

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: 15T8U6/8CCTS/HYB/C

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.ltlqa.com

Report No.: HZ24120004a

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

Review by:

Wei Fei

Approved by:



April Zou

Engineer: Wei Fei
Dec. 12, 2024

Manager: April Zou
Dec. 12, 2024

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

TEST SUMMARY

Tested Model	15T8U6/8CCTS/HYB/C 3500K Setting	15T8U6/8CCTS/HYB/C 4000K Setting	15T8U6/8CCTS/HYB/C 5000K Setting
Luminous Efficacy (Lumens /Watt)	131.7	142.2	136.2
Total Luminous Flux (Lumens)	2182.0	2297.0	2242.4
Power (Watts)/2	16.57	16.15	16.46
Power Factor	0.9976	0.9976	0.9976
CCT (K)	3443	4177	4935
CRI	81.8	83.6	83.1
Stabilization Time(Light & Power)	50	50	50
Note	3500K	4000K	5000K

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Dec. 03, 2024
Date of Test	: Dec. 11, 2024
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

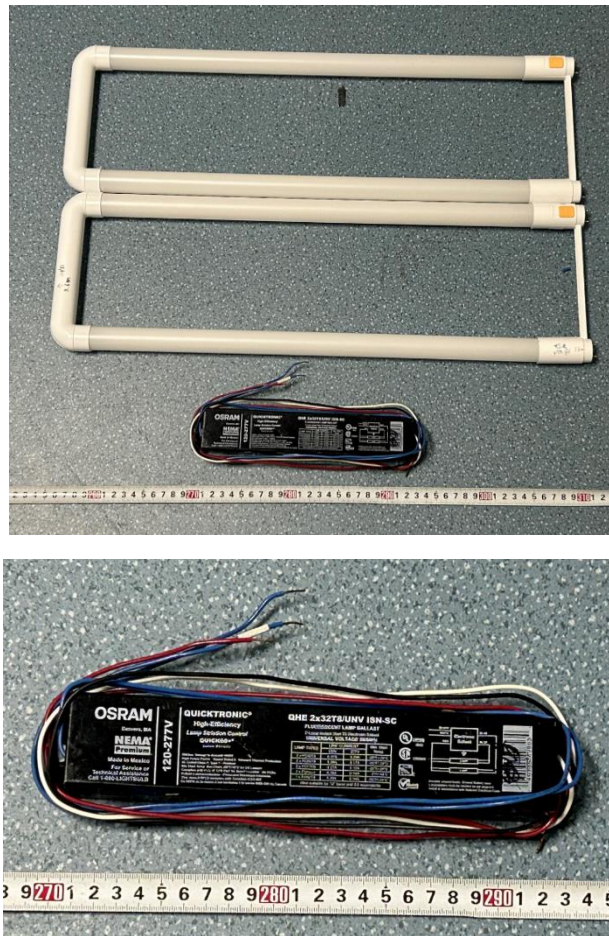


Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Tube
Model	: 15T8U6/8CCTS/HYB/C
Electrical Ratings	: 120-277V, 50/60Hz, 15W
Product Description	: Color- Tunable 3500K/4000K/5000K LED Tubes supplied by a high frequency fluorescent lamp ballast: QHE 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 (3500K Setting)

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)	0.077	0.124
Power Factor	0.9976	0.9666
Test Power (W)/2	16.57	16.57
THD A%	4.37	8.95
Luminous Efficacy (lm/W)	131.7	131.7
Total Luminous Flux (lm)	2182.0	2182.3
Color Rendering Index (CRI)	81.8	
R9	3.4	
Correlated Color Temperature (CCT)(K)	3443	
Chromaticity Chroma x	0.4091	
Chromaticity Chroma y	0.3939	
Chromaticity Chroma u	0.2368	
Chromaticity Chroma v	0.3421	
Duv	0.0006	
Chromaticity Chroma u'	0.2368	
Chromaticity Chroma v'	0.5132	

Special Color Rendering Indices	
R1	79.7
R2	88.7
R3	95.9
R4	80.5
R5	79.9
R6	85.1
R7	84.2
R8	60.4
R9	3.4
R10	74
R11	79.6
R12	64.6
R13	81.7
R14	97.9

Table 2: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u',v') diagram, $u' = u = 4x/(-2x+12y+3)$, $v' = 3v/2 = 9y/(-2x+12y+3)$.

Spectral Power Distribution - Sphere Spectroradiometer Method

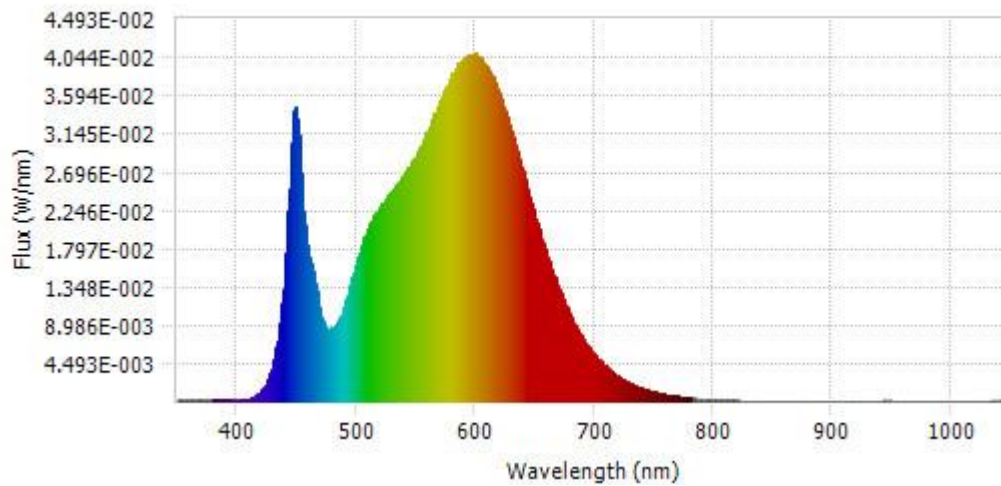
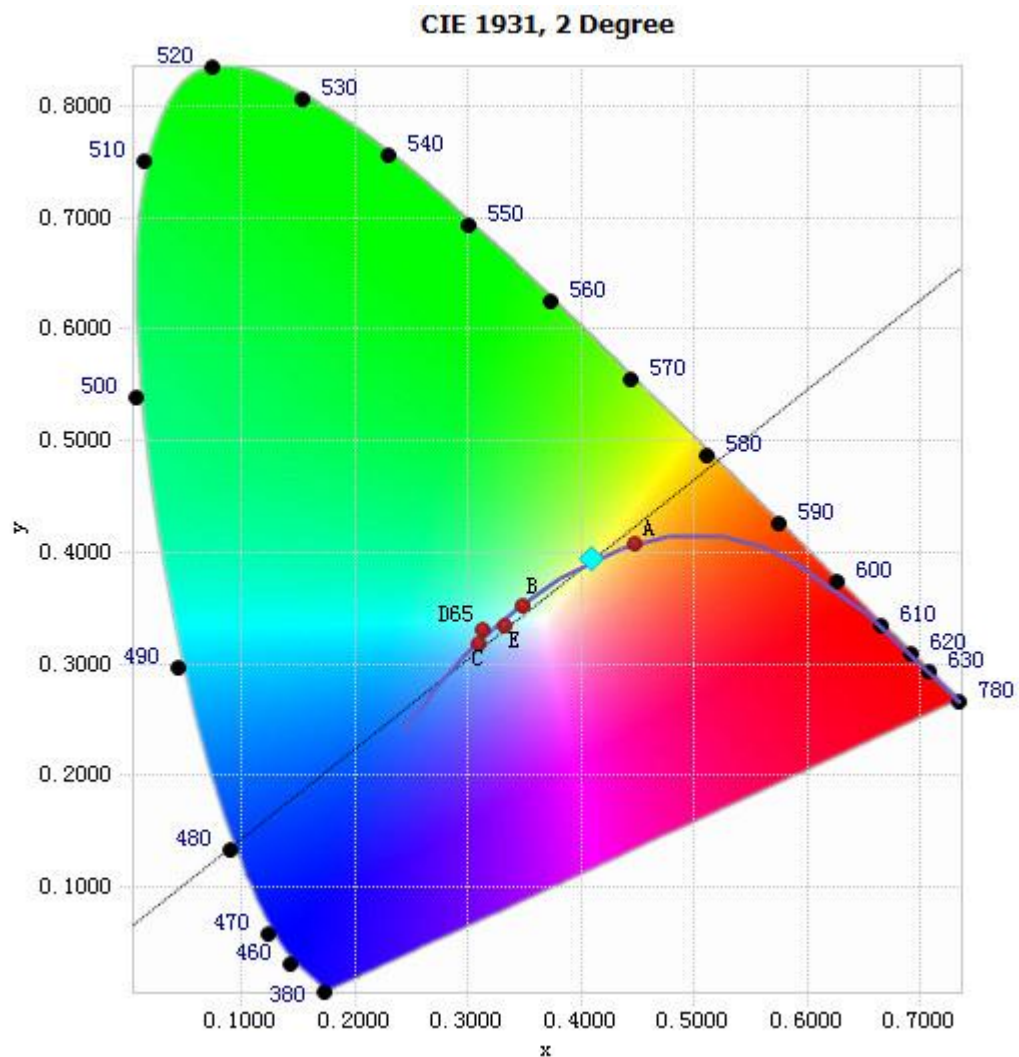


