LM-79-08 TEST REPORT

for

RAB Lighting Inc

170 Ludlow Avenue, Northvale, New Jersey 07647 USA

LED Tube

Model: T8-9.5-48G-835-SD-BYP/2

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.: HZ21060026ae

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

Review by: April Zou

Engineer: April Zou
Jul. 21, 2021

Approved by: Jim Zhang

Manager: Jim Zhang
Jul. 21, 2021

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: **T8-9.5-48G-835-SD-BYP/2**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
174.9	1675.7	9.58	0.9718

CCT (K)	CRI	Stabilization Time (Light & Power)
3497	81.8	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 : Jun. 23, 2021

Date of Test : Jul. 12, 2021

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
ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

TABLE OF CONTENT

SAMPLE PHOTO

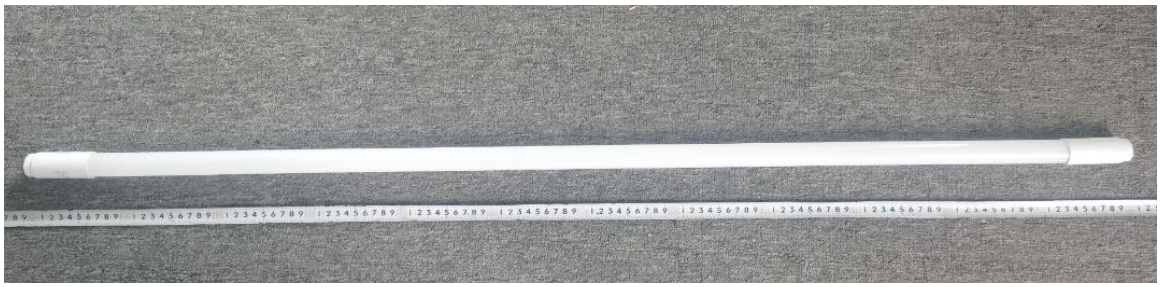


Figure 1- Overview of the sample

Equipment Under Test(EUT)	
Name	: LED Tube
Model	: T8-9.5-48G-835-SD-BYP/2
Electrical Ratings	: 120V, 50/60Hz
Product Description	: 3500K

TEST RESULTS

Test ambient temperature was 25.0 ℃.

Base orientation was base up. 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
Voltage frequency (Hz)	60
Test Current (A)	0.082
Power Factor	0.9718
Test Power (W)	9.58
THD A%	22.24
Luminous Efficacy (lm/W)	174.9
Total Luminous Flux (lm)	1675.7
Color Rendering Index (CRI)	81.8
R9	1.8
Correlated Color Temperature (CCT)(K)	3497
Chromaticity Chroma x	0.4036
Chromaticity Chroma y	0.3862
Chromaticity Chroma u	0.2365
Chromaticity Chroma v	0.3394
Duv	-0.0016
Chromaticity Chroma u ’	0.2365
Chromaticity Chroma v’	0.5091

Special Color Rendering Indices	
R1	80
R2	89.2
R3	95.6
R4	80.5
R5	80.5
R6	85.8
R7	83.2
R8	59.5
R9	1.8
R10	75.3
R11	80
R12	66.3
R13	82.2
R14	98

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 25.2 ℃.

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)	0.082
Power Factor	0.9707
Power (W)	9.56
Luminous Efficacy (lm/W)	172.1
Total Luminous Flux (lm)	1645.0
Beam Angle (°)	106.7 (0^o-180^o) / 163.8 (90^o-270^o)
Center Beam Candle Power (cd)	346
Maximum Beam Candle Power (cd)	346.6 (At: C=100.0, Gamma=4.0)
Spacing Criteria	1.23 (0^o-180^o) / 1.33 (90^o-270^o)
Zonal Lumens in the 0 °-60 °Zone	50.63%
Zonal Lumens in the 60 °-90 °Zone	26.31%
Zonal Lumens in the 90 °-120 °Zone	13.95%
Zonal Lumens in the 120 °-180 °Zone	9.10%

