

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 Lamp

Model: 8PLV/8CCTS/HYBM

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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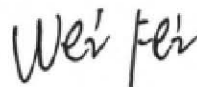
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Report No.: HZ23070004i

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

Review by:



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Jul. 24, 2023

Approved by:



Manager: April Zou
Jul. 24, 2023

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	8PLV/8CCTS/HYBM 2700K Setting	8PLV/8CCTS/HYBM 3000K Setting	8PLV/8CCTS/HYBM 3500K Setting
Luminous Efficacy (Lumens /Watt)	136.2	144.6	151.4
Total Luminous Flux (Lumens)	1096.8	1149.8	1212.9
Power (Watts)	8.05	7.95	8.01
Power Factor	0.9748	0.9751	0.9750
CCT (K)	2765	3006	3554
CRI	82.9	84.1	84.8
Stabilization Time (Light & Power)	50 mins	50 mins	50 mins
Note	2700K	3000K	3500K

Tested Model	8PLV/8CCTS/HYBM 4000K Setting
Luminous Efficacy (Lumens /Watt)	148.3
Total Luminous Flux (Lumens)	1208.4
Power (Watts)	8.15
Power Factor	0.9742
CCT (K)	3988
CRI	83.4
Stabilization Time (Light & Power)	50 mins
Note	4000K

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Jul. 06, 2023
Date of Test	: Jul. 12, 2023
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 Lamp
Model	: 8PLV/8CCTS/HYBM
Electrical Ratings	: 120-277V, 50/60Hz, 8W
Product Description	: Color- Tunable 2700K/3000K/3500K/4000K
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 (2700K 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)	0.069	0.033
Power Factor	0.9748	0.9054
Test Power (W)	8.05	8.16
THD A%	19.11	17.81
Luminous Efficacy (lm/W)	136.2	133.7
Total Luminous Flux (lm)	1096.8	1090.9
Color Rendering Index (CRI)	82.9	
R9	9	
Correlated Color Temperature (CCT)(K)	2765	
Chromaticity Chroma x	0.4517	
Chromaticity Chroma y	0.4041	
Chromaticity Chroma u	0.2601	
Chromaticity Chroma v	0.3491	
Duv	-0.0017	
Chromaticity Chroma u'	0.2601	
Chromaticity Chroma v'	0.5236	

Special Color Rendering Indices	
R1	82.4
R2	93.9
R3	92.8
R4	80.3
R5	83.2
R6	93.5
R7	80.1
R8	57.1
R9	9
R10	86.6
R11	80.6
R12	78.9
R13	85.4
R14	96.7

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

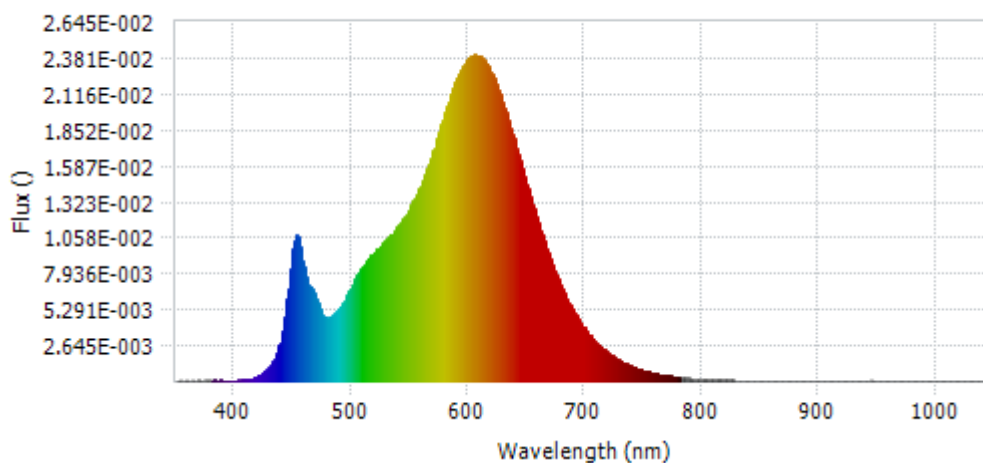
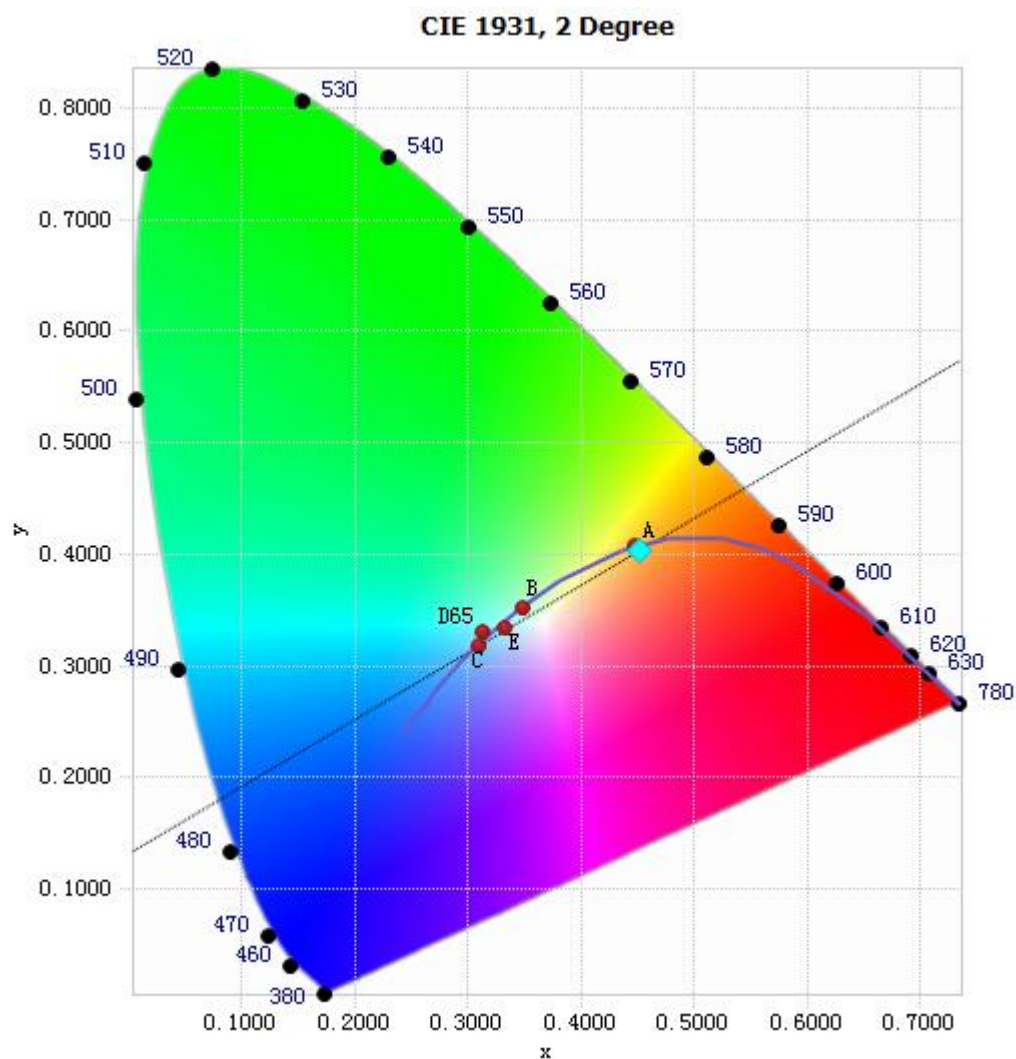


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	6.10E-05	485	4.95E-03	590	2.23E-02	695	4.45E-03
385	4.99E-05	490	5.41E-03	595	2.32E-02	700	3.81E-03
390	5.81E-05	495	6.14E-03	600	2.38E-02	705	3.25E-03
395	5.21E-05	500	6.98E-03	605	2.39E-02	710	2.79E-03
400	5.82E-05	505	7.79E-03	610	2.38E-02	715	2.38E-03
405	7.34E-05	510	8.43E-03	615	2.34E-02	720	2.05E-03
410	1.22E-04	515	9.08E-03	620	2.26E-02	725	1.75E-03
415	2.22E-04	520	9.49E-03	625	2.15E-02	730	1.48E-03
420	3.85E-04	525	9.97E-03	630	2.03E-02	735	1.26E-03
425	6.80E-04	530	1.05E-02	635	1.90E-02	740	1.07E-03
430	1.10E-03	535	1.08E-02	640	1.75E-02	745	9.22E-04
435	1.87E-03	540	1.14E-02	645	1.60E-02	750	7.89E-04
440	3.26E-03	545	1.20E-02	650	1.45E-02	755	6.72E-04
445	6.02E-03	550	1.27E-02	655	1.30E-02	760	5.72E-04
450	9.75E-03	555	1.36E-02	660	1.16E-02	765	4.91E-04
455	1.04E-02	560	1.46E-02	665	1.03E-02	770	4.21E-04
460	7.96E-03	565	1.57E-02	670	9.00E-03	775	3.60E-04
465	6.89E-03	570	1.70E-02	675	7.90E-03	780	3.09E-04
470	6.03E-03	575	1.83E-02	680	6.86E-03		
475	4.91E-03	580	1.97E-02	685	5.96E-03		
480	4.63E-03	585	2.12E-02	690	5.15E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4517, 0.4041)

Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

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

[illegible]

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Color Rendition Report – Sphere Spectroradiometer Method

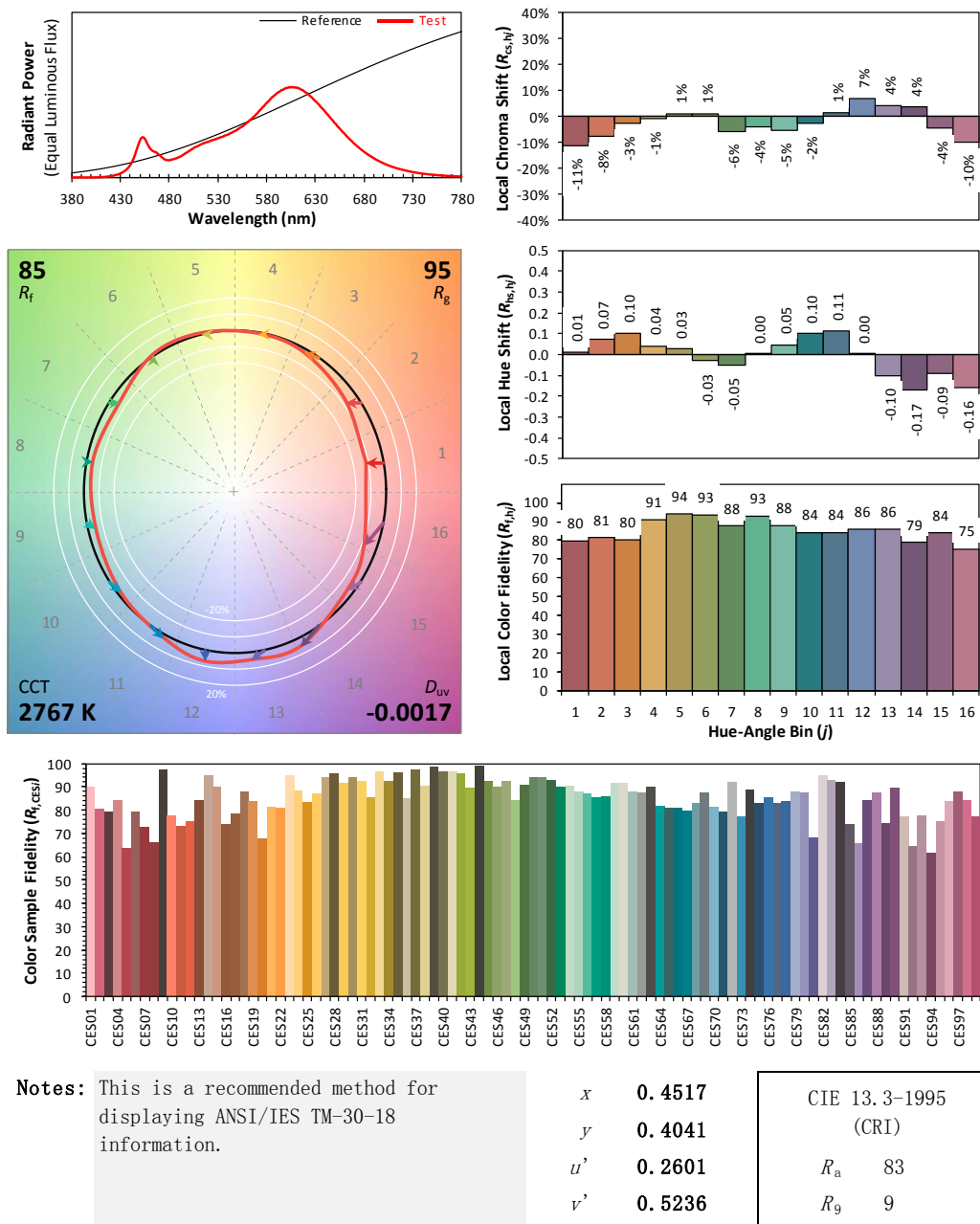
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/07/12

Model: 8PLV/8CCTS/HYBM



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 25.1 °C.

The photometric distance is 2.47 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)	0.069
Power Factor	0.9720
Power (W)	8.08
Luminous Efficacy (lm/W)	136.0
Total Luminous Flux (lm)	1099.1
Beam Angle (°)	102.5 (0°-180°) / 102.3 (90°-270°)
Center Beam Candle Power (cd)	415
Maximum Beam Candle Power (cd)	417.0 (At: C=210.0, Gamma=6.5)
Spacing Criteria	1.27 (0°-180°) / 1.25 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	78.88%
Zonal Lumens in the 60 °-90 °Zone	19.79%
Zonal Lumens in the 90 °-120 °Zone	1.26%
Zonal Lumens in the 120 °-180 °Zone	0.07%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	39.169	3.56%
10- 20	111.339	10.13%
20- 30	166.076	15.11%
30- 40	194.811	17.73%
40- 50	192.95	17.56%
50- 60	162.567	14.79%
60- 70	116.038	10.56%
70- 80	68.83	6.26%
80- 90	32.605	2.97%
90-100	11.132	1.01%
100-110	2.37	0.22%
110-120	0.365	0.03%
120-130	0.143	0.01%
130-140	0.176	0.02%
140-150	0.185	0.02%
150-160	0.16	0.01%
160-170	0.107	0.01%
170-180	0.038	0.00%
Total	1099.1	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	866.912	78.88%
60- 90	217.473	19.79%
0-90	1084.39	98.66%
90- 180	14.676	1.34%
0- 180	1099.1	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

