

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/8CCTS/BYP/EM

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ24090036a

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. 06, 2024

Manager: April Zou
Dec. 06, 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	15T8/4F/8CCTS/BYP/EM 3500K Setting	15T8/4F/8CCTS/BYP/EM 4000K Setting	15T8/4F/8CCTS/BYP/EM 5000K Setting
Luminous Efficacy (Lumens /Watt)	139.3	143.7	138.8
Total Luminous Flux (Lumens)	2036.1	2049.3	2033.1
Power (Watts)	14.62	14.26	14.65
Power Factor	0.9917	0.9910	0.9917
CCT (K)	3430	4036	4941
CRI	82.9	84.3	83.4
Stabilization Time(Light & Power)	50	50	50
Note	3500K	4000K	5000K

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Sep. 25, 2024
Date of Test	: Dec. 06, 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	: 15T8/4F/8CCTS/BYP/EM
Electrical Ratings	: 120-277V, 50/60Hz, 15W
Product Description	: Color- Tunable 3500K/4000K/5000K
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)	0.123	0.061
Power Factor	0.9917	0.9171
Test Power (W)	14.62	15.52
THD A%	10.69	19.43
Luminous Efficacy (lm/W)	139.3	137.2
Total Luminous Flux (lm)	2036.1	2129.0
Color Rendering Index (CRI)	82.9	
R9	6.6	
Correlated Color Temperature (CCT)(K)	3430	
Chromaticity Chroma x	0.4098	
Chromaticity Chroma y	0.3944	
Chromaticity Chroma u	0.2371	
Chromaticity Chroma v	0.3423	
Duv	0.0006	
Chromaticity Chroma u'	0.2371	
Chromaticity Chroma v'	0.5134	

Special Color Rendering Indices	
R1	81.5
R2	91.9
R3	95.5
R4	80
R5	81.6
R6	89.3
R7	83.1
R8	60.2
R9	6.6
R10	81.2
R11	79.4
R12	65.5
R13	84.3
R14	98.2

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

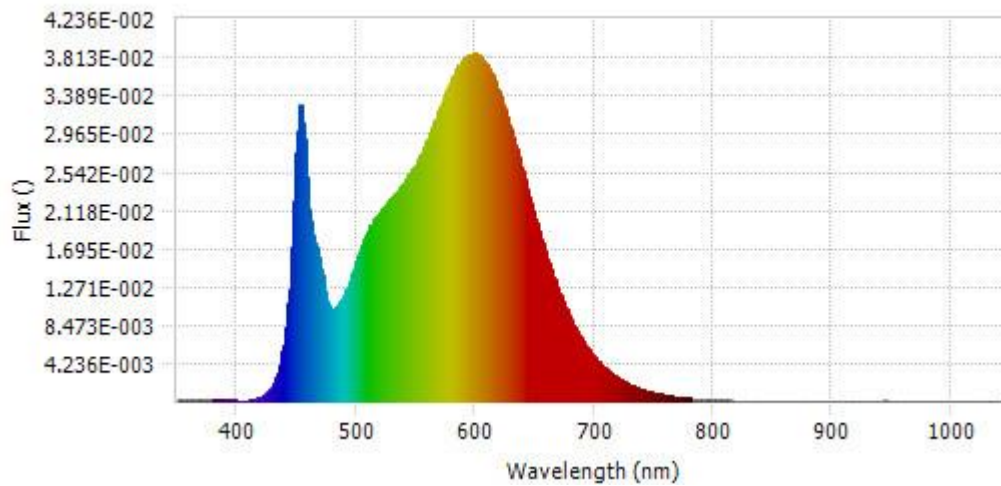
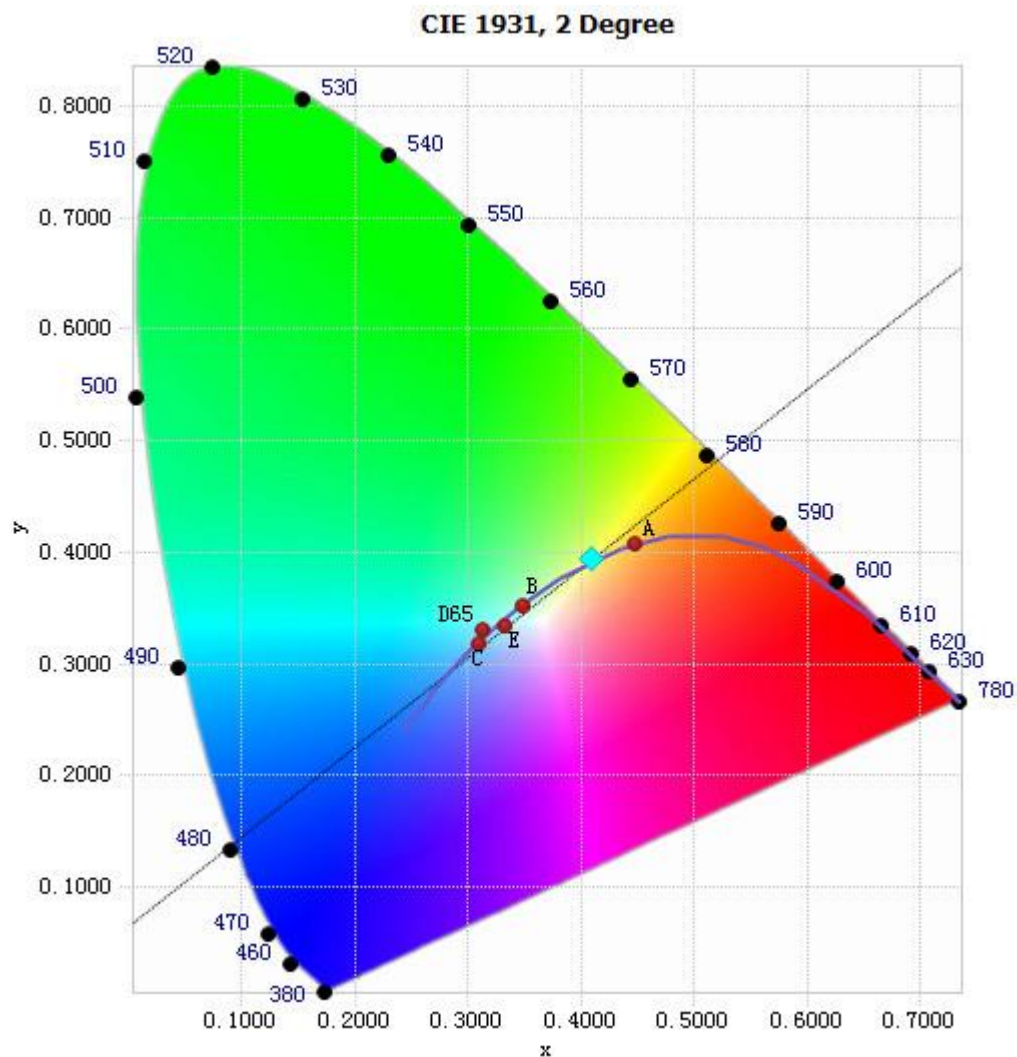


