	595	3.39E-02	700	5.18E-03
390	3.33E-04	495	1.24E-02	600	3.41E-02	705	4.44E-03
395	3.49E-04	500	1.41E-02	605	3.40E-02	710	3.80E-03
400	3.74E-04	505	1.57E-02	610	3.36E-02	715	3.27E-03
405	4.62E-04	510	1.70E-02	615	3.26E-02	720	2.81E-03
410	6.14E-04	515	1.82E-02	620	3.12E-02	725	2.40E-03
415	9.41E-04	520	1.91E-02	625	2.97E-02	730	2.05E-03
420	1.49E-03	525	1.98E-02	630	2.77E-02	735	1.75E-03
425	2.50E-03	530	2.05E-02	635	2.59E-02	740	1.50E-03
430	4.17E-03	535	2.12E-02	640	2.37E-02	745	1.27E-03
435	6.90E-03	540	2.19E-02	645	2.16E-02	750	1.09E-03
440	1.17E-02	545	2.28E-02	650	1.97E-02	755	9.38E-04
445	1.96E-02	550	2.36E-02	655	1.76E-02	760	8.04E-04
450	2.51E-02	555	2.46E-02	660	1.57E-02	765	6.88E-04
455	2.06E-02	560	2.58E-02	665	1.39E-02	770	5.92E-04
460	1.56E-02	565	2.70E-02	670	1.22E-02	775	5.06E-04
465	1.31E-02	570	2.83E-02	675	1.07E-02	780	4.36E-04
470	1.04E-02	575	2.97E-02	680	9.30E-03		
475	8.75E-03	580	3.10E-02	685	8.08E-03		
480	8.79E-03	585	3.22E-02	690	6.99E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method

