

## LM-79-08 TEST REPORT

for

### GREEN CREATIVE LTD

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

### LED Tube

**Model: 10.5T8/4F/830/IS/DIR**

### Laboratory: Leading Testing Laboratories

**NVLAP CODE: 200960-0**

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Report No.: HZ19040014c

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

Review by:



Engineer: April Zou  
Apr. 18, 2019

Approved by:



Manager: Jim Zhang  
Apr. 18, 2019

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: **10.5T8/4F/830/IS/DIR**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
126.7	1763.0	13.91	0.9922
CCT (K)	CRI	Stabilization Time (Light & Power)	
2857	81.4	60	

Table 1: Executive Data Summary

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

### Test specifications:

<b>Date of Receipt</b>	: Apr. 09, 2019
<b>Date of Test</b>	: Apr. 10, 2019
<b>Test item</b>	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
<b>Reference Standard</b>	: IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

## TABLE OF CONTENT

LM-79-08 TEST REPORT .....	1
TEST SUMMARY .....	2
SAMPLE PHOTO .....	4
TEST RESULTS .....	5
Sphere-Spectroradiometer Method.....	5
Goniophotometer Method .....	6
Spectral Power Distribution - Sphere Spectroradiometer Method .....	7
Chromaticity Diagram - Sphere Spectroradiometer Method.....	8
Nominal CCT Quadrangles – Sphere Spectroradiometer Method .....	9
Color Rendition Report – Sphere Spectroradiometer Method .....	10
Zonal Lumen Tabulation- Goniophotometer Method .....	11
Illuminance Plots- Goniophotometer Method .....	12
Luminous Intensity Distribution Plots- Goniophotometer Method.....	13
Luminous Intensity Data- Goniophotometer Method .....	14
EQUIPMENT LIST .....	16
TEST METHODS .....	16
Seasoning of SSL Product.....	16
Sphere-Spectroradiometer Method- Photometric and Electrical Measurements.....	16
Goniophotometer Method .....	17
Photometric and Electrical Measurements .....	17
Color Characteristics Measurements.....	17
Color Spatial Uniformity .....	17