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.76E-04	485	1.08E-02	590	3.80E-02	695	5.88E-03
385	1.48E-04	490	1.18E-02	595	3.85E-02	700	5.00E-03
390	1.54E-04	495	1.34E-02	600	3.85E-02	705	4.26E-03
395	1.58E-04	500	1.55E-02	605	3.81E-02	710	3.63E-03
400	1.31E-04	505	1.74E-02	610	3.73E-02	715	3.08E-03
405	1.17E-04	510	1.88E-02	615	3.61E-02	720	2.63E-03
410	1.33E-04	515	2.02E-02	620	3.43E-02	725	2.24E-03
415	2.42E-04	520	2.09E-02	625	3.24E-02	730	1.89E-03
420	4.67E-04	525	2.18E-02	630	3.02E-02	735	1.60E-03
425	9.56E-04	530	2.26E-02	635	2.79E-02	740	1.36E-03
430	1.84E-03	535	2.33E-02	640	2.55E-02	745	1.16E-03
435	3.61E-03	540	2.42E-02	645	2.31E-02	750	9.80E-04
440	7.16E-03	545	2.53E-02	650	2.06E-02	755	8.35E-04
445	1.45E-02	550	2.63E-02	655	1.84E-02	760	7.12E-04
450	2.75E-02	555	2.76E-02	660	1.62E-02	765	6.08E-04
455	3.23E-02	560	2.91E-02	665	1.42E-02	770	5.17E-04
460	2.29E-02	565	3.07E-02	670	1.24E-02	775	4.39E-04
465	1.80E-02	570	3.24E-02	675	1.07E-02	780	3.78E-04
470	1.54E-02	575	3.41E-02	680	9.26E-03		
475	1.16E-02	580	3.56E-02	685	8.00E-03		
480	1.02E-02	585	3.71E-02	690	6.87E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4098, 0.3944)

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

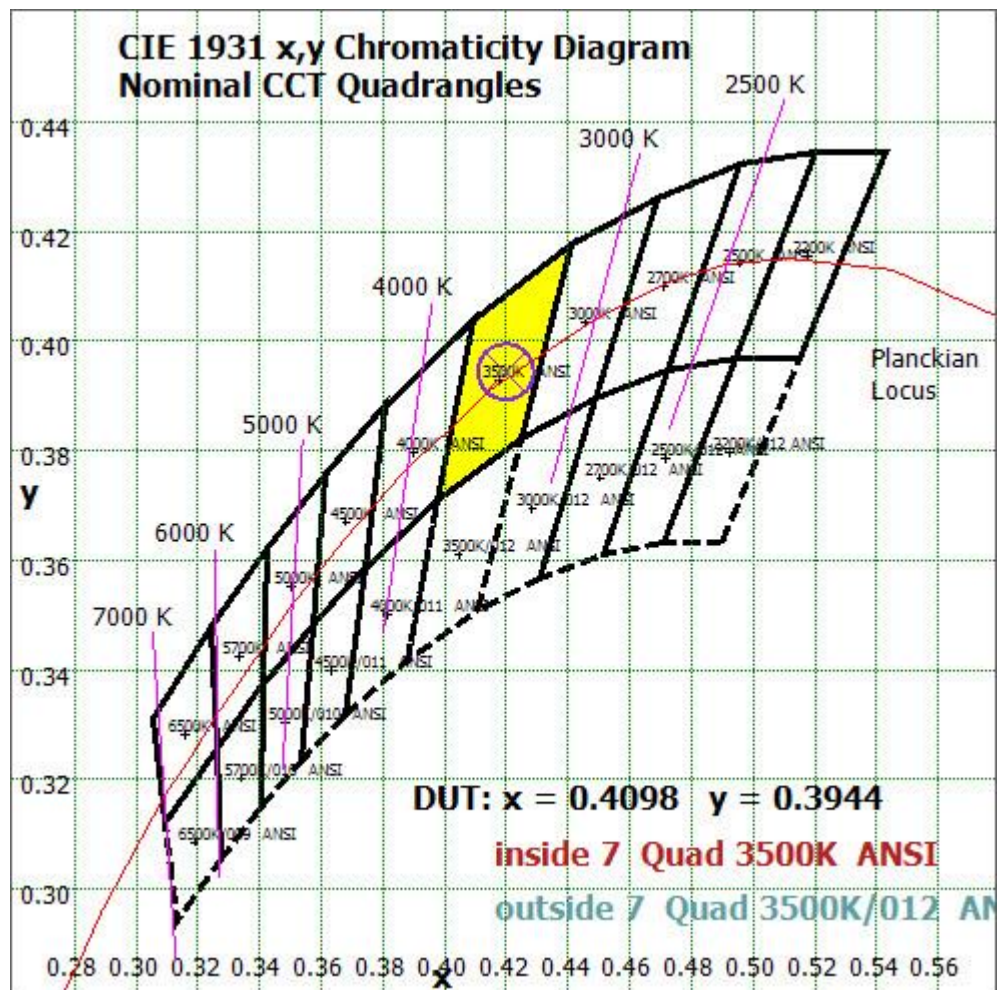


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

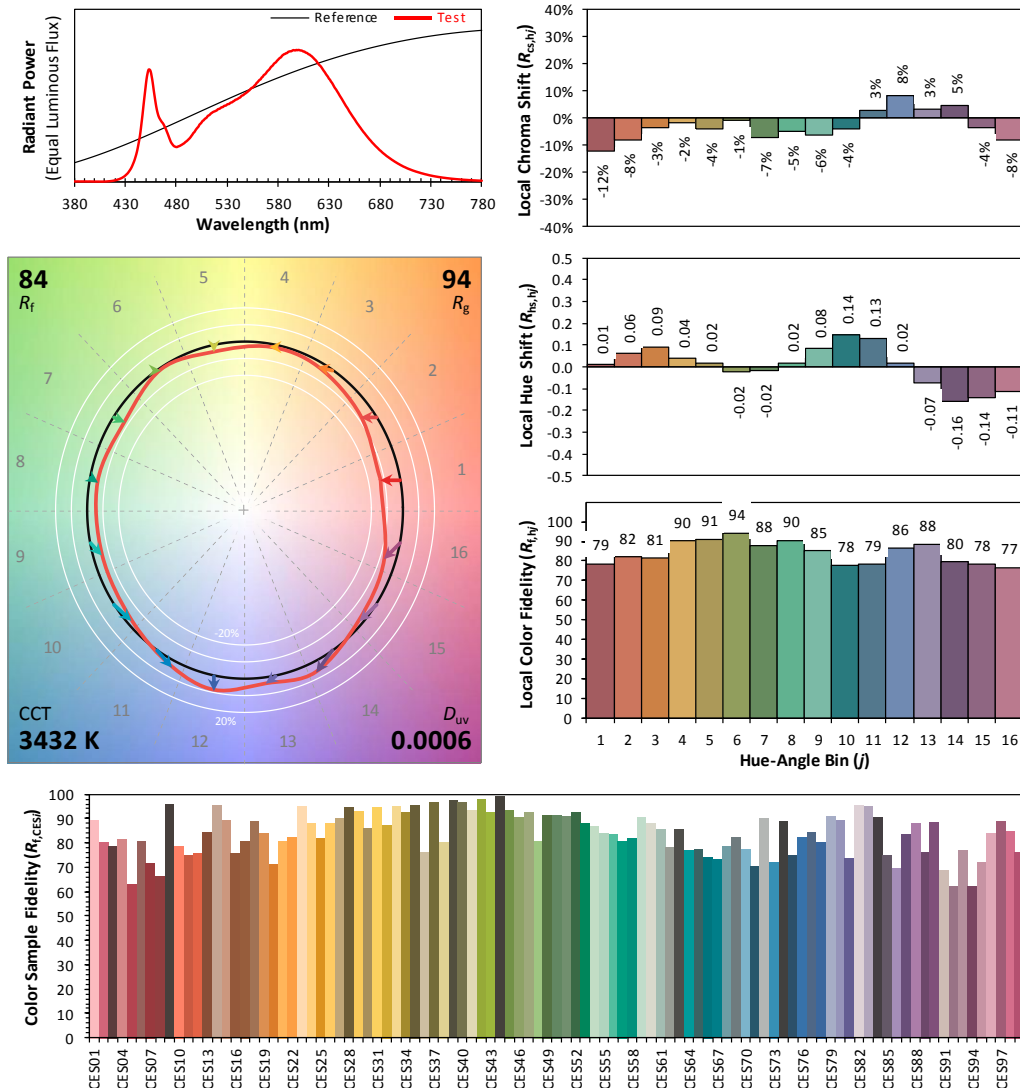
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/06