Table 3: Test data per Goniophotometer Method

Spectral Power Distribution - Sphere Spectroradiometer Method

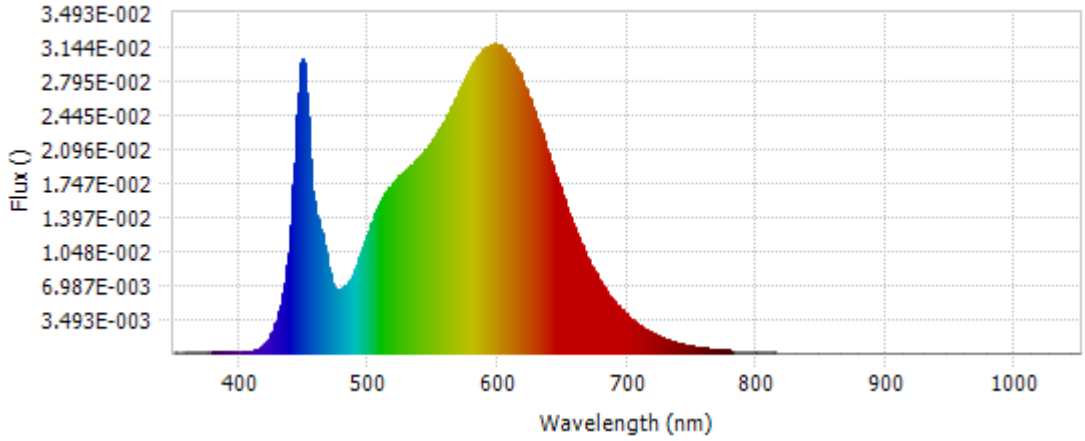
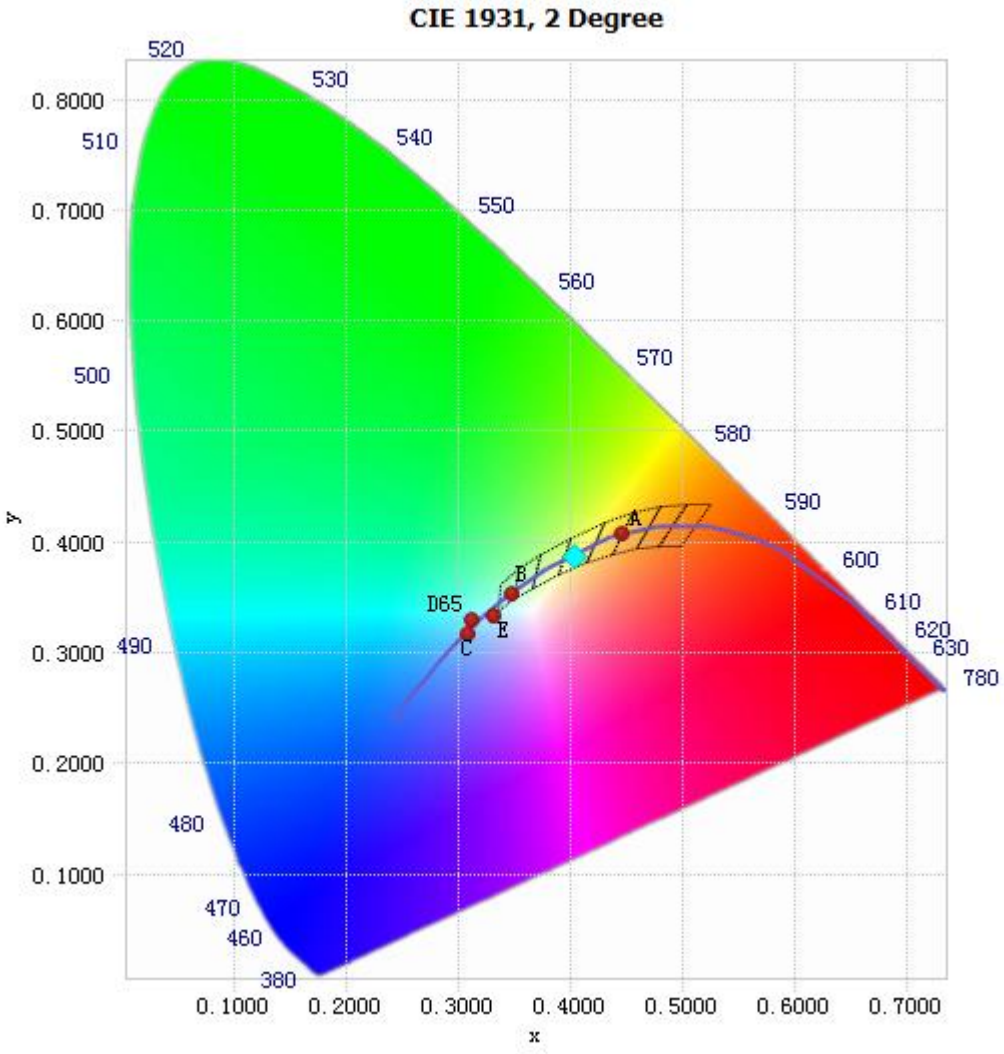


