

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: 15T8/4F/850/HYB/R

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, YuhangDist,
Hangzhou, Zhejiang Province, China 311100

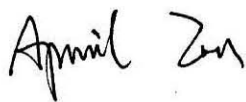
Tel: +86571 86376106

www.ledtestlab.com

Report No.: HZ22120037f

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

Review by:



Engineer: April Zou
Jan. 05, 2023

Approved by:



Manager: Jim Zhang
Jan. 05, 2023

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: 15T8/4F/850/HYB/R

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)/2	Power Factor
127.4	2251.4	17.68	0.9949
CCT (K)	CRI	Stabilization Time (Light & Power)	
5022	83.6	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	: Dec. 27, 2022
Date of Test	: Dec. 28, 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

TABLE OF CONTENT

LM-79-19 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

SAMPLE PHOTO

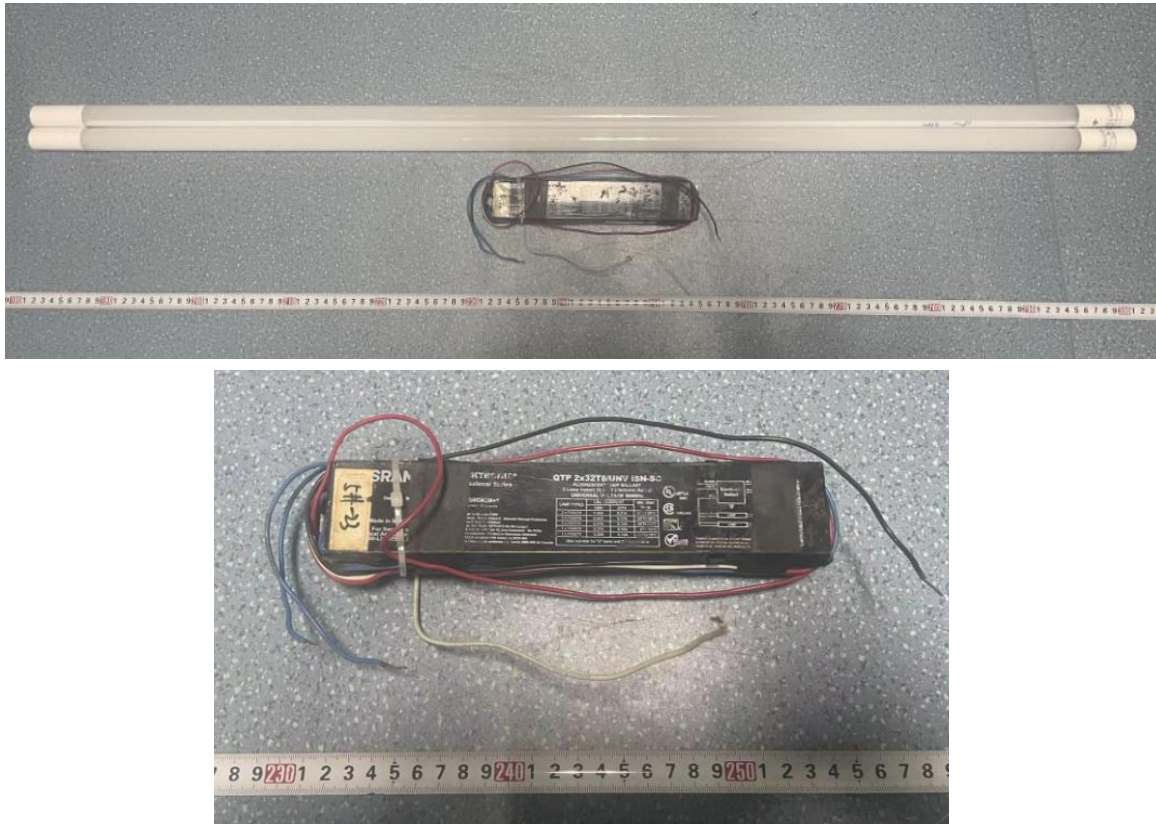


Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Tube
Model	: 15T8/4F/850/HYB/R
Electrical Ratings	: 120-277V, 50/60Hz
Product Description	: 5000K LED Tubes supplied by a high frequency fluorescent lamp ballast: QTP 2x32T8/UNV ISN-SC
Manufacturer	: GREEN CREATIVE LTD
Address	: 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)	0.296	0.131
Power Factor	0.9949	0.9680
Test Power (W)/2	17.68	17.54
THD A%	7.91	11.97
Luminous Efficacy (lm/W)	127.4	128.4
Total Luminous Flux (lm)	2251.4	2251.2
Color Rendering Index (CRI)	83.6	
R9	8.7	
Correlated Color Temperature (CCT)(K)	5022	
Chromaticity Chroma x	0.3449	
Chromaticity Chroma y	0.3568	
Chromaticity Chroma u	0.2093	
Chromaticity Chroma v	0.3248	
Duv	0.0027	
Chromaticity Chroma u'	0.2093	
Chromaticity Chroma v'	0.4871	