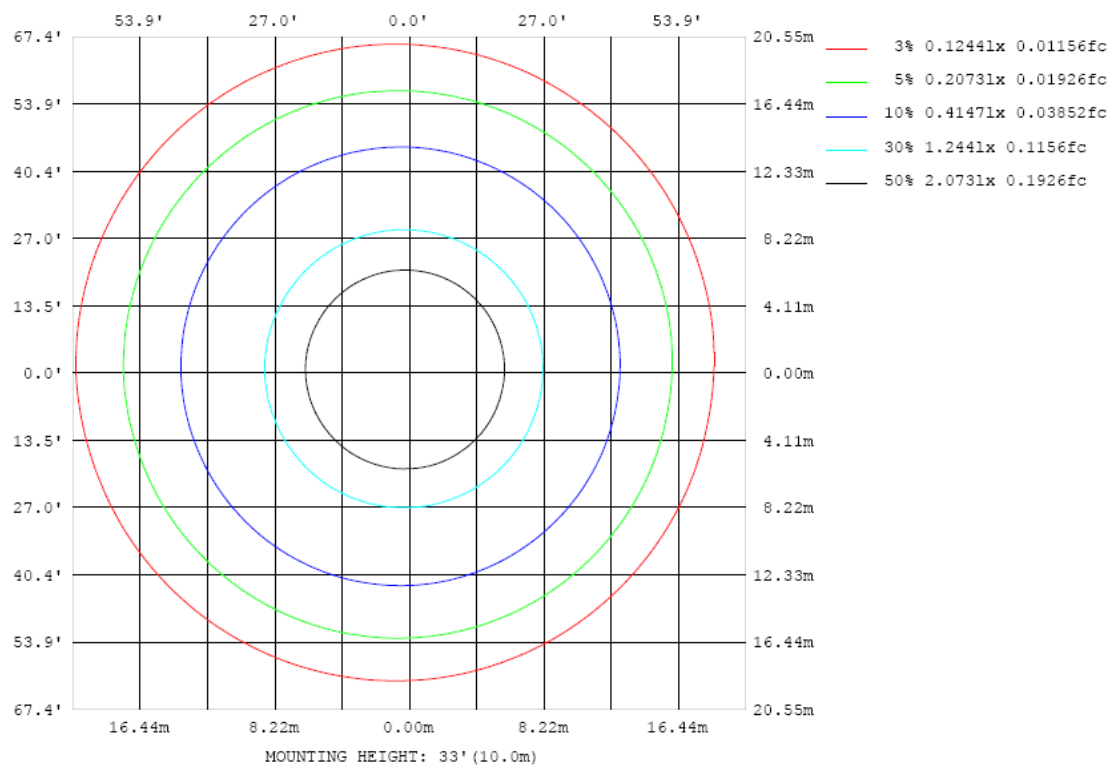


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

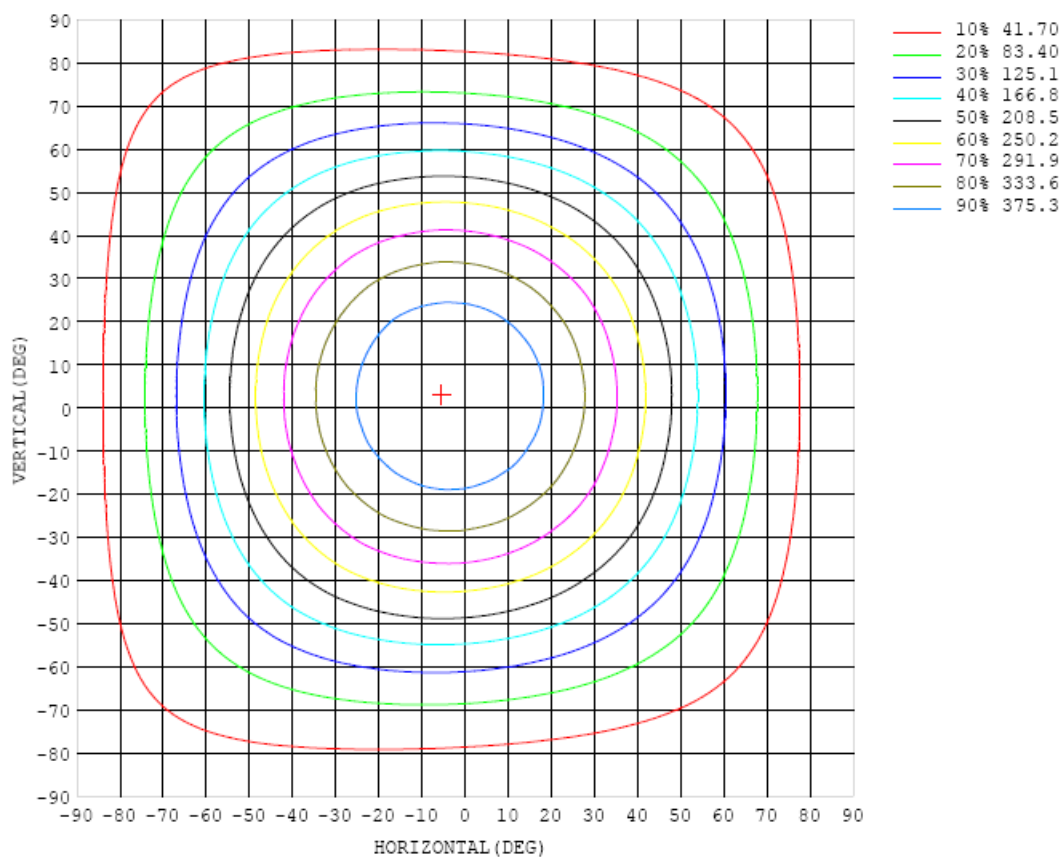


Chart 6: Isocandela Plot

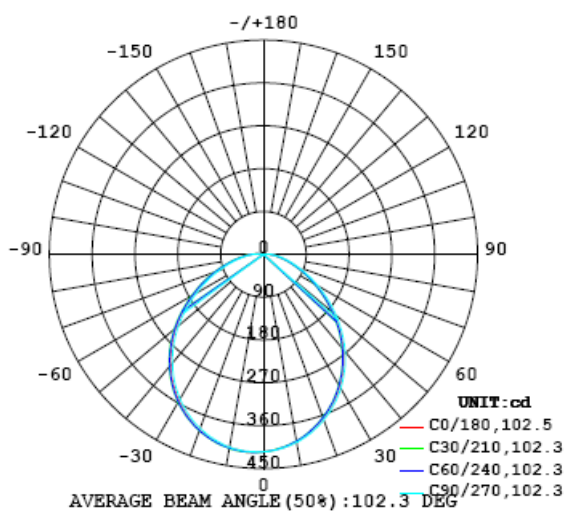


Chart 7: Polar Candela Distribution

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	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415
5	409	409	408	408	408	408	409	409	409	410	410	412	412	412	413	414	415	415	417
10	400	399	399	398	398	398	398	399	399	401	402	403	404	406	408	409	410	411	412
15	386	385	384	383	383	384	384	385	386	388	389	391	393	395	397	399	401	403	404
20	368	367	365	365	364	365	365	367	368	371	373	375	377	380	383	385	388	390	393
25	347	344	343	343	342	343	343	345	347	349	352	355	358	361	364	367	371	374	376
30	321	319	317	317	316	317	318	320	322	325	328	331	335	339	342	346	349	353	355
35	293	290	289	288	288	288	290	292	294	297	301	305	308	313	316	320	324	329	331
40	262	259	257	257	256	256	258	260	263	266	270	274	279	284	288	292	296	301	304
45	229	225	224	223	223	223	225	227	230	234	237	242	247	252	256	261	265	270	273
50	194	191	189	188	188	189	190	192	195	199	203	207	213	218	222	227	232	236	240
55	160	157	155	154	154	155	156	158	161	165	169	173	178	183	188	193	197	201	205
60	127	125	123	122	122	123	124	126	129	132	136	140	144	149	154	158	162	166	170
65	98.0	95.5	94.5	93.9	93.6	94.2	95.7	97.1	99.7	103	106	109	113	118	122	126	129	133	138
70	72.3	70.5	69.5	68.9	69.6	69.3	70.5	71.8	73.9	76.1	79.0	82.3	85.5	89.4	93.0	96.5	99.5	103	107
75	51.0	50.0	49.4	49.0	48.8	49.4	50.3	51.4	53.0	54.9	57.2	59.7	62.5	65.3	68.2	70.9	73.5	76.2	79.6
80	34.2	33.4	32.8	32.6	32.6	32.9	33.7	34.5	35.9	37.3	39.0	41.1	43.3	45.8	48.2	50.6	52.6	54.5	56.6
85	21.3	20.8	20.4	20.2	20.3	20.5	21.1	21.7	22.7	23.7	25.0	26.5	28.2	30.1	32.0	33.6	35.3	36.6	38.3
90	12.1	11.8	11.5	11.4	11.4	11.6	12.0	12.4	13.1	13.9	14.8	15.8	17.0	18.3	19.7	20.9	22.1	23.0	24.3
95	6.11	5.93	5.79	5.74	5.69	5.86	6.02	6.33	6.69	7.18	7.67	8.37	9.14	10.0	10.9	11.8	12.5	13.1	14.0
100	2.75	2.67	2.59	2.55	2.54	2.56	2.63	2.73	2.89	3.11	3.41	3.76	4.20	4.68	5.24	5.76	6.25	6.64	7.17
105	1.22	1.20	1.19	1.16	1.14	1.11	1.10	1.09	1.11	1.18	1.29	1.44	1.65	1.88	2.15	2.41	2.68	2.88	3.21
110	0.56	0.56	0.56	0.55	0.53	0.50	0.47	0.44	0.43	0.43	0.46	0.52	0.61	0.71	0.84	0.96	1.08	1.19	1.34
115	0.21	0.22	0.22	0.22	0.21	0.19	0.17	0.16	0.15	0.14	0.14	0.17	0.20	0.25	0.31	0.37	0.44	0.49	0.56
120	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.14	0.13	0.13	0.13	0.12	0.13	0.14	0.15	0.16	0.19
125	0.18	0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.14	0.14
130	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.18	0.17	0.17	0.17
135	0.25	0.25	0.25	0.25	0.24	0.24	0.23	0.23	0.23	0.22	0.21	0.22	0.21	0.21	0.21	0.21	0.21	0.21	0.21
140	0.28	0.28	0.27	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.25	0.25	0.25	0.24	0.24	0.24	0.24	0.23	0.24
145	0.30	0.30	0.30	0.30	0.30	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.27	0.27	0.27	0.27	0.26	0.26	0.26
150	0.32	0.32	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.29	0.29	0.29	0.29	0.28	0.28
155	0.35	0.34	0.34	0.34	0.33	0.33	0.33	0.33	0.33	0.32	0.32	0.32	0.31	0.31	0.31	0.31	0.31	0.31	0.31
160	0.37	0.37	0.36	0.36	0.35	0.35	0.35	0.34	0.34	0.34	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.34
165	0.38	0.38	0.38	0.38	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.36	0.36	0.35	0.35	0.35	0.35	0.35	0.35
170	0.39	0.39	0.38	0.38	0.38	0.38	0.37	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.37
175	0.41	0.40	0.40	0.40	0.39	0.39	0.39	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.39
180	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40