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.13E-04	485	7.35E-03	590	3.12E-02	695	4.57E-03
385	1.34E-04	490	8.66E-03	595	3.17E-02	700	3.89E-03
390	1.49E-04	495	1.06E-02	600	3.16E-02	705	3.31E-03
395	1.26E-04	500	1.25E-02	605	3.13E-02	710	2.81E-03
400	1.17E-04	505	1.43E-02	610	3.04E-02	715	2.39E-03
405	1.12E-04	510	1.57E-02	615	2.92E-02	720	2.05E-03
410	2.24E-04	515	1.68E-02	620	2.77E-02	725	1.74E-03
415	4.76E-04	520	1.76E-02	625	2.60E-02	730	1.48E-03
420	9.88E-04	525	1.83E-02	630	2.41E-02	735	1.25E-03
425	1.98E-03	530	1.89E-02	635	2.21E-02	740	1.07E-03
430	3.87E-03	535	1.95E-02	640	2.02E-02	745	9.07E-04
435	7.13E-03	540	2.02E-02	645	1.81E-02	750	7.73E-04
440	1.32E-02	545	2.10E-02	650	1.62E-02	755	6.59E-04
445	2.45E-02	550	2.20E-02	655	1.43E-02	760	5.53E-04
450	2.97E-02	555	2.30E-02	660	1.27E-02	765	4.76E-04
455	1.99E-02	560	2.41E-02	665	1.11E-02	770	4.09E-04
460	1.42E-02	565	2.54E-02	670	9.65E-03	775	3.48E-04
465	1.18E-02	570	2.68E-02	675	8.37E-03	780	2.96E-04
470	8.21E-03	575	2.82E-02	680	7.24E-03		
475	6.61E-03	580	2.95E-02	685	6.22E-03		
480	6.71E-03	585	3.06E-02	690	5.36E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4036, 0.3862)