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.77E-04	485	9.41E-03	590	4.04E-02	695	6.47E-03
385	1.96E-04	490	1.11E-02	595	4.08E-02	700	5.58E-03
390	1.76E-04	495	1.36E-02	600	4.09E-02	705	4.76E-03
395	1.63E-04	500	1.61E-02	605	4.03E-02	710	4.07E-03
400	1.42E-04	505	1.83E-02	610	3.93E-02	715	3.48E-03
405	1.97E-04	510	2.02E-02	615	3.81E-02	720	2.96E-03
410	3.09E-04	515	2.18E-02	620	3.62E-02	725	2.54E-03
415	6.23E-04	520	2.28E-02	625	3.42E-02	730	2.16E-03
420	1.16E-03	525	2.39E-02	630	3.18E-02	735	1.84E-03
425	2.31E-03	530	2.48E-02	635	2.95E-02	740	1.57E-03
430	4.34E-03	535	2.56E-02	640	2.71E-02	745	1.35E-03
435	8.05E-03	540	2.66E-02	645	2.44E-02	750	1.15E-03
440	1.52E-02	545	2.77E-02	650	2.20E-02	755	9.82E-04
445	2.77E-02	550	2.87E-02	655	1.97E-02	760	8.40E-04
450	3.43E-02	555	3.02E-02	660	1.74E-02	765	7.18E-04
455	2.45E-02	560	3.17E-02	665	1.53E-02	770	6.24E-04
460	1.76E-02	565	3.33E-02	670	1.33E-02	775	5.31E-04
465	1.44E-02	570	3.50E-02	675	1.16E-02	780	4.47E-04
470	1.04E-02	575	3.67E-02	680	1.01E-02		
475	8.42E-03	580	3.82E-02	685	8.75E-03		
480	8.62E-03	585	3.96E-02	690	7.60E-03		

Table 3: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4091, 0.3939)

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

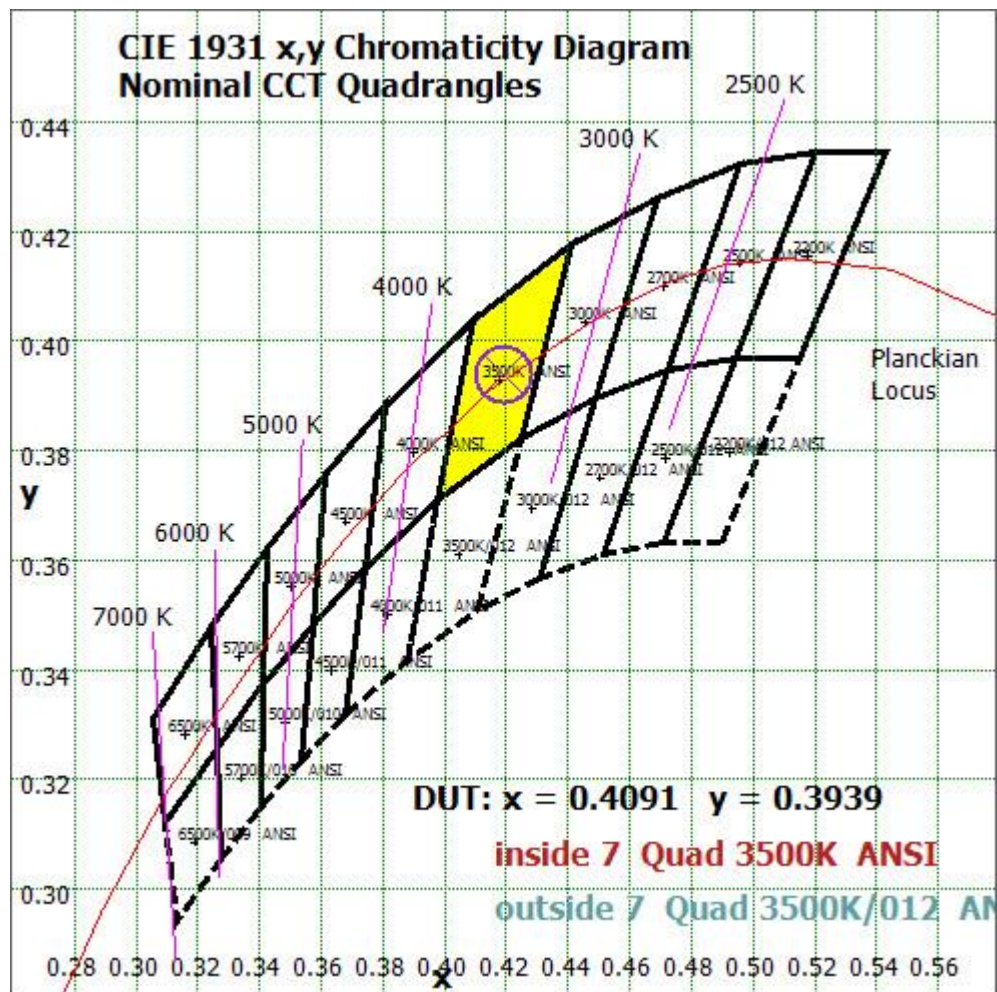


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

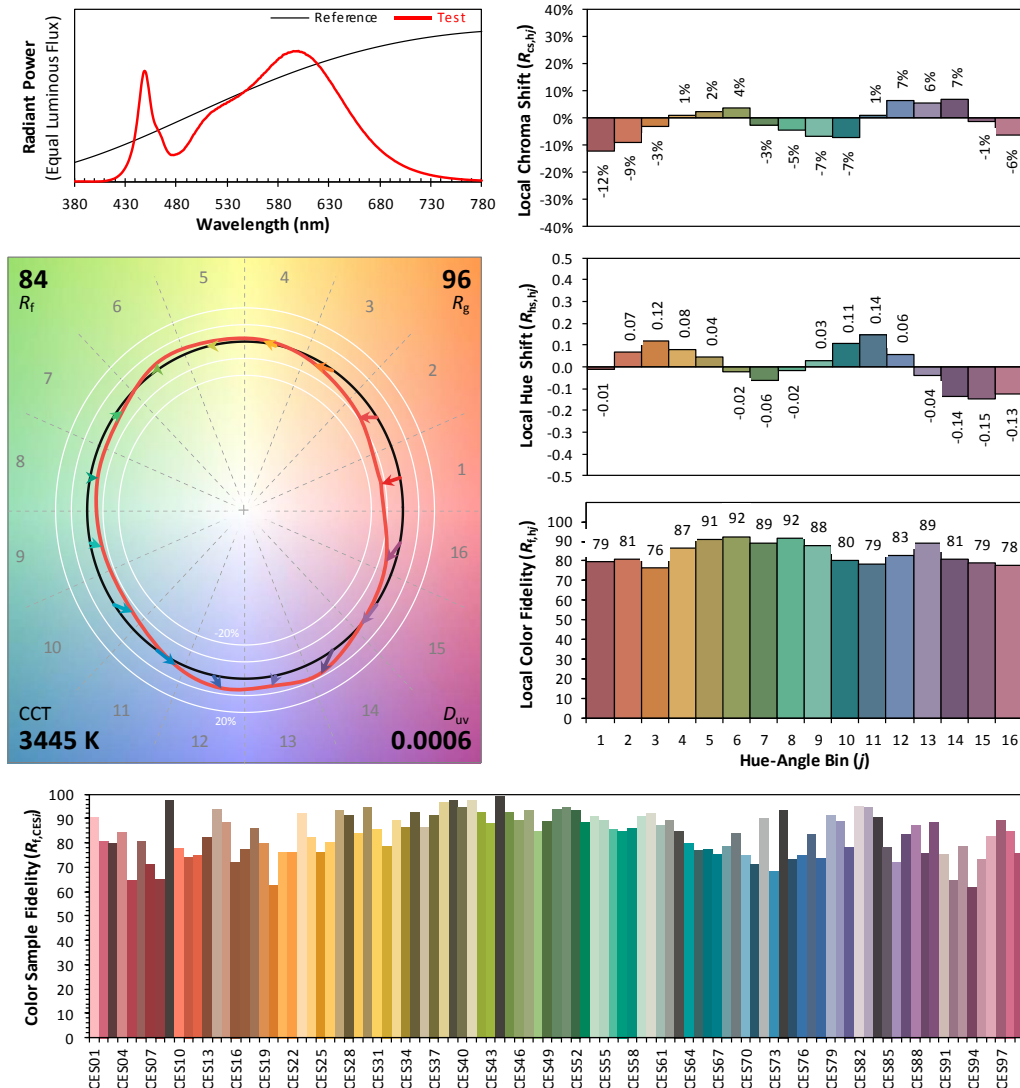
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/11