Model: 15T8/4F/8CCTS/BYP/EM



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

x 0.4098
 y 0.3944
 u' 0.2371
 v' 0.5134

CIE 13.3-1995
(CRI)
 R_a 83
 R_9 7

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)	0.123
Power Factor	0.9918
Power (W)	14.68
Luminous Efficacy (lm/W)	139.9
Total Luminous Flux (lm)	2053.7
Beam Angle (°)	116.9 (0°-180°) / 136.5 (90°-270°)
Center Beam Candle Power (cd)	537
Maximum Beam Candle Power (cd)	537.3 (At: C=30.0, Gamma=0.5)
Spacing Criteria	1.26 (0°-180°) / 1.31 (90°-270°)
Zonal Lumens in the 0°-60° Zone	63.01%
Zonal Lumens in the 60°-90° Zone	27.56%
Zonal Lumens in the 90°-120° Zone	7.79%
Zonal Lumens in the 120°-180° Zone	1.63%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	50.889	2.48%
10- 20	146.883	7.15%
20- 30	226.075	11.01%
30- 40	279.393	13.60%
40- 50	301.096	14.66%
50- 60	289.74	14.11%
60- 70	249.169	12.13%
70- 80	189.347	9.22%
80- 90	127.518	6.21%
90-100	80.373	3.91%
100-110	49.759	2.42%
110-120	29.929	1.46%
120-130	17.198	0.84%
130-140	9.279	0.45%
140-150	4.523	0.22%
150-160	1.837	0.09%
160-170	0.559	0.03%
170-180	0.12	0.01%
Total	2053.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1294.08	63.01%
60- 90	566.034	27.56%
0-90	1860.11	90.57%
90- 180	193.577	9.43%
0- 180	2053.7	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