Special Color Rendering Indices	
R1	81.9
R2	89.7
R3	94.1
R4	82.4
R5	82.3
R6	84.8
R7	86.8
R8	66.9
R9	8.7
R10	75
R11	81.7
R12	60.8
R13	84.2
R14	97.1

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 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)	0.296
Power Factor	0.9952
Power (W)/2	17.69
Luminous Efficacy (lm/W)	128.2
Total Luminous Flux (lm)	2268.4
Beam Angle (°)	110.9 (0°-180°) / 207.8 (90°-270°)
Center Beam Candle Power (cd)	402
Maximum Beam Candle Power (cd)	402.2 (At: C=270.0, Gamma=4.5)
Spacing Criteria	1.25 (0°-180°) / 1.43 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	44.69%
Zonal Lumens in the 60 °-90 °Zone	26.72%
Zonal Lumens in the 90 °-120 °Zone	17.25%
Zonal Lumens in the 120 °-180 °Zone	11.33%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

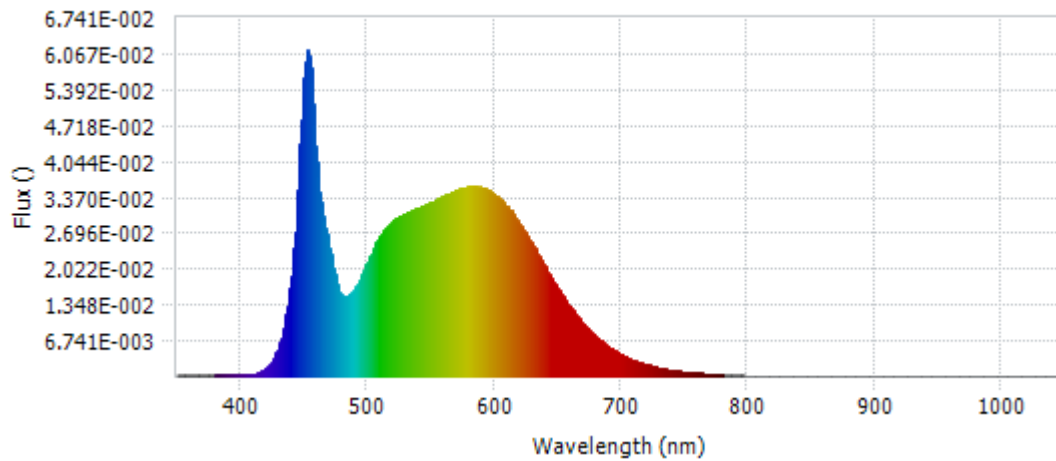
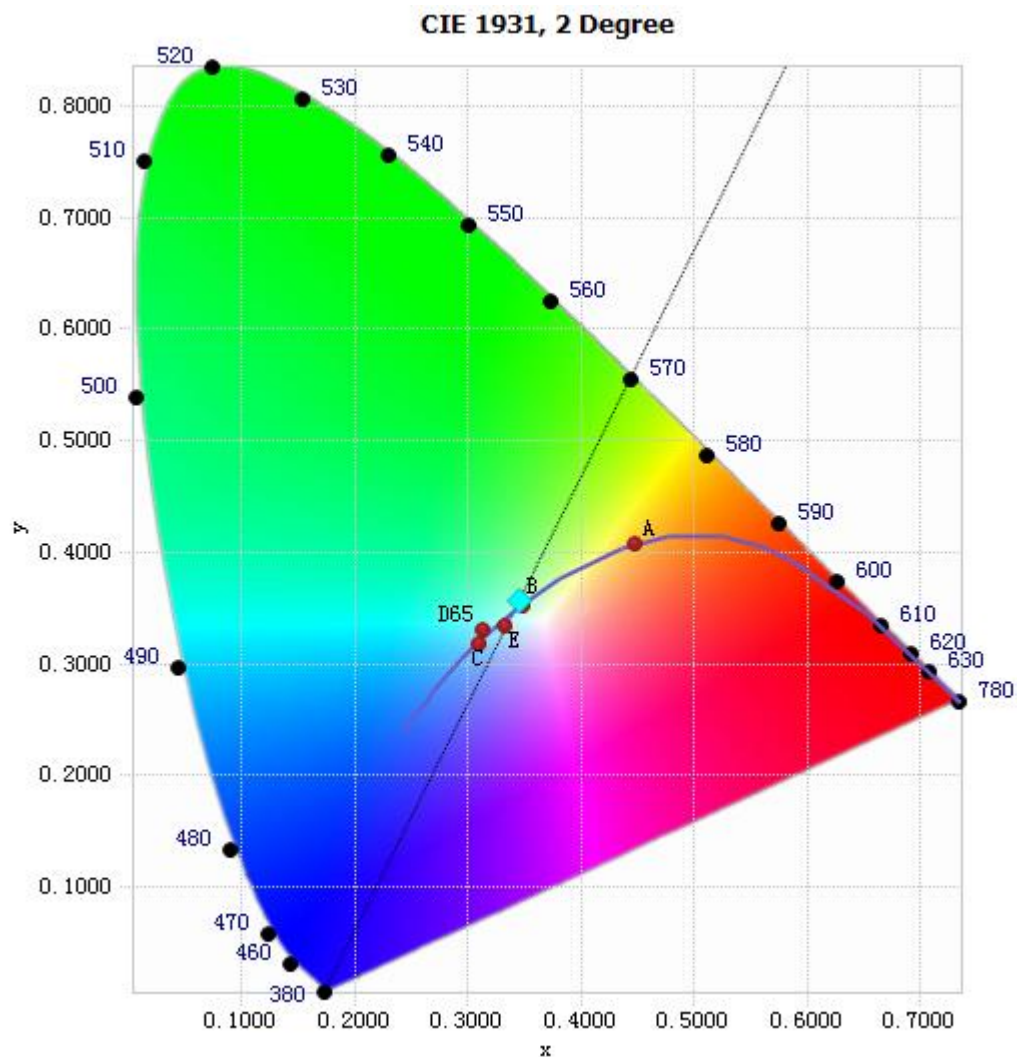