Model: 15T8U6/8CCTS/HYB/C



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

x 0.4091
 y 0.3939
 u' 0.2368
 v' 0.5132

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.

Goniophotometer Method

Test ambient temperature was 25.0 °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)	0.277
Power Factor	0.9988
Power (W)/2	16.60
Luminous Efficacy (lm/W)	132.6
Total Luminous Flux (lm)	2200.5
Beam Angle (°)	112.3 (0°-180°) / 234.4 (90°-270°)
Center Beam Candle Power (cd)	375
Maximum Beam Candle Power (cd)	378.0 (At: C=270.0, Gamma=13.5)
Spacing Criteria	1.26 (0°-180°) / 1.51 (90°-270°)
Zonal Lumens in the 0°-60° Zone	44.51%
Zonal Lumens in the 60°-90° Zone	27.24%
Zonal Lumens in the 90°-120° Zone	16.96%
Zonal Lumens in the 120°-180° Zone	11.29%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	35.601	1.62%
10- 20	103.474	4.70%
20- 30	161.795	7.35%
30- 40	205.705	9.35%
40- 50	232.209	10.55%
50- 60	240.684	10.94%
60- 70	232.93	10.59%
70- 80	211.534	9.61%
80- 90	154.907	7.04%
90-100	125.564	5.71%
100-110	133.266	6.06%
110-120	114.397	5.20%
120-130	92.115	4.19%
130-140	69.576	3.16%
140-150	45.401	2.06%
150-160	25.719	1.17%
160-170	12.389	0.56%
170-180	3.271	0.15%
Total	2200.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	979.468	44.51%
60- 90	599.371	27.24%
0-90	1578.84	71.75%
90- 180	621.698	28.25%
0- 180	2200.5	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