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	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415	415		
5	416	417	417	416	416	416	416	416	415	415	414	413	412	411	411	410	410		
10	412	413	414	414	413	413	412	410	409	408	407	406	404	403	403	402	401		
15	405	406	406	407	407	405	405	404	402	401	399	397	395	392	391	389	387		
20	393	394	394	395	396	394	392	391	389	387	384	382	380	377	375	373	370		
25	378	378	379	379	380	378	376	375	372	369	367	364	360	357	354	351	349		
30	357	358	359	360	359	358	356	354	351	348	345	341	337	334	330	327	324		
35	334	335	335	335	336	334	332	330	327	323	319	315	311	307	303	299	296		
40	306	308	308	308	308	307	304	302	298	294	290	286	281	277	272	269	265		
45	276	278	278	278	278	276	273	271	267	263	258	254	249	244	240	236	232		
50	243	245	245	245	244	243	240	237	233	229	225	219	214	210	205	201	197		
55	208	209	210	210	209	207	205	202	198	194	189	184	179	175	170	166	163		
60	172	174	175	174	174	172	169	166	163	159	155	151	146	142	138	134	131		
65	140	141	142	141	141	139	137	134	130	126	123	118	114	111	107	104	101		
70	109	110	110	110	109	108	105	103	99.6	96.3	92.9	89.4	86.0	82.8	79.6	77.0	74.8		
75	80.8	81.7	82.2	81.9	81.1	79.7	77.8	75.6	73.1	70.4	67.5	64.6	61.8	59.2	56.8	54.6	52.9		
80	57.6	58.4	58.6	58.2	57.6	56.5	54.9	53.1	51.1	48.9	46.7	44.4	42.3	40.3	38.4	36.8	35.4		
85	39.0	39.6	39.8	39.4	38.8	38.0	36.7	35.4	33.8	32.2	30.5	28.9	27.2	25.8	24.4	23.2	22.3		
90	24.8	25.2	25.2	25.0	24.5	23.9	22.9	21.9	20.8	19.7	18.5	17.3	16.2	15.2	14.2	13.4	12.7		
95	14.4	14.7	14.7	14.5	14.1	13.6	12.9	12.3	11.5	10.7	9.96	9.20	8.50	7.88	7.32	6.87	6.47		
100	7.42	7.55	7.56	7.42	7.20	6.87	6.47	6.05	5.60	5.14	4.71	4.28	3.91	3.60	3.32	3.11	2.93		
105	3.37	3.43	3.42	3.32	3.18	3.00	2.78	2.55	2.32	2.09	1.89	1.71	1.56	1.45	1.37	1.32	1.27		
110	1.41	1.43	1.41	1.36	1.28	1.19	1.08	0.98	0.88	0.79	0.71	0.65	0.60	0.58	0.57	0.57	0.57		
115	0.60	0.61	0.60	0.57	0.53	0.49	0.43	0.38	0.33	0.28	0.25	0.22	0.20	0.19	0.19	0.19	0.20		
120	0.21	0.22	0.22	0.21	0.19	0.17	0.15	0.13	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.14		
125	0.13	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.15	0.16	0.15	0.17		
130	0.17	0.17	0.17	0.18	0.18	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.19	0.19	0.19	0.20		
135	0.21	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.23	0.24		
140	0.25	0.26	0.26	0.27	0.27	0.27	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.27	0.28		
145	0.29	0.30	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.30		
150	0.32	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.34	0.32		
155	0.33	0.38	0.38	0.39	0.39	0.39	0.39	0.38	0.38	0.38	0.37	0.37	0.37	0.37	0.37	0.36	0.35		
160	0.33	0.38	0.41	0.41	0.41	0.41	0.41	0.40	0.40	0.40	0.39	0.39	0.39	0.39	0.38	0.37	0.37		
165	0.35	0.35	0.41	0.43	0.43	0.43	0.43	0.42	0.42	0.41	0.41	0.40	0.40	0.40	0.39	0.38	0.38		
170	0.37	0.38	0.38	0.38	0.42	0.44	0.43	0.43	0.43	0.41	0.41	0.41	0.42	0.41	0.41	0.40	0.40		
175	0.39	0.40	0.40	0.41	0.42	0.42	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.43	0.42	0.41	0.41		
180	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40		

Table 7: Luminous Intensity Data

TEST RESULTS (3000K 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)	0.068	0.032
Power Factor	0.9751	0.9039
Test Power (W)	7.95	8.05
THD A%	18.73	18.04
Luminous Efficacy (lm/W)	144.6	142.6
Total Luminous Flux (lm)	1149.8	1148.2
Color Rendering Index (CRI)	84.1	
R9	13.2	
Correlated Color Temperature (CCT)(K)	3006	
Chromaticity Chroma x	0.4328	
Chromaticity Chroma y	0.3965	
Chromaticity Chroma u	0.2512	
Chromaticity Chroma v	0.3452	
Duv	-0.0025	
Chromaticity Chroma u'	0.2512	
Chromaticity Chroma v'	0.5177	

Special Color Rendering Indices	
R1	83.6
R2	93.7
R3	94.4
R4	82.1
R5	84.3
R6	92.5
R7	82
R8	60.5
R9	13.2
R10	85.7
R11	82.4
R12	77.4
R13	86.3
R14	97.7

Table 8: 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

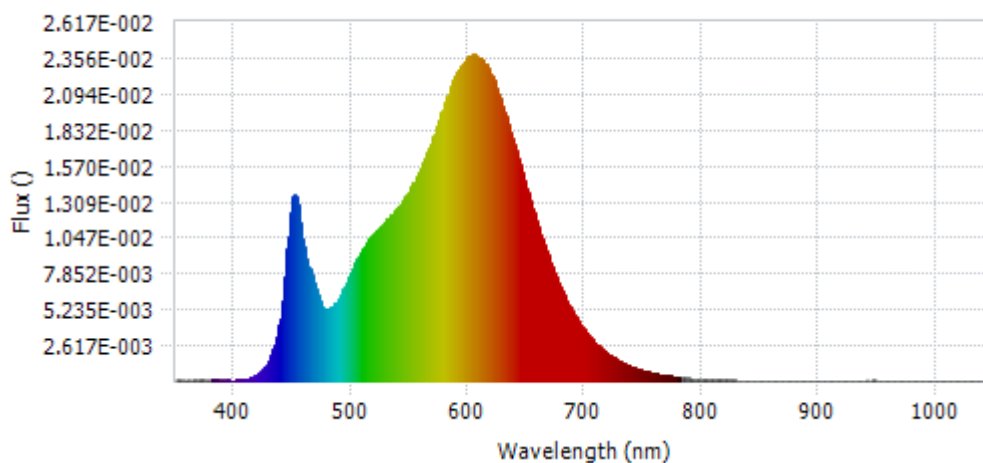
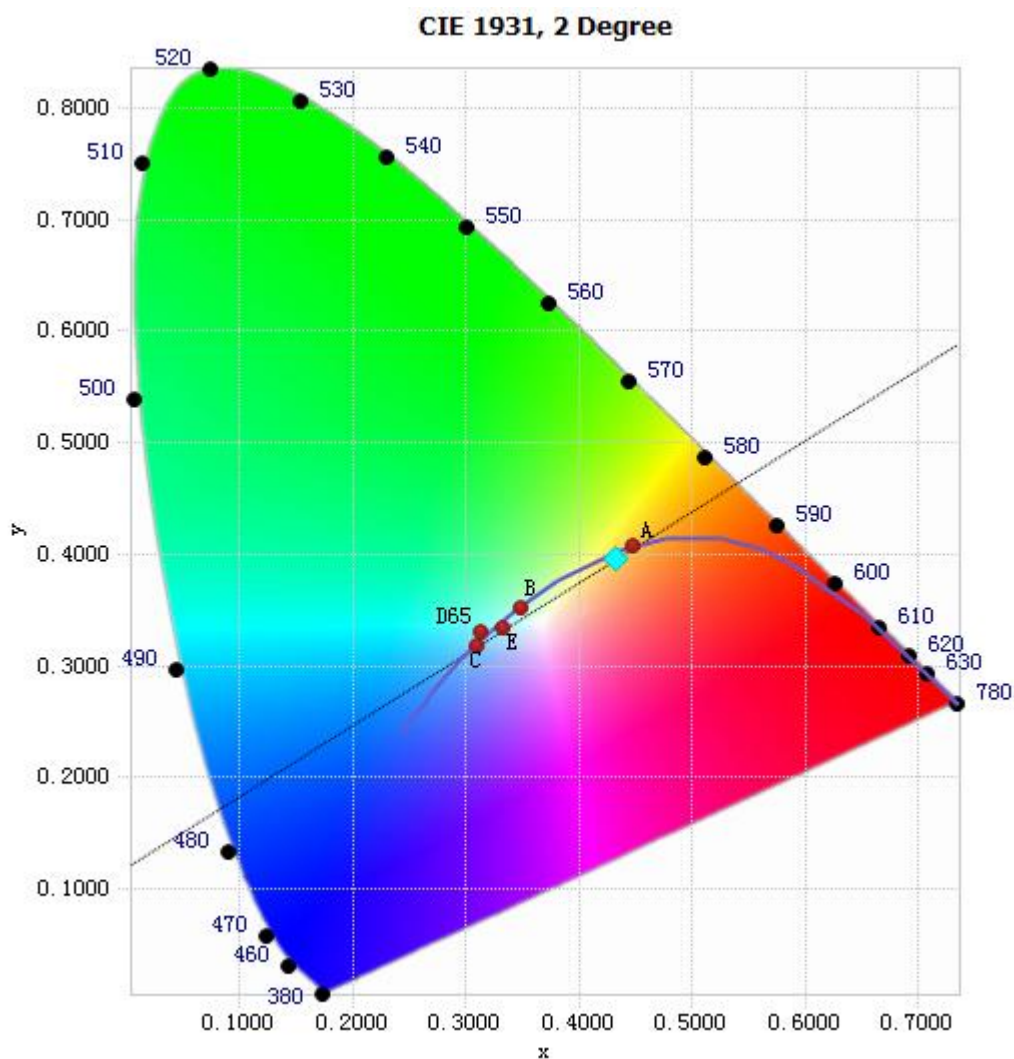