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.37E-04	485	1.53E-02	590	3.54E-02	695	4.82E-03
385	2.30E-04	490	1.65E-02	595	3.50E-02	700	4.14E-03
390	2.62E-04	495	1.87E-02	600	3.43E-02	705	3.53E-03
395	2.35E-04	500	2.16E-02	605	3.32E-02	710	3.01E-03
400	2.37E-04	505	2.43E-02	610	3.19E-02	715	2.58E-03
405	2.84E-04	510	2.63E-02	615	3.04E-02	720	2.22E-03
410	4.29E-04	515	2.81E-02	620	2.86E-02	725	1.90E-03
415	8.06E-04	520	2.92E-02	625	2.67E-02	730	1.62E-03
420	1.60E-03	525	3.01E-02	630	2.48E-02	735	1.37E-03
425	3.05E-03	530	3.06E-02	635	2.26E-02	740	1.17E-03
430	5.65E-03	535	3.11E-02	640	2.06E-02	745	1.01E-03
435	1.04E-02	540	3.16E-02	645	1.85E-02	750	8.54E-04
440	1.89E-02	545	3.21E-02	650	1.66E-02	755	7.31E-04
445	3.49E-02	550	3.27E-02	655	1.47E-02	760	6.31E-04
450	5.62E-02	555	3.33E-02	660	1.30E-02	765	5.34E-04
455	5.82E-02	560	3.39E-02	665	1.14E-02	770	4.54E-04
460	4.03E-02	565	3.44E-02	670	9.97E-03	775	3.95E-04
465	3.01E-02	570	3.50E-02	675	8.71E-03	780	3.38E-04
470	2.42E-02	575	3.53E-02	680	7.52E-03		
475	1.80E-02	580	3.56E-02	685	6.49E-03		
480	1.52E-02	585	3.57E-02	690	5.61E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3449, 0.3568)