## SAMPLE PHOTO

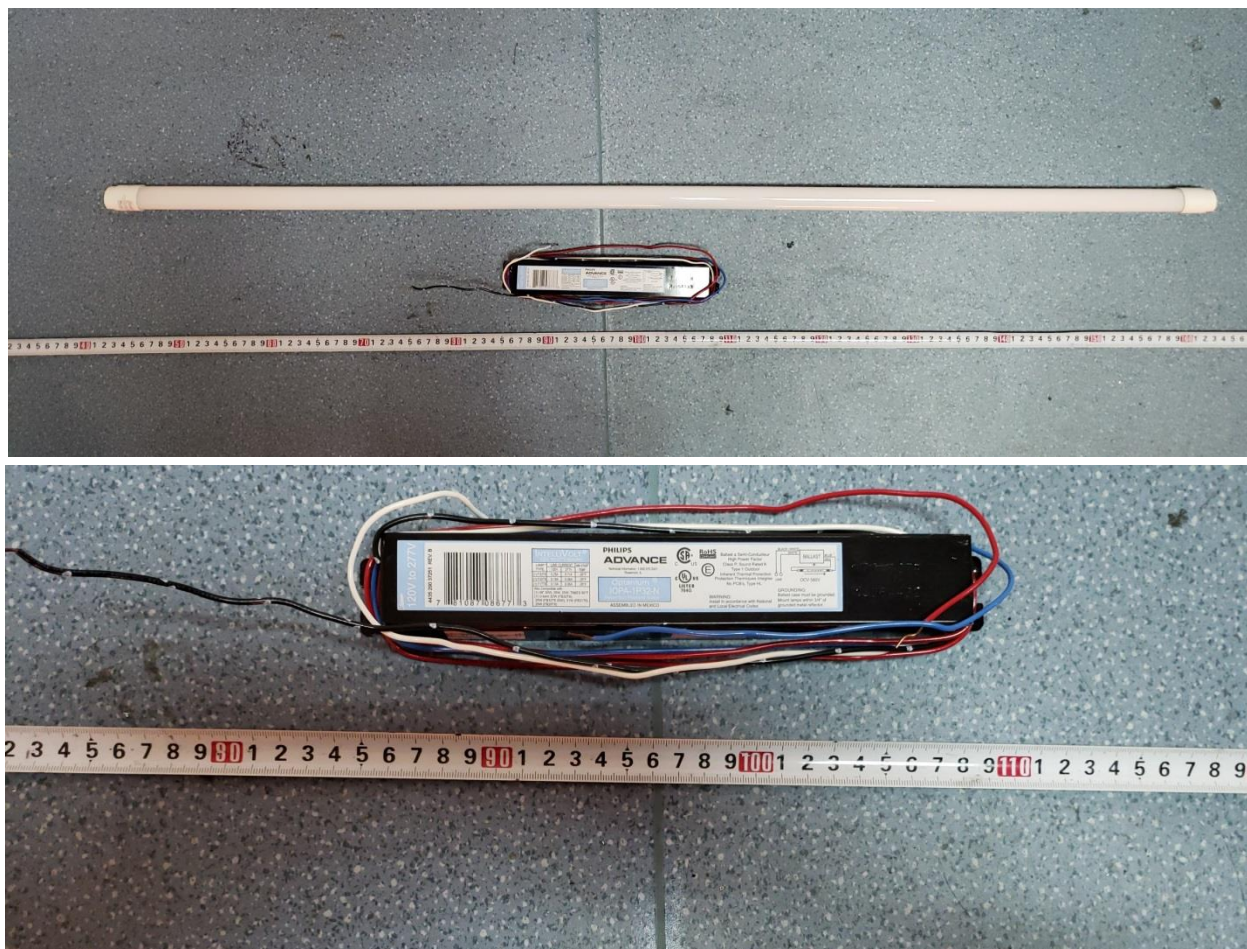


Figure 1- Overview of the sample

### Equipment Under Test(EUT)

<b>Name</b>	: LED Tube
<b>Model</b>	: 10.5T8/4F/830/IS/DIR
<b>Electrical Ratings</b>	: 120-277V, 60Hz
<b>Product Description</b>	: 3000K LED Tubes supplied by a high frequency fluorescent lamp ballast: IOPA-1P32-N
<b>Manufacturer</b>	: GREEN CREATIVE LTD
<b>Address</b>	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

## TEST RESULTS

Test ambient temperature was 26.0°C.

Base orientation was horizontal. 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 65 minutes.

### Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.117	0.055
Power Factor	0.9922	0.9309
Test Power (W)	13.91	14.05
THD A%	8.47	14.44
Luminous Efficacy (lm/W)	126.7	125.6
Total Luminous Flux (lm)	1763.0	1765.0
Color Rendering Index (CRI)	81.4	
R9	0.7	
Correlated Color Temperature (CCT)(K)	2857	
Chromaticity Chroma x	0.4452	
Chromaticity Chroma y	0.4034	
Chromaticity Chroma u	0.2562	
Chromaticity Chroma v	0.3482	
Duv	0.0013	
Chromaticity Chroma u'	0.2562	
Chromaticity Chroma v'	0.5223	

Special Color Rendering Indices	
R1	80
R2	90.9
R3	95.3
R4	79.5
R5	80.6
R6	89.7
R7	80.5
R8	55.1
R9	0.7
R10	80
R11	79.5
R12	75.2
R13	82.6
R14	98.1
Rf	84
Rg	97

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 30 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)	0.117
Power Factor	0.9929
Power (W)	13.98
Luminous Efficacy (lm/W)	124.4
Total Luminous Flux (lm)	1738.7
Beam Angle ( ° )	116.4 (0°-180°) / 237.4 (90°-270°)
Center Beam Candle Power (cd)	269
Maximum Beam Candle Power (cd)	268.9 (At: C=70.0, Gamma=3.5)
Spacing Criteria	1.28 (0°-180°) /1.45 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	41.11%
Zonal Lumens in the 60 °-90 °Zone	27.00%
Zonal Lumens in the 90 °-120 °Zone	18.32%
Zonal Lumens in the 120 °-180 °Zone	13.56%