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	8.57E-05	485	5.57E-03	590	2.25E-02	695	4.29E-03
385	7.49E-05	490	6.17E-03	595	2.32E-02	700	3.67E-03
390	5.60E-05	495	7.01E-03	600	2.36E-02	705	3.14E-03
395	7.00E-05	500	8.01E-03	605	2.37E-02	710	2.68E-03
400	6.89E-05	505	8.91E-03	610	2.35E-02	715	2.29E-03
405	8.61E-05	510	9.65E-03	615	2.30E-02	720	1.97E-03
410	1.53E-04	515	1.03E-02	620	2.22E-02	725	1.69E-03
415	3.04E-04	520	1.08E-02	625	2.11E-02	730	1.42E-03
420	5.60E-04	525	1.13E-02	630	1.98E-02	735	1.22E-03
425	9.75E-04	530	1.18E-02	635	1.85E-02	740	1.04E-03
430	1.68E-03	535	1.22E-02	640	1.71E-02	745	8.91E-04
435	2.89E-03	540	1.27E-02	645	1.56E-02	750	7.59E-04
440	5.22E-03	545	1.33E-02	650	1.40E-02	755	6.43E-04
445	9.60E-03	550	1.39E-02	655	1.26E-02	760	5.50E-04
450	1.34E-02	555	1.47E-02	660	1.12E-02	765	4.71E-04
455	1.23E-02	560	1.56E-02	665	9.93E-03	770	4.01E-04
460	9.36E-03	565	1.67E-02	670	8.70E-03	775	3.45E-04
465	7.95E-03	570	1.78E-02	675	7.62E-03	780	2.98E-04
470	6.66E-03	575	1.90E-02	680	6.64E-03		
475	5.43E-03	580	2.03E-02	685	5.73E-03		
480	5.22E-03	585	2.15E-02	690	4.98E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4328, 0.3965)