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

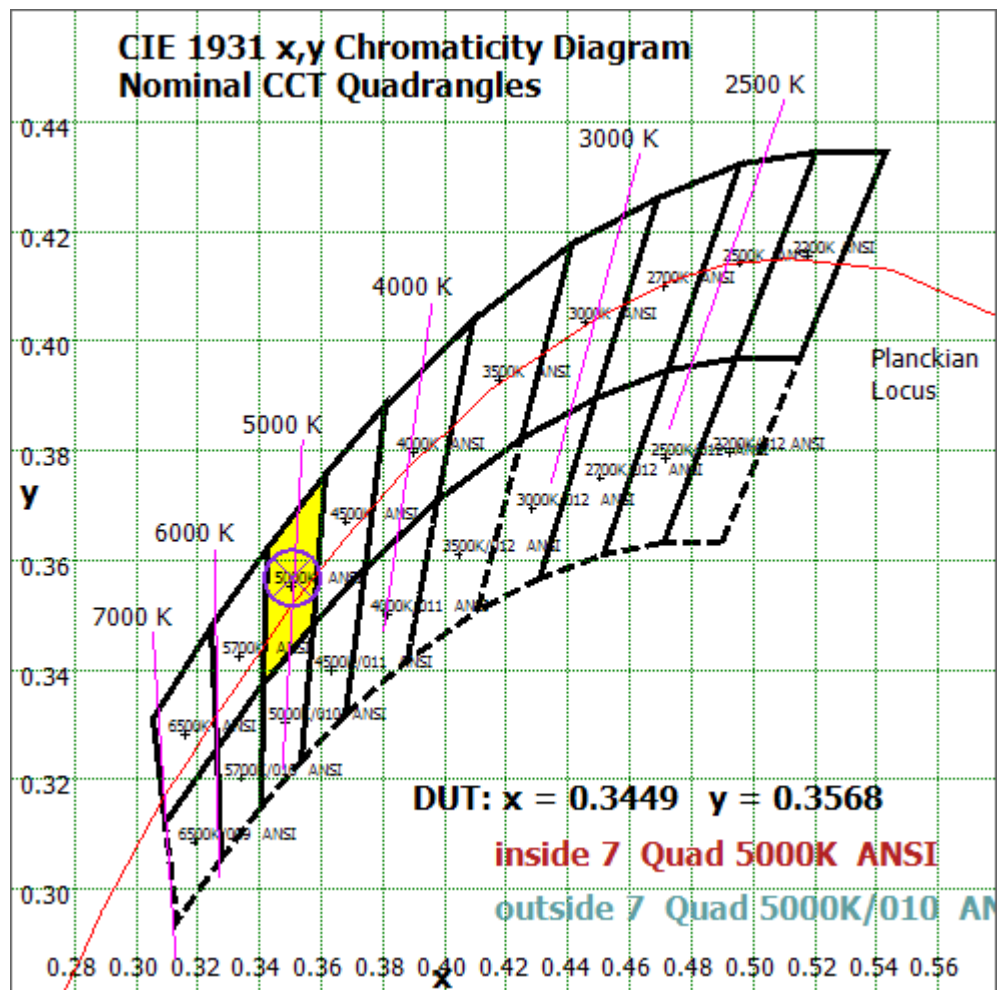


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

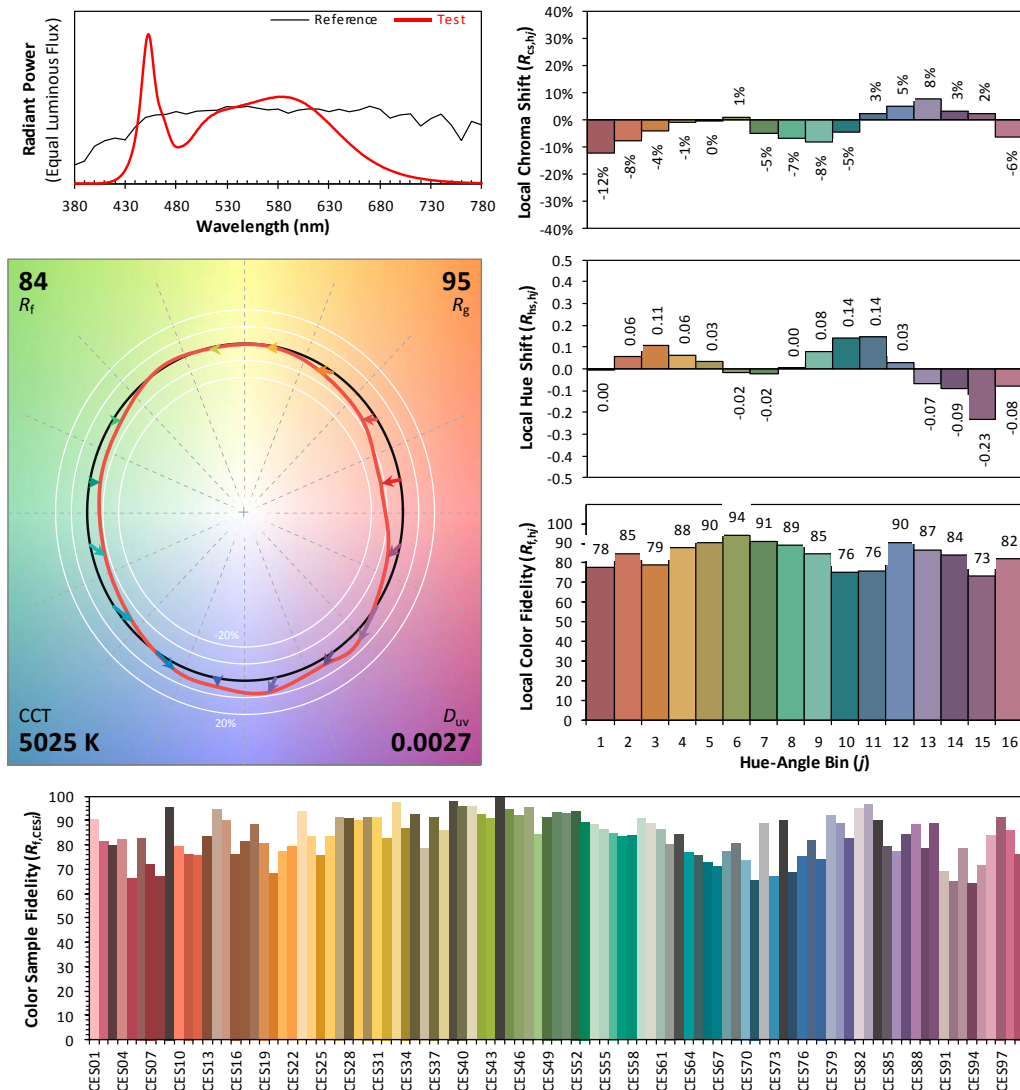
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2022/12/28