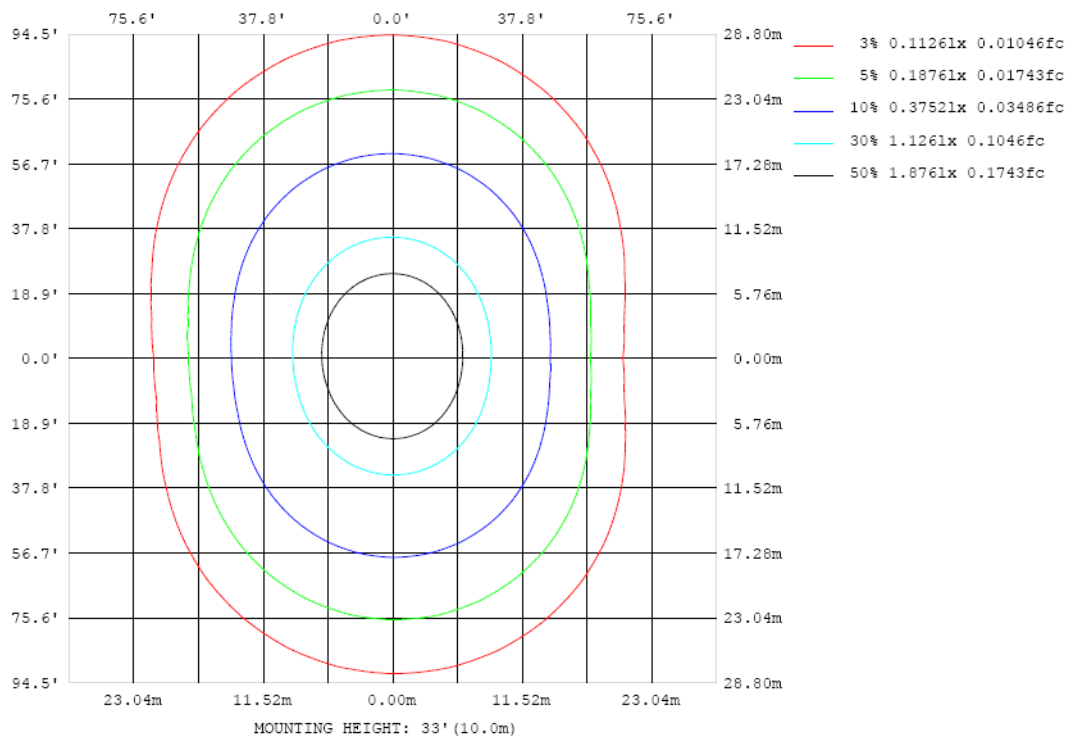


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

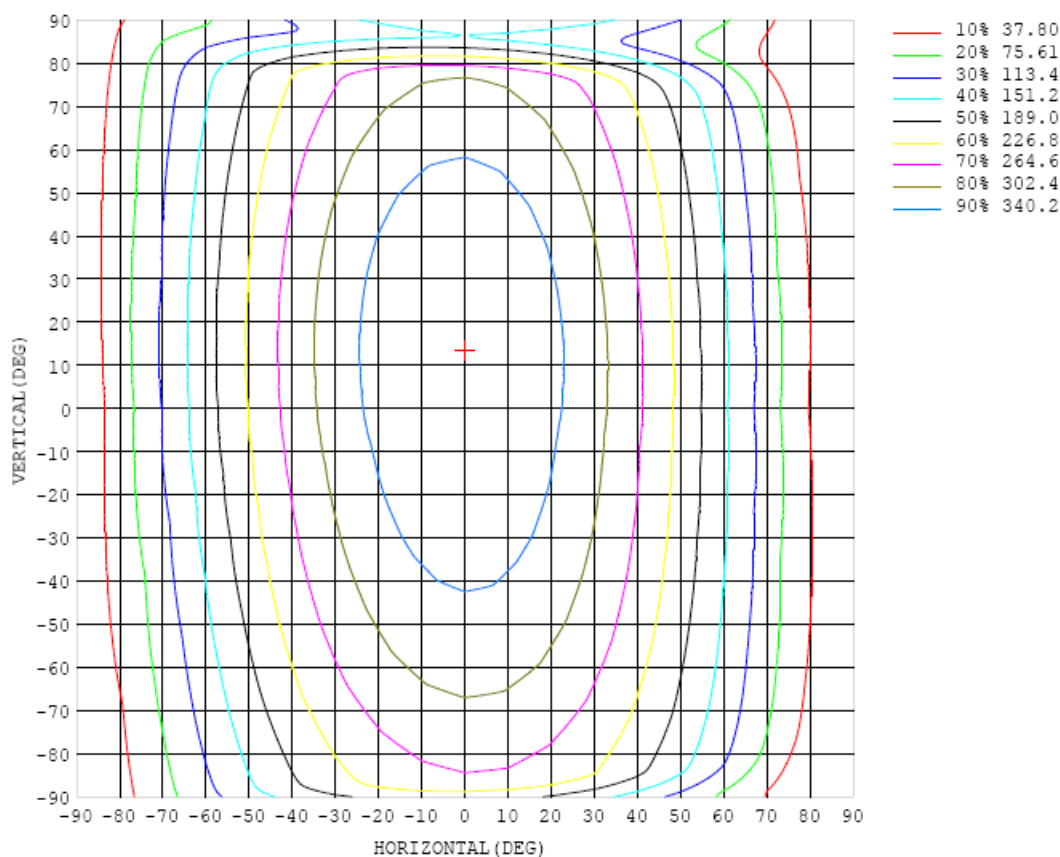


Chart 6: Isocandela Plot

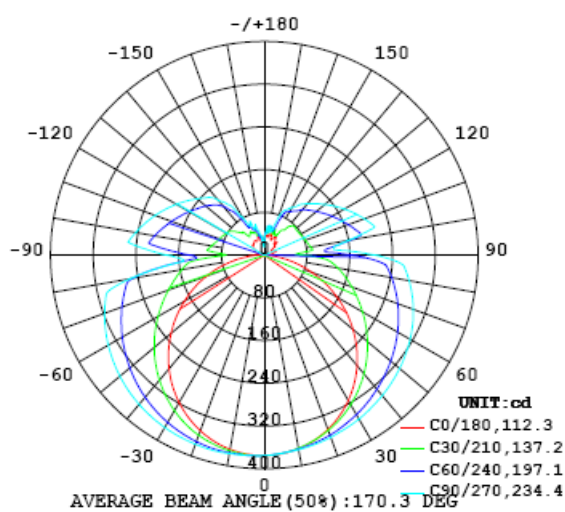


Chart 7: Polar Candela Distribution

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	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
5	373	373	373	372	372	372	372	372	372	373	373	373	373	373	373	373	373	374	374
10	368	368	367	367	367	368	369	369	370	370	370	369	369	368	368	368	368	369	369
15	359	359	358	359	361	363	364	366	367	367	366	366	364	363	361	360	360	360	361
20	347	346	347	349	352	356	359	361	363	363	363	361	359	356	353	350	349	349	350
25	332	331	333	337	342	347	352	356	358	359	358	355	351	347	342	338	335	335	336
30	314	313	317	323	330	338	345	350	353	354	353	349	343	337	330	324	319	318	319
35	293	293	299	307	317	328	337	344	348	349	347	342	335	326	316	308	301	298	299
40	270	271	279	290	303	316	328	337	342	343	341	334	325	314	301	290	281	277	278
45	244	247	257	271	288	304	318	329	336	337	334	326	315	301	286	271	259	253	254
50	217	221	234	252	272	292	309	321	329	330	327	318	304	287	269	251	236	228	228
55	187	193	210	232	256	279	298	313	321	323	319	308	293	273	252	230	212	201	201
60	157	165	185	212	240	266	288	304	313	315	310	299	281	259	235	210	188	174	173
65	126	136	161	193	225	253	277	294	304	306	301	288	270	245	218	189	163	146	145
70	94.8	109	138	174	209	240	266	284	294	297	291	278	258	232	201	169	139	118	115
75	64.3	81.9	117	157	195	228	254	273	284	286	280	266	245	218	186	150	116	89.8	85.4
80	35.8	59.2	98.0	140	180	214	242	262	273	275	269	255	233	204	171	133	95.3	64.4	56.4
85	10.8	38.0	78.0	122	163	200	229	250	261	263	257	243	220	191	156	118	77.9	42.2	30.1
90	1.57	14.2	36.4	69.9	102	135	164	186	201	207	207	198	183	162	135	101	62.4	25.1	9.11
95	6.37	17.8	52.0	81.4	93.4	104	114	124	130	131	127	118	106	91.3	73.5	54.3	35.2	12.3	4.80
100	12.1	21.3	51.2	88.1	126	158	164	166	164	160	154	145	134	122	108	76.8	40.9	14.4	8.50
105	18.5	24.1	51.8	84.5	118	151	179	199	210	212	207	193	172	142	107	72.6	39.9	16.4	13.8
110	24.1	27.4	52.6	81.9	112	141	167	186	197	199	194	181	161	134	102	69.2	40.2	20.0	19.9
115	20.4	30.9	53.6	79.7	106	133	156	174	184	186	181	169	151	126	96.1	67.4	41.7	23.5	20.4
120	15.0	31.8	55.6	77.9	101	125	146	162	171	173	168	157	141	118	91.6	66.7	43.7	23.1	19.8
125	17.1	34.6	58.0	76.8	96.8	118	136	151	159	160	156	146	131	111	88.2	66.5	44.0	27.1	25.5
130	26.1	35.6	52.0	76.8	93.2	111	127	140	146	148	144	135	123	105	85.6	66.2	40.1	26.2	29.1
135	32.6	37.2	50.8	77.3	90.2	105	119	129	135	136	133	126	115	101	83.2	64.3	40.3	26.9	27.8
140	28.8	40.7	45.1	68.5	85.6	97.5	112	120	125	125	123	117	108	96.0	79.3	59.8	40.9	31.1	30.1
145	35.7	42.4	38.6	57.3	81.2	91.6	101	108	114	115	113	106	97.7	86.9	73.7	53.2	39.2	37.0	32.4
150	38.7	43.1	46.4	43.3	64.4	87.1	94.2	99.8	103	103	101	95.5	88.8	79.6	59.3	42.5	42.5	37.2	30.3
155	32.4	38.8	47.9	43.6	44.1	64.6	85.1	93.0	93.7	93.1	91.3	86.8	78.9	62.0	42.8	43.6	44.6	34.3	29.8
160	38.1	49.2	49.0	42.7	49.6	49.9	51.1	58.9	67.2	69.2	66.7	58.3	50.0	47.5	48.4	40.9	44.4	39.1	36.3
165	39.8	42.5	49.7	51.7	54.5	47.8	54.5	48.0	44.3	44.6	44.1	47.3	52.1	45.5	49.9	45.8	42.0	33.5	30.2
170	39.0	44.5	45.5	42.3	49.5	46.8	51.7	55.6	51.9	48.4	51.2	54.3	50.5	44.0	44.2	39.6	36.4	30.8	25.2
175	35.5	39.2	42.7	45.7	44.9	43.8	42.3	40.7	40.2	40.1	39.6	39.3	39.7	40.0	39.6	38.5	34.8	28.8	24.2
180	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7

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	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375			
5	374	375	375	375	376	376	376	377	377	376	376	376	375	375	375	374	374			
10	370	371	372	373	375	376	377	377	377	377	376	375	374	372	371	370	369			
15	362	364	367	369	372	375	377	378	378	377	376	373	370	367	365	362	360			
20	352	355	359	364	368	372	375	376	377	376	373	370	366	361	356	352	349			
25	338	343	349	355	362	367	372	374	375	373	370	365	358	351	345	338	334			
30	322	328	336	345	354	362	368	372	373	370	366	358	349	340	331	323	317			
35	304	311	322	333	345	355	363	368	369	366	360	351	339	327	315	304	297			
40	283	293	305	320	334	347	357	363	365	361	354	342	328	312	297	283	274			
45	260	272	288	305	323	338	350	357	359	355	346	333	315	296	277	261	250			
50	235	250	269	290	311	329	342	351	353	348	338	322	302	279	256	237	223			
55	210	227	250	274	298	318	333	343	345	341	329	311	288	262	235	211	194			
60	183	203	230	258	284	307	324	334	337	332	319	300	274	244	214	185	165			
65	156	180	210	241	271	295	314	325	328	323	309	288	260	227	192	160	136			
70	129	158	191	226	257	284	303	315	318	313	298	276	246	210	172	135	107			
75	103	136	173	210	244	271	291	304	307	301	286	262	231	193	153	112	77.4			
80	78.7	117	157	195	230	250	257	259	255	248	237	221	201	171	131	88.4	50.7			
85	58.0	98.5	138	154	161	164	167	166	162	154	144	129	113	95.8	76.7	53.9	25.2			
90	35.6	55.0	72.8	94.8	117	140	160	174	182	183	176	161	140	114	81.0	44.2	10.1			
95	23.8	63.4	108	148	179	207	228	243	252	251	236	209	174	134	89.2	45.3	13.8			
100	23.6	58.9	100	142	178	208	229	241	244	239	223	197	164	126	84.0	44.8	18.6			
105	24.4	55.7	94.1	134	168	196	216	228	231	226	211	186	154	119	80.5	45.5	23.0			
110	26.3	54.0	89.3	126	158	185	203	214	217	212	198	175	147	113	78.0	46.9	27.4			
115	26.8	52.9	85.7	119	149	174	191	201	204	199	186	165	139	107	76.5	48.2	28.5			
120	23.7	48.7	82.1	113	141	163	178	187	190	186	174	155	131	103	69.9	36.7	23.9			
125	27.4	47.2	77.9	107	133	152	166	175	177	173	163	147	124	99.5	67.1	36.2	29.7			
130	30.9	40.8	68.0	101	125	143	154	162	164	161	152	137	117	80.4	48.9	36.7	26.0			
135	34.7	39.6	58.3	90.9	115	133	144	151	152	150	141	126	104	73.5	41.9	36.7	25.4			
140	36.7	40.9	46.3	69.5	102	119	127	132	134	130	125	109	79.1	52.7	49.2	34.5	17.9			
145	41.2	45.2	47.9	57.8	72.6	97.3	107	113	115	113	97.8	68.2	58.2	49.1	55.0	29.0	9.92			
150	42.2	43.6	51.5	52.5	60.8	60.3	72.9	81.8	81.2	74.2	64.9	60.3	55.1	54.1	49.7	23.8	9.56			
155	40.9	42.7	47.1	52.8	52.9	57.0	65.5	62.0	60.9	64.3	69.0	58.2	54.6	59.0	43.3	21.4	14.0			
160	40.0	45.1	39.9	44.2	45.2	53.7	51.0	54.0	53.5	54.9	56.2	54.1	59.3	48.4	31.8	20.6	25.9			
165	38.8	40.7	38.7	42.8	36.6	40.0	48.8	48.6	48.1	49.7	51.4	51.9	44.3	39.3	21.4	18.1	36.5			
170	30.5	34.9	36.7	34.2	31.1	33.9	35.2	33.7	38.3	38.0	37.4	34.8	23.8	10.3	14.2	18.8	37.3			
175	22.7	26.6	29.5	29.2	28.0	24.5	22.4	22.2	16.2	20.5	17.1	12.0	8.88	13.9	27.8	36.6	36.6			
180	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7			