Table 3: Test data per Goniophotometer Method



## Spectral Power Distribution - Sphere Spectroradiometer Method

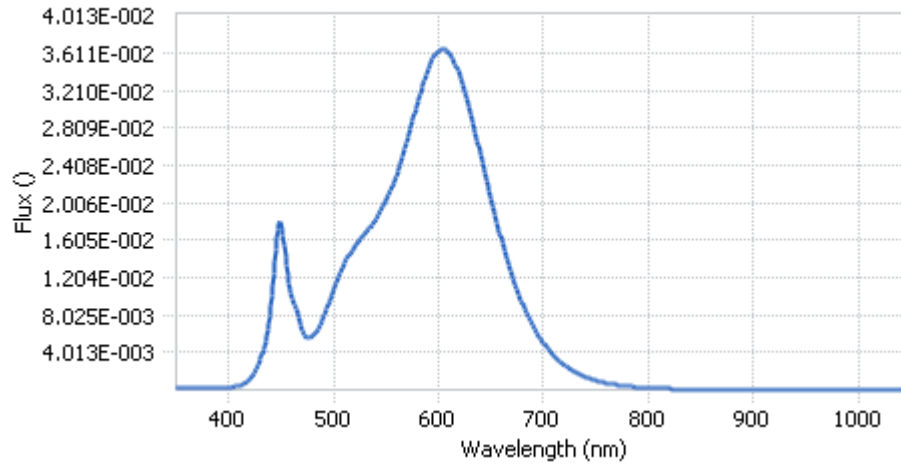
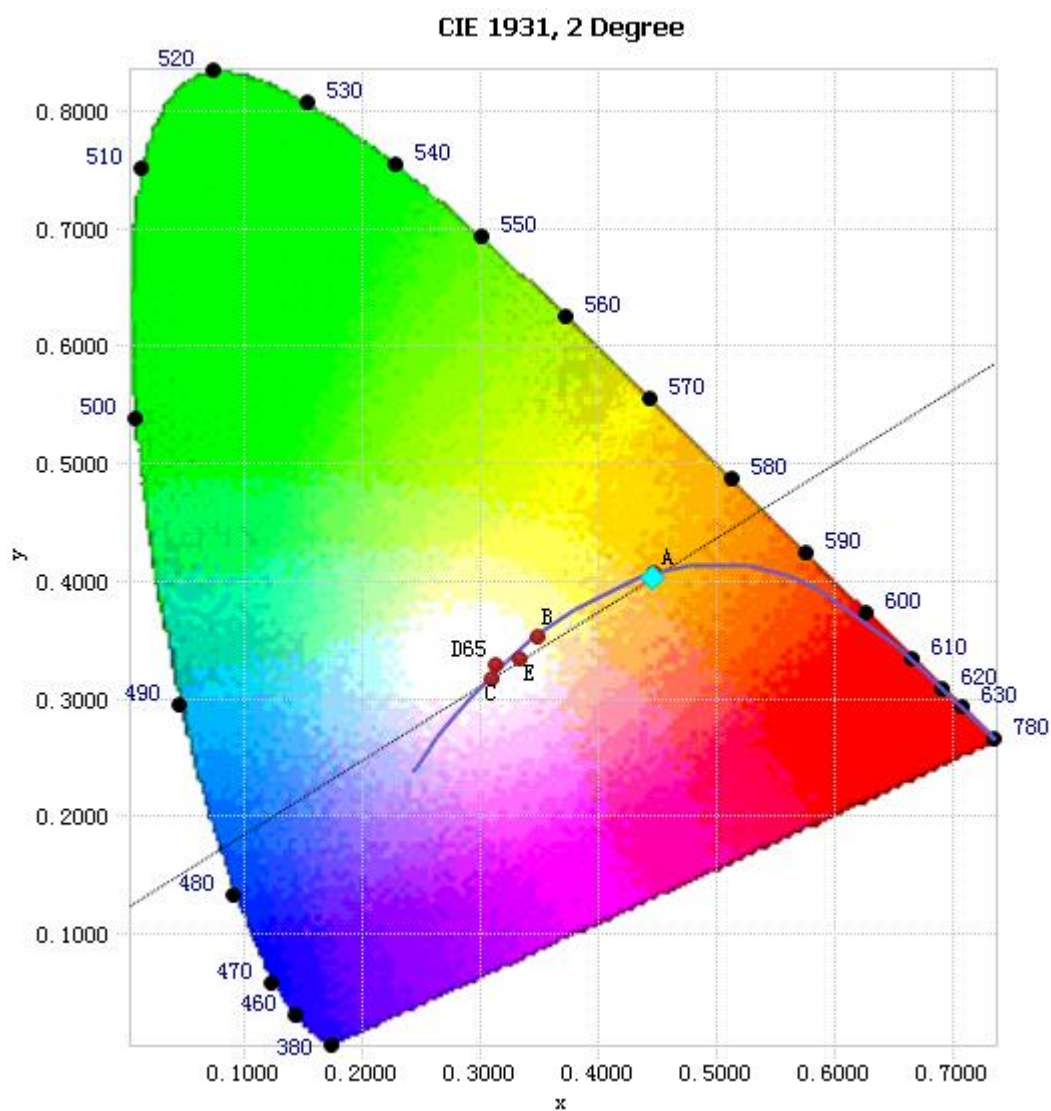


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.19E-04	485	6.51E-03	590	3.44E-02	695	5.88E-03
385	2.26E-04	490	7.66E-03	595	3.56E-02	700	5.02E-03
390	2.42E-04	495	9.21E-03	600	3.62E-02	705	4.29E-03
395	2.58E-04	500	1.08E-02	605	3.65E-02	710	3.66E-03
400	2.81E-04	505	1.23E-02	610	3.61E-02	715	3.12E-03
405	3.48E-04	510	1.35E-02	615	3.51E-02	720	2.65E-03
410	4.82E-04	515	1.45E-02	620	3.37E-02	725	2.27E-03
415	7.30E-04	520	1.54E-02	625	3.18E-02	730	1.94E-03
420	1.18E-03	525	1.61E-02	630	2.99E-02	735	1.65E-03
425	1.95E-03	530	1.68E-02	635	2.75E-02	740	1.40E-03
430	3.22E-03	535	1.75E-02	640	2.51E-02	745	1.20E-03
435	5.26E-03	540	1.83E-02	645	2.27E-02	750	1.02E-03
440	8.96E-03	545	1.92E-02	650	2.04E-02	755	8.73E-04
445	1.51E-02	550	2.03E-02	655	1.82E-02	760	7.47E-04
450	1.79E-02	555	2.16E-02	660	1.60E-02	765	6.43E-04
455	1.32E-02	560	2.31E-02	665	1.41E-02	770	5.48E-04
460	9.97E-03	565	2.49E-02	670	1.23E-02	775	4.72E-04
465	8.53E-03	570	2.67E-02	675	1.07E-02	780	3.99E-04
470	6.53E-03	575	2.87E-02	680	9.24E-03		
475	5.59E-03	580	3.08E-02	685	7.96E-03		
480	5.84E-03	585	3.28E-02	690	6.86E-03		

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

## Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4452, 0.4034)