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

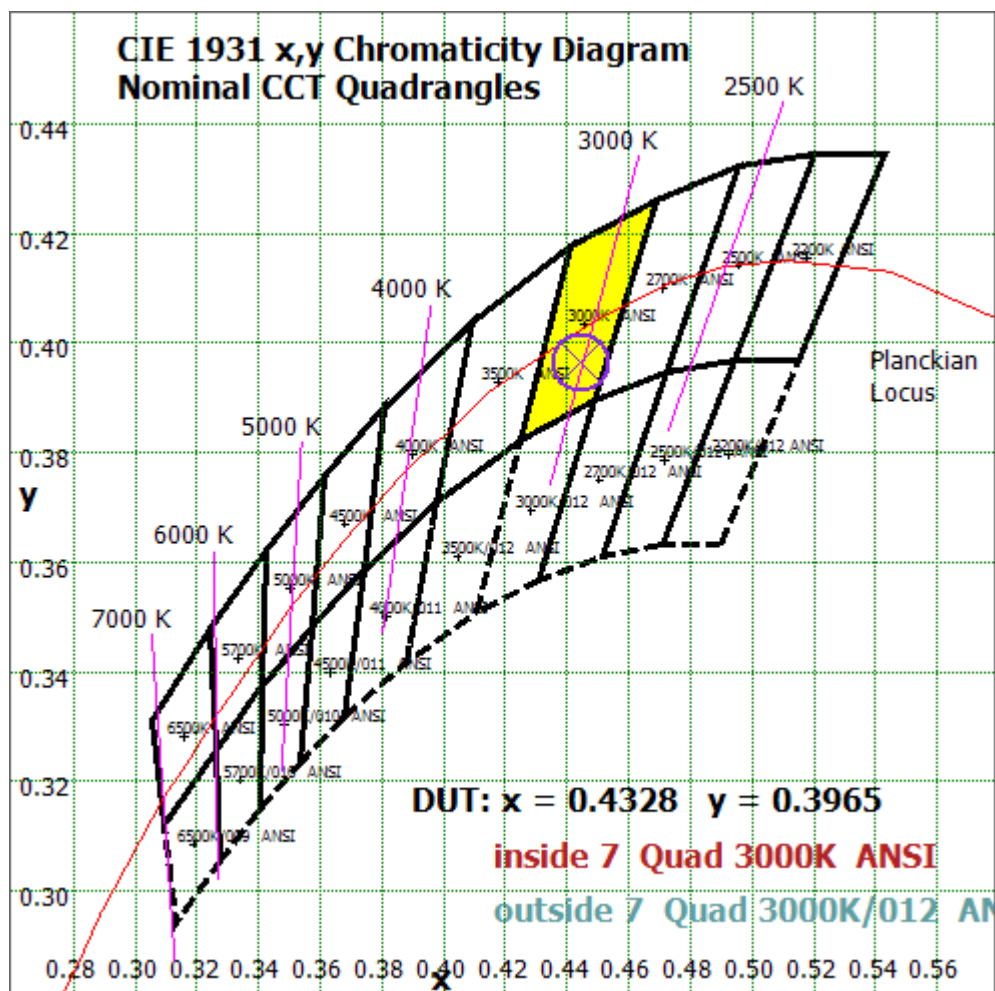


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

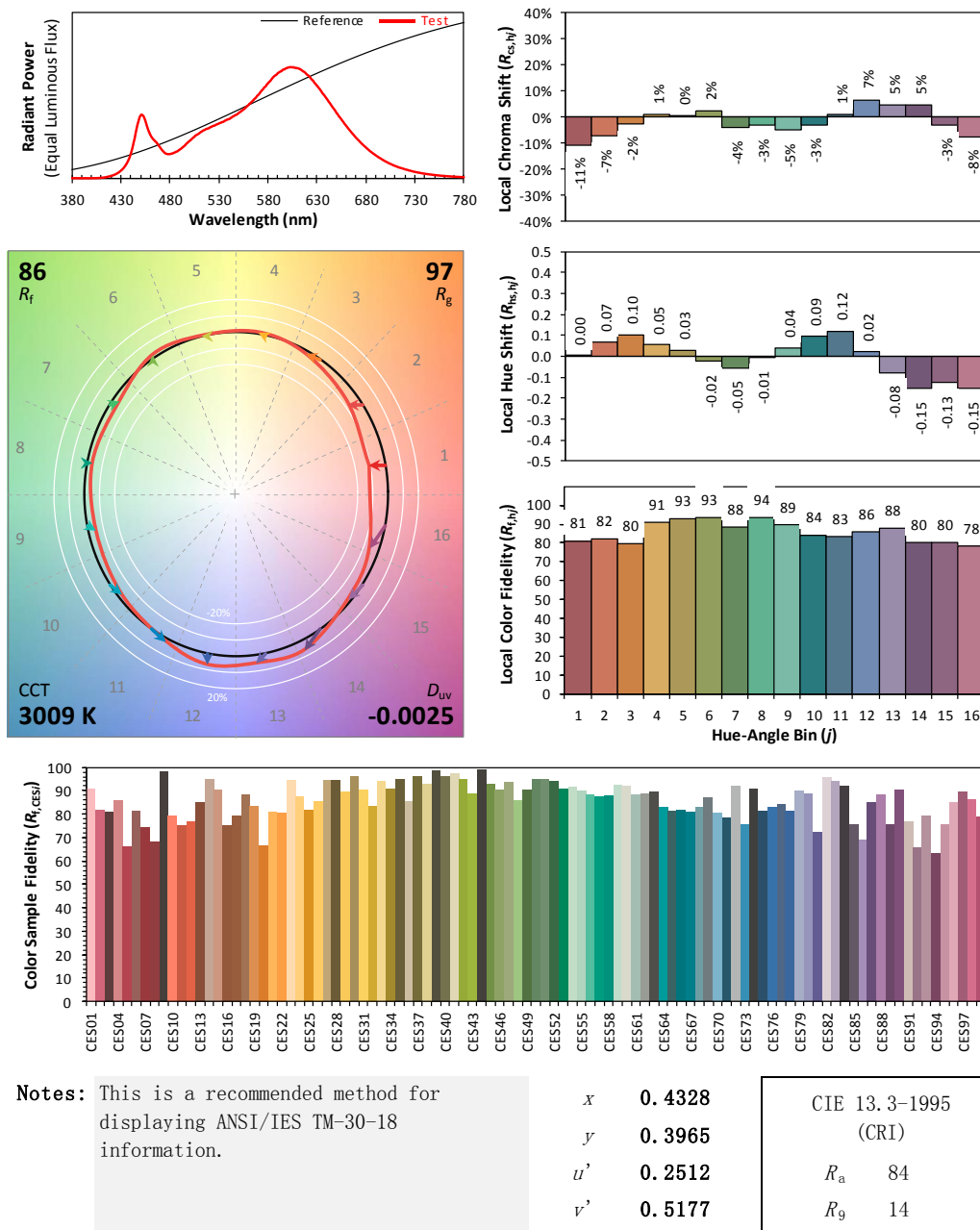
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/07/12

Model: 8PLV/8CCTS/HYBM



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 (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)	0.068	0.032
Power Factor	0.9750	0.9053
Test Power (W)	8.01	8.11
THD A%	18.95	17.82
Luminous Efficacy (lm/W)	151.4	149.1
Total Luminous Flux (lm)	1212.9	1208.8
Color Rendering Index (CRI)	84.8	
R9	15.2	
Correlated Color Temperature (CCT)(K)	3554	
Chromaticity Chroma x	0.4005	
Chromaticity Chroma y	0.3845	
Chromaticity Chroma u	0.2351	
Chromaticity Chroma v	0.3386	
Duv	-0.0017	
Chromaticity Chroma u'	0.2351	
Chromaticity Chroma v'	0.5079	

Special Color Rendering Indices	
R1	83.6
R2	91.3
R3	96.3
R4	83.9
R5	84.1
R6	88.6
R7	85.3
R8	65
R9	15.2
R10	79.7
R11	83.9
R12	72
R13	85.5
R14	98.3

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

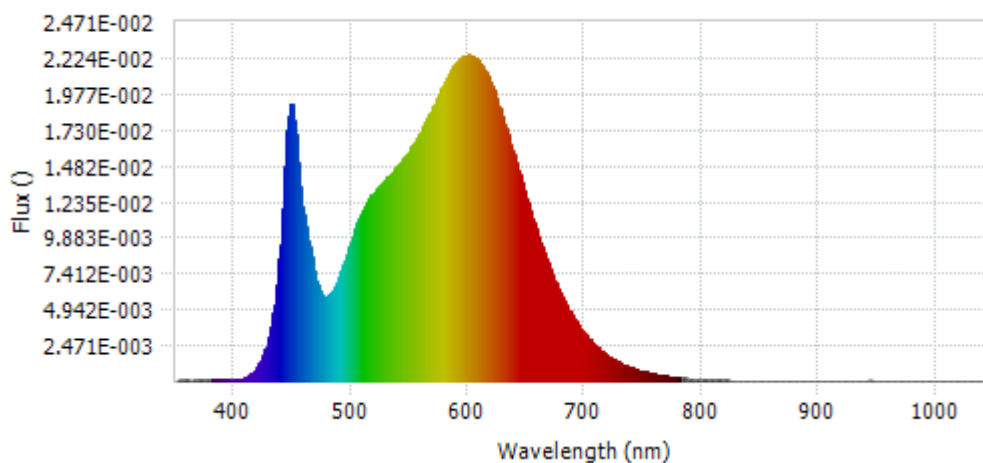
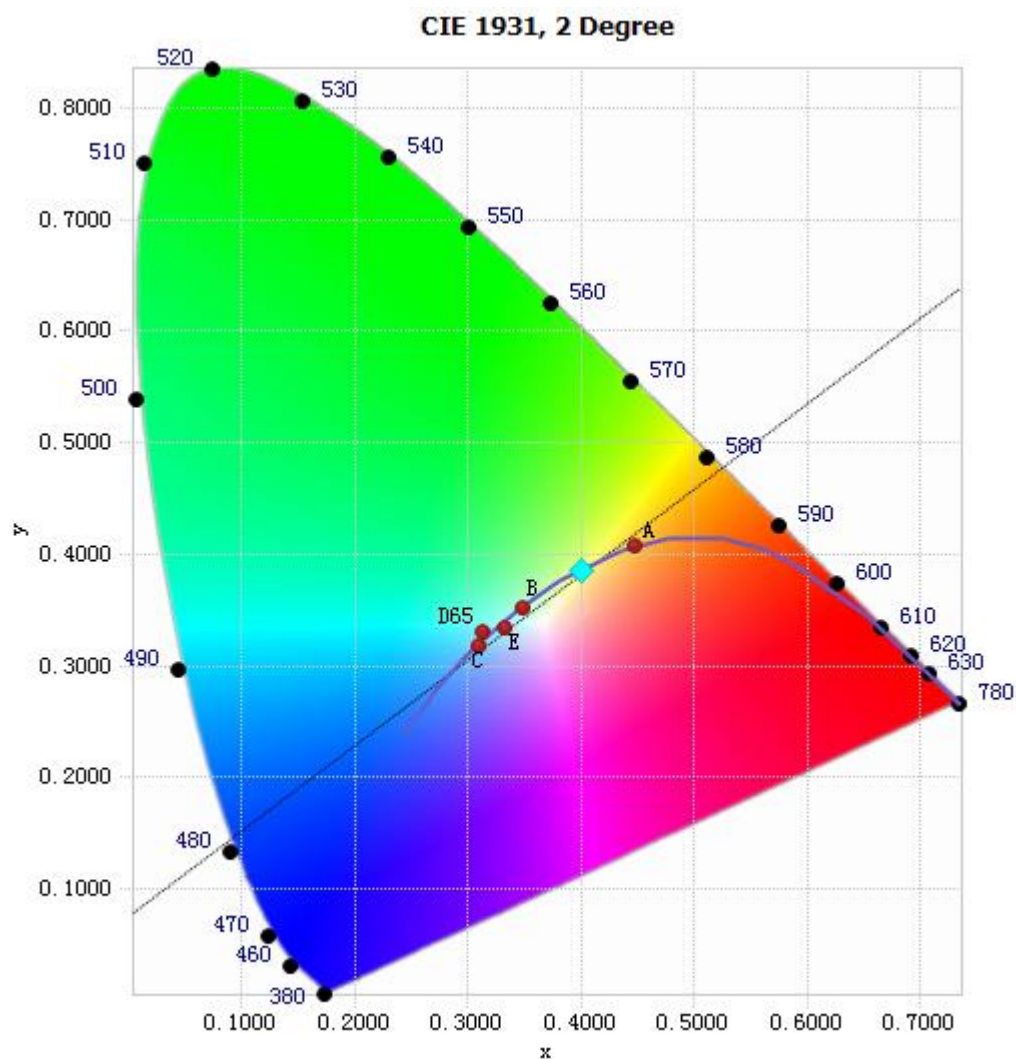