Model: 15T8/4F/850/HYB/R



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

x 0.3449
 y 0.3568
 u' 0.2093
 v' 0.4871

CIE 13.3-1995
(CRI)
 R_a 84
 R_g 9

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	38.095	1.68%
10- 20	110.322	4.86%
20- 30	170.975	7.54%
30- 40	214.533	9.46%
40- 50	238.089	10.50%
50- 60	241.672	10.65%
60- 70	228.233	10.06%
70- 80	203.224	8.96%
80- 90	174.772	7.70%
90-100	150.687	6.64%
100-110	130.12	5.74%
110-120	110.579	4.87%
120-130	90.241	3.98%
130-140	70.194	3.09%
140-150	49.601	2.19%
150-160	28.637	1.26%
160-170	13.797	0.61%
170-180	4.655	0.21%
Total	2268.4	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1013.69	44.69%
60- 90	606.229	26.72%
0-90	1619.92	71.41%
90- 180	648.511	28.59%
0- 180	2268.4	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

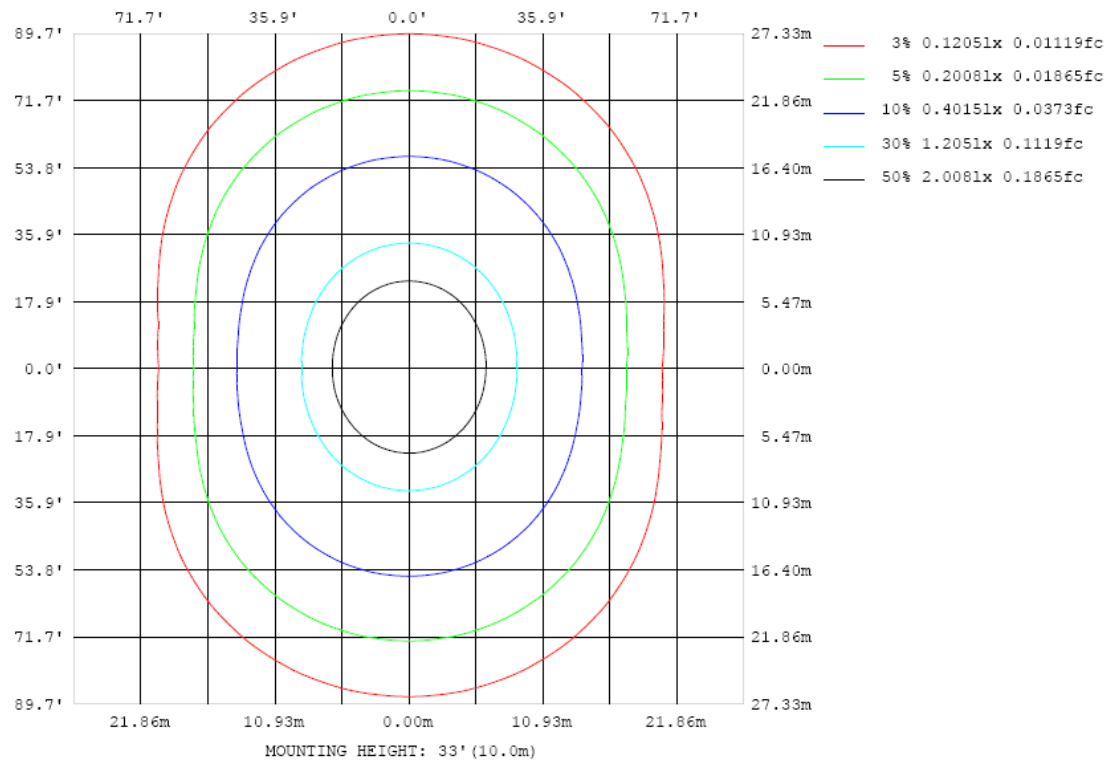


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

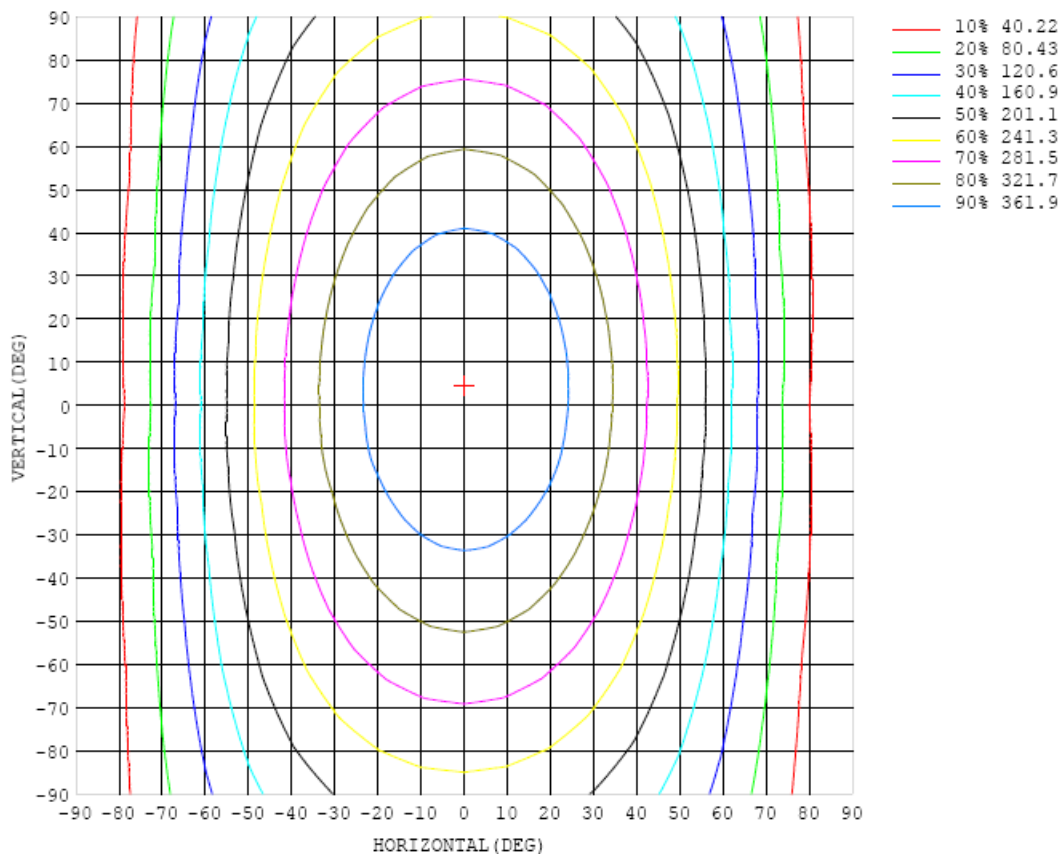


Chart 6: Isocandela Plot

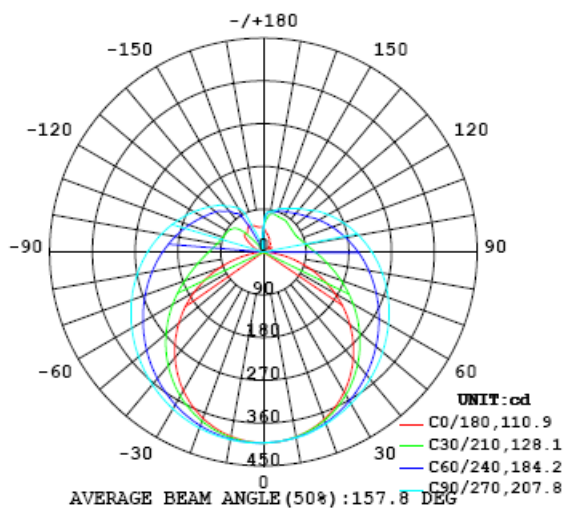


Chart 7: Polar Candela Distribution

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	402	402	402	402	402	402	402	402	402	402	402	402	402	402	402	402	402	402	402
5	400	400	400	400	400	400	400	400	400	400	400	400	399	399	399	399	399	399	399
10	395	395	395	395	395	396	396	397	397	397	397	396	396	395	394	394	394	394	394
15	386	386	386	387	388	390	391	392	392	392	391	391	390	389	387	386	385	384	385