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

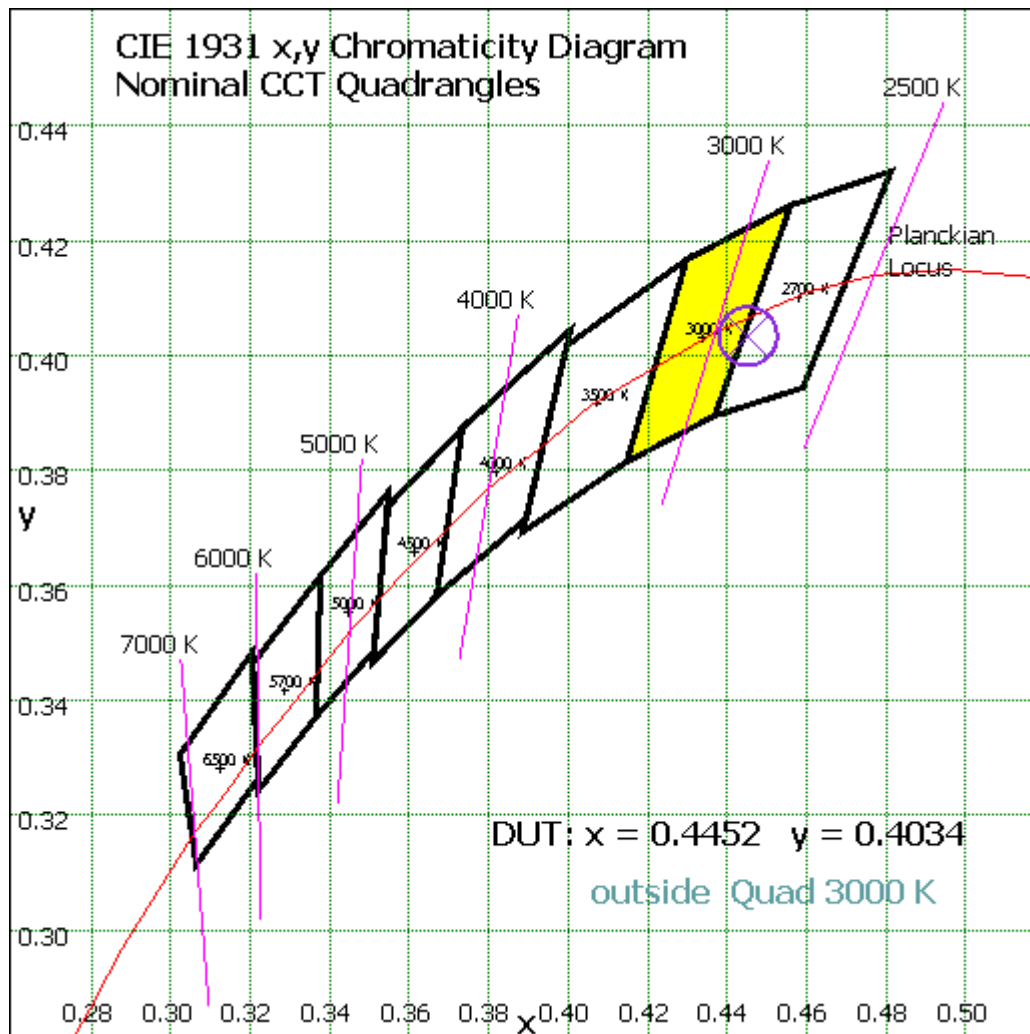
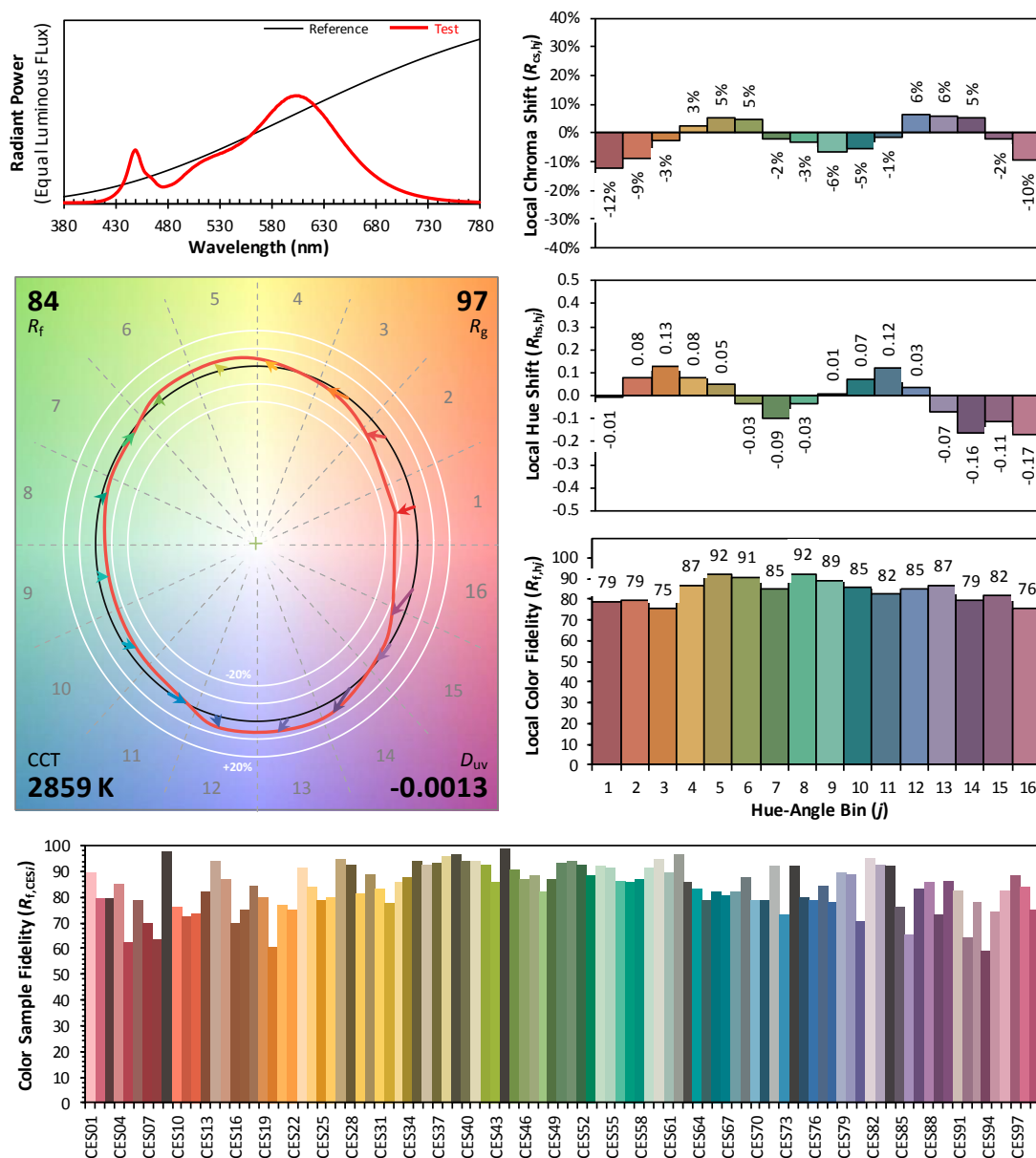