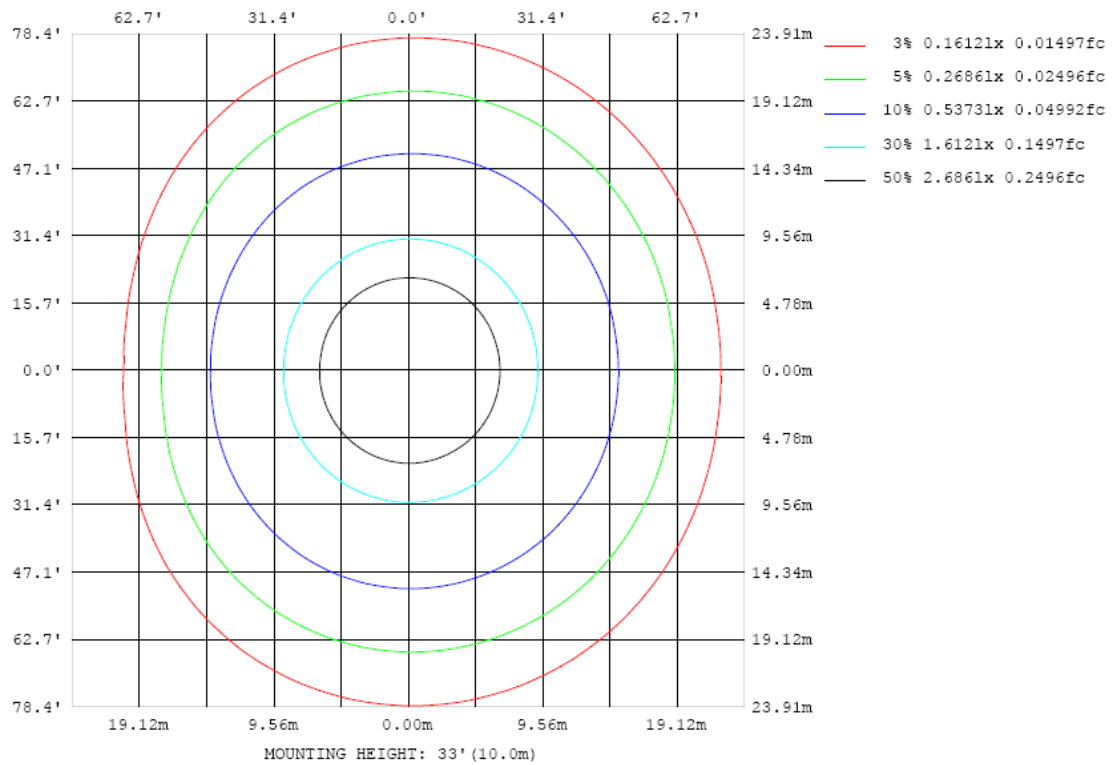


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

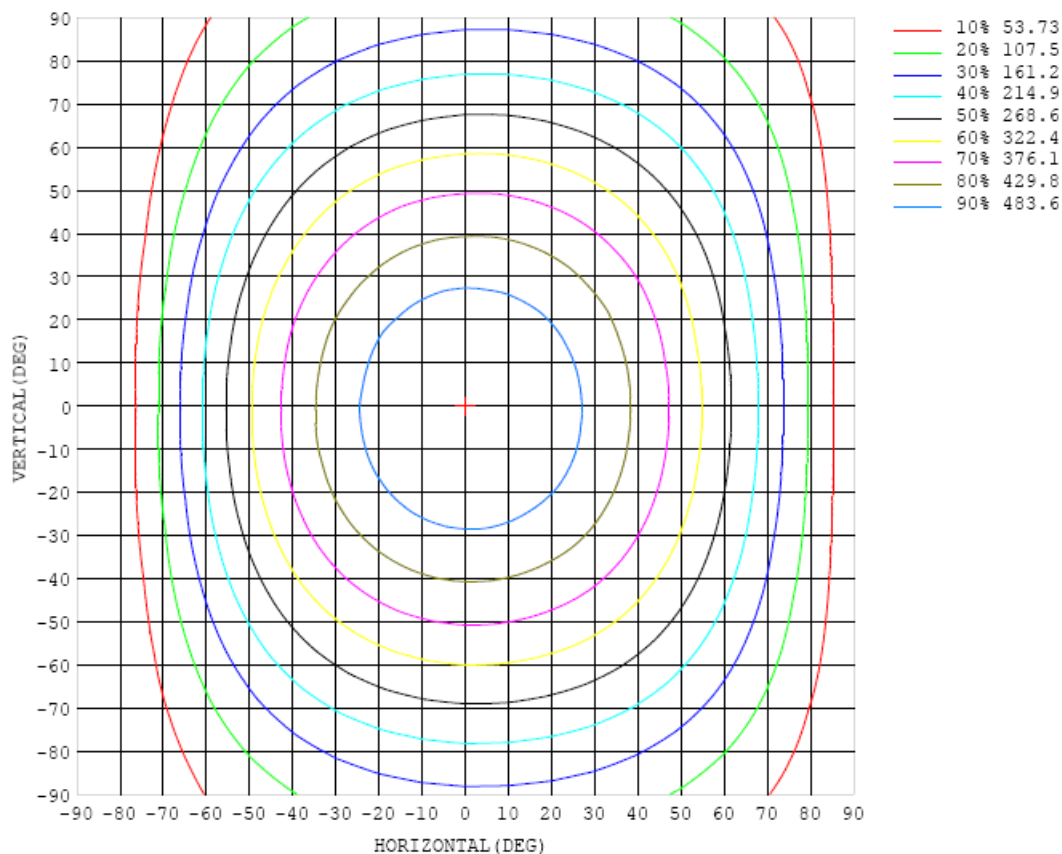


Chart 6: Isocandela Plot

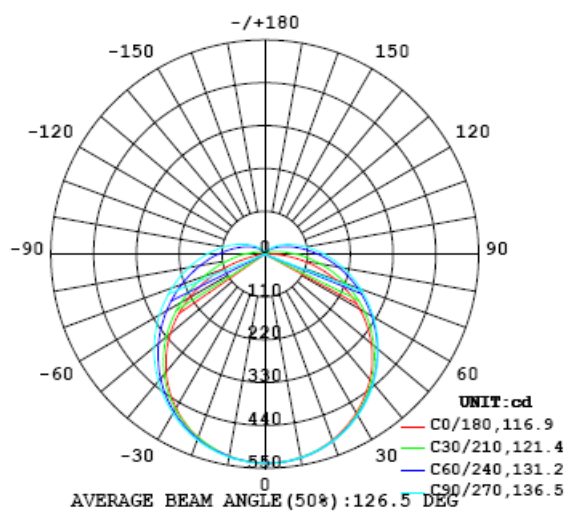


Chart 7: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537
5	536	536	536	536	536	536	536	536	536	536	535	535	535	535	534	535	534	534	534
10	530	530	530	530	531	532	532	531	531	531	531	530	530	529	529	528	528	528	527
15	522	522	522	522	522	522	523	523	523	523	522	521	521	520	519	518	517	516	516
20	508	509	510	511	510	511	511	511	511	511	510	510	509	507	505	504	502	501	501
25	491	492	494	495	495	495	495	496	497	496	495	494	492	490	487	486	483	482	481
30	471	472	473	475	476	477	477	478	479	478	477	475	472	469	467	463	460	458	456
35	447	448	450	452	454	455	456	457	458	457	456	453	450	446	441	437	433	430	428
40	421	421	424	426	429	431	432	433	434	433	431	428	424	419	413	407	401	398	395
45	391	392	394	397	401	404	406	407	408	408	405	402	396	389	382	374	367	362	358
50	357	359	362	366	371	375	378	380	381	380	378	373	366	357	348	337	329	321	317
55	321	323	327	332	338	344	348	351	352	352	349	343	335	324	312	299	287	277	272
60	282	284	290	297	304	311	317	321	323	323	319	312	303	290	275	258	243	229	223
65	240	243	250	259	269	278	286	290	293	293	289	281	270	255	237	217	197	179	172
70	195	199	209	221	233	245	254	260	263	263	259	251	238	221	201	176	151	128	119
75	148	154	166	182	198	212	222	230	233	233	229	220	207	188	166	138	108	80.1	66.5
80	101	108	125	145	164	180	192	200	205	205	200	191	177	158	133	104	71.9	40.6	23.0
85	55.9	65.3	86.6	110	131	149	163	172	177	178	173	164	150	130	105	75.9	45.1	15.8	0.52
90	18.1	30.2	55.0	79.7	103	122	137	146	151	152	148	139	125	105	81.5	55.1	27.6	6.28	0.05
95	0.28	9.83	31.9	56.3	78.3	97.2	112	122	128	129	125	116	103	84.6	62.7	39.5	17.5	3.37	0.00
100	0.14	2.81	18.0	38.6	58.6	76.7	91.0	101	107	108	104	96.3	83.7	67.3	48.7	28.6	12.0	2.37	0.00
105	0.14	0.87	10.4	26.0	43.8	59.6	72.7	82.2	87.6	88.8	85.9	78.6	67.5	53.8	37.4	21.3	8.82	1.89	0.05
110	0.16	0.62	6.39	17.6	31.8	45.9	57.6	66.2	70.8	72.3	69.9	63.2	54.7	42.3	28.9	16.3	6.93	1.58	0.17
115	0.22	0.55	4.55	12.3	23.0	34.5	44.9	52.7	57.3	58.8	56.9	51.5	43.3	33.2	22.5	12.8	5.53	1.20	0.27
120	0.32	0.54	3.36	9.18	17.1	26.0	34.5	41.1	45.2	46.7	45.1	40.7	34.1	26.1	17.7	10.1	4.60	1.01	0.27
125	0.42	0.43	2.70	7.01	13.0	19.8	26.4	31.8	35.3	36.5	35.3	31.9	26.8	20.5	14.1	8.23	3.84	0.76	0.33
130	0.48	0.41	1.82	5.42	9.98	15.1	20.1	24.4	27.1	28.1	27.3	24.8	20.9	16.1	11.0	6.55	2.91	0.55	0.52
135	0.54	0.39	0.74	3.61	7.49	11.4	15.4	18.5	20.7	21.5	21.0	19.1	16.2	12.5	8.57	5.29	2.20	0.46	0.67
140	0.56	0.41	0.20	2.34	5.64	8.51	11.4	14.0	15.6	16.3	15.9	14.6	12.1	9.51	6.63	4.02	1.48	0.47	0.57
145	0.66	0.38	0.38	1.40	4.38	6.30	8.34	9.90	11.2	11.6	11.4	10.5	9.10	6.79	4.70	2.43	0.89	0.56	0.59
150	0.78	0.45	0.61	0.53	2.03	4.01	6.20	7.27	8.08	8.46	8.30	7.55	6.27	4.66	3.09	1.24	0.69	0.57	0.66
155	0.79	0.53	0.57	0.57	0.77	1.66	3.41	4.90	5.61	5.90	5.86	5.47	4.11	2.89	1.52	0.70	0.65	0.59	0.67
160	0.82	0.55	0.57	0.66	0.64	0.85	1.24	1.76	2.04	2.14	2.23	2.37	1.77	0.87	0.94	0.83	0.69	0.62	0.68
165	0.86	0.62	0.57	0.62	0.68	0.74	0.73	0.76	0.78	0.82	0.78	0.91	1.04	0.86	0.85	0.75	0.70	0.69	0.73
170	0.94	0.73	0.65	0.60	0.60	0.65	0.71	0.76	0.80	0.82	0.83	0.82	0.81	0.72	0.73	0.69	0.69	0.73	0.78
175	0.97	0.84	0.77	0.73	0.71	0.69	0.67	0.66	0.66	0.66	0.66	0.67	0.67	0.68	0.71	0.75	0.80	0.82	0.89
180	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95

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	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537		
5	534	534	534	534	535	534	534	535	535	535	534	535	535	535	535	535	535		
10	527	527	528	528	528	528	528	528	529	530	529	530	530	530	530	530	529		
15	517	516	515	516	517	519	519	519	520	521	522	520	521	520	521	521	522		
20	500	500	501	503	504	505	506	507	508	509	508	508	508	508	509	507	508		
25	479	481	483	485	486	488	490	491	492	492	493	492	493	493	491	492	491		
30	456	457	460	463	465	467	470	472	473	473	474	474	473	473	472	471	471		
35	428	430	434	436	440	444	447	450	450	452	452	452	451	450	450	447	448		
40	395	399	403	407	412	417	422	425	426	428	428	427	426	424	424	421	421		
45	360	364	369	374	381	388	394	397	400	401	401	400	399	396	395	392	391		
50	319	324	331	339	348	357	364	369	372	374	373	372	369	366	363	360	357		
55	275	282	290	302	313	325	333	339	342	344	344	341	337	333	329	325	321		
60	227	236	249	264	279	291	302	308	313	315	313	310	305	299	293	288	283		
65	176	189	207	226	244	259	271	278	283	285	283	278	272	263	255	248	242		
70	126	144	166	189	210	227	240	249	254	255	253	247	238	228	217	207	198		
75	77.0	101	129	155	178	197	211	220	225	227	223	216	206	193	179	165	154		
80	36.9	65.7	96.4	125	149	168	183	193	198	199	195	187	175	160	143	126	110		
85	14.3	40.7	70.4	98.6	123	143	157	167	172	172	168	159	147	131	110	88.5	67.9		
90	6.02	25.6	51.2	77.0	100	120	134	144	148	148	144	135	121	103	81.7	57.7	34.0		
95	3.61	17.2	37.6	60.2	81.3	99.4	113	122	127	126	121	112	97.9	80.0	58.6	35.5	13.7		
100	2.64	12.4	28.4	47.3	65.8	82.0	94.4	103	107	106	101	91.6	78.2	61.3	41.8	21.9	5.67		
105	2.23	9.63	22.2	37.5	53.3	67.3	78.3	85.7	89.2	88.4	83.6	74.7	62.2	47.0	30.1	14.2	3.42		
110	2.03	7.65	17.7	30.1	43.2	55.1	64.6	71.1	74.0	73.1	68.5	60.5	49.4	36.1	22.2	10.1	2.64		
115	1.99	6.41	14.3	24.4	35.1	45.0	53.0	58.5	60.8	60.0	55.8	48.6	39.1	28.0	16.9	7.72	2.26		
120	1.89	5.61	11.7	19.9	28.6	36.7	43.3	47.8	49.7	48.8	45.1	39.0	31.0	22.0	13.2	6.25	2.05		
125	1.86	5.00	9.79	16.2	23.3	29.7	35.1	38.7	40.2	39.4	36.3	31.1	24.6	17.4	10.6	5.24	1.90		
130	1.91	4.47	8.37	13.3	18.9	24.0	28.3	31.1	32.3	31.5	28.9	24.8	19.6	13.9	8.61	4.50	1.80		
135	1.88	4.02	7.19	11.0	15.3	19.3	22.6	24.8	25.7	25.0	22.9	19.6	15.5	11.1	7.13	3.92	1.72		
140	1.81	3.63	6.15	9.11	12.3	15.4	17.9	19.5	20.2	19.6	18.0	15.5	12.3	8.98	5.95	3.31	1.62		
145	1.84	3.21	5.20	7.54	9.87	12.0	13.9	15.2	15.7	15.2	13.9	12.0	9.69	7.30	4.93	2.90	1.57		
150	1.69	2.88	4.36	6.13	7.88	9.44	10.7	11.6	11.9	11.6	10.7	9.30	7.66	5.81	4.03	2.59	1.54		
155	1.60	2.55	3.57	4.85	6.07	7.30	8.18	8.75	8.94	8.68	8.07	7.12	5.87	4.56	3.39	2.33	1.46		
160	1.36	2.19	2.93	3.75	4.60	5.31	5.91	6.37	6.52	6.31	5.89	5.18	4.40	3.58	2.79	2.05	1.41		
165	1.11	1.91	2.39	2.87	3.34	3.84	4.21	4.44	4.49	4.40	4.17	3.80	3.31	2.78	2.26	1.80	1.32		
170	1.06	1.62	1.95	2.21	2.47	2.68	2.85	2.95	2.98	2.94	2.82	2.63	2.41	2.15	1.89	1.63	1.30		
175	1.03	1.22	1.46	1.67	1.79	1.86	1.93	1.97	1.98	1.96	1.92	1.86	1.78	1.68	1.54	1.35	1.14		
180	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		