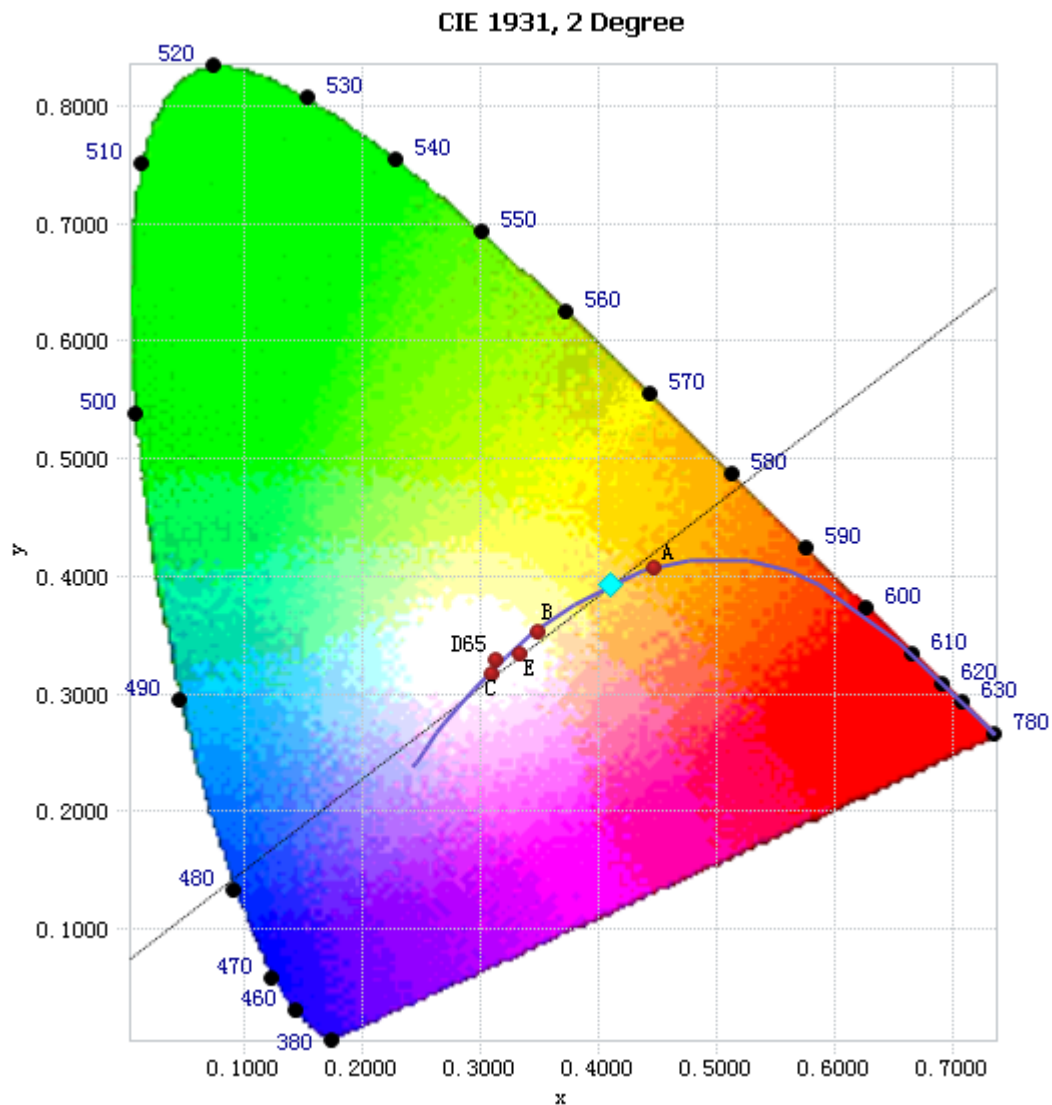


Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

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

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

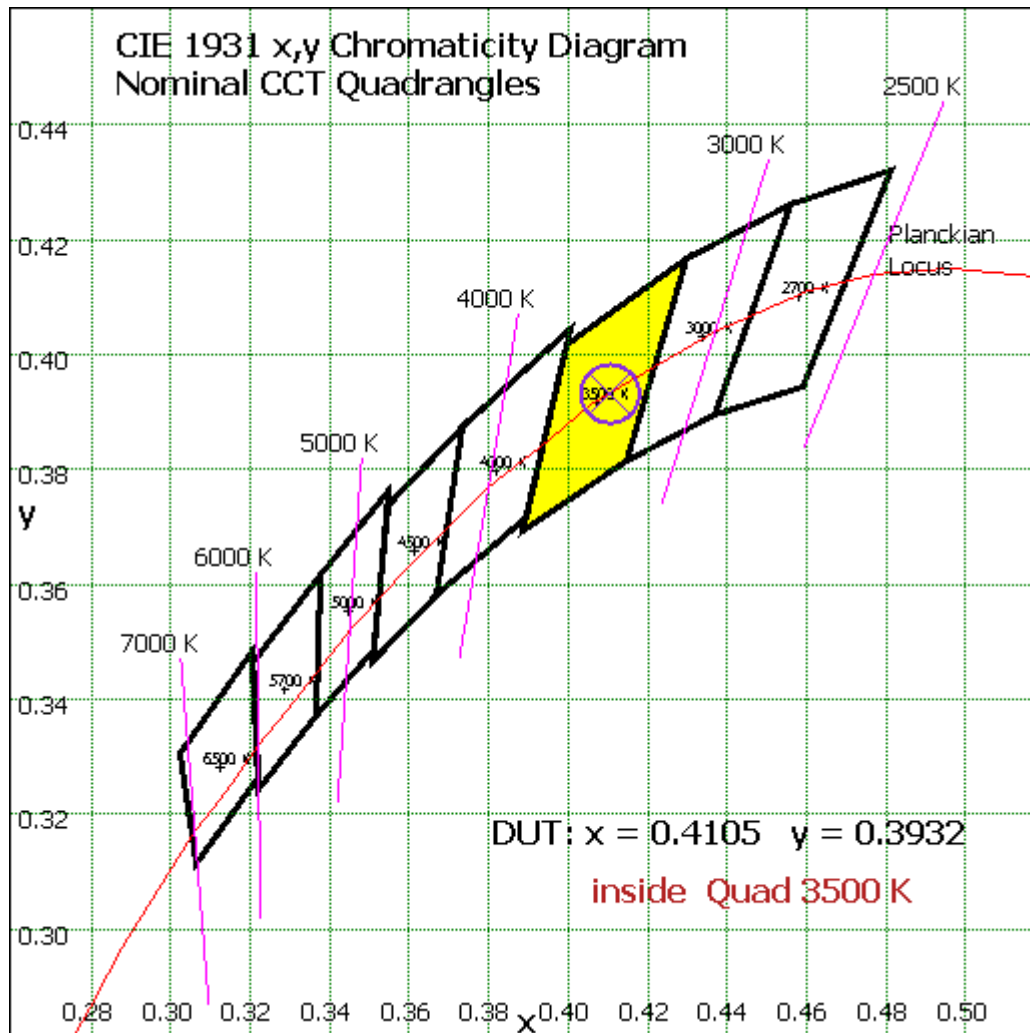


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	74.338	3.92%
10- 20	211.891	11.18%
20- 30	314.907	16.61%
30- 40	360.806	19.04%
40- 50	341.439	18.01%
50- 60	272.708	14.39%
60- 70	184.235	9.72%
70- 80	98.379	5.19%
80- 90	31.973	1.69%
90-100	2.776	0.15%
100-110	0.125	0.01%
110-120	0.192	0.01%
120-130	0.265	0.01%
130-140	0.351	0.02%
140-150	0.389	0.02%
150-160	0.342	0.02%
160-170	0.23	0.01%
170-180	0.079	0.00%
Total	1895.4	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1576.089	83.15%
60- 90	314.587	16.60%
0-90	1890.676	99.75%
90- 180	4.749	0.25%
0- 180	1895.4	100%