Table 7: Luminous Intensity Data

TEST RESULTS (4000K Setting)

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)	0.270	0.121
Power Factor	0.9976	0.9651
Test Power (W)/2	16.15	16.16
THD A%	4.40	9.18
Luminous Efficacy (lm/W)	142.2	142.1
Total Luminous Flux (lm)	2297.0	2296.6
Color Rendering Index (CRI)	83.6	
R9	10.6	
Correlated Color Temperature (CCT)(K)	4177	
Chromaticity Chroma x	0.3731	
Chromaticity Chroma y	0.3731	
Chromaticity Chroma u	0.2217	
Chromaticity Chroma v	0.3326	
Duv	0.0005	
Chromaticity Chroma u'	0.2217	
Chromaticity Chroma v'	0.4989	

Special Color Rendering Indices	
R1	82.1
R2	90.7
R3	95.5
R4	81.3
R5	81.8
R6	86.2
R7	85.9
R8	65.2
R9	10.6
R10	77.4
R11	80.3
R12	59.4
R13	84.5
R14	98

Table 8: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u', v') diagram, $u' = u / (-2x + 12y + 3)$, $v' = 3v / 2 = 9y / (-2x + 12y + 3)$.

Spectral Power Distribution - Sphere Spectroradiometer Method

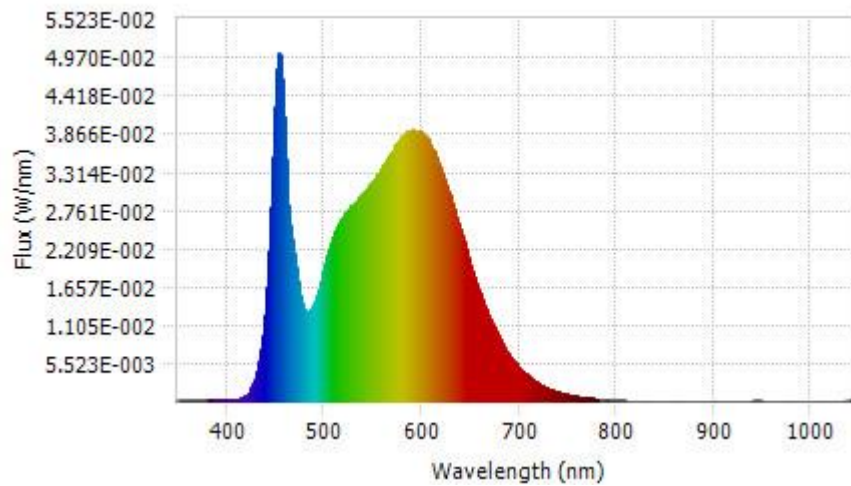
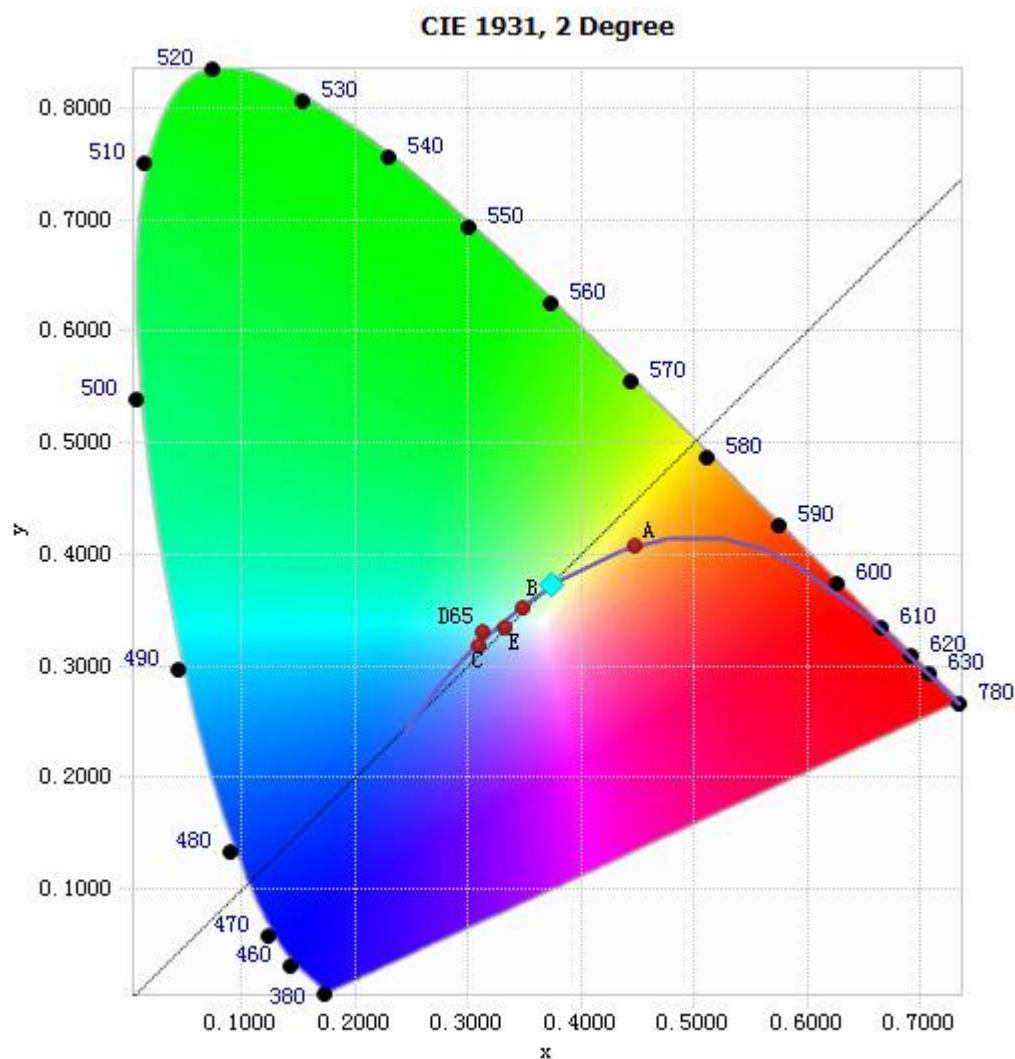