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

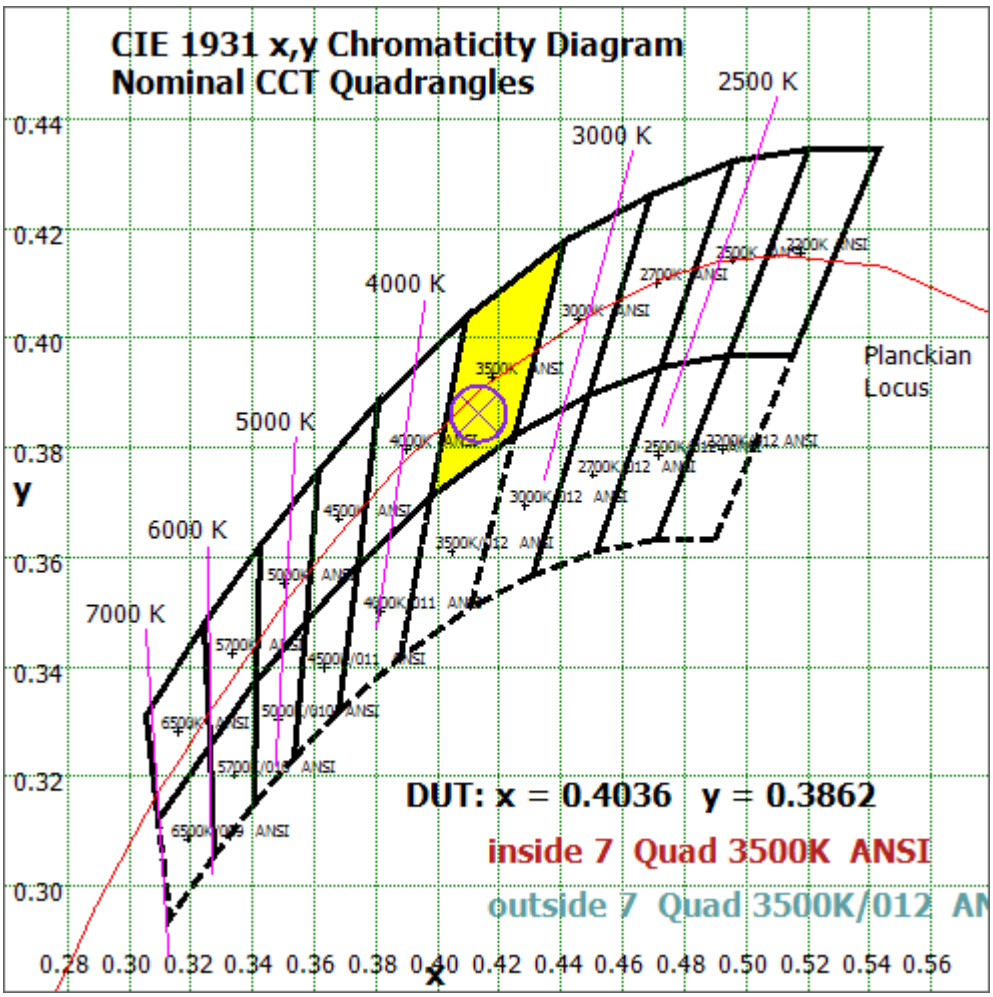


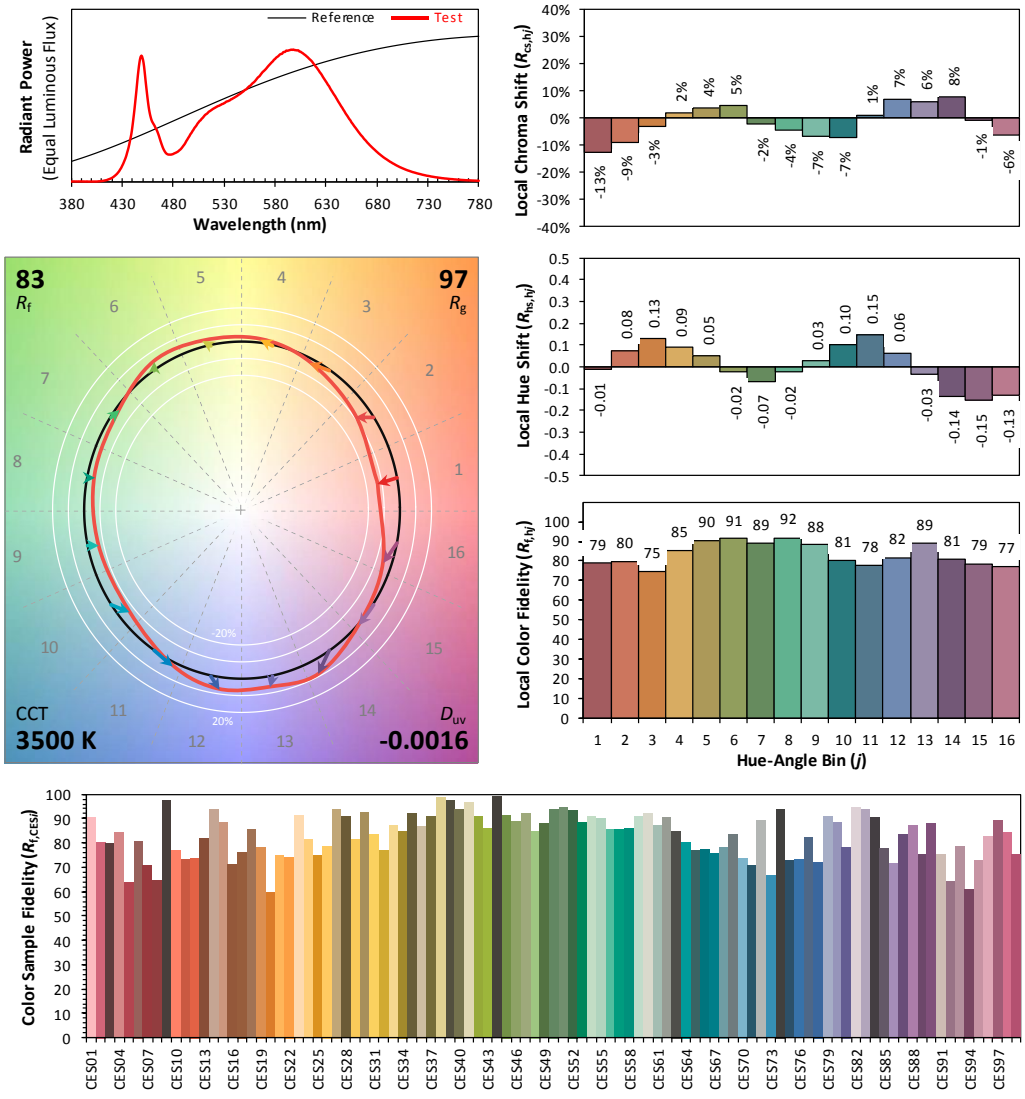
Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

ANSI/IES TM-30-18 Color Rendition Report

Source: LED **Manufacturer:** RAB Lighting Inc

Date: 2021/07/12 **Model:** T8-9.5-48G-835-SD-BYP/2



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

x	0.4036
y	0.3862
u'	0.2365
v'	0.5091

CIE 13.3-1995 (CRI)

R_a	82
R_9	2

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

γ(°)	Lumens	% Total
0- 10	32.733	1.99%
10- 20	94.252	5.73%
20- 30	144.588	8.79%
30- 40	178.412	10.85%
40- 50	193.228	11.75%
50- 60	189.711	11.53%
60- 70	171.539	10.43%
70- 80	144.625	8.79%
80- 90	116.708	7.09%
90-100	94.066	5.72%
100-110	75.343	4.58%
110-120	60.002	3.65%
120-130	48.124	2.93%
130-140	38.185	2.32%
140-150	29.073	1.77%
150-160	20.205	1.23%
160-170	11.032	0.67%
170-180	3.152	0.19%
Total	1645.0	100%

γ(°)	Lumens	% Total
0- 60	832.924	50.63%
60- 90	432.872	26.31%
0-90	1265.8	76.95%
90- 180	379.182	23.05%
0- 180	1645.0	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