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

## Color Rendition Report – Sphere Spectroradiometer Method



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

$x$  0.4452

$y$  0.4034

$u'$  0.2562

$v'$  0.5223

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	25.539	1.47%
10- 20	74.447	4.28%
20- 30	117.032	6.73%
30- 40	149.791	8.61%
40- 50	170.329	9.80%
50- 60	177.671	10.22%
60- 70	172.53	9.92%
70- 80	157.873	9.08%
80- 90	139.137	8.00%
90-100	122.106	7.02%
100-110	106.15	6.11%
110-120	90.306	5.19%
120-130	75.029	4.32%
130-140	60.363	3.47%
140-150	46.077	2.65%
150-160	31.68	1.82%
160-170	17.258	0.99%
170-180	5.415	0.31%
Total	1738.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	714.809	41.11%
60- 90	469.54	27.00%
0-90	1184.349	68.12%
90- 180	554.384	31.88%
0- 180	1738.7	100%

Table 5: Zonal Lumen

## Illuminance Plots- Goniophotometer Method

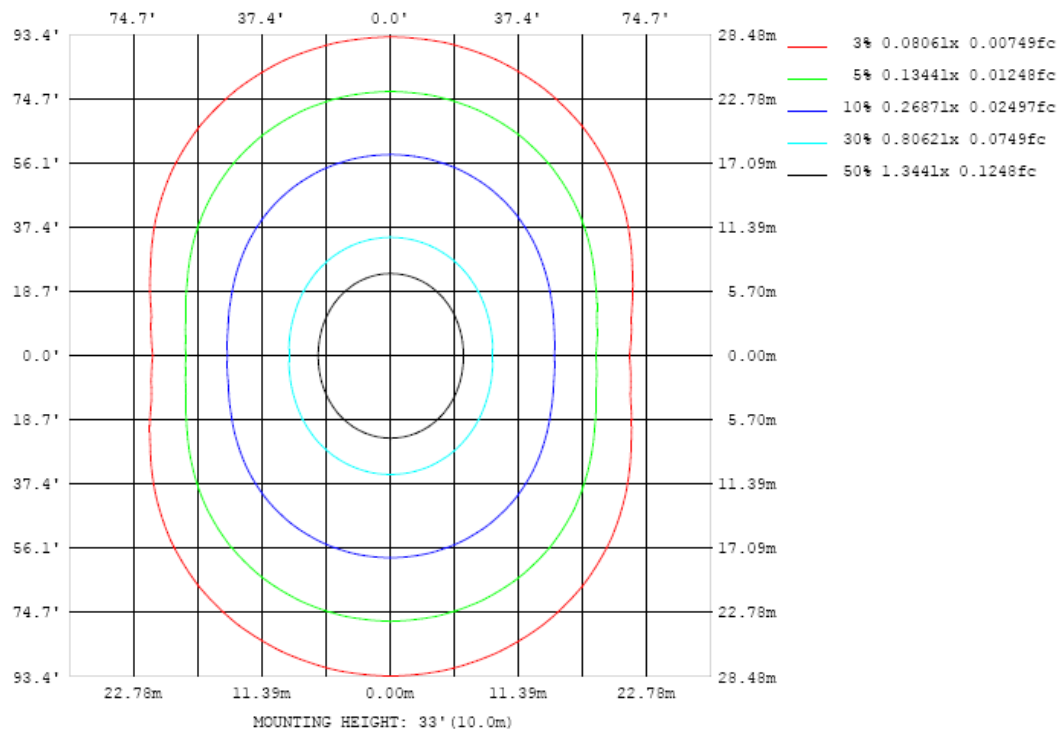


Chart 5: Illuminance Plot (Footcandles)