20	374	374	375	377	379	381	383	384	385	385	385	383	381	379	377	375	373	372	372
25	359	359	360	363	366	370	373	375	377	377	376	374	371	368	364	362	359	356	356
30	340	340	343	347	352	357	362	365	368	369	368	365	361	355	350	345	341	338	337
35	318	319	323	329	336	343	350	355	358	359	358	354	349	342	334	326	321	316	315
40	294	295	301	309	318	328	337	344	348	349	348	343	336	327	316	306	298	293	290
45	267	269	276	287	300	312	323	332	337	339	337	331	323	312	298	285	273	266	262
50	238	241	250	264	281	296	309	319	326	328	325	319	309	296	280	262	247	238	233
55	207	210	223	241	261	280	295	307	314	316	314	307	295	280	261	240	220	207	201
60	174	179	195	218	242	263	281	294	302	304	302	294	282	264	242	218	193	175	168
65	140	147	168	195	223	247	267	281	289	292	289	281	268	249	224	196	166	143	134
70	106	115	141	174	205	232	253	268	276	279	277	268	254	234	207	175	141	112	98.7
75	71.9	84.2	117	154	188	217	239	254	264	267	264	255	240	219	191	157	118	81.8	64.1
80	40.6	57.0	95.0	137	173	203	225	241	251	254	251	243	227	205	176	140	98.2	56.2	32.6
85	14.3	35.9	77.9	122	159	189	212	228	238	241	239	230	214	192	163	126	83.1	38.3	8.66
90	0.65	23.1	65.8	109	146	177	200	216	225	229	226	217	202	180	151	115	72.4	28.9	0.63
95	0.90	18.6	58.6	99.1	135	165	187	203	213	216	213	205	190	169	140	105	65.4	26.3	2.11
100	2.35	18.7	54.1	91.3	126	154	176	191	200	204	201	193	179	158	131	98.1	62.1	27.9	4.53