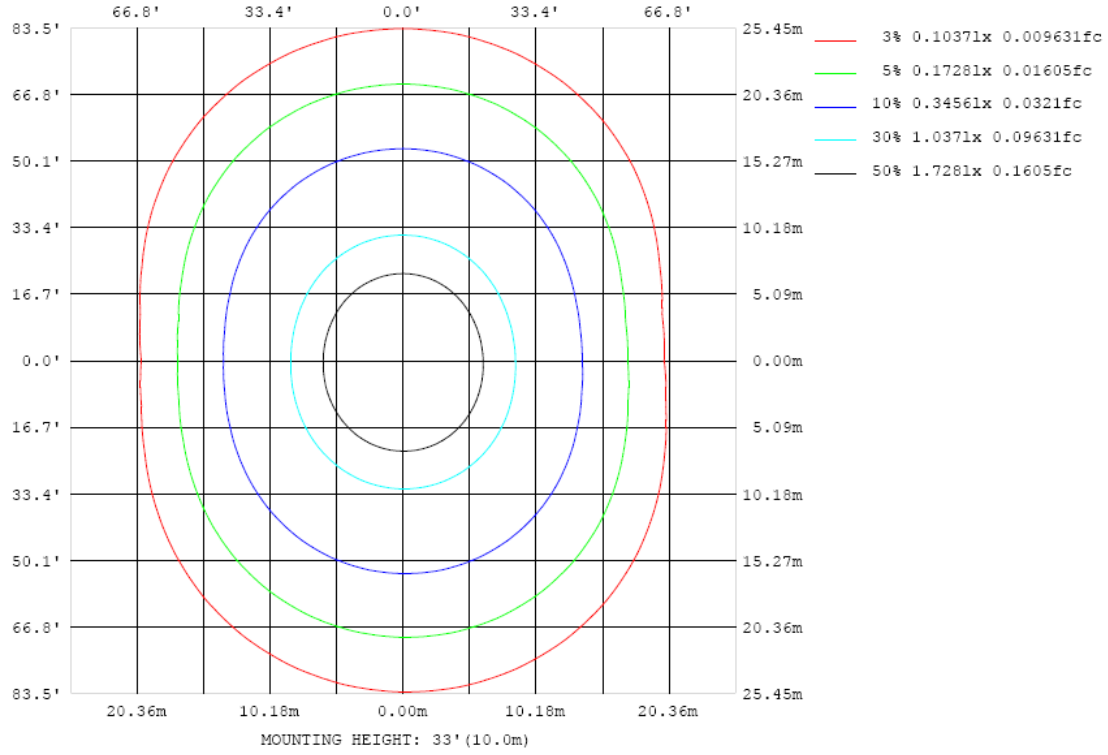


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

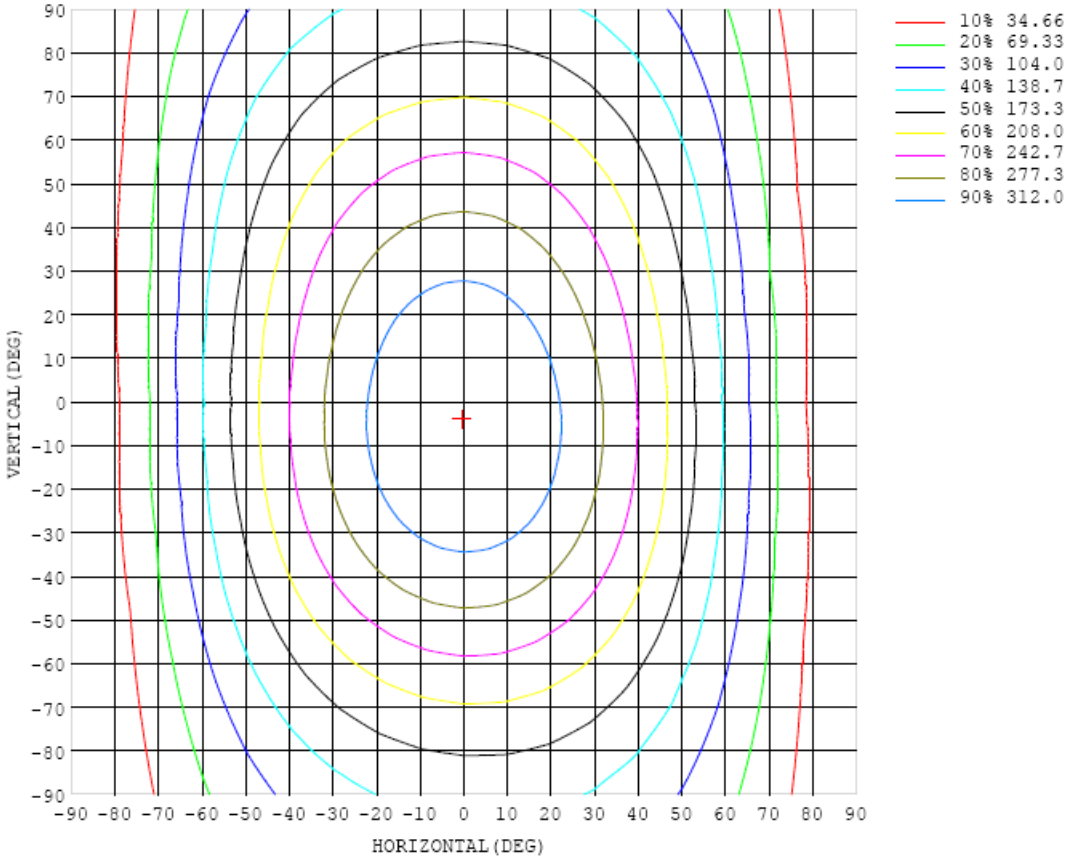


Chart 6: Isocandela Plot

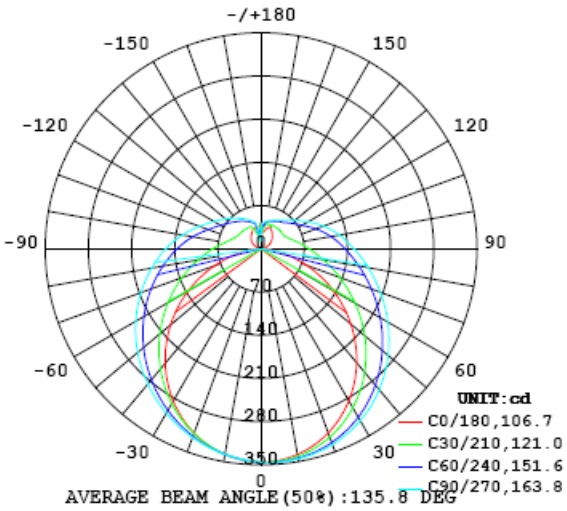


Chart 7: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346
5	344	344	344	345	345	346	346	346	347	347	347	346	346	346	345	345	344	344	344
10	338	339	340	341	342	343	344	345	345	346	346	345	344	343	342	341	340	339	339
15	330	331	333	335	337	339	340	342	343	343	342	342	340	338	336	335	333	331	330
20	318	319	322	325	328	331	334	336	337	338	337	336	334	331	328	325	322	319	318
25	302	305	308	312	317	322	326	328	330	331	330	328	325	321	316	312	308	305	303
30	284	287	292	297	304	310	315	319	321	322	320	318	314	308	302	297	292	287	285
35	264	267	273	280	288	296	302	307	310	311	309	306	301	294	286	279	272	267	265
40	241	245	252	261	271	280	288	294	297	298	296	292	286	278	269	259	251	245	242
45	216	221	230	241	253	264	273	279	283	284	282	277	270	260	249	238	228	221	218
50	190	195	206	219	233	246	256	264	268	269	266	261	253	241	229	216	204	195	192
55	163	169	182	197	214	228	240	248	252	253	250	244	235	222	208	193	179	169	165
60	135	142	157	176	194	210	223	232	237	237	234	227	217	203	187	170	154	141	137
65	107	116	134	155	175	192	206	216	221	221	218	210	199	184	167	148	129	114	108
70	78.4	89.9	112	136	157	176	190	200	205	206	202	194	182	167	148	127	105	87.1	80.5
75	51.6	65.7	91.5	118	141	160	175	185	190	191	187	179	166	150	131	108	82.7	61.4	54.0
80	27.9	45.0	74.0	102	127	146	161	171	176	176	173	164	152	135	115	90.5	63.3	38.7	30.1
85	10.0	29.6	60.0	88.9	114	134	148	158	163	163	159	151	139	123	102	76.4	48.1	21.3	11.2
90	2.54	20.7	49.8	77.9	102	122	136	145	150	151	147	139	127	111	90.0	65.3	37.6	11.5	1.78