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.90E-04	485	1.32E-02	590	3.94E-02	695	5.76E-03
385	2.76E-04	490	1.46E-02	595	3.92E-02	700	4.94E-03
390	2.45E-04	495	1.68E-02	600	3.88E-02	705	4.20E-03
395	2.64E-04	500	1.95E-02	605	3.79E-02	710	3.61E-03
400	1.73E-04	505	2.20E-02	610	3.67E-02	715	3.06E-03
405	2.25E-04	510	2.40E-02	615	3.53E-02	720	2.62E-03
410	3.00E-04	515	2.58E-02	620	3.33E-02	725	2.25E-03
415	5.34E-04	520	2.68E-02	625	3.14E-02	730	1.92E-03
420	1.02E-03	525	2.78E-02	630	2.91E-02	735	1.63E-03
425	2.01E-03	530	2.86E-02	635	2.68E-02	740	1.39E-03
430	3.86E-03	535	2.93E-02	640	2.44E-02	745	1.18E-03
435	7.45E-03	540	3.01E-02	645	2.21E-02	750	1.02E-03
440	1.44E-02	545	3.10E-02	650	1.98E-02	755	8.77E-04
445	2.80E-02	550	3.18E-02	655	1.76E-02	760	7.59E-04
450	4.55E-02	555	3.28E-02	660	1.56E-02	765	6.51E-04
455	4.86E-02	560	3.40E-02	665	1.37E-02	770	5.54E-04
460	3.51E-02	565	3.51E-02	670	1.19E-02	775	4.81E-04
465	2.56E-02	570	3.63E-02	675	1.03E-02	780	4.12E-04
470	2.04E-02	575	3.73E-02	680	8.95E-03		
475	1.54E-02	580	3.83E-02	685	7.78E-03		
480	1.30E-02	585	3.91E-02	690	6.70E-03		

Table 9: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3731, 0.3731)

Chart 9: 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

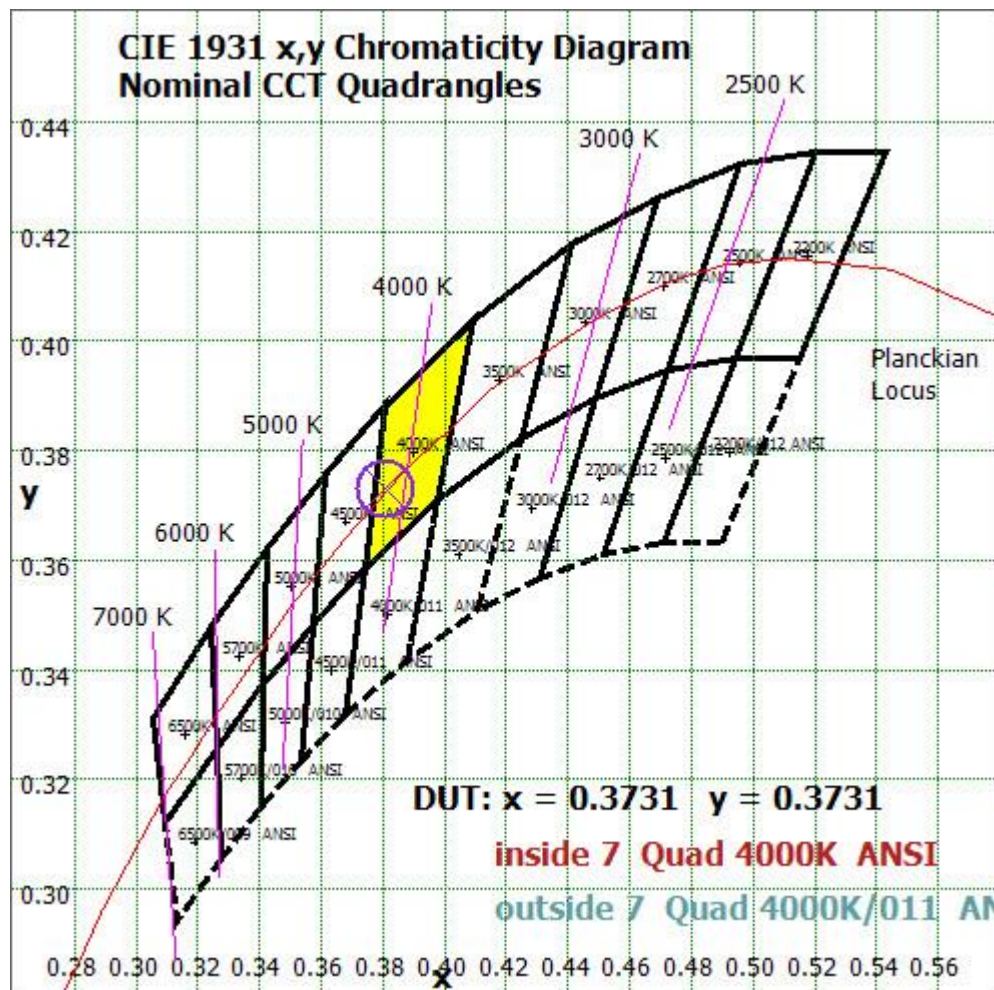


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

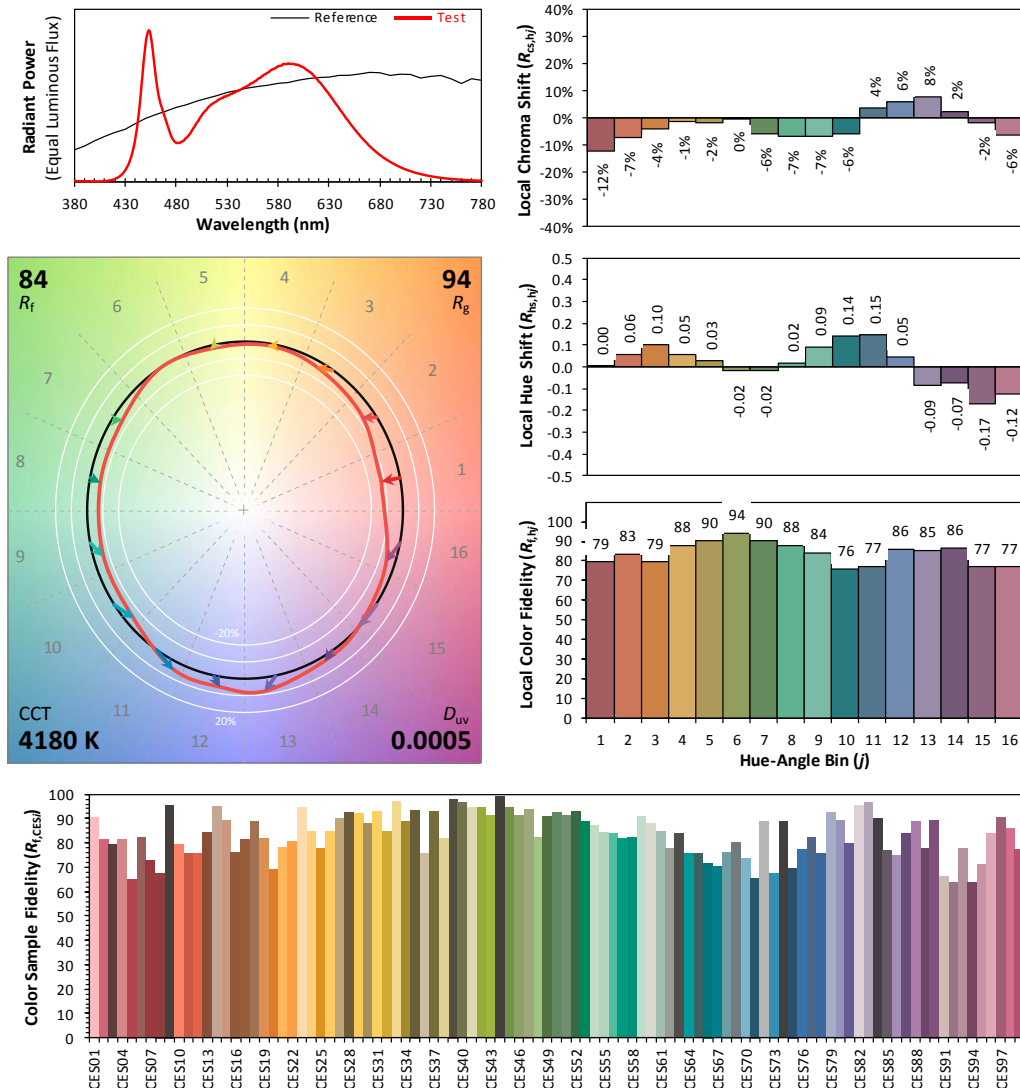
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/11

Model: 15T8U6/8CCTS/HYB/C



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

x 0.3731
 y 0.3731
 u' 0.2217
 v' 0.4989

CIE 13.3-1995
(CRI)
 R_a 84
 R_9 11

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Chart 11: 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 8 due to rounding.