## Luminous Intensity Distribution Plots- Goniophotometer Method

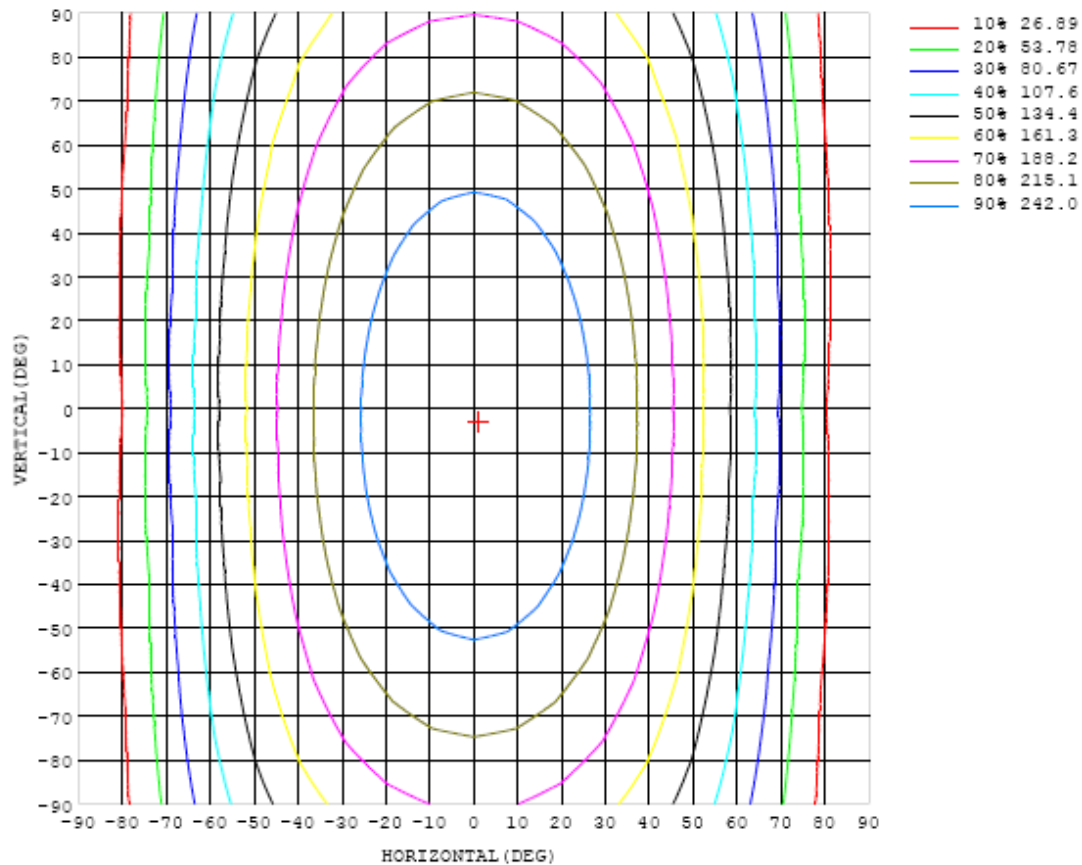


Chart 6: Isocandela Plot

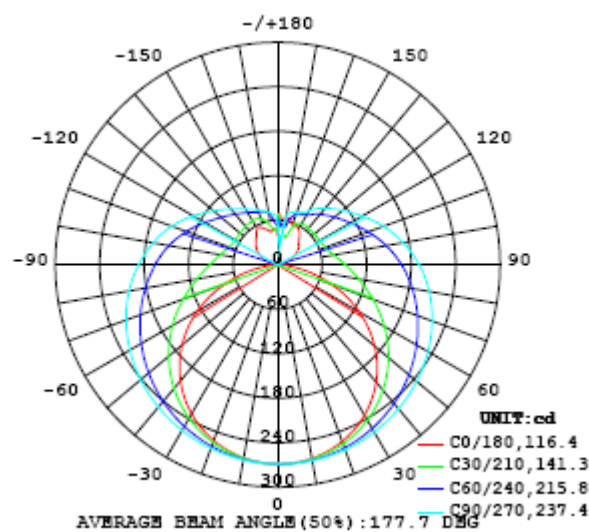


Chart 7: Polar Candela Distribution

## Luminous Intensity Data- Goniophotometer Method

Table--1

UNIT: cd

C (DMMG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
y (DMMG)	0	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269
5	268	268	268	268	268	269	269	269	269	269	269	269	268	268	268	268	268	268	268
10	265	265	266	266	267	267	268	268	268	268	268	268	267	267	266	266	265	265	264
15	260	261	261	262	264	265	266	267	267	267	267	266	265	264	263	262	260	260	259
20	254	254	255	257	259	261	263	264	265	265	265	264	262	260	258	256	254	253	252
25	245	246	248	250	253	257	259	262	263	263	263	261	259	256	252	249	246	244	243
30	234	235	238	242	246	251	255	258	260	261	260	257	254	250	245	240	236	233	232
35	221	223	227	232	238	244	250	254	257	257	256	253	249	243	237	230	225	221	219
40	206	208	214	221	229	237	244	249	253	254	252	249	243	236	228	219	212	206	204
45	190	192	199	208	219	229	238	244	248	249	248	244	237	228	218	207	197	190	187
50	171	174	183	195	208	221	231	239	243	245	243	238	230	220	207	194	181	172	168
55	150	154	165	181	197	212	224	233	238	240	238	232	223	211	196	180	164	152	148
60	127	132	147	166	185	203	216	226	232	234	232	226	216	202	185	165	146	130	125
65	103	110	128	151	174	193	209	219	226	228	226	219	208	193	174	151	128	108	101
70	77.3	86.3	110	137	162	184	201	212	219	222	219	212	201	184	162	137	110	85.4	75.8
75	52.5	64.0	91.9	123	152	175	193	205	212	215	212	205	193	175	152	124	92.7	63.8	50.6
80	28.4	43.3	76.8	111	141	166	184	197	205	207	205	197	185	166	142	112	78.2	44.2	27.0
85	9.07	27.6	64.5	100	132	157	176	189	197	200	197	189	176	158	133	102	66.7	29.6	8.21