Chart 12: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	9.63E-05	485	6.36E-03	590	2.20E-02	695	3.77E-03
385	9.49E-05	490	7.29E-03	595	2.23E-02	700	3.23E-03
390	8.47E-05	495	8.52E-03	600	2.25E-02	705	2.76E-03
395	8.74E-05	500	9.79E-03	605	2.22E-02	710	2.35E-03
400	8.41E-05	505	1.09E-02	610	2.19E-02	715	2.01E-03
405	1.37E-04	510	1.18E-02	615	2.12E-02	720	1.72E-03
410	2.73E-04	515	1.25E-02	620	2.03E-02	725	1.48E-03
415	5.72E-04	520	1.30E-02	625	1.92E-02	730	1.26E-03
420	1.07E-03	525	1.35E-02	630	1.79E-02	735	1.07E-03
425	1.94E-03	530	1.40E-02	635	1.67E-02	740	9.08E-04
430	3.38E-03	535	1.44E-02	640	1.53E-02	745	7.81E-04
435	5.88E-03	540	1.49E-02	645	1.39E-02	750	6.60E-04
440	1.06E-02	545	1.54E-02	650	1.25E-02	755	5.72E-04
445	1.73E-02	550	1.59E-02	655	1.12E-02	760	4.87E-04
450	1.86E-02	555	1.66E-02	660	1.00E-02	765	4.09E-04
455	1.42E-02	560	1.73E-02	665	8.80E-03	770	3.54E-04
460	1.10E-02	565	1.81E-02	670	7.72E-03	775	3.06E-04
465	8.88E-03	570	1.89E-02	675	6.73E-03	780	2.60E-04
470	6.93E-03	575	1.98E-02	680	5.86E-03		
475	5.91E-03	580	2.06E-02	685	5.08E-03		
480	5.88E-03	585	2.14E-02	690	4.38E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4005, 0.3845)

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

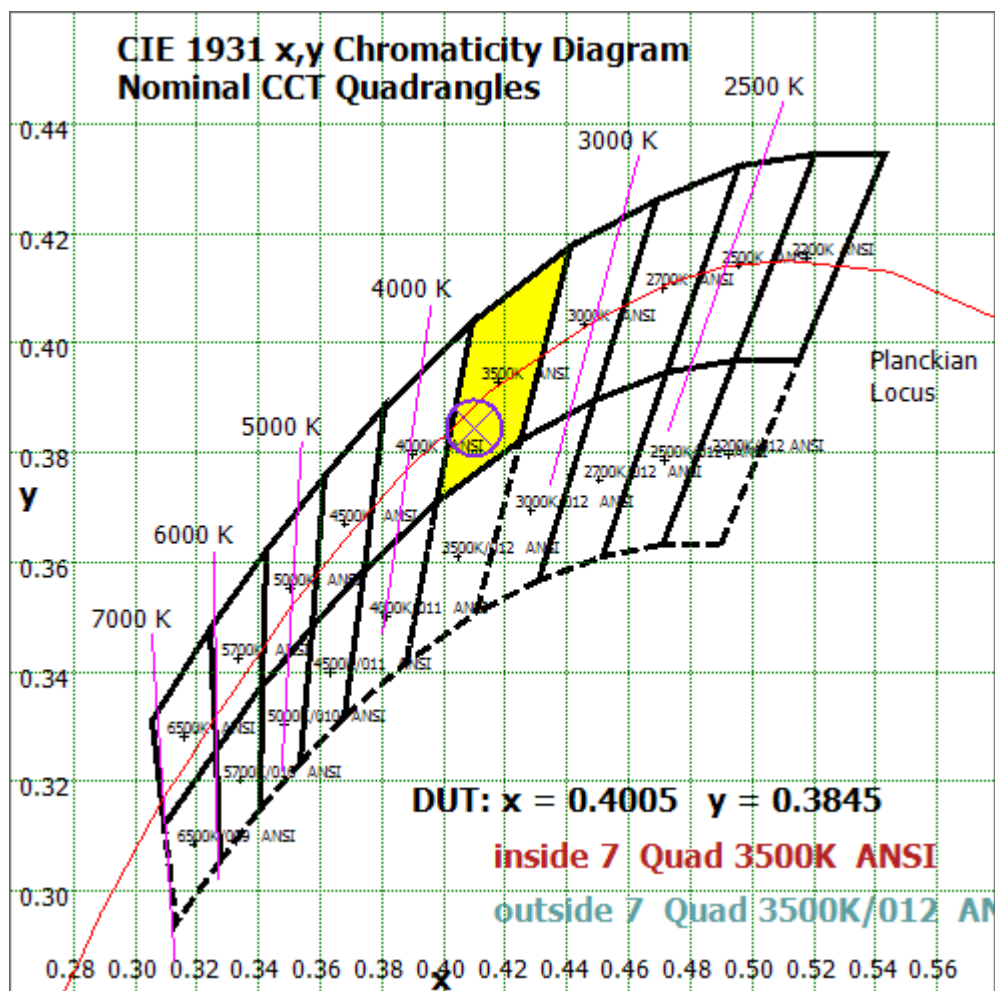


Chart14: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

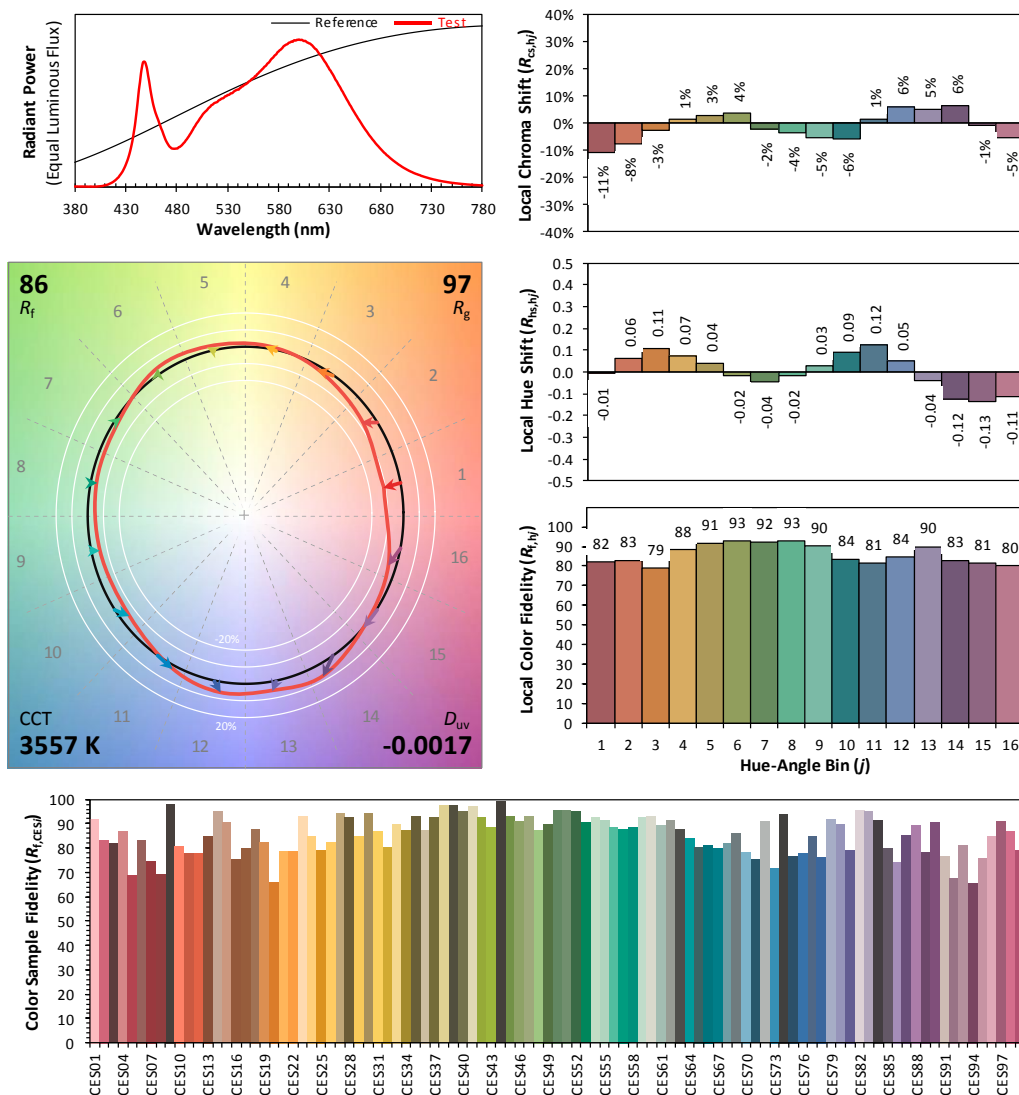
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/07/12

Model: 8PLV/8CCTS/HYBM



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

x 0.4005
 y 0.3845
 u' 0.2351
 v' 0.5079

CIE 13.3-1995
(CRI)

R_a 85
 R_g 15

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.