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)	0.120	0.060
Power Factor	0.9910	0.9128
Test Power (W)	14.26	15.17
THD A%	10.94	19.73
Luminous Efficacy (lm/W)	143.7	141.5
Total Luminous Flux (lm)	2049.3	2146.1
Color Rendering Index (CRI)	84.3	
R9	14	
Correlated Color Temperature (CCT)(K)	4036	
Chromaticity Chroma x	0.3789	
Chromaticity Chroma y	0.3762	
Chromaticity Chroma u	0.2243	
Chromaticity Chroma v	0.3341	
Duv	0.0002	
Chromaticity Chroma u'	0.2243	
Chromaticity Chroma v'	0.5011	

Special Color Rendering Indices	
R1	83.1
R2	91.6
R3	96
R4	82.1
R5	82.8
R6	87.5
R7	85.9
R8	65.8
R9	14
R10	79.5
R11	81.5
R12	61.2
R13	85.5
R14	98.3

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

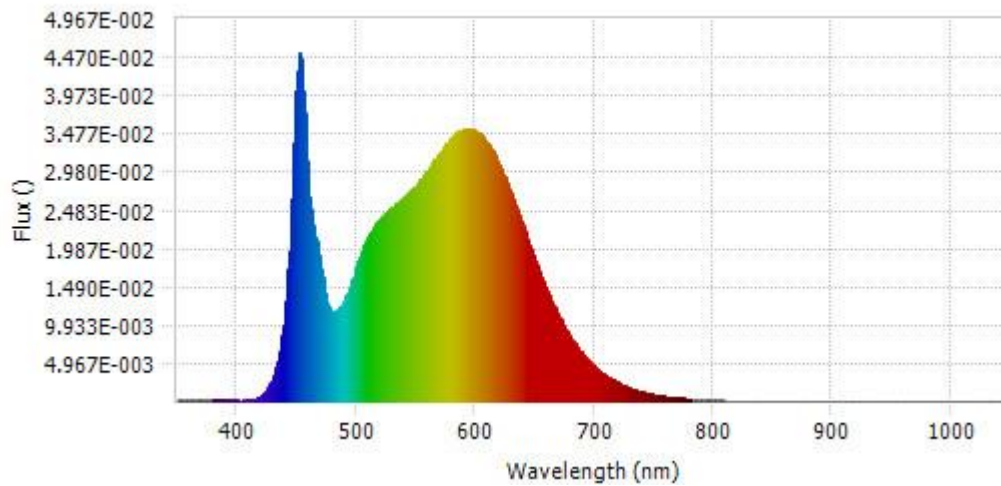


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.97E-04	485	1.20E-02	590	3.54E-02	695	5.37E-03
385	2.04E-04	490	1.31E-02	595	3.54E-02	700	4.58E-03
390	1.85E-04	495	1.49E-02	600	3.52E-02	705	3.91E-03
395	1.85E-04	500	1.74E-02	605	3.46E-02	710	3.32E-03
400	1.63E-04	505	1.95E-02	610	3.37E-02	715	2.84E-03
405	1.46E-04	510	2.12E-02	615	3.25E-02	720	2.43E-03
410	1.92E-04	515	2.28E-02	620	3.08E-02	725	2.07E-03
415	3.40E-04	520	2.36E-02	625	2.91E-02	730	1.76E-03
420	7.38E-04	525	2.45E-02	630	2.70E-02	735	1.49E-03
425	1.49E-03	530	2.52E-02	635	2.50E-02	740	1.26E-03
430	2.94E-03	535	2.57E-02	640	2.29E-02	745	1.08E-03
435	5.81E-03	540	2.64E-02	645	2.07E-02	750	9.22E-04
440	1.13E-02	545	2.73E-02	650	1.85E-02	755	7.81E-04
445	2.26E-02	550	2.80E-02	655	1.65E-02	760	6.62E-04
450	4.02E-02	555	2.89E-02	660	1.46E-02	765	5.69E-04
455	4.28E-02	560	3.00E-02	665	1.28E-02	770	4.88E-04
460	2.87E-02	565	3.11E-02	670	1.11E-02	775	4.14E-04
465	2.21E-02	570	3.22E-02	675	9.73E-03	780	3.53E-04
470	1.82E-02	575	3.32E-02	680	8.41E-03		
475	1.32E-02	580	3.42E-02	685	7.27E-03		
480	1.15E-02	585	3.50E-02	690	6.26E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method

