

LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

LED Track Luminaires

Model: 8TRSG4DIM/827NF30/S/H

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ18050049a

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

Review by:



Engineer: April Zou
Jun. 05, 2018

Approved by:



Manager: Jim Zhang
Jun. 05, 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: 8TRSG4DIM/827NF30/S/H

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
77.9	637.6	8.18	0.9212
CCT (K)	CRI	Stabilization Time (Light & Power)	
2691	81.7	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 : Jun. 01, 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	: LED Track Luminaires
Model	: 8TRSG4DIM/827NF30/S/H
Electrical Ratings	: 120V, 60Hz, 8.8W
Product Description	: 2700K
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 25.0°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
Voltage frequency (Hz)	60
Test Current (A)	0.074
Power Factor	0.9212
Test Power (W)	8.18
THD A%	31.88
Luminous Efficacy (lm/W)	77.9
Total Luminous Flux (lm)	637.6
Color Rendering Index (CRI)	81.7
R9	8.8
Correlated Color Temperature (CCT)(K)	2691
Chromaticity Chroma x	0.4572
Chromaticity Chroma y	0.4050
Chromaticity Chroma u	0.2633
Chromaticity Chroma v	0.3499
Duv	0.0022
Chromaticity Chroma u'	0.2633
Chromaticity Chroma v'	0.5248

Special Color Rendering Indices	
R1	80.1
R2	90
R3	96.5
R4	79.3
R5	79.9
R6	88
R7	81.9
R8	58
R9	8.8
R10	77.3
R11	78.2
R12	74
R13	82.2
R14	98.5
Rf	81
Rg	99

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 25.1°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)	0.075
Power Factor	0.9231
Test Power (W)	8.32
Luminous Efficacy (lm/W)	78.7
Total Luminous Flux (lm)	654.6
Beam Angle (°)	24.2
Center Beam Candle Power (cd)	2393
Spacing Criteria	0.41 (0°-180°)/ 0.41 (90°-270°)
Zonal Lumens in the 0°-60°Zone	97.52%
Zonal Lumens in the 60°-90°Zone	2.36%
Zonal Lumens in the 90°-120°Zone	0.00%
Zonal Lumens in the 120°-180°Zone	0.13%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