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)	0.070	0.033
Power Factor	0.9742	0.9078
Test Power (W)	8.15	8.25
THD A%	19.42	18.16
Luminous Efficacy (lm/W)	148.3	146.4
Total Luminous Flux (lm)	1208.4	1207.6
Color Rendering Index (CRI)	83.4	
R9	10.4	
Correlated Color Temperature (CCT)(K)	3988	
Chromaticity Chroma x	0.3811	
Chromaticity Chroma y	0.3778	
Chromaticity Chroma u	0.2251	
Chromaticity Chroma v	0.3348	
Duv	0.0003	
Chromaticity Chroma u'	0.2251	
Chromaticity Chroma v'	0.5021	

Special Color Rendering Indices	
R1	81.6
R2	88.5
R3	94.3
R4	83.4
R5	82.2
R6	84.7
R7	86.4
R8	65.7
R9	10.4
R10	73.4
R11	83
R12	66.7
R13	83.1
R14	96.9

Table 12: 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

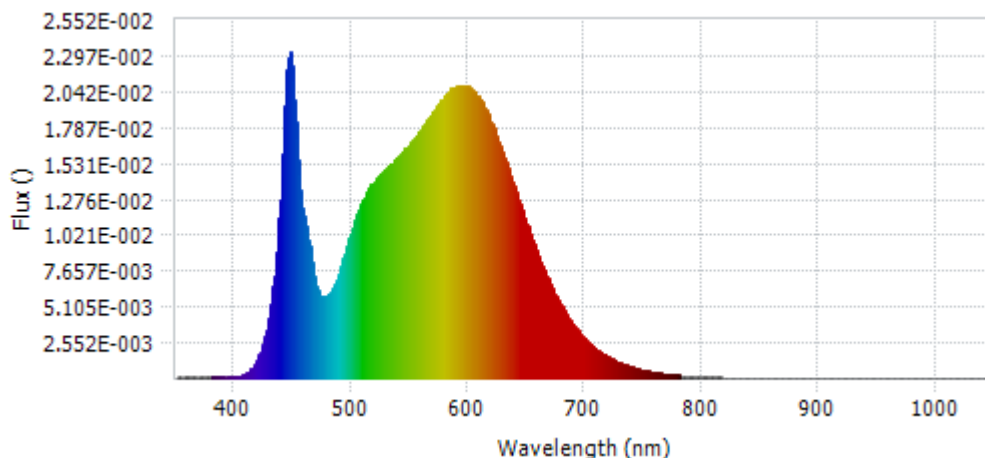


Chart16: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.03E-04	485	6.57E-03	590	2.08E-02	695	3.26E-03
385	9.23E-05	490	7.72E-03	595	2.09E-02	700	2.79E-03
390	8.76E-05	495	9.15E-03	600	2.08E-02	705	2.39E-03
395	9.42E-05	500	1.05E-02	605	2.04E-02	710	2.05E-03
400	9.47E-05	505	1.17E-02	610	1.99E-02	715	1.76E-03
405	1.73E-04	510	1.27E-02	615	1.91E-02	720	1.51E-03
410	3.85E-04	515	1.35E-02	620	1.81E-02	725	1.29E-03
415	7.87E-04	520	1.39E-02	625	1.71E-02	730	1.10E-03
420	1.49E-03	525	1.45E-02	630	1.59E-02	735	9.35E-04
425	2.77E-03	530	1.50E-02	635	1.47E-02	740	7.98E-04
430	4.73E-03	535	1.53E-02	640	1.34E-02	745	6.74E-04
435	8.07E-03	540	1.58E-02	645	1.22E-02	750	5.82E-04
440	1.43E-02	545	1.62E-02	650	1.10E-02	755	4.98E-04
445	2.20E-02	550	1.67E-02	655	9.80E-03	760	4.26E-04
450	2.11E-02	555	1.72E-02	660	8.71E-03	765	3.63E-04
455	1.44E-02	560	1.78E-02	665	7.66E-03	770	3.10E-04
460	1.12E-02	565	1.84E-02	670	6.71E-03	775	2.71E-04
465	8.84E-03	570	1.90E-02	675	5.86E-03	780	2.29E-04
470	6.52E-03	575	1.96E-02	680	5.08E-03		
475	5.74E-03	580	2.01E-02	685	4.40E-03		
480	5.97E-03	585	2.06E-02	690	3.81E-03		

Table 13: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method

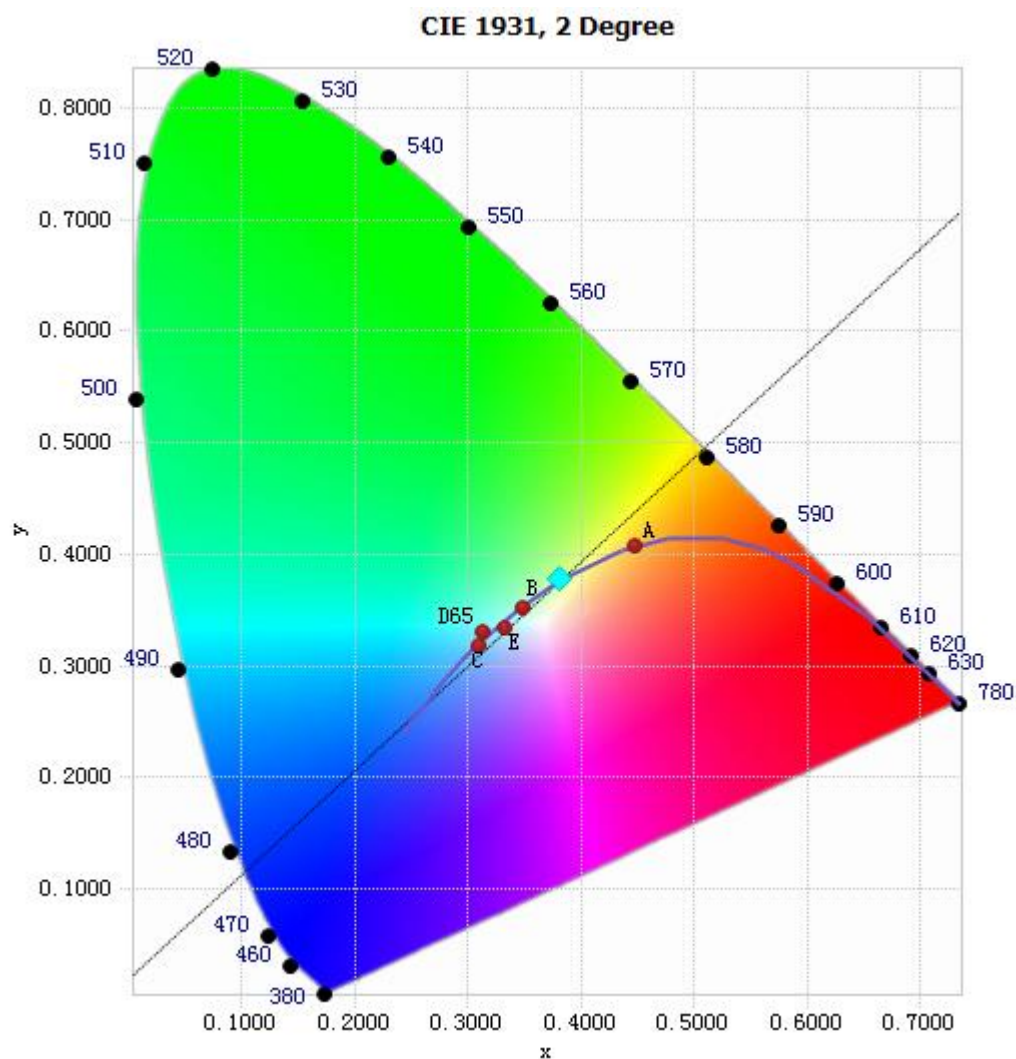


Chart 17: Chromaticity Diagram per Sphere - Spectroradiometer Method

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

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