95	2.38	15.9	42.5	69.0	92.3	111	126	135	139	139	136	129	117	101	80.4	56.7	30.7	8.19	1.91
100	4.05	14.4	36.4	61.1	83.1	101	115	124	129	129	125	118	106	91.1	71.8	49.4	26.0	8.16	3.59
105	7.16	15.9	32.9	53.9	74.5	91.6	105	113	118	118	115	108	96.8	82.1	63.9	43.5	24.1	10.1	6.02
110	10.2	17.9	31.1	48.9	66.4	82.3	94.5	103	107	108	104	97.7	87.4	73.7	57.2	39.7	23.8	13.0	8.76
115	13.3	20.7	31.5	45.5	60.5	73.8	84.9	92.7	96.8	97.3	94.3	88.1	78.6	66.2	52.3	37.7	24.5	15.9	11.7
120	16.5	23.7	32.2	43.1	56.0	67.4	76.6	83.1	86.9	87.4	84.7	79.1	71.1	60.9	49.0	36.6	26.3	19.0	14.6
125	19.6	26.4	33.4	42.4	52.3	62.2	70.1	75.8	78.9	79.2	77.0	72.4	65.5	56.7	46.5	36.4	28.5	22.3	17.6
130	22.7	29.0	34.6	42.4	49.8	57.8	64.6	69.5	72.1	72.5	70.6	66.7	60.8	53.3	44.9	37.0	30.4	25.4	20.6
135	25.3	31.5	36.0	42.4	48.6	54.2	59.7	63.9	66.2	66.6	65.0	61.7	56.8	50.8	44.2	38.0	32.7	28.2	23.1
140	28.0	33.6	37.2	42.3	47.7	52.3	56.0	59.1	61.0	61.3	60.0	57.4	53.8	49.2	44.0	38.7	34.6	31.1	25.7
145	31.1	35.6	37.8	42.4	46.8	50.5	53.7	56.0	57.2	57.4	56.5	54.5	51.6	47.9	43.8	39.7	36.6	33.8	27.8
150	34.0	37.5	39.2	42.7	46.0	48.7	51.3	53.2	54.2	54.3	53.5	51.9	49.6	46.7	43.4	40.4	38.3	36.2	30.0
155	36.8	38.8	39.8	39.5	44.9	47.4	49.0	50.4	51.2	51.3	50.7	49.5	47.8	45.6	43.3	41.3	39.6	38.1	33.0
160	36.9	40.6	41.3	42.2	44.1	46.2	47.2	48.2	48.7	48.8	48.2	47.3	46.1	44.8	43.4	42.1	41.1	39.7	35.3
165	34.1	37.8	41.2	42.1	42.1	45.1	45.9	46.4	46.8	46.7	46.3	45.7	45.1	44.4	43.6	42.9	42.3	41.2	36.0
170	29.5	32.0	34.8	39.1	40.8	41.0	43.2	45.0	45.3	45.2	44.9	44.6	44.3	44.0	43.6	43.1	42.6	41.8	35.0
175	26.1	27.5	28.8	31.1	35.3	38.7	39.2	40.2	42.5	43.9	44.0	43.7	43.5	43.2	42.9	42.8	42.7	40.9	35.7
180	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2