Table 5: Zonal Lumen Data

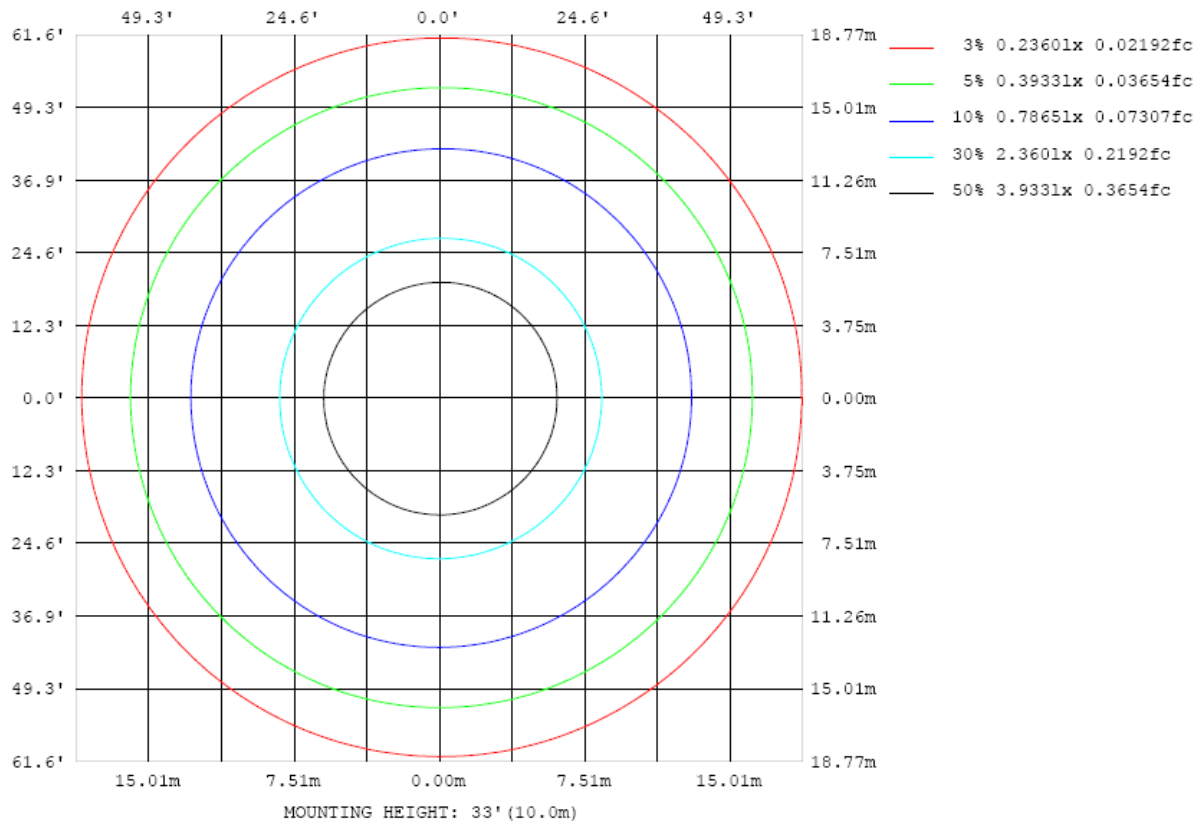


Chart 4: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

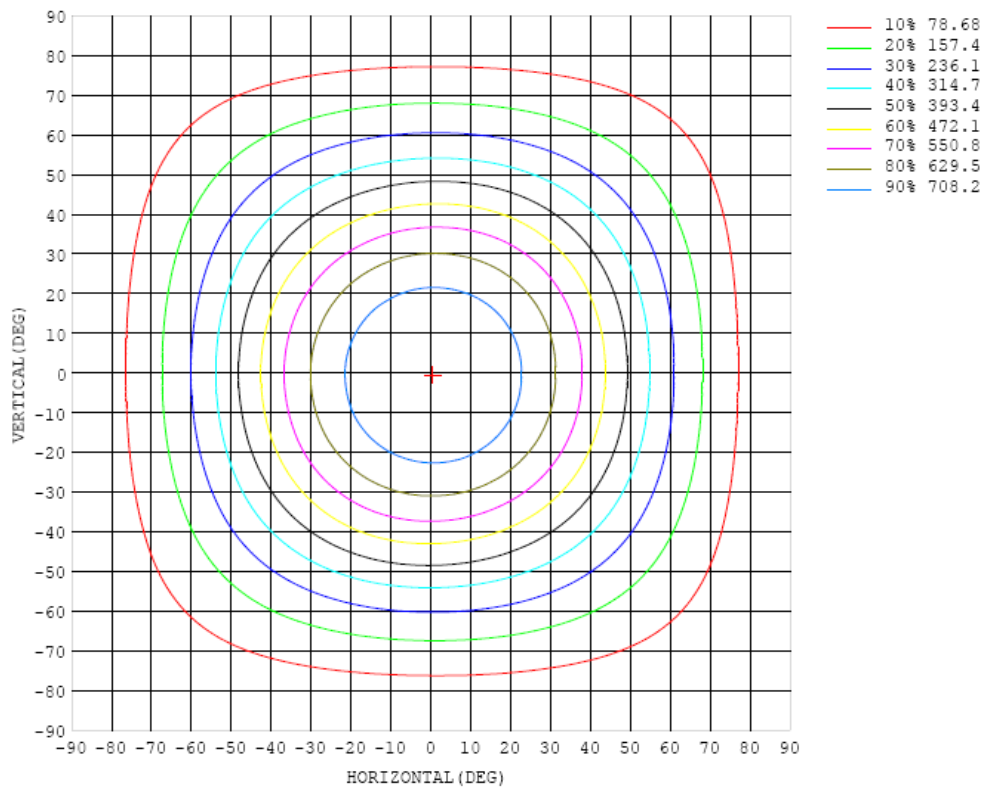


Chart 5: Isocandela Plot

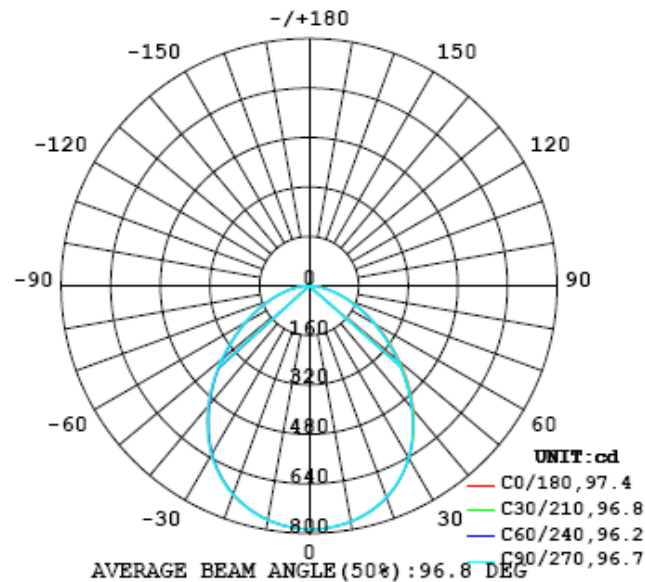


Chart 6: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1 UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787
5	783	784	784	784	784	784	784	784	784	784	784	783	783	783	783	782	782	782	781
10	773	773	774	774	774	774	774	774	774	773	773	772	772	771	771	770	770	769	769
15	755	755	756	756	756	756	756	756	756	755	755	753	753	752	751	751	750	749	748
20	728	728	728	728	728	729	729	729	728	727	726	725	725	724	722	722	721	720	719
25	690	691	691	691	691	691	691	691	690	689	688	687	686	685	684	683	682	680	680
30	643	644	644	644	643	642	641	642	641	640	640	639	638	637	636	635	633	632	631
35	587	588	587	586	584	583	582	582	582	582	582	581	580	579	578	577	575	574	573
40	524	523	522	520	517	515	514	514	514	515	516	516	515	513	512	511	509	508	508
45	454	454	452	450	446	444	443	443	443	444	445	446	445	443	442	441	439	438	439
50	383	382	381	378	375	373	371	371	372	372	373	373	373	372	370	369	368	368	368
55	313	312	311	309	307	305	303	303	303	303	303	303	303	302	302	301	300	299	300
60	248	247	246	245	244	243	241	241	240	239	239	239	239	238	238	238	237	236	237
65	190	190	189	188	187	186	185	185	184	183	182	182	182	181	181	181	180	180	181
70	139	138	137	137	136	135	135	134	133	133	132	132	131	131	131	131	131	131	132
75	94.5	94.1	93.4	92.6	91.9	91.2	90.5	89.9	89.2	88.7	88.4	88.1	88.0	88.0	88.3	88.4	88.3	88.4	89.8
80	57.8	57.5	57.0	55.8	55.1	54.4	53.7	53.3	52.9	52.6	52.5	52.4	52.6	52.7	53.0	53.2	53.3	53.3	54.1
85	29.2	28.6	28.0	27.4	26.7	26.1	25.7	25.3	25.1	25.1	25.1	25.1	25.3	25.4	25.6	25.7	25.8	26.0	26.6