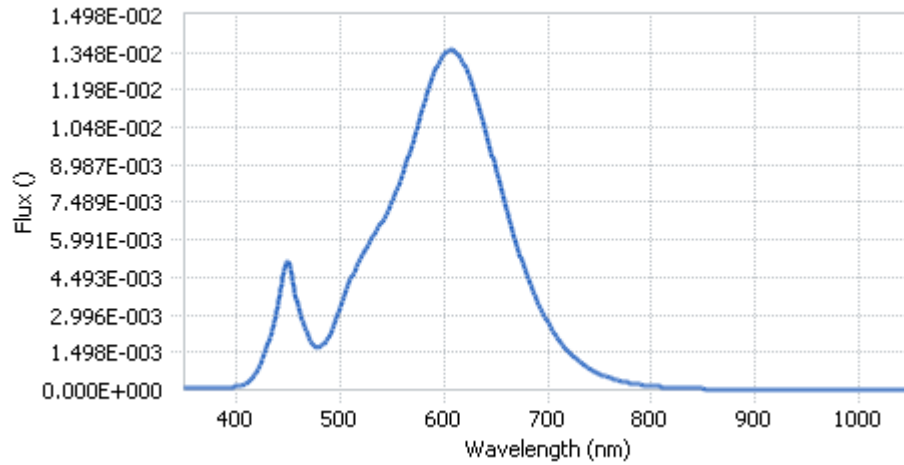


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	9.93E-05	485	1.87E-03	590	1.25E-02	695	3.10E-03
385	9.35E-05	490	2.20E-03	595	1.31E-02	700	2.70E-03
390	1.03E-04	495	2.70E-03	600	1.34E-02	705	2.34E-03
395	1.07E-04	500	3.26E-03	605	1.36E-02	710	2.03E-03
400	1.24E-04	505	3.86E-03	610	1.36E-02	715	1.77E-03
405	1.68E-04	510	4.37E-03	615	1.34E-02	720	1.54E-03
410	2.70E-04	515	4.86E-03	620	1.30E-02	725	1.33E-03
415	4.44E-04	520	5.29E-03	625	1.25E-02	730	1.15E-03
420	7.30E-04	525	5.62E-03	630	1.19E-02	735	9.94E-04
425	1.18E-03	530	6.00E-03	635	1.12E-02	740	8.50E-04
430	1.79E-03	535	6.31E-03	640	1.04E-02	745	7.35E-04
435	2.52E-03	540	6.69E-03	645	9.63E-03	750	6.32E-04
440	3.39E-03	545	7.06E-03	650	8.85E-03	755	5.45E-04
445	4.53E-03	550	7.49E-03	655	8.05E-03	760	4.75E-04
450	5.13E-03	555	8.00E-03	660	7.29E-03	765	4.08E-04
455	4.33E-03	560	8.55E-03	665	6.56E-03	770	3.56E-04
460	3.25E-03	565	9.20E-03	670	5.86E-03	775	3.06E-04
465	2.60E-03	570	9.86E-03	675	5.20E-03	780	2.66E-04
470	2.12E-03	575	1.05E-02	680	4.60E-03		
475	1.77E-03	580	1.13E-02	685	4.05E-03		
480	1.71E-03	585	1.20E-02	690	3.55E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method

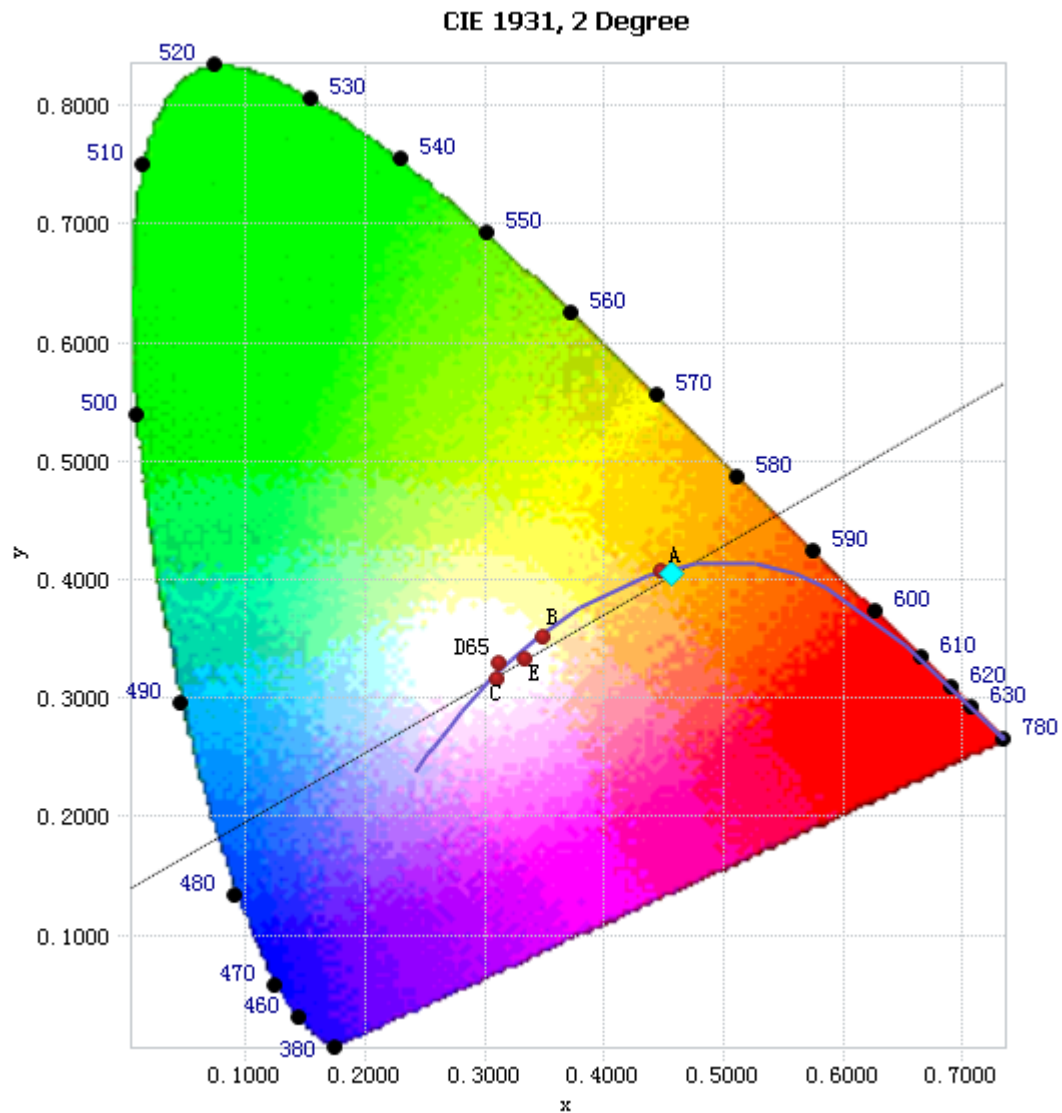


Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

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

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

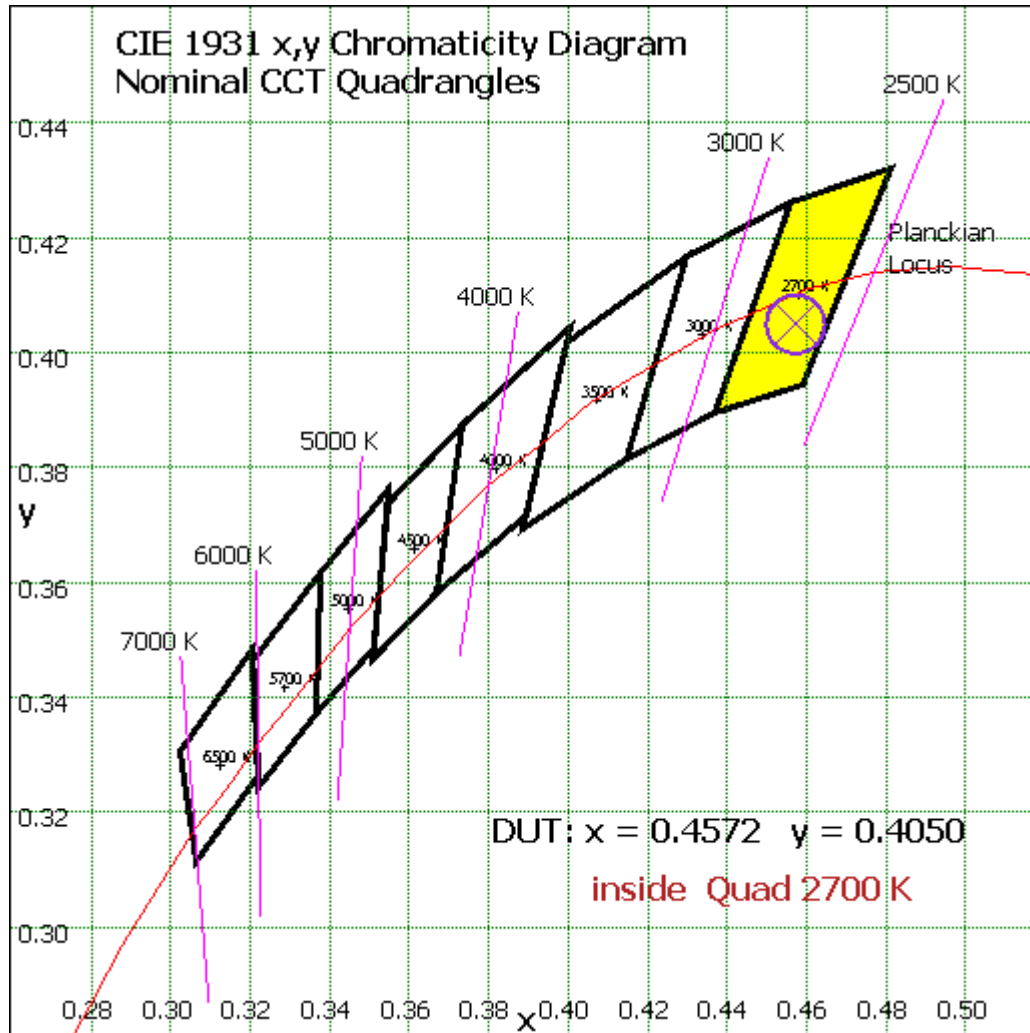


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	180.982	27.65%
10- 20	239.965	36.66%
20- 30	118.66	18.13%
30- 40	55.847	8.53%
40- 50	26.447	4.04%
50- 60	16.402	2.51%
60- 70	11.015	1.68%
70- 80	4.089	0.62%
80- 90	0.319	0.05%
90-100	0.001	0.00%
100-110	0.004	0.00%
110-120	0.01	0.00%
120-130	0.027	0.00%
130-140	0.087	0.01%
140-150	0.196	0.03%
150-160	0.257	0.04%
160-170	0.198	0.03%
170-180	0.063	0.01%
Total	654.6	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	638.303	97.52%
60- 90	15.423	2.36%
0-90	653.726	99.87%
90- 180	0.843	0.13%
0- 180	654.6	100%

Table 5: Zonal Lumen Data

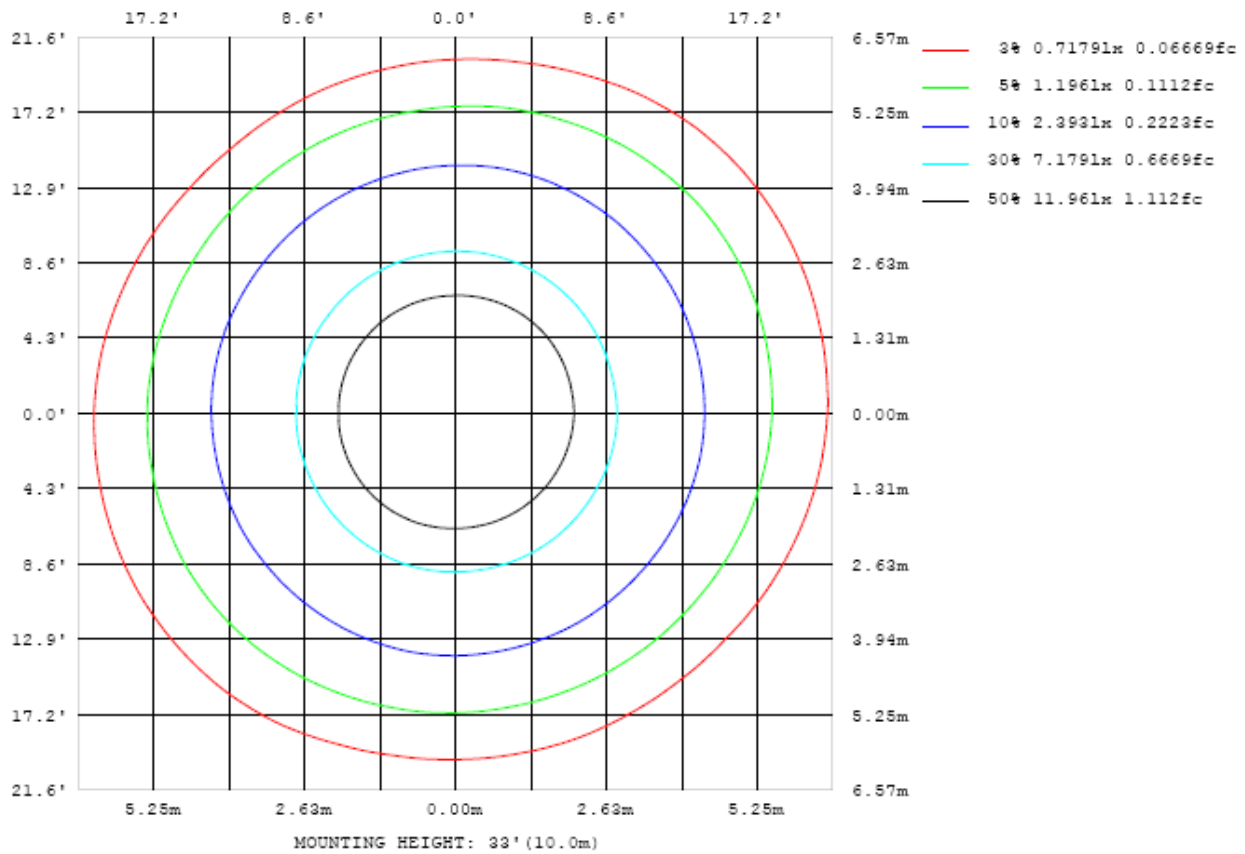


Chart 4: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

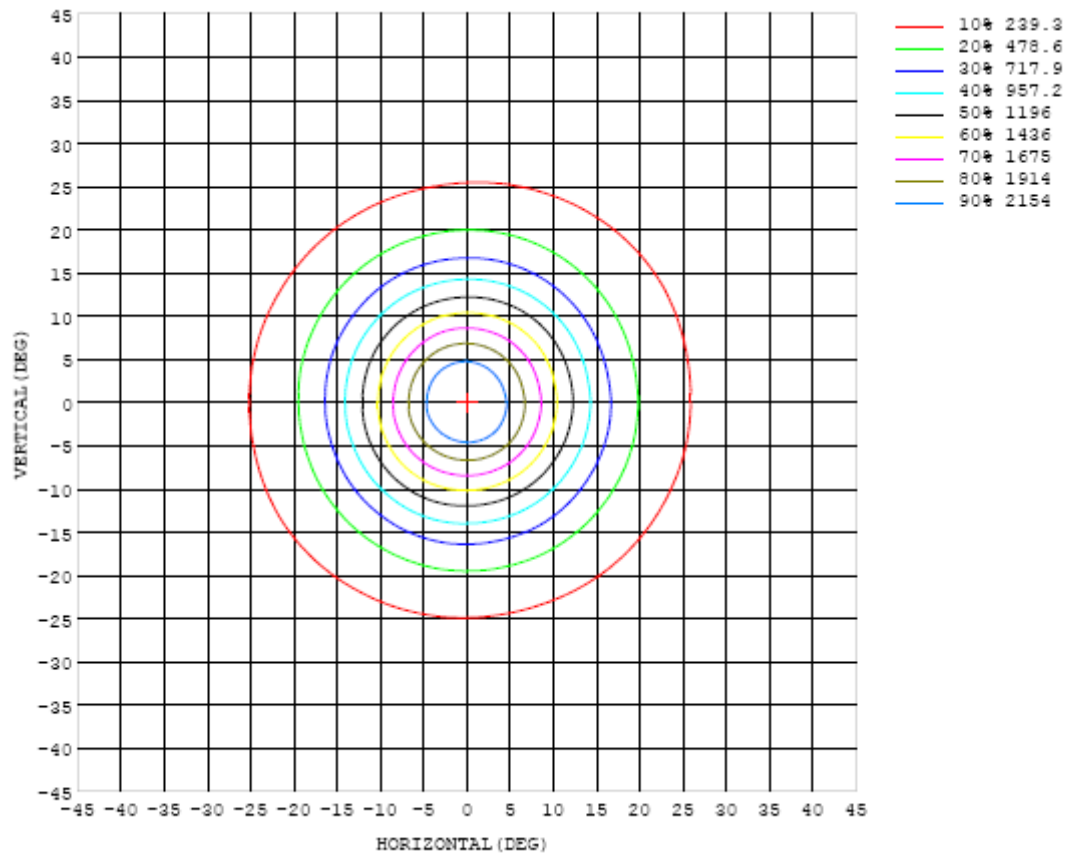


Chart 5: Isocandela Plot

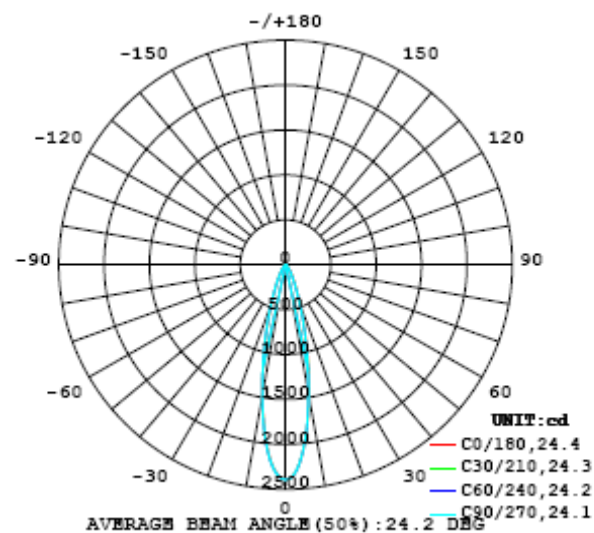


Chart 6: Polar Candela Distribution

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	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393
5	2112	2112	2115	2116	2118	2120	2118	2116	2113	2110	2108	2110	2110	2115	2118	2122	2126	2127	2120
10	1490	1482	1477	1472	1467	1462	1458	1454	1453	1454	1457	1466	1471	1476	1479	1478	1478	1482	1477
15	879	873	867	860	856	856	851	849	847	849	852	854	852	850	853	852	853	859	859
20	465	463	460	455	452	450	449	446	446	446	447	445	444	443	443	444	443	445	450
25	262	260	254	248	243	239	235	233	233	235	237	239	239	241	243	245	245	244	245
30	160	155	150	143	137	133	131	130	129	130	132	137	142	147	149	150	150	148	147
35	100	96.4	91.3	86.4	80.3	76.6	75.2	74.7	74.6	75.6	77.0	80.9	86.5	90.1	92.0	93.3	92.8	91.9	91.0
40	62.5	59.4	56.2	52.0	47.9	44.9	42.1	40.7	42.0	44.2	47.0	49.4	52.3	55.8	58.6	59.9	59.3	58.1	55.9
45	40.0	38.6	36.6	33.0	29.6	27.0	25.1	24.4	25.0	26.7	29.4	31.7	33.8	36.1	38.0	38.7	38.4	37.2	35.5
50	27.9	27.4	25.7	23.3	21.2	19.6	18.7	18.4	18.6	19.4	20.9	22.5	24.0	25.3	25.9	25.8	25.7	25.6	25.1
55	21.1	20.7	19.7	18.3	17.1	16.2	15.7	15.6	15.6	16.0	16.7	17.6	18.5	19.3	19.5	19.3	19.3	19.3	19.3
60	16.5	16.3	15.7	14.9	14.2	13.6	13.3	13.2	13.2	13.4	13.8	14.4	14.9	15.3	15.5	15.4	15.3	15.3	15.3
65	12.2	12.1	11.8	11.3	10.9	10.6	10.4	10.3	10.3	10.4	10.7	11.0	11.3	11.5	11.6	11.6	11.6	11.7	11.5
70	7.81	7.79	7.73	7.52	7.32	7.12	7.04	7.03	7.05	7.09	7.27	7.48	7.67	7.77	7.86	7.83	7.83	7.87	7.73
75	3.73	3.74	3.74	3.74	3.69	3.63	3.59	3.57	3.59	3.62	3.67	3.72	3.75	3.77	3.80	3.80	3.79	3.78	3.73
80	1.39	1.40	1.39	1.37	1.35	1.32	1.31	1.31	1.32	1.34	1.36	1.40	1.42	1.44	1.46	1.47	1.45	1.43	1.40
85	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.09
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01
115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
120	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02
125	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
130	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.07
135	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.14
140	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	0.15	0.15	0.15	0.15	0.26
145	0.22	0.22	0.22	0.21	0.21	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.42
150	0.30	0.30	0.30	0.30	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.59
155	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.40	0.73
160	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.83
165	0.54	0.54	0.54	0.54	0.54	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.54	0.54	0.54	0.54	0.54	0.54	0.86
170	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.82
175	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.68
180	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58

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	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393	2393		
5	2123	2126	2130	2133	2137	2135	2135	2135	2130	2128	2121	2116	2112	2108	2105	2101	2101		
10	1479	1482	1483	1486	1487	1490	1492	1491	1491	1493	1496	1502	1501	1501	1497	1489	1484		
15	864	868	872	872	875	878	878	880	883	887	887	887	887	884	879	875	872		
20	455	457	458	459	463	467	472	475	477	479	479	477	474	471	468	465	464		
25	245	243	241	240	241	243	245	248	253	259	261	264	265	266	268	266	264		
30	144	140	136	133	132	133	135	137	141	145	151	158	164	168	168	166	163		
35	88.3	84.1	81.2	77.3	75.2	75.2	76.8	78.8	81.9	84.8	89.9	96.1	101	103	104	104	102		
40	53.5	50.7	47.7	44.8	42.7	41.2	40.6	42.8	46.5	50.5	53.7	57.1	61.4	64.8	66.6	65.7	64.3		
45	34.9	33.5	30.5	27.6	25.6	24.4	23.9	25.0	27.4	30.9	34.0	36.3	39.3	41.9	42.9	42.6	41.4		
50	24.8	23.6	21.7	20.0	18.7	18.0	18.0	18.4	19.5	21.3	23.5	25.5	27.4	28.5	28.4	28.5	28.3		
55	19.0	18.3	17.2	16.3	15.6	15.2	15.2	15.4	16.0	16.9	18.1	19.4	20.5	21.0	20.8	20.9	21.0		
60	15.1	14.8	14.1	13.5	13.0	12.9	12.8	13.0	13.3	13.8	14.6	15.4	16.1	16.4	16.4	16.3	16.4		
65	11.4	11.2	10.9	10.5	10.3	10.1	10.1	10.1	10.3	10.6	11.1	11.5	11.8	12.0	12.0	12.0	12.0		
70	7.66	7.57	7.42	7.24	7.09	7.02	7.01	7.04	7.11	7.27	7.46	7.57	7.68	7.75	7.71	7.71	7.72		
75	3.71	3.69	3.67	3.62	3.57	3.53	3.53	3.55	3.58	3.63	3.68	3.69	3.69	3.69	3.69	3.69	3.71		
80	1.38	1.35	1.32	1.30	1.28	1.27	1.27	1.27	1.28	1.30	1.32	1.34	1.36	1.36	1.36	1.37	1.38		
85	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08		
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
105	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
110	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
120	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02		
125	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04		
130	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07		
135	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14		
140	0.26	0.26	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	0.26	0.26		
145	0.42	0.41	0.41	0.41	0.41	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41		
150	0.59	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.59	0.59		
155	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73		
160	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.84	0.84	0.84	0.84	0.84	0.84	0.84		
165	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87		
170	0.82	0.82	0.82	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.84	0.83	0.83	0.83	0.83	0.83	0.83		
175	0.68	0.69	0.69	0.69	0.69	0.69	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70		
180	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58		

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

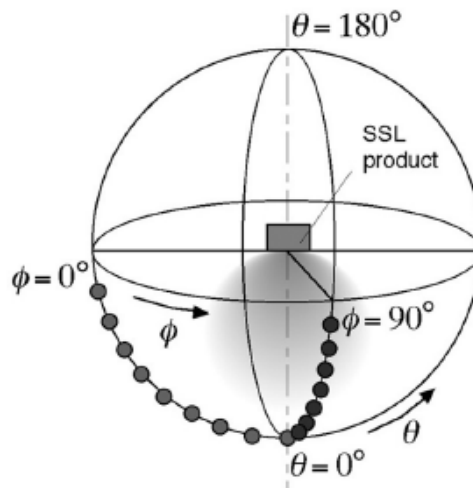
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as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