90	0.35	19.1	55.6	91.4	123	148	167	180	188	191	188	181	168	149	124	93.3	58.1	21.7	0.29
95	2.01	16.1	49.1	83.4	114	139	158	171	179	182	179	171	159	140	116	85.7	52.0	18.8	2.13
100	5.73	17.6	45.3	76.7	106	130	149	162	170	172	170	162	150	131	108	79.3	48.4	20.0	6.08
105	10.6	20.8	44.2	72.0	98.7	121	139	152	160	162	160	153	140	123	101	74.3	47.1	22.9	11.5
110	16.5	25.3	44.7	68.8	92.2	113	130	142	149	152	150	143	131	115	94.3	71.5	47.2	25.4	17.5
115	22.5	30.0	46.2	66.8	87.3	106	121	132	139	142	140	133	122	107	89.2	69.4	48.2	28.4	23.6
120	28.0	34.6	48.4	65.6	83.5	99.7	113	123	129	132	130	124	114	101	85.4	68.1	49.1	32.8	29.4
125	32.6	37.7	50.5	65.0	80.2	94.4	106	115	120	123	121	116	107	95.9	82.3	66.2	50.4	37.8	34.3
130	37.1	40.0	51.9	64.8	77.5	89.8	100	108	113	114	113	108	101	91.1	79.3	63.7	50.6	40.9	38.3
135	40.0	41.2	53.4	64.3	75.0	85.6	94.3	101	105	107	105	102	95.4	86.7	75.5	63.5	53.5	42.1	42.1
140	45.1	41.9	54.4	63.2	72.6	81.3	89.1	94.6	98.2	99.4	98.3	95.2	89.9	81.7	68.9	60.8	55.3	43.1	46.0
145	51.0	41.2	56.1	65.2	70.7	76.7	83.2	88.3	91.4	92.5	91.6	88.5	83.2	74.6	67.9	64.1	57.9	43.1	50.2
150	56.3	40.2	56.1	64.1	69.9	74.6	78.1	80.3	83.6	84.6	83.4	79.4	75.8	73.8	67.3	63.8	57.7	42.0	56.0
155	56.4	42.9	46.3	61.2	69.0	72.4	74.3	77.3	78.9	79.0	78.8	78.2	74.8	67.7	62.8	56.3	50.0	43.9	56.3
160	56.9	43.4	37.7	49.8	64.9	70.2	73.1	75.0	75.2	75.0	75.4	71.9	63.5	56.6	51.6	46.9	42.4	43.7	51.6
165	65.2	44.7	37.6	38.6	42.5	59.5	65.1	67.0	71.6	72.9	67.3	53.2	49.3	49.5	43.7	39.2	40.3	42.7	48.6
170	64.0	52.5	41.5	42.2	46.0	47.1	51.2	54.8	56.8	66.0	40.1	51.9	51.7	50.0	46.2	44.1	42.5	43.0	46.7
175	63.6	59.3	53.6	52.2	54.0	54.1	54.0	55.0	53.5	35.4	56.6	57.8	56.1	53.8	51.9	50.5	49.0	48.5	49.3
180	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6