90	10.3	10.0	9.72	9.36	9.00	8.70	8.48	8.33	8.23	8.19	8.17	8.15	8.17	8.18	8.21	8.27	8.27	8.39	8.73
95	1.65	1.61	1.57	1.54	1.48	1.42	1.36	1.30	1.22	1.14	1.04	0.93	0.83	0.76	0.74	0.74	0.76	0.80	0.93
100	0.08	0.08	0.10	0.14	0.17	0.19	0.19	0.16	0.13	0.10	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09
105	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.13
110	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.17
115	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.21
120	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.25
125	0.28	0.27	0.27	0.27	0.27	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.29	0.29	0.29	0.29	0.31
130	0.34	0.33	0.33	0.34	0.34	0.34	0.34	0.34	0.34	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.36	0.40
135	0.42	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.43	0.51
140	0.50	0.47	0.47	0.47	0.47	0.48	0.48	0.48	0.48	0.48	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.51	0.62
145	0.58	0.53	0.53	0.53	0.53	0.53	0.53	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.55	0.54	0.58	0.72
150	0.65	0.57	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.58	0.65	0.80
155	0.73	0.62	0.63	0.63	0.63	0.63	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.63	0.71	0.85
160	0.80	0.67	0.67	0.67	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.69	0.69	0.68	0.78	0.89
165	0.86	0.70	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.71	0.83	0.89
170	0.89	0.74	0.74	0.74	0.74	0.74	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.76	0.87	0.87
175	0.85	0.85	0.81	0.81	0.81	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.83	0.82	0.82	0.82	0.83	0.84	0.84
180	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82