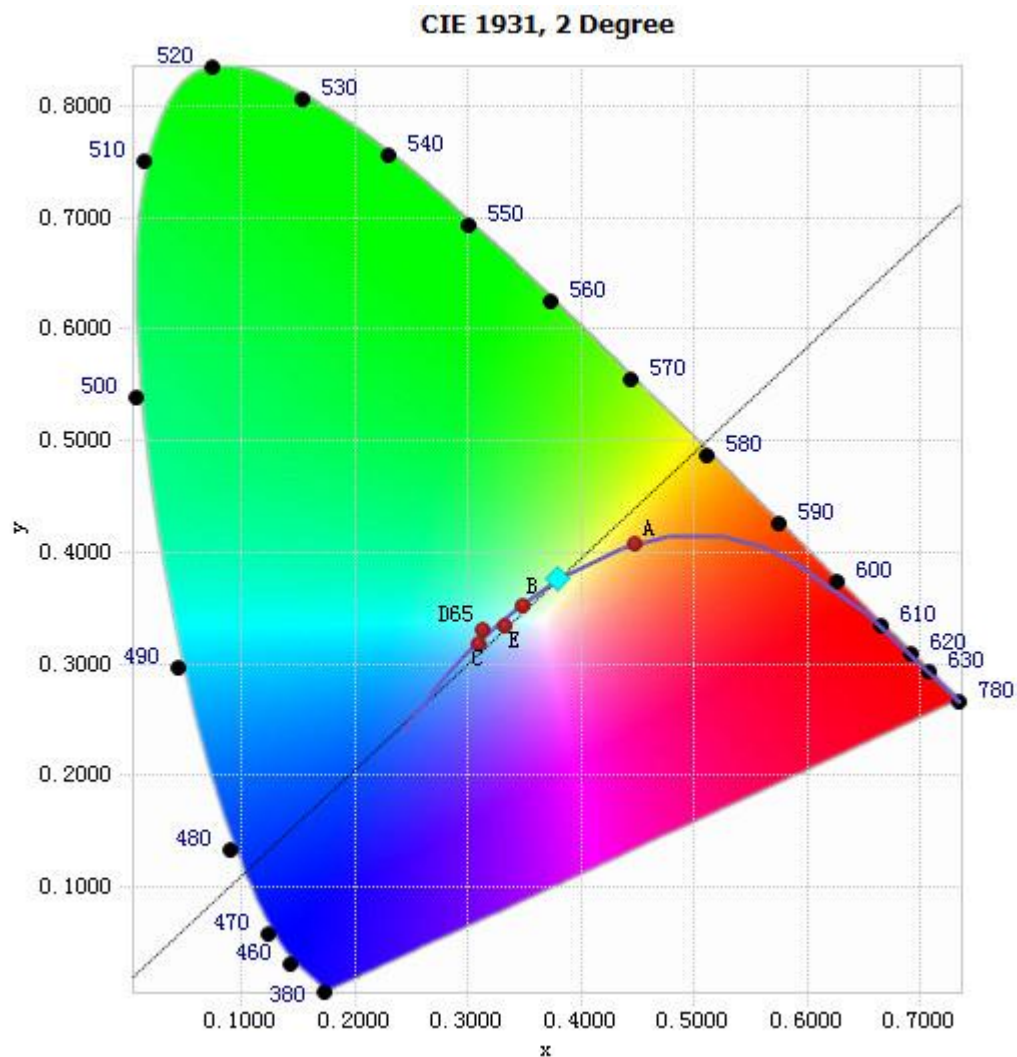


Chart 9: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

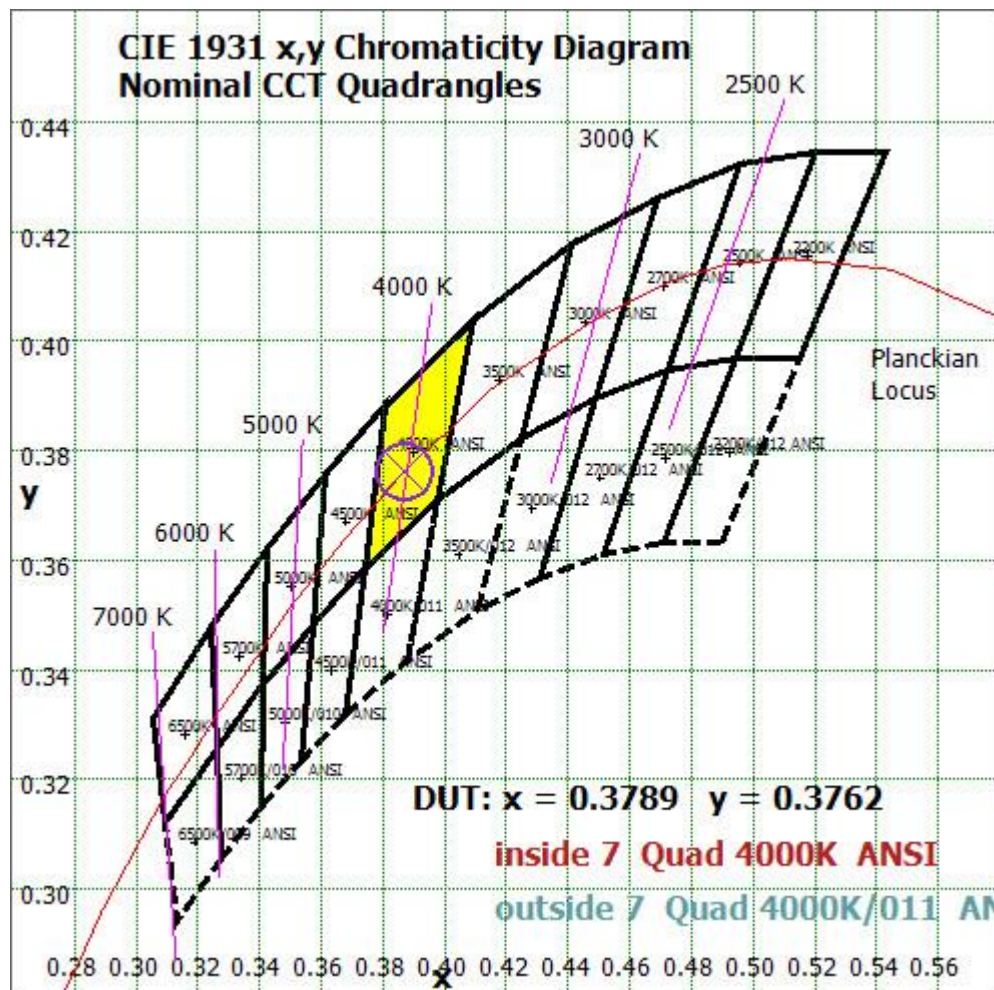


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

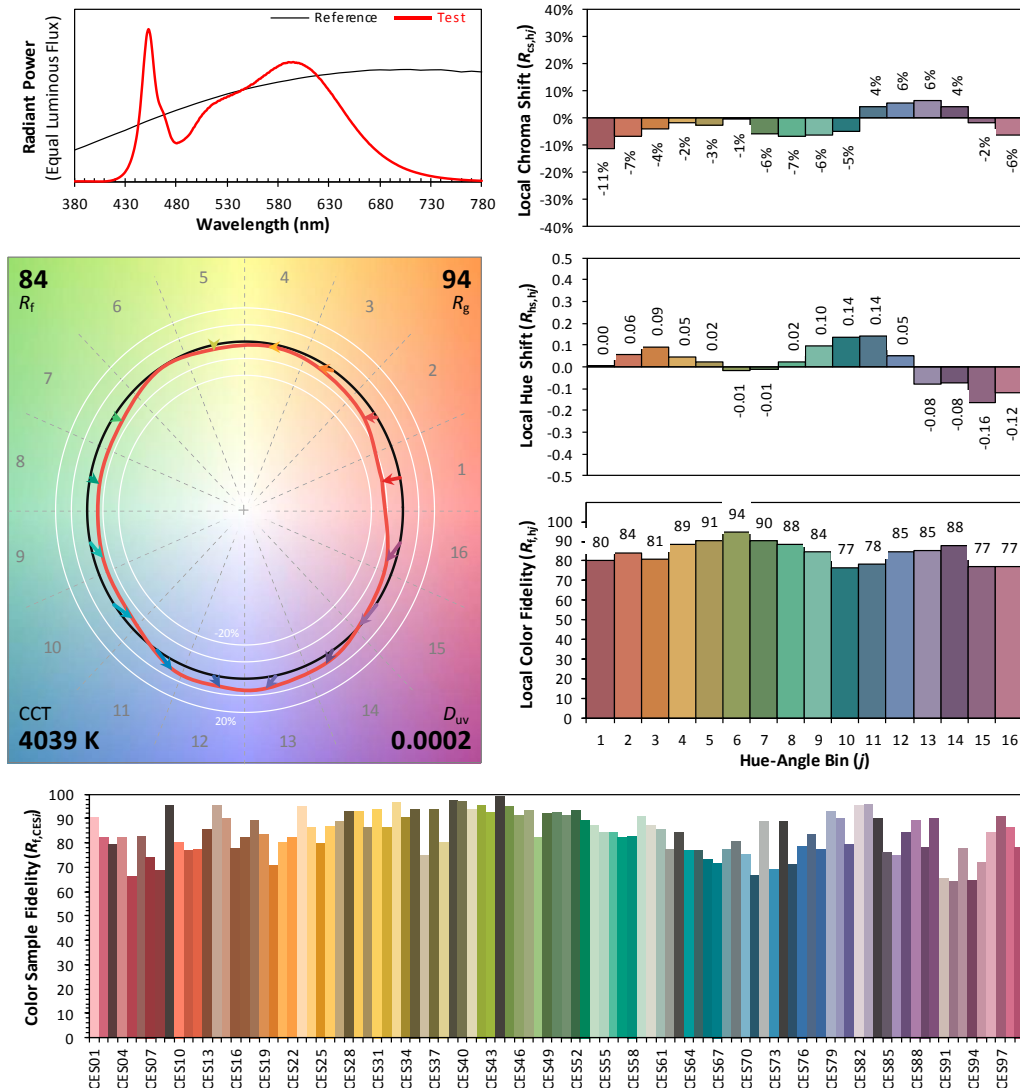
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/06