105	6.59	22.1	51.7	85.7	117	144	165	179	188	191	189	181	168	148	123	92.4	60.4	32.3	9.07
110	12.1	27.2	51.7	81.3	110	135	154	168	177	180	178	170	157	139	116	88.4	60.7	38.1	14.2
115	17.5	33.3	53.6	77.7	104	126	144	157	165	168	166	159	147	131	110	85.7	62.3	44.7	21.0
120	19.3	39.4	56.5	76.3	97.7	119	135	147	155	157	156	149	138	123	105	84.3	64.7	51.0	29.3
125	13.3	43.7	60.2	76.0	93.9	111	126	138	145	147	146	140	130	117	101	83.7	67.7	56.4	40.3
130	12.0	52.1	64.1	76.4	91.2	106	117	127	133	136	135	130	122	111	97.8	83.7	70.6	59.6	51.7
135	16.3	61.1	67.4	77.5	89.3	101	111	119	124	127	126	122	116	106	95.4	84.1	73.9	65.2	54.0
140	24.1	61.0	70.3	79.2	88.1	97.4	106	113	117	119	119	115	110	102	93.7	84.8	75.5	69.0	52.9
145	23.7	58.4	74.0	80.7	87.8	94.8	101	107	110	112	112	109	105	99.0	92.5	85.7	77.5	73.5	58.5
150	24.4	64.8	76.5	80.6	88.1	93.1	98.0	102	105	106	106	104	101	96.3	91.5	84.8	78.8	75.4	63.0
155	30.6	63.7	77.7	80.9	86.1	91.8	95.3	98.1	100	101	101	99.5	97.1	94.1	89.6	83.9	80.2	76.1	58.7
160	32.9	62.6	79.8	82.0	83.9	87.8	91.9	94.5	96.0	96.6	96.5	95.6	93.4	89.9	86.4	84.5	81.0	74.1	59.5
165	37.7	60.0	78.2	83.1	83.9	85.6	86.7	88.3	89.5	90.0	89.8	89.3	88.0	87.0	86.0	84.3	81.0	72.4	55.4
170	40.6	56.9	71.1	80.5	84.0	84.7	85.2	85.9	86.4	86.7	86.8	86.5	86.0	85.5	84.8	83.1	78.4	67.1	53.0
175	45.3	53.9	61.9	68.5	73.5	77.9	80.8	82.5	83.3	83.6	83.7	83.4	82.6	80.9	78.0	74.0	69.4	62.0	53.0
180	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7