Table 6: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787		
5	782	781	781	781	781	781	781	782	782	782	782	783	783	783	783	783	784		
10	769	769	768	768	768	768	768	769	769	770	770	771	771	772	772	773	773		
15	748	747	747	747	747	746	747	748	748	749	750	751	752	753	753	754	755		
20	718	717	717	717	717	717	717	718	719	719	721	722	724	725	726	727	727		
25	679	678	677	677	677	676	677	678	679	681	682	684	686	687	689	690	690		
30	630	629	628	627	627	626	627	629	630	632	634	636	638	640	642	643	644		
35	572	570	569	567	567	566	567	569	572	574	577	580	582	583	585	586	588		
40	507	505	503	501	501	500	502	504	507	510	513	516	518	519	521	522	524		
45	438	436	434	432	432	431	433	435	438	441	445	447	449	450	452	454	455		
50	367	366	365	364	363	363	365	367	369	372	375	377	378	380	382	383	384		
55	300	299	298	298	298	298	299	301	303	305	307	308	310	311	313	314	314		
60	237	237	237	237	238	238	239	240	241	243	244	246	247	248	248	249	250		
65	181	182	182	183	184	184	185	186	186	187	188	189	190	190	191	191	191		
70	133	133	134	135	136	136	137	138	138	139	139	140	140	140	141	141	141		
75	90.3	90.7	91.4	92.1	93.0	93.6	94.2	94.7	95.0	95.4	95.8	96.1	96.4	96.6	96.8	96.7	96.5		
80	54.5	54.8	55.4	55.9	56.4	57.0	57.6	58.1	58.4	58.8	59.1	59.4	59.6	59.7	59.7	59.4	59.1		
85	26.9	27.1	27.5	27.9	28.2	28.6	29.0	29.5	29.8	30.2	30.4	30.7	30.8	30.8	30.7	30.4	30.2		
90	8.88	9.05	9.23	9.40	9.63	9.86	10.1	10.4	10.6	10.8	11.0	11.1	11.2	11.1	11.1	10.9	10.8		
95	0.99	1.08	1.17	1.26	1.35	1.44	1.53	1.61	1.68	1.74	1.78	1.80	1.80	1.80	1.78	1.77	1.76		
100	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		
105	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13		
110	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17		
115	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.21	0.20	0.21	0.21	0.20	0.20	0.20	0.20	0.20	0.20		
120	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		
125	0.31	0.31	0.31	0.31	0.31	0.31	0.30	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31		
130	0.40	0.40	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.40		
135	0.51	0.50	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.50	0.50	0.50	0.51		
140	0.61	0.61	0.61	0.61	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.61	0.61	0.62		
145	0.71	0.71	0.71	0.71	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.71	0.71	0.71	0.72		
150	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.78	0.78	0.78	0.79	0.79	0.79	0.79	0.79	0.80		
155	0.84	0.84	0.84	0.84	0.84	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.86		
160	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.90		
165	0.89	0.89	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.90	0.91		
170	0.88	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89		
175	0.84	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85		
180	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82		

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 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 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 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 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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