Model: 15T8/4F/8CCTS/BYP/EM



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

x 0.3789
 y 0.3762
 u' 0.2243
 v' 0.5011

CIE 13.3-1995
(CRI)
 R_a 84
 R_9 14

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)	0.123	0.061
Power Factor	0.9917	0.9179
Test Power (W)	14.65	15.56
THD A%	10.68	19.42
Luminous Efficacy (lm/W)	138.8	136.8
Total Luminous Flux (lm)	2033.1	2128.0
Color Rendering Index (CRI)	83.4	
R9	12.6	
Correlated Color Temperature (CCT)(K)	4941	
Chromaticity Chroma x	0.3472	
Chromaticity Chroma y	0.3584	
Chromaticity Chroma u	0.2102	
Chromaticity Chroma v	0.3255	
Duv	0.0025	
Chromaticity Chroma u'	0.2102	
Chromaticity Chroma v'	0.4882	

Special Color Rendering Indices	
R1	81.6
R2	88.8
R3	93.3
R4	82.1
R5	81.3
R6	83.3
R7	88.3
R8	68.8
R9	12.6
R10	72.7
R11	80.9
R12	54.5
R13	83.6
R14	96.5

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

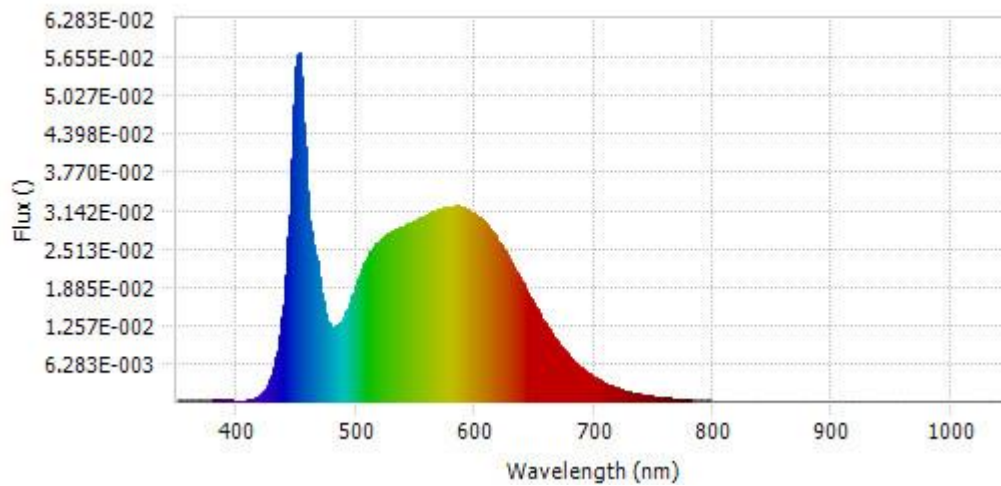
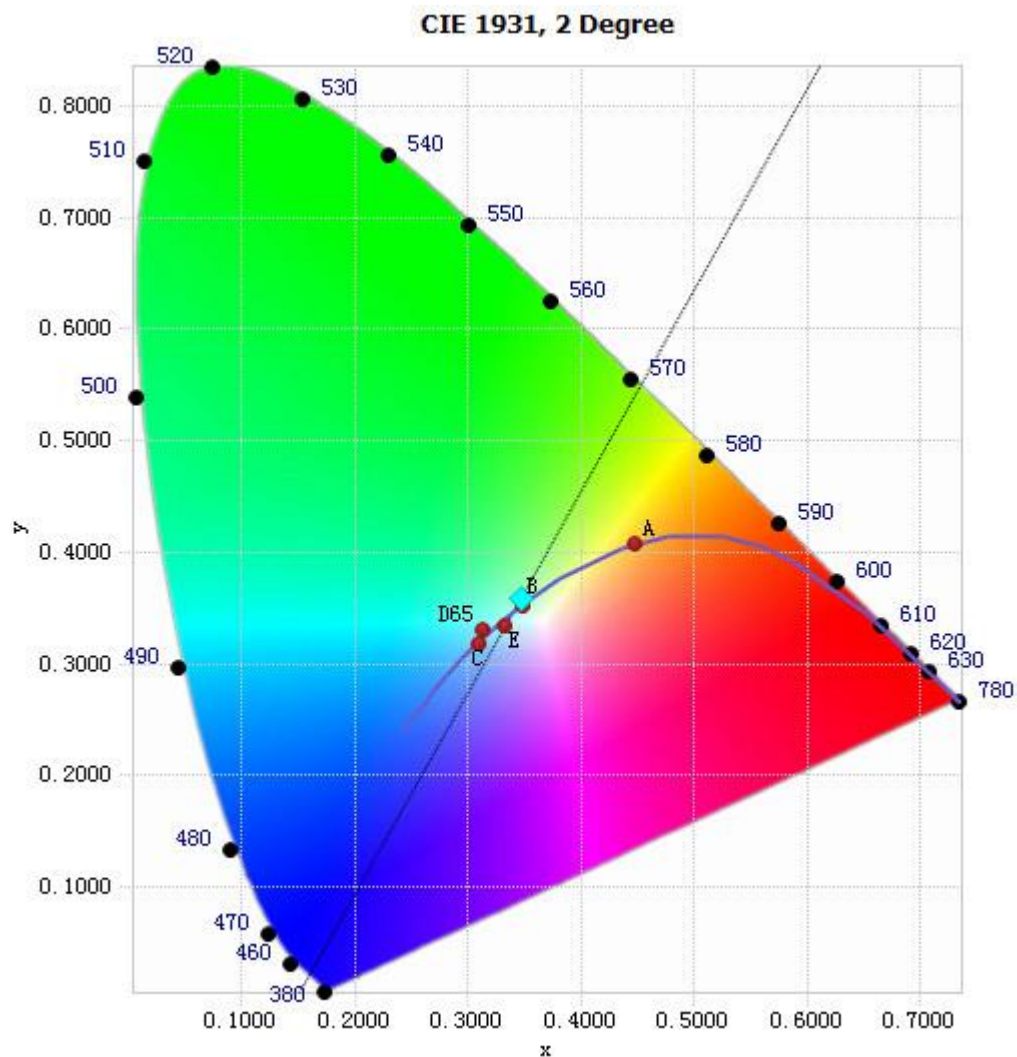