TEST RESULTS (5000K Setting)

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)	0.275	0.123
Power Factor	0.9976	0.9663
Test Power (W)/2	16.46	16.46
THD A%	4.43	8.97
Luminous Efficacy (lm/W)	136.2	136.3
Total Luminous Flux (lm)	2242.4	2242.7
Color Rendering Index (CRI)	83.1	
R9	8.6	
Correlated Color Temperature (CCT)(K)	4935	
Chromaticity Chroma x	0.3474	
Chromaticity Chroma y	0.3581	
Chromaticity Chroma u	0.2104	
Chromaticity Chroma v	0.3254	
Duv	0.0024	
Chromaticity Chroma u'	0.2104	
Chromaticity Chroma v'	0.4882	

Special Color Rendering Indices	
R1	81.4
R2	90.6
R3	94.9
R4	79.6
R5	80.7
R6	85.1
R7	86.4
R8	66.1
R9	8.6
R10	76.6
R11	78.5
R12	54.1
R13	84.3
R14	97.7

Table 10: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u', v') diagram, $u' = u = 4x/(-2x+12y+3)$, $v' = 3v/2 = 9y/(-2x+12y+3)$.

Spectral Power Distribution - Sphere Spectroradiometer Method

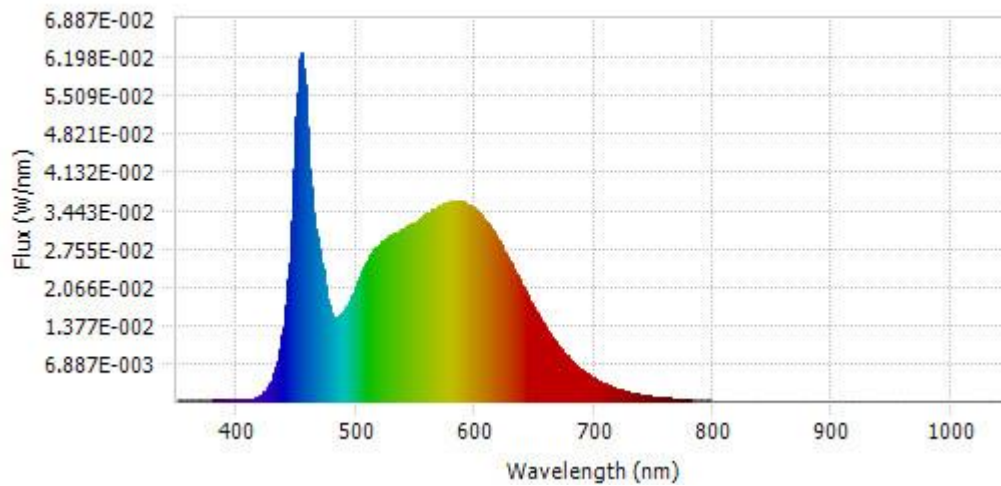
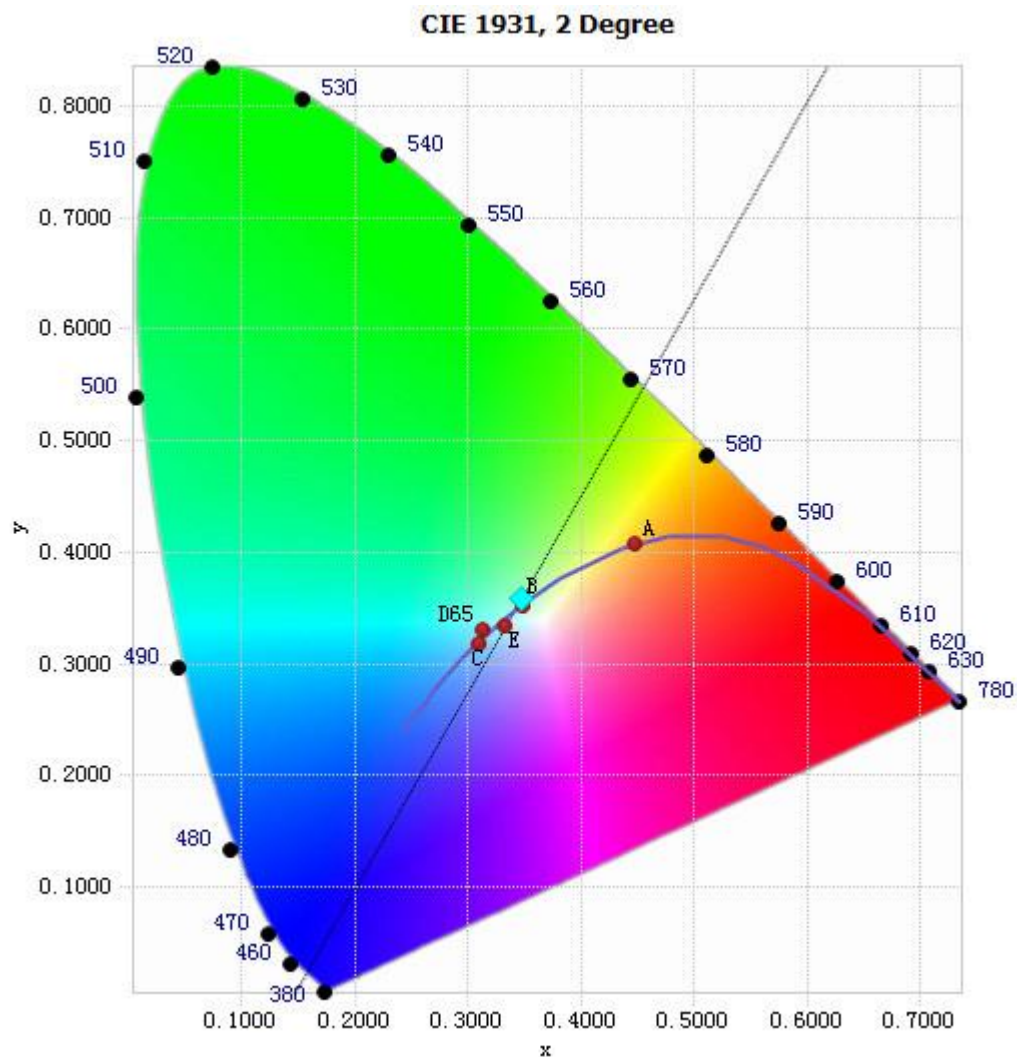


Chart 12: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.58E-04	485	1.53E-02	590	3.59E-02	695	4.80E-03
385	2.42E-04	490	1.63E-02	595	3.54E-02	700	4.11E-03
390	2.25E-04	495	1.81E-02	600	3.47E-02	705	3.52E-03
395	2.58E-04	500	2.07E-02	605	3.35E-02	710	3.01E-03
400	2.22E-04	505	2.34E-02	610	3.21E-02	715	2.56E-03
405	2.23E-04	510	2.54E-02	615	3.06E-02	720	2.20E-03
410	3.26E-04	515	2.73E-02	620	2.87E-02	725	1.88E-03
415	5.64E-04	520	2.82E-02	625	2.68E-02	730	1.62E-03
420	1.14E-03	525	2.93E-02	630	2.47E-02	735	1.37E-03
425	2.25E-03	530	3.00E-02	635	2.26E-02	740	1.17E-03
430	4.29E-03	535	3.05E-02	640	2.06E-02	745	1.01E-03
435	8.15E-03	540	3.11E-02	645	1.86E-02	750	8.59E-04
440	1.52E-02	545	3.18E-02	650	1.65E-02	755	7.47E-04
445	2.85E-02	550	3.23E-02	655	1.47E-02	760	6.30E-04
450	5.11E-02	555	3.31E-02	660	1.30E-02	765	5.52E-04
455	6.20E-02	560	3.38E-02	665	1.14E-02	770	4.74E-04
460	4.53E-02	565	3.45E-02	670	9.92E-03	775	4.02E-04
465	3.23E-02	570	3.52E-02	675	8.65E-03	780	3.52E-04
470	2.62E-02	575	3.56E-02	680	7.49E-03		
475	1.95E-02	580	3.60E-02	685	6.49E-03		
480	1.56E-02	585	3.62E-02	690	5.60E-03		