Table 6: Luminous Intensity Data

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346		
5	344	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	344		
10	338	338	338	338	338	338	338	338	338	338	338	338	338	337	337	337	338		
15	329	329	329	330	331	332	332	332	333	332	332	331	330	329	329	329	329		
20	317	317	318	320	322	323	324	325	325	325	324	322	321	319	317	317	317		
25	302	303	305	308	311	313	315	317	317	316	315	312	309	306	304	302	301		
30	285	286	290	294	298	302	305	307	308	307	304	301	297	292	288	285	283		
35	265	268	273	279	285	290	294	297	297	296	293	288	283	276	270	265	263		
40	243	247	254	262	270	277	282	285	286	285	281	275	267	259	251	244	241		
45	219	225	235	245	255	263	269	273	274	272	268	261	252	241	231	222	216		
50	195	203	215	227	239	249	256	260	261	260	254	246	236	223	210	198	191		
55	169	180	194	209	223	234	242	247	248	246	241	232	219	205	189	174	164		
60	143	157	174	192	207	219	228	233	235	233	227	217	203	187	168	150	137		
65	117	134	155	175	191	205	214	219	221	219	213	202	187	169	148	127	110		
70	91.4	113	137	158	176	190	200	206	207	205	199	187	172	152	129	104	84.0		
75	67.8	93.6	120	142	161	176	186	192	194	192	185	173	157	136	111	83.6	59.0		
80	47.6	76.2	104	128	147	162	172	178	180	178	172	160	143	122	95.6	65.8	38.6		
85	31.7	62.3	90.2	114	134	149	159	165	167	165	159	147	130	108	82.0	51.8	22.3		
90	21.3	51.0	78.6	103	122	137	147	153	155	153	146	135	118	96.9	70.9	41.4	13.3		
95	15.7	42.0	68.3	91.5	110	124	134	140	142	140	134	123	107	86.1	61.2	33.8	10.1		
100	14.3	35.9	59.9	81.0	98.9	113	122	128	130	128	122	111	95.8	76.3	53.5	29.8	10.2		
105	15.1	32.7	53.2	72.0	88.6	101	111	116	118	116	110	99.9	85.9	68.5	48.9	28.3	12.1		
110	16.5	31.0	48.7	65.0	79.6	91.4	99.8	105	107	105	99.4	90.1	77.7	62.6	45.8	28.6	15.0		
115	18.2	30.7	45.6	59.7	72.8	83.2	90.5	95.1	96.7	95.2	90.4	82.4	71.5	58.3	44.0	29.5	17.7		
120	20.2	31.3	43.7	56.5	67.5	76.5	83.1	87.2	88.6	87.4	83.1	76.0	66.4	55.1	43.1	30.9	20.1		
125	21.7	31.9	42.6	53.4	62.9	70.9	76.7	80.4	81.7	80.5	76.8	70.6	62.6	53.1	42.7	32.4	22.1		
130	23.1	32.5	42.0	50.9	58.9	66.0	71.1	74.3	75.5	74.5	71.2	65.9	59.0	51.3	42.7	33.6	23.7		
135	24.3	33.3	41.5	49.2	56.2	61.6	65.9	68.8	69.8	68.9	66.1	61.8	56.3	49.8	42.7	34.8	24.9		
140	25.0	34.0	41.0	47.4	53.5	58.3	61.4	63.7	64.5	63.9	61.8	58.6	54.1	48.5	42.7	35.5	25.7		
145	24.0	33.8	40.4	45.8	50.7	54.9	58.0	59.4	60.0	59.6	58.4	55.6	51.7	46.7	42.1	35.8	26.2		
150	22.8	33.0	40.0	44.2	48.2	51.6	54.2	55.8	56.4	56.1	54.8	52.5	49.0	45.2	41.7	35.8	25.6		
155	23.1	32.0	39.4	42.7	45.9	48.6	50.6	51.9	52.4	52.3	51.4	49.2	45.5	43.8	40.8	34.2	26.1		
160	26.0	26.4	34.3	40.9	43.9	45.8	47.3	48.2	48.7	48.6	47.1	43.9	43.1	40.2	36.8	29.7	27.4		
165	26.0	21.7	24.2	28.6	39.7	43.5	44.1	44.7	45.1	44.1	39.6	36.2	33.9	32.7	29.6	25.1	26.9		
170	24.4	21.9	21.2	21.0	22.0	25.2	30.6	40.2	39.0	24.3	25.4	25.7	25.1	25.6	24.7	24.8	26.2		
175	29.6	27.0	27.6	25.9	26.3	27.7	30.2	28.6	20.6	34.0	32.6	31.0	29.2	27.1	25.4	25.1	25.0		
180	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2		