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	402	402	402	402	402	402	402	402	402	402	402	402	402	402	402	402	402		
5	400	400	400	401	401	402	402	402	402	402	402	402	402	401	401	401	400		
10	394	395	396	397	398	399	400	401	401	401	401	400	399	398	397	396	396		
15	385	387	389	391	393	395	397	398	398	398	397	396	394	392	390	389	387		
20	373	376	379	382	386	389	392	393	394	394	392	390	387	384	381	378	376		
25	358	361	366	371	376	381	385	387	388	388	386	382	378	373	368	364	361		
30	339	344	350	357	364	371	376	380	381	380	377	373	367	360	353	347	342		
35	318	324	332	342	351	360	367	371	373	372	368	362	354	345	336	327	321		
40	293	301	312	324	337	348	356	362	364	362	358	350	340	328	316	306	298		
45	266	276	290	306	321	335	345	351	354	352	346	337	325	310	295	282	272		
50	237	250	268	287	305	321	333	340	343	341	335	323	309	291	273	256	243		
55	207	223	244	267	289	307	320	329	332	329	322	309	293	272	250	229	213		
60	174	194	221	248	273	293	308	317	320	317	309	295	276	253	227	202	182		
65	142	166	198	229	257	279	295	305	308	305	296	281	260	234	205	175	151		
70	110	140	176	212	241	265	282	292	295	293	283	267	245	216	183	149	119		
75	78.4	116	157	195	227	251	269	279	283	280	270	253	230	200	163	125	88.8		
80	51.1	95.1	141	180	213	238	256	266	270	267	257	240	216	184	146	103	61.4		
85	31.7	79.3	127	167	200	225	243	253	257	254	244	227	202	170	132	86.5	40.2		
90	20.4	67.8	115	155	187	212	230	240	244	241	231	214	189	158	119	74.1	28.1		
95	16.2	60.4	106	144	176	200	217	228	231	228	218	201	177	146	109	66.0	23.9		
100	16.5	56.9	99.3	135	165	189	205	215	218	215	205	189	166	136	102	61.6	23.7		
105	17.5	55.5	94.4	127	155	177	193	202	206	202	193	178	156	128	95.5	59.9	25.4		
110	17.6	55.6	90.9	121	147	167	181	190	193	190	181	167	146	121	91.0	60.4	27.0		
115	15.7	54.8	88.6	116	138	157	170	178	181	178	170	156	138	115	88.1	61.5	27.0		
120	10.1	42.0	86.8	111	131	147	160	167	169	167	159	147	130	110	86.3	62.8	23.8		
125	5.72	23.4	83.6	104	125	139	149	156	158	156	149	138	124	105	83.8	64.1	17.6		
130	7.97	11.5	78.6	94.7	117	132	140	146	148	146	140	131	117	96.8	79.2	60.9	8.68		
135	14.5	7.81	61.8	91.9	108	121	132	137	138	137	132	121	106	93.6	75.3	47.5	5.62		
140	19.5	5.19	30.9	75.5	99.9	113	120	124	126	124	119	112	101	90.4	63.7	28.5	4.76		
145	20.9	6.96	14.6	44.0	83.6	99.6	110	116	117	115	111	104	95.1	79.7	39.3	13.9	7.61		
150	23.6	8.38	9.99	15.8	32.7	70.4	94.3	102	106	106	103	96.6	82.8	52.3	16.9	10.9	10.2		
155	28.3	9.89	6.98	7.58	12.4	16.2	27.6	59.2	78.2	86.1	80.7	66.3	47.1	23.5	10.8	10.6	13.0		
160	32.0	13.3	8.73	6.97	5.14	7.57	15.5	14.5	36.2	37.8	37.1	27.7	14.8	10.9	12.0	10.8	14.2		
165	35.8	19.6	9.73	7.01	6.88	6.57	9.65	11.9	2.94	11.9	11.9	11.1	10.2	9.90	9.43	10.7	21.7		
170	38.6	27.1	17.4	12.7	11.2	12.6	11.0	9.97	3.20	10.6	11.2	11.4	9.80	10.5	12.2	17.8	26.7		
175	44.4	36.5	30.4	24.2	19.2	16.4	16.4	17.2	18.7	18.5	17.9	17.4	19.5	22.0	25.6	29.8	37.0		
180	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7		

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, 2022	Aug. 04, 2023
Digital Power Meter	PF2010A	HZTE028-01	Aug. 05, 2022	Aug. 04, 2023
AC Power Supply	DPS1060	HZTE001-06	Aug. 05, 2022	Aug. 04, 2023
DC Power Supply	WY12010	HZTE004-03	Aug. 05, 2022	Aug. 04, 2023
Temperature recorder	JM624U	HZTE018-08	Aug. 05, 2022	Aug. 04, 2023
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 05, 2022	Aug. 04, 2023
Standard source	D908	HZTE012-01	Aug. 05, 2022	Aug. 04, 2023
Integrate Sphere system	3M	HZTE015-04	Aug. 05, 2022	Aug. 04, 2023
Digital Power Meter	WT210	HZTE008-01	Aug. 05, 2022	Aug. 04, 2023
AC Power Supply	PCR 500L	HZTE001-07	Aug. 05, 2022	Aug. 04, 2023
DC Power Supply	IT6154	HZTE004-04	Aug. 05, 2022	Aug. 04, 2023
Standard source	SCL-1400	HZTE012-02	Aug. 05, 2022	Aug. 04, 2023
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 05, 2022	Aug. 04, 2023
Temperature Meter	TES1310	HZTE017-01	Aug. 05, 2022	Aug. 04, 2023

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 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 Tubes) 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 Tubes) 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 ***

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.