Table 11: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3474, 0.3581)

Chart 13: 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

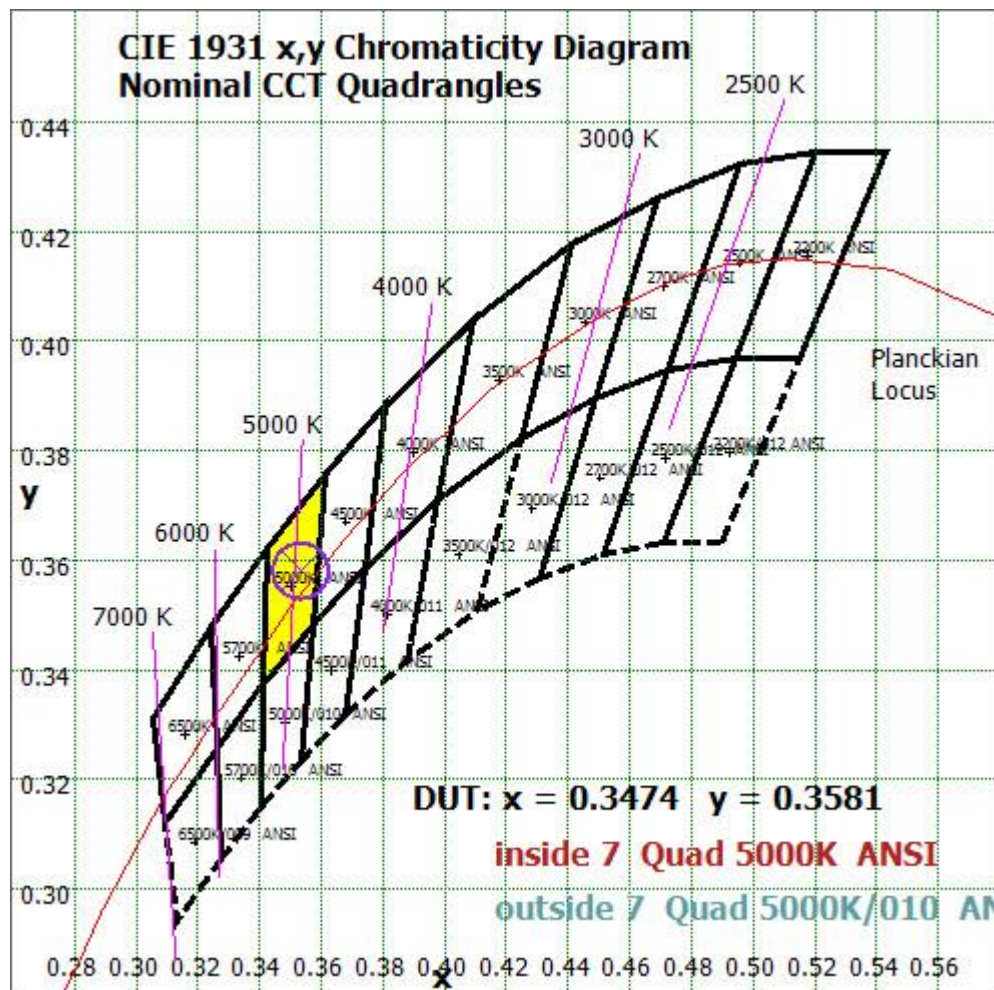


Chart 14: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

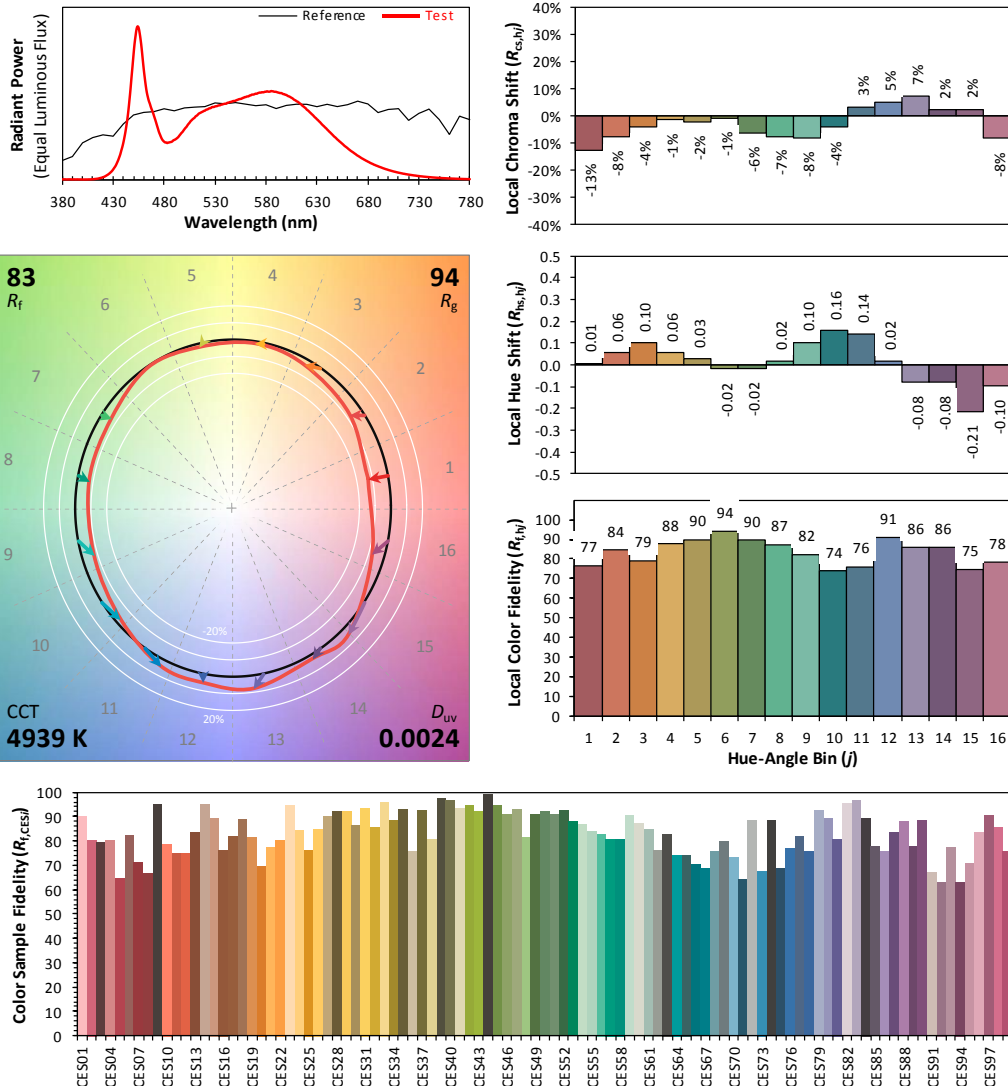
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/11

Model: 15T8U6/8CCTS/HYB/C



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

x 0.3474
 y 0.3581
 u' 0.2104
 v' 0.4882

CIE 13.3-1995
(CRI)
 R_a 83
 R_g 9

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Chart 15: 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 10 due to rounding.

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jun. 18, 2024	-
Digital Power Meter	PF2010A	HZTE028-01	Aug. 08, 2024	Aug. 07, 2025
AC Power Supply	DPS1060	HZTE001-06	Aug. 08, 2024	Aug. 07, 2025
DC Power Supply	WY12010	HZTE004-03	Aug. 08, 2024	Aug. 07, 2025
Temperature recorder	JM624U	HZTE018-08	Aug. 08, 2024	Aug. 07, 2025
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 08, 2024	Aug. 07, 2025
Standard source	D908	HZTE012-01	Aug. 14, 2018	-
Integrate Sphere system	3M	HZTE015-04	Jun. 18, 2024	-
Digital Power Meter	WT210	HZTE008-01	Aug. 08, 2024	Aug. 07, 2025
AC Power Supply	PCR 500L	HZTE001-07	Aug. 08, 2024	Aug. 07, 2025
DC Power Supply	IT6154	HZTE004-04	Aug. 08, 2024	Aug. 07, 2025
Standard source	SCL-1400	HZTE012-06	Nov. 04, 2021	-
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 08, 2024	Aug. 07, 2025
Temperature Meter	TES1310	HZTE017-01	Aug. 08, 2024	Aug. 07, 2025

Table 12: 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 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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