Chart 12: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.38E-04	485	1.27E-02	590	3.19E-02	695	4.64E-03
385	2.16E-04	490	1.39E-02	595	3.14E-02	700	3.98E-03
390	2.24E-04	495	1.63E-02	600	3.08E-02	705	3.39E-03
395	1.95E-04	500	1.92E-02	605	2.99E-02	710	2.90E-03
400	1.63E-04	505	2.17E-02	610	2.89E-02	715	2.47E-03
405	1.69E-04	510	2.37E-02	615	2.77E-02	720	2.12E-03
410	2.37E-04	515	2.55E-02	620	2.62E-02	725	1.82E-03
415	5.10E-04	520	2.64E-02	625	2.46E-02	730	1.55E-03
420	1.14E-03	525	2.73E-02	630	2.28E-02	735	1.32E-03
425	2.44E-03	530	2.79E-02	635	2.11E-02	740	1.12E-03
430	4.87E-03	535	2.83E-02	640	1.93E-02	745	9.57E-04
435	9.47E-03	540	2.88E-02	645	1.75E-02	750	8.19E-04
440	1.82E-02	545	2.93E-02	650	1.57E-02	755	6.97E-04
445	3.50E-02	550	2.96E-02	655	1.40E-02	760	5.95E-04
450	5.51E-02	555	3.01E-02	660	1.24E-02	765	5.11E-04
455	5.00E-02	560	3.07E-02	665	1.09E-02	770	4.38E-04
460	3.19E-02	565	3.11E-02	670	9.52E-03	775	3.76E-04
465	2.49E-02	570	3.16E-02	675	8.33E-03	780	3.24E-04
470	1.91E-02	575	3.18E-02	680	7.21E-03		
475	1.36E-02	580	3.20E-02	685	6.25E-03		
480	1.21E-02	585	3.21E-02	690	5.39E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3472, 0.3584)

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

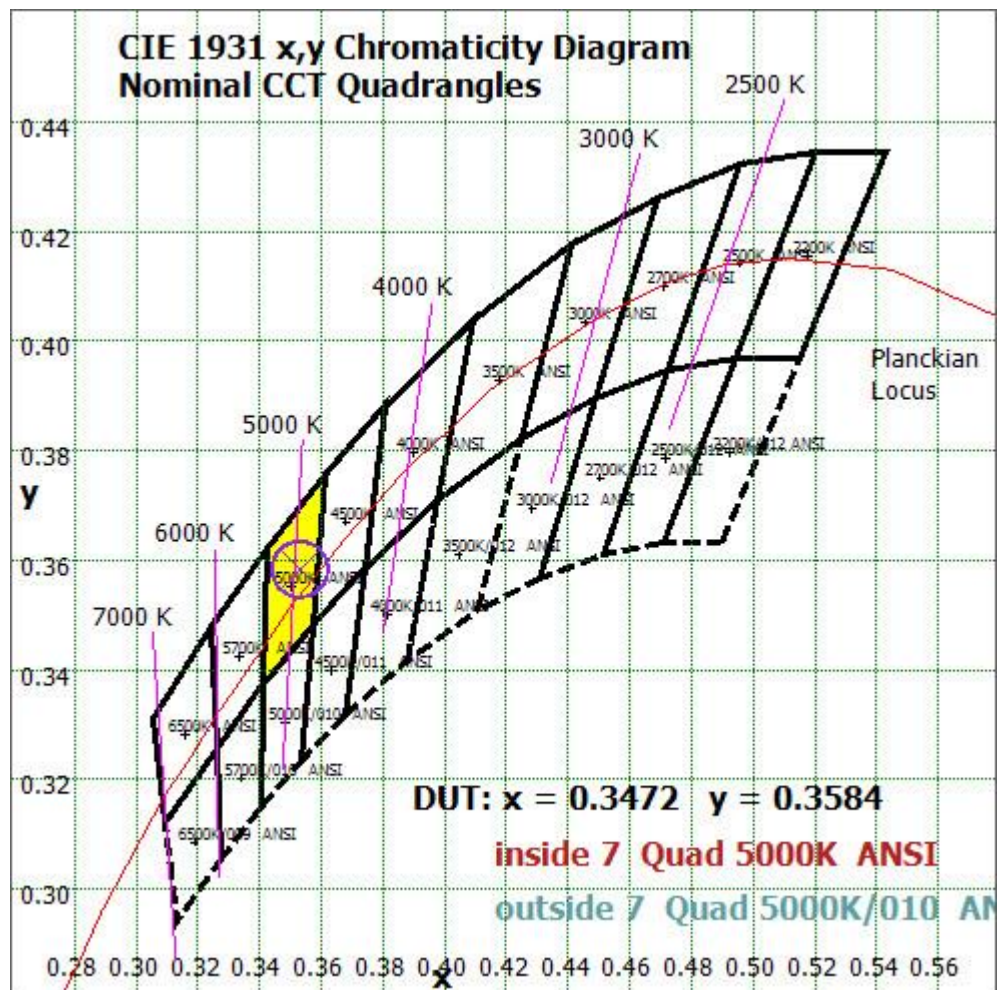


Chart 14: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

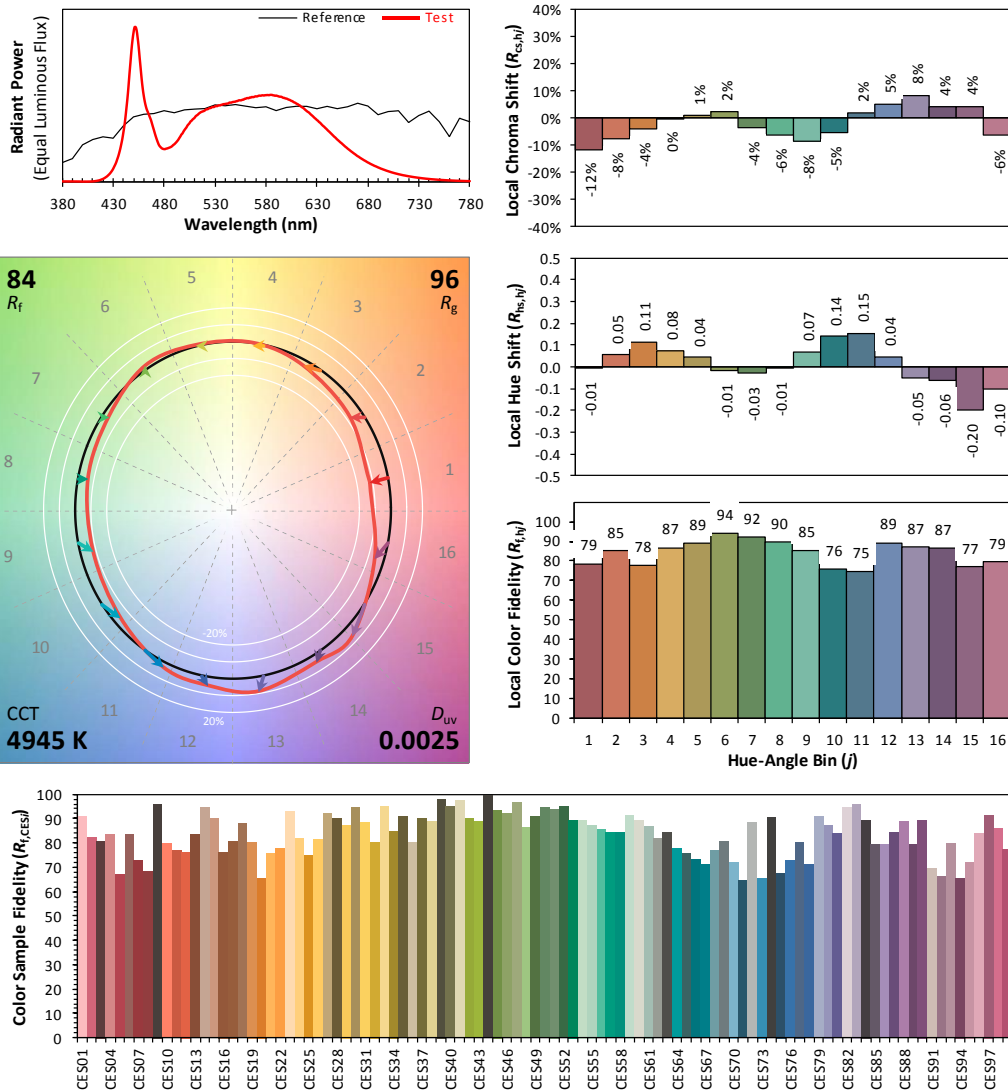
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2024/12/06

Model: 15T8/4F/8CCTS/BYP/EM



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

x 0.3472
 y 0.3584
 u' 0.2102
 v' 0.4882

CIE 13.3-1995
(CRI)
 R_a 83
 R_9 13

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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