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, 2020	Aug. 04, 2021
Digital Power Meter	PF2010A	HZTE028-01	Aug. 05, 2020	Aug. 04, 2021
AC Power Supply	DPS1060	HZTE001-06	Aug. 05, 2020	Aug. 04, 2021
DC Power Supply	WY12010	HZTE004-03	Aug. 05, 2020	Aug. 04, 2021
Temperature recorder	JM624U	HZTE018-08	Aug. 05, 2020	Aug. 04, 2021
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 05, 2020	Aug. 04, 2021
Standard source	D908	HZTE012-01	Aug. 05, 2020	Aug. 04, 2021
Integrate Sphere system	3M	HZTE015-04	Aug. 05, 2020	Aug. 04, 2021
Digital Power Meter	WT210	HZTE008-01	Aug. 05, 2020	Aug. 04, 2021
AC Power Supply	PCR 500L	HZTE001-07	Aug. 05, 2020	Aug. 04, 2021
DC Power Supply	IT6154	HZTE004-04	Aug. 05, 2020	Aug. 04, 2021
Standard source	SCL-1400	HZTE012-02	Aug. 05, 2020	Aug. 04, 2021
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 05, 2020	Aug. 04, 2021
Temperature Meter	TES1310	HZTE017-01	Aug. 05, 2020	Aug. 04, 2021

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.

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, YuhangDist,
Hangzhou, Zhejiang Province, China 311100
Tel: +86 571 86376106 www.ledtestlab.com

The uncertainty of integrating sphere system reported in this document is expended 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 expended uncertainty is 2.3% with a coverage factor k=2.

Color Characteristics Measurements

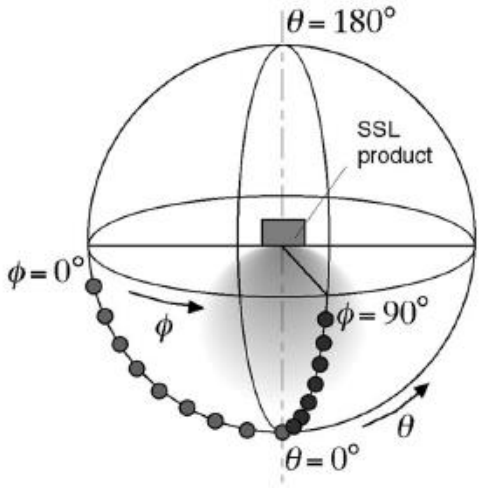
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as 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°/180° and C=90°/270°) 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, Δu'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 ***