Table 6: Luminous Intensity Data



Table---2

UNIT: cd

C (DBG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
y (DBG)	0	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269		
5	268	268	268	268	268	268	268	268	268	268	268	268	268	268	268	268	268		
10	264	265	265	265	266	266	267	267	267	267	267	267	266	266	266	265	265		
15	259	260	261	262	263	264	265	265	266	266	265	264	264	263	262	261	261		
20	253	254	255	257	259	261	262	263	264	263	263	261	260	258	256	255	254		
25	244	245	248	251	254	257	259	260	261	261	259	258	255	252	249	247	245		
30	233	235	239	243	248	252	255	257	258	257	256	253	249	245	241	237	235		
35	220	224	229	235	241	246	251	253	255	254	251	248	242	237	231	226	222		
40	206	211	218	226	234	241	246	249	251	250	247	242	235	228	220	213	208		
45	190	196	205	216	226	234	241	245	246	245	241	235	227	218	208	199	192		
50	172	180	192	205	217	227	235	240	241	240	236	228	219	207	194	183	174		
55	152	163	178	194	208	220	229	234	236	234	229	221	210	196	180	166	155		
60	131	146	164	182	199	213	222	228	230	229	223	214	201	184	166	148	134		
65	109	127	150	171	190	205	216	222	224	222	216	206	191	173	152	130	111		
70	85.6	109	136	161	181	197	209	216	218	216	209	198	182	162	138	112	88.5		
75	63.4	91.5	122	150	172	189	202	209	211	209	202	190	173	152	125	94.2	66.4		
80	43.4	76.5	111	140	164	181	194	201	204	201	194	182	165	142	112	78.8	46.2		
85	28.3	64.6	100	131	156	173	186	193	196	194	186	174	156	132	102	66.5	30.5		
90	20.3	56.3	91.8	122	147	166	178	185	188	185	178	166	148	123	93.0	57.6	21.4		
95	17.7	50.9	84.9	115	139	157	169	177	179	177	170	158	139	115	85.7	51.6	18.1		
100	18.8	47.2	78.9	107	131	149	162	168	171	168	162	149	131	108	79.3	47.4	18.3		
105	22.2	45.6	73.8	100	123	140	153	160	162	160	153	140	123	100	73.8	45.1	21.4		
110	27.1	46.0	69.9	94.0	115	131	143	150	152	150	143	131	115	93.7	69.5	44.9	26.1		
115	32.4	47.7	67.7	88.3	107	122	133	140	142	140	133	122	107	87.7	66.7	46.0	31.1		
120	37.7	50.1	66.6	84.1	100	114	124	130	132	130	124	114	99.6	83.1	65.2	48.3	35.8		
125	42.6	52.7	66.2	80.9	94.6	106	115	120	122	120	115	106	93.8	79.7	64.6	51.2	40.5		
130	47.0	55.6	66.4	78.4	89.9	99.7	107	112	113	111	107	99.1	89.0	77.2	64.8	54.3	45.2		
135	50.8	58.3	66.9	76.6	86.0	94.1	100	104	105	104	99.9	93.5	85.1	75.3	65.5	57.1	48.5		
140	54.5	60.6	67.5	75.1	82.6	89.2	94.3	97.4	98.3	97.2	93.9	88.6	81.8	74.0	66.5	59.6	52.5		
145	57.7	62.2	68.0	74.0	79.8	84.9	89.0	91.4	92.2	91.2	88.6	84.4	79.0	73.1	67.3	61.4	56.2		
150	60.1	62.9	68.3	73.2	77.4	81.3	84.3	86.2	86.7	86.0	84.0	80.8	76.9	72.6	67.9	62.9	58.7		
155	59.8	63.6	68.5	72.4	75.4	78.2	80.3	81.7	82.1	81.6	80.2	78.0	75.2	72.0	68.0	64.7	60.2		
160	56.6	61.1	65.9	71.8	73.8	75.6	77.0	77.9	78.3	78.0	77.1	75.7	73.5	70.8	68.2	65.9	63.9		
165	51.1	55.6	60.1	67.3	72.5	73.6	74.4	75.0	75.2	75.1	74.5	73.2	71.6	70.1	68.6	66.7	65.7		
170	49.1	49.9	52.5	56.4	64.8	71.4	72.1	72.0	72.0	71.7	71.2	70.7	70.1	69.3	67.4	65.6	64.7		
175	49.6	48.7	47.7	49.2	54.2	60.7	66.1	68.4	69.0	68.8	68.0	67.3	67.1	67.0	65.7	64.7	64.9		
180	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6	54.6		

Table 7: Luminous Intensity Data

## EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Aug. 14, 2018	Aug. 13, 2019
Digital Power Meter	PF2010A	HZTE028-01	Sep. 12, 2018	Sep. 11, 2019
AC Power Supply	DPS1060	HZTE001-06	Aug. 09, 2018	Aug. 08, 2019
DC Power Supply	WY12010	HZTE004-03	Aug. 09, 2018	Aug. 08, 2019
Temperature recorder	JM624U	HZTE018-08	Aug. 09, 2018	Aug. 08, 2019
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 09, 2018	Aug. 08, 2019
Standard source	D908	HZTE012-01	Aug. 14, 2018	Aug. 13, 2019
Integrate Sphere system	3M	HZTE015-04	Aug. 16, 2018	Aug. 15, 2019
Digital Power Meter	WT210	HZTE008-01	Aug. 02, 2018	Aug. 01, 2019
AC Power Supply	PCR 500L	HZTE001-07	Aug. 09, 2018	Aug. 08, 2019
DC Power Supply	IT6154	HZTE004-04	Aug. 09, 2018	Aug. 08, 2019
Standard source	SCL-1400	HZTE012-02	Aug. 16, 2018	Aug. 15, 2019
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 09, 2018	Aug. 08, 2019
Temperature Meter	TES1310	HZTE017-01	Aug. 09, 2018	Aug. 08, 2019

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  $4\pi$ . 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 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**

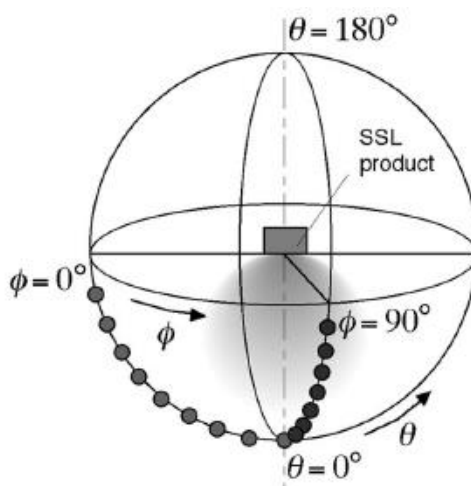
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as 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  $10^\circ$  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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