

## 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 Tube

**Model: 13PLL/840/GL/DIR/R**

### Laboratory: Leading Testing Laboratories

**NVLAP CODE: 200960-0**

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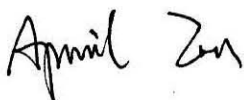
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[www.ledtestlab.com](http://www.ledtestlab.com)

Report No.: HZ22070009c

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

Review by:



Engineer: April Zou  
Jul. 15, 2022

Approved by:



Manager: Jim Zhang  
Jul. 15, 2022

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: 13PLL/840/GL/DIR/R

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)/2	Power Factor
126.2	2081.8	16.50	0.9931
CCT (K)	CRI	Stabilization Time (Light & Power)	
3966	82.4	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** : Jul. 08, 2022

**Date of Test** : Jul. 12, 2022

**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

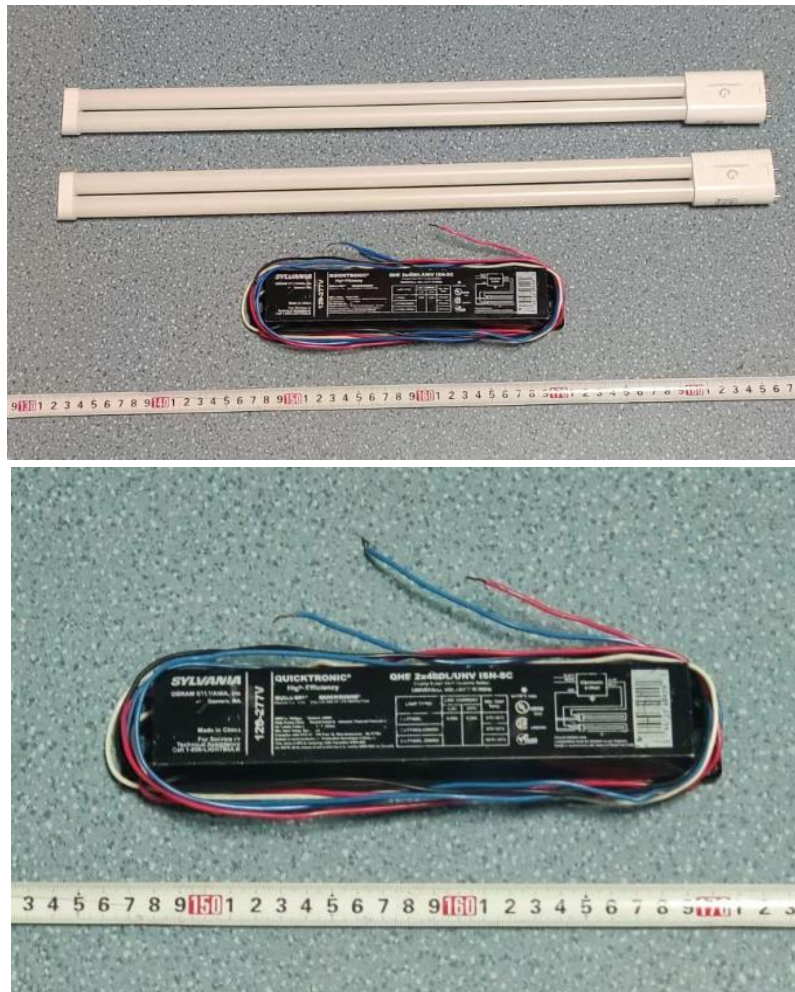


Figure 1- Overview of the sample

### Equipment Under Test(EUT)

<b>Name</b>	: LED Tube
<b>Model</b>	: 13PLL/840/GL/DIR/R
<b>Electrical Ratings</b>	: 120-277V, 50/60Hz
<b>Product Description</b>	: 4000K LED Tubes supplied by a high frequency fluorescent lamp ballast:
	QHE2X40DL/UNV/ISN-SC
<b>Manufacturer</b>	: GREEN CREATIVE LTD
<b>Address</b>	: 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)	0.277	0.131
Power Factor	0.9931	0.9392
Test Power (W)/2	16.50	17.06
THD A%	10.95	20.03
Luminous Efficacy (lm/W)	126.2	122.1
Total Luminous Flux (lm)	2081.8	2082.9
Color Rendering Index (CRI)	82.4	
R9	4.1	
Correlated Color Temperature (CCT)(K)	3966	
Chromaticity Chroma x	0.3829	
Chromaticity Chroma y	0.3815	
Chromaticity Chroma u	0.2248	
Chromaticity Chroma v	0.3360	
Duv	0.0015	
Chromaticity Chroma u'	0.2248	
Chromaticity Chroma v'	0.5040	

Special Color Rendering Indices	
R1	80.4
R2	89.6
R3	95.6
R4	80.1
R5	80.3
R6	85.3
R7	85.2
R8	62.4
R9	4.1
R10	75.1
R11	78.9
R12	59.4
R13	82.8
R14	97.9

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)	0.278
Power Factor	0.9935
Power (W)/2	16.54
Luminous Efficacy (lm/W)	124.2
Total Luminous Flux (lm)	2054.1
Beam Angle ( ° )	108.4 (0°-180°) / 140.5 (90°-270°)
Center Beam Candle Power (cd)	467
Maximum Beam Candle Power (cd)	467.5 (At: C=290.0, Gamma=4.0)
Spacing Criteria	1.21 (0°-180°) / 1.43 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	55.92%
Zonal Lumens in the 60 °-90 °Zone	23.98%
Zonal Lumens in the 90 °-120 °Zone	10.21%
Zonal Lumens in the 120 °-180 °Zone	9.90%

Table 3: Test data per Goniophotometer Method

## Spectral Power Distribution - Sphere Spectroradiometer Method

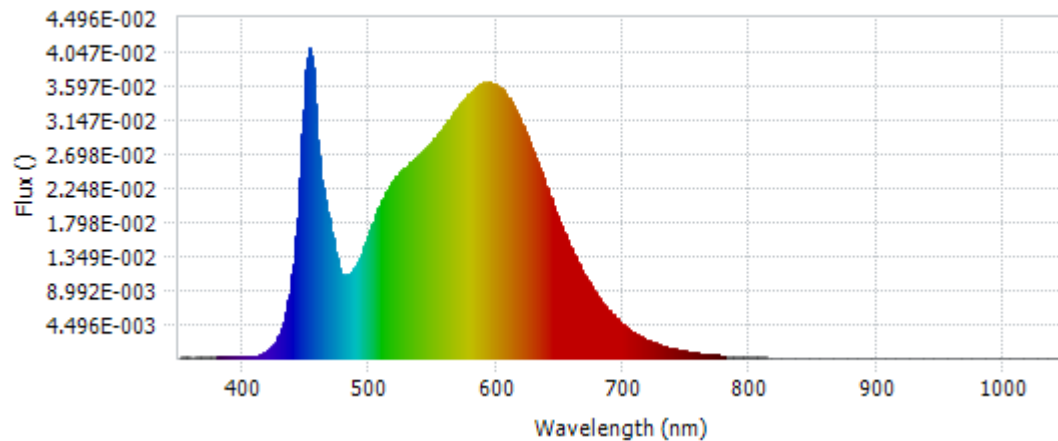
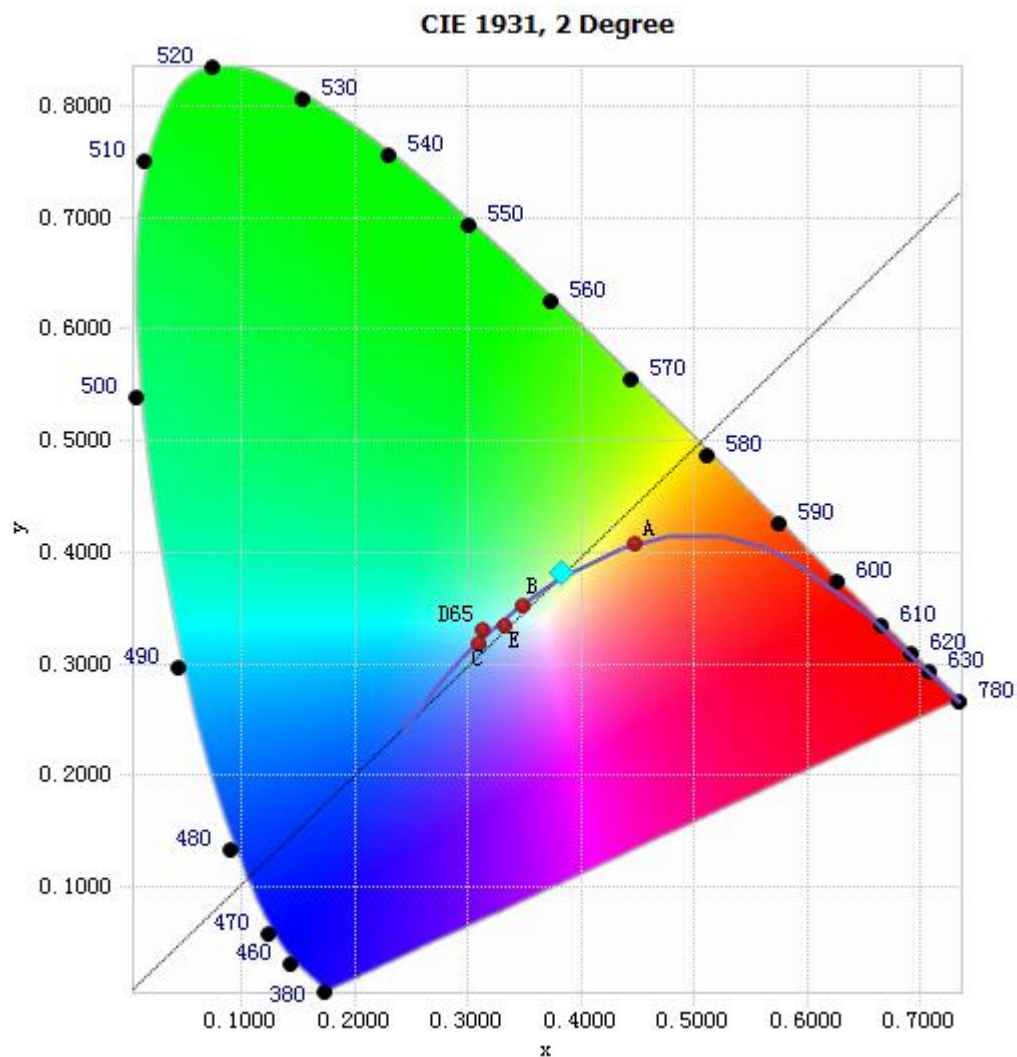


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.91E-04	485	1.13E-02	590	3.64E-02	695	5.19E-03
385	1.98E-04	490	1.24E-02	595	3.65E-02	700	4.45E-03
390	1.94E-04	495	1.43E-02	600	3.61E-02	705	3.78E-03
395	1.89E-04	500	1.68E-02	605	3.54E-02	710	3.24E-03
400	1.94E-04	505	1.90E-02	610	3.43E-02	715	2.76E-03
405	1.97E-04	510	2.10E-02	615	3.29E-02	720	2.35E-03
410	3.09E-04	515	2.25E-02	620	3.11E-02	725	2.03E-03
415	5.72E-04	520	2.37E-02	625	2.91E-02	730	1.71E-03
420	1.05E-03	525	2.46E-02	630	2.69E-02	735	1.46E-03
425	1.97E-03	530	2.55E-02	635	2.47E-02	740	1.25E-03
430	3.58E-03	535	2.62E-02	640	2.24E-02	745	1.07E-03
435	6.73E-03	540	2.70E-02	645	2.02E-02	750	9.01E-04
440	1.26E-02	545	2.78E-02	650	1.80E-02	755	7.68E-04
445	2.38E-02	550	2.88E-02	655	1.60E-02	760	6.47E-04
450	3.82E-02	555	2.98E-02	660	1.41E-02	765	5.59E-04
455	3.84E-02	560	3.09E-02	665	1.24E-02	770	4.87E-04
460	2.66E-02	565	3.20E-02	670	1.08E-02	775	4.14E-04
465	2.09E-02	570	3.31E-02	675	9.42E-03	780	3.52E-04
470	1.68E-02	575	3.42E-02	680	8.15E-03		
475	1.25E-02	580	3.51E-02	685	7.01E-03		
480	1.10E-02	585	3.59E-02	690	6.06E-03		

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

## Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3829, 0.3815)

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

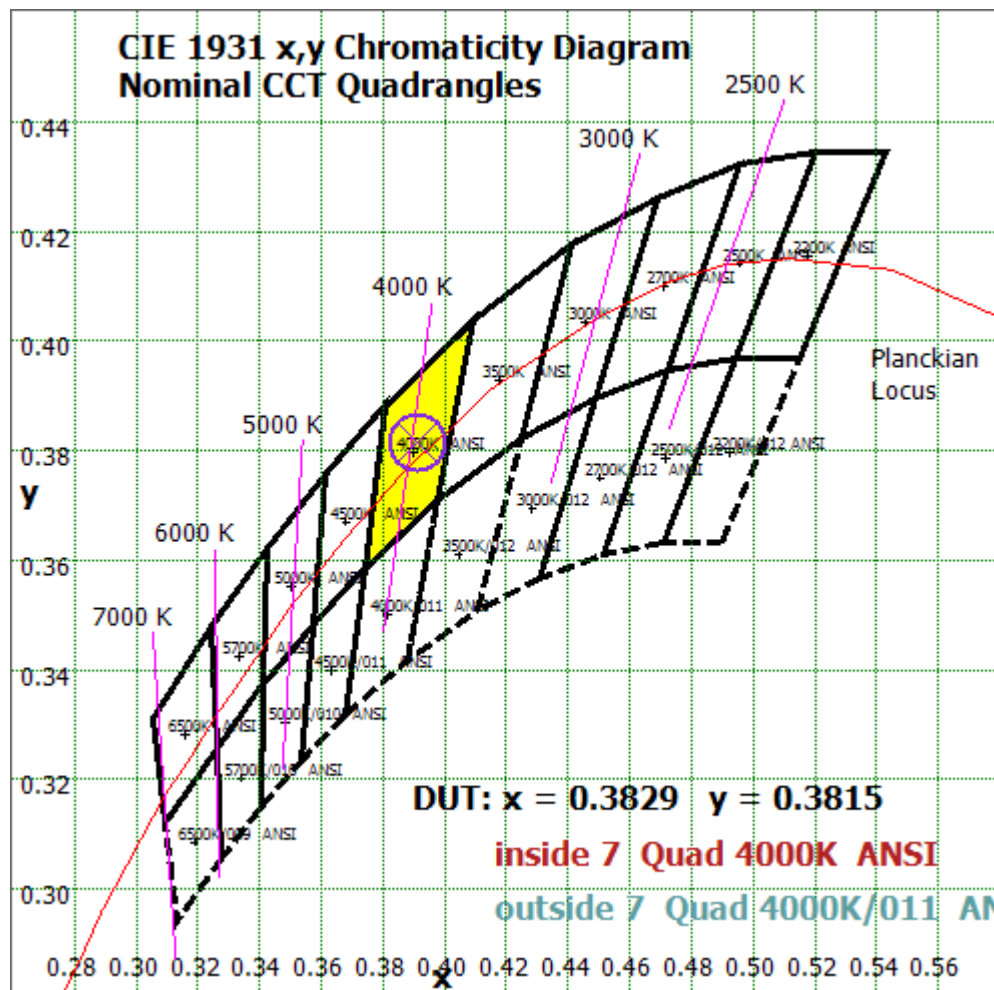


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

# Color Rendition Report – Sphere Spectroradiometer Method

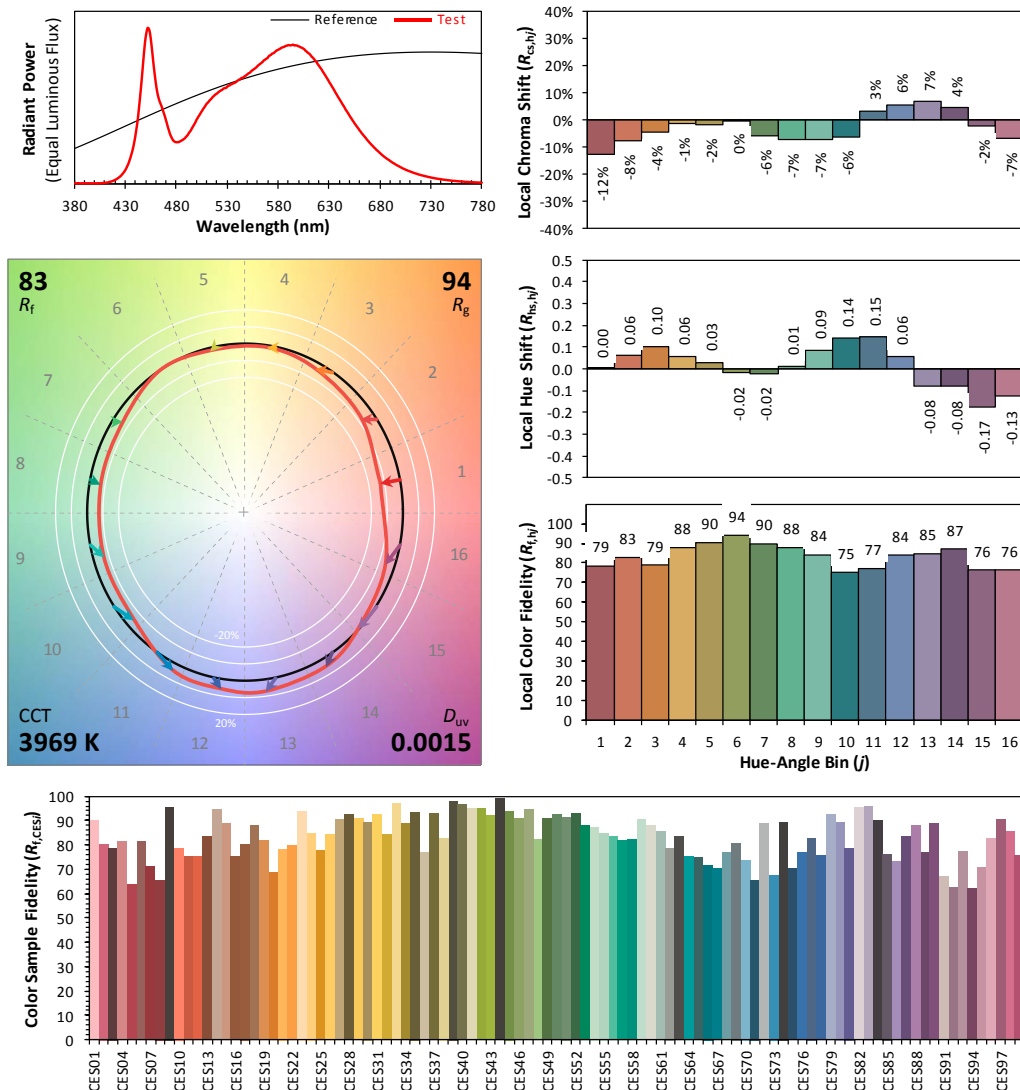
## ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2022/07/12

Model: 13PLL/840/GL/DIR/R



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

$x$  0.3829  
 $y$  0.3815  
 $u'$  0.2248  
 $v'$  0.5040

CIE 13.3-1995  
(CRI)  
 $R_a$  82  
 $R_9$  4

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	44.28	2.16%
10- 20	128.184	6.24%
20- 30	198.827	9.68%
30- 40	248.752	12.11%
40- 50	269.713	13.13%
50- 60	258.825	12.60%
60- 70	220.69	10.74%
70- 80	165.136	8.04%
80- 90	106.644	5.19%
90-100	75.944	3.70%
100-110	68.623	3.34%
110-120	65.083	3.17%
120-130	61.208	2.98%
130-140	53.844	2.62%
140-150	42.001	2.04%
150-160	27.612	1.34%
160-170	14.776	0.72%
170-180	3.923	0.19%
Total	2054.1	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1148.58	55.92%
60- 90	492.47	23.98%
0-90	1641.05	79.89%
90- 180	413.014	20.11%
0- 180	2054.1	100%

Table 5: Zonal Lumen

## Illuminance Plots- Goniophotometer Method

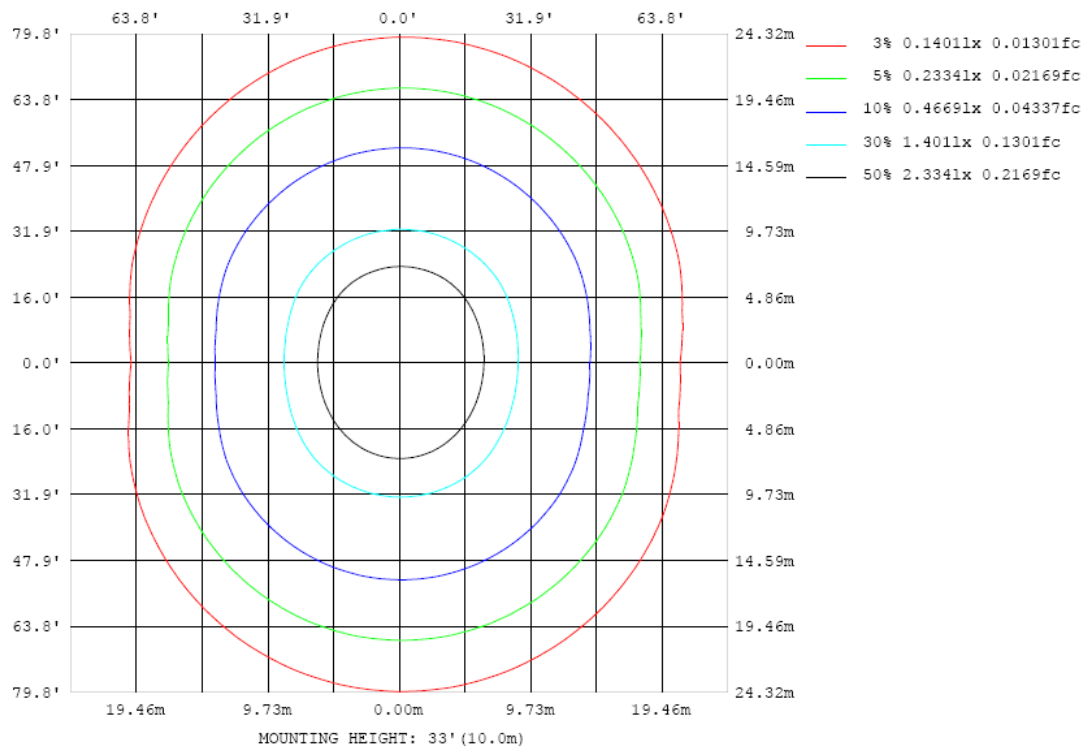


Chart 5: Illuminance Plot (Footcandles)

## Luminous Intensity Distribution Plots- Goniophotometer Method

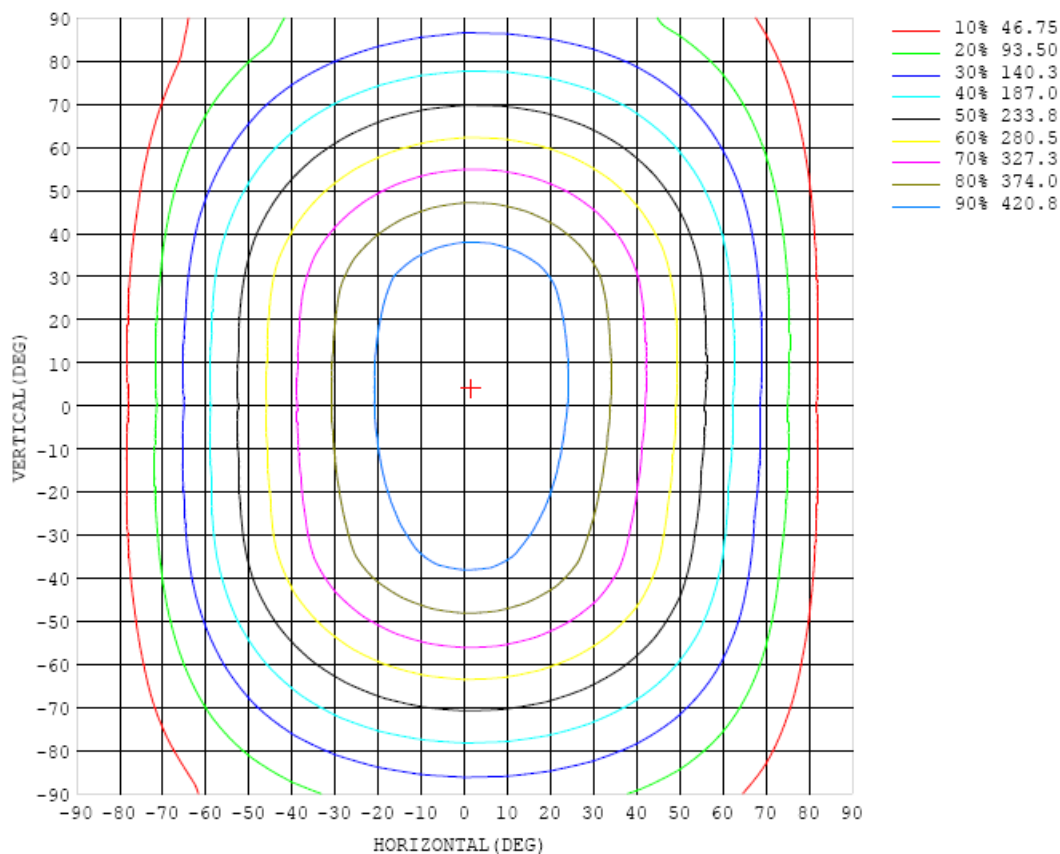


Chart 6: Isocandela Plot

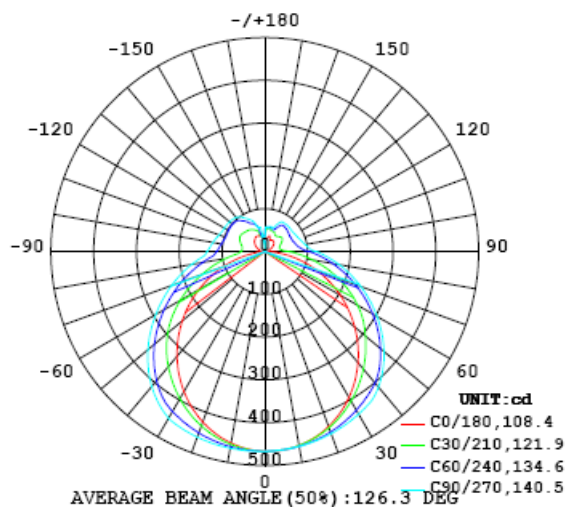


Chart 7: Polar Candela Distribution

## Luminous Intensity Data- Goniophotometer Method

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	467	467	467	467	467	467	467	467	467	467	467	467	467	467	467	467	467	467	467
5	466	466	466	465	466	466	465	465	465	465	465	465	464	464	464	463	463	463	463
10	460	460	460	460	461	462	462	462	463	462	462	461	460	458	457	456	455	454	454
15	450	450	450	451	453	455	457	458	459	458	457	456	453	450	447	445	443	442	441
20	435	435	436	438	442	446	449	452	453	453	452	449	445	440	435	430	427	425	424
25	416	416	418	422	428	434	439	444	446	446	444	440	435	427	420	413	407	404	403
30	394	393	397	404	412	420	428	434	438	439	436	431	423	413	403	393	384	379	378
35	368	368	373	382	393	405	415	424	429	430	427	420	410	398	384	371	359	352	350
40	339	339	347	359	373	388	401	409	413	413	411	405	395	381	364	347	332	322	320
45	308	309	318	333	352	368	380	387	390	390	387	381	372	360	343	322	303	291	287
50	274	276	289	307	328	343	353	360	364	363	360	354	344	332	317	296	273	257	252
55	239	243	258	281	300	313	323	330	334	334	331	324	314	301	286	267	243	223	216
60	203	208	226	250	268	281	291	298	303	303	300	292	282	269	253	235	213	188	178
65	167	172	196	217	234	247	258	266	270	271	267	260	249	235	219	201	179	153	141
70	130	138	162	182	199	213	225	233	238	239	235	228	217	202	184	165	144	120	104
75	93.5	104	127	147	165	180	192	201	206	207	204	196	184	169	151	130	109	85.7	67.3
80	58.2	71.8	92.9	113	132	148	161	170	175	176	173	165	154	138	119	98.3	75.3	52.7	33.7
85	26.4	40.6	60.8	82.3	102	118	131	141	146	147	144	136	124	109	90.7	69.6	47.5	24.7	8.58
90	4.64	15.0	35.6	56.2	74.6	90.7	104	113	119	120	117	109	98.2	83.8	67.5	50.2	30.7	12.3	1.91
95	1.48	7.01	23.4	41.3	58.2	73.2	85.9	95.4	101	103	102	96.9	88.1	75.9	61.8	44.5	27.4	12.3	4.60
100	4.57	9.27	20.4	36.3	51.9	65.3	77.3	86.6	92.9	95.6	94.6	90.1	82.0	70.7	57.9	42.3	27.9	18.4	8.39
105	8.40	14.5	23.0	35.8	49.2	62.4	73.5	82.2	87.9	90.4	89.4	85.2	78.2	67.0	55.1	43.1	32.9	24.2	12.5
110	11.5	16.8	28.3	37.6	49.5	60.8	70.3	78.9	84.3	86.5	85.3	80.9	74.2	65.7	56.2	46.5	38.6	27.8	16.4
115	15.3	20.4	32.5	41.1	50.7	60.8	69.2	76.6	81.6	83.4	82.6	79.3	73.6	65.9	58.3	51.0	42.3	29.2	19.8
120	19.5	24.5	35.4	46.0	53.3	61.5	68.8	75.2	79.7	81.5	81.0	78.1	73.2	67.3	61.6	55.4	45.6	33.8	24.1
125	24.1	27.8	34.0	49.8	57.0	63.6	69.5	74.7	78.4	80.1	79.8	77.7	74.2	69.6	65.0	57.2	47.1	37.9	27.8
130	27.8	32.0	37.4	51.5	60.6	66.3	71.1	75.4	78.5	80.1	80.0	78.4	75.7	71.9	67.4	59.2	48.1	40.9	31.3
135	30.3	35.2	38.0	49.0	63.1	68.7	72.7	76.4	79.1	80.5	80.6	79.4	77.1	73.5	66.3	59.3	50.3	44.2	34.6
140	31.6	38.1	39.3	45.8	61.5	70.6	73.8	77.3	79.6	80.9	81.1	79.9	77.1	71.6	68.2	58.7	51.0	45.4	36.2
145	31.8	38.9	43.7	45.6	55.8	68.2	74.7	77.6	79.6	80.8	80.4	78.3	76.2	72.9	64.3	57.2	53.3	47.9	38.9
150	31.0	40.4	46.0	46.8	50.3	60.2	69.1	75.4	78.7	80.0	79.1	77.3	73.1	65.8	59.1	56.0	52.8	49.2	40.4
155	30.1	43.3	47.2	50.5	51.5	53.3	59.2	65.1	69.3	71.3	70.3	68.0	63.4	59.0	57.9	56.6	53.0	50.0	39.8
160	35.6	47.3	49.9	51.5	53.7	55.2	55.4	56.4	58.3	59.1	58.7	57.7	57.6	58.6	57.8	55.3	52.0	50.3	38.5
165	37.1	47.6	51.7	53.0	54.4	56.1	57.7	58.6	59.7	60.5	60.7	59.5	58.3	58.0	55.9	51.8	51.8	49.7	41.1
170	30.7	40.0	51.9	55.0	55.8	56.5	56.8	57.7	58.4	58.6	58.5	57.7	55.9	54.4	56.2	55.9	51.3	42.3	36.0
175	26.9	32.4	43.9	52.7	56.3	57.5	57.8	57.8	57.9	57.9	57.8	57.8	57.9	55.7	49.3	42.2	36.6	34.6	33.6
180	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6

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	467	467	467	467	467	467	467	467	467	467	467	467	467	467	467	467	467		
5	464	464	464	465	465	466	467	467	467	467	467	467	467	467	467	466	466		
10	455	456	458	459	461	463	465	466	467	467	467	466	465	464	463	462	461		
15	442	445	447	451	454	458	461	463	465	465	464	463	461	458	455	453	451		
20	425	429	434	439	445	451	456	459	462	462	460	457	453	449	444	440	437		
25	405	410	417	425	434	442	449	454	457	457	454	450	444	437	430	423	419		
30	381	387	397	409	420	431	441	447	450	450	447	441	432	422	412	403	397		
35	353	362	375	390	405	417	424	430	433	434	432	427	418	405	392	380	372		
40	324	335	351	369	383	393	402	408	411	412	410	405	398	386	370	355	344		
45	292	306	325	343	356	367	376	382	386	386	384	379	372	362	346	328	315		
50	258	275	297	312	326	337	346	353	357	358	355	350	343	333	319	299	283		
55	223	243	264	279	293	305	315	322	326	327	324	319	311	301	288	269	250		
60	188	210	229	245	259	272	282	290	294	295	292	286	278	267	254	237	216		
65	151	174	192	209	225	239	250	258	263	263	260	254	244	232	218	203	181		
70	116	138	156	175	192	207	219	228	232	232	229	221	211	197	183	167	146		
75	81.6	102	123	143	161	177	189	198	202	202	198	190	179	164	148	131	112		
80	47.4	68.6	91.6	113	132	148	160	169	174	174	169	161	149	134	116	95.7	77.1		
85	19.8	42.4	65.4	87.1	106	123	135	143	147	147	142	134	122	105	86.3	65.0	43.7		
90	11.1	33.1	56.0	77.7	96.8	113	125	132	135	133	127	117	102	84.1	63.4	41.6	19.9		
95	13.9	32.0	53.5	74.0	92.2	107	119	126	128	126	120	109	94.9	77.1	56.7	34.7	13.3		
100	20.3	35.1	53.5	72.1	89.1	103	114	121	123	121	115	104	90.2	72.8	53.0	32.2	14.1		
105	23.7	40.8	56.4	72.0	87.0	100	110	116	118	116	110	99.8	86.1	69.7	51.9	34.8	20.6		
110	27.1	46.0	60.7	74.2	86.6	97.8	107	112	114	112	106	96.2	83.8	69.3	54.2	39.5	24.5		
115	30.1	49.2	64.7	77.2	88.2	97.5	105	109	111	109	103	94.9	84.2	71.2	58.2	44.5	27.2		
120	31.8	49.5	67.4	80.1	90.0	98.2	105	108	109	108	103	95.3	85.5	74.2	62.2	47.6	30.2		
125	33.7	50.0	68.3	81.9	91.5	99.0	104	108	109	107	103	96.0	87.3	77.3	64.7	48.2	33.2		
130	35.9	51.1	66.5	81.8	92.2	99.1	104	107	108	106	102	96.5	88.8	78.5	64.4	48.8	34.6		
135	36.7	51.1	64.9	78.3	90.6	98.3	103	106	107	105	101	96.0	88.5	77.1	62.9	49.2	34.7		
140	37.0	51.0	63.7	74.8	85.3	94.8	101	104	104	103	99.4	93.8	84.6	73.1	61.6	48.6	34.0		
145	37.4	50.3	62.1	71.1	79.8	87.6	93.6	97.4	98.7	97.2	93.0	87.0	79.4	70.6	59.3	46.7	33.4		
150	36.5	47.9	59.6	67.0	72.8	79.7	85.9	88.8	89.8	88.7	85.7	81.1	74.9	67.4	57.5	46.7	33.2		
155	35.7	43.2	55.8	64.0	69.5	71.8	75.3	80.4	82.0	81.2	79.1	75.6	70.4	62.7	55.2	43.2	30.6		
160	35.7	40.5	51.4	58.4	64.4	67.2	69.2	66.3	73.4	73.5	72.1	68.9	64.1	59.6	54.3	43.7	29.8		
165	35.7	36.1	38.5	44.5	49.6	55.9	61.7	62.7	56.8	59.8	63.5	62.5	61.5	56.7	46.2	34.7	29.2		
170	34.1	34.3	34.4	34.3	33.7	33.6	33.5	36.9	56.9	54.6	55.0	46.8	33.1	31.3	29.3	27.4	27.8		
175	33.1	33.0	33.0	32.9	33.7	36.7	38.8	34.1	13.0	24.0	27.4	29.1	29.9	26.6	26.1	26.4	26.5		
180	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6		

Table 7: Luminous Intensity Data

## EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Aug. 05, 2021	Aug. 04, 2022
Digital Power Meter	PF2010A	HZTE028-01	Aug. 05, 2021	Aug. 04, 2022
AC Power Supply	DPS1060	HZTE001-06	Aug. 05, 2021	Aug. 04, 2022
DC Power Supply	WY12010	HZTE004-03	Aug. 05, 2021	Aug. 04, 2022
Temperature recorder	JM624U	HZTE018-08	Aug. 05, 2021	Aug. 04, 2022
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 05, 2021	Aug. 04, 2022
Standard source	D908	HZTE012-01	Aug. 05, 2021	Aug. 04, 2022
Integrate Sphere system	3M	HZTE015-04	Aug. 05, 2021	Aug. 04, 2022
Digital Power Meter	WT210	HZTE008-01	Aug. 05, 2021	Aug. 04, 2022
AC Power Supply	PCR 500L	HZTE001-07	Aug. 05, 2021	Aug. 04, 2022
DC Power Supply	IT6154	HZTE004-04	Aug. 05, 2021	Aug. 04, 2022
Standard source	SCL-1400	HZTE012-02	Aug. 05, 2021	Aug. 04, 2022
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 05, 2021	Aug. 04, 2022
Temperature Meter	TES1310	HZTE017-01	Aug. 05, 2021	Aug. 04, 2022

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  $4\pi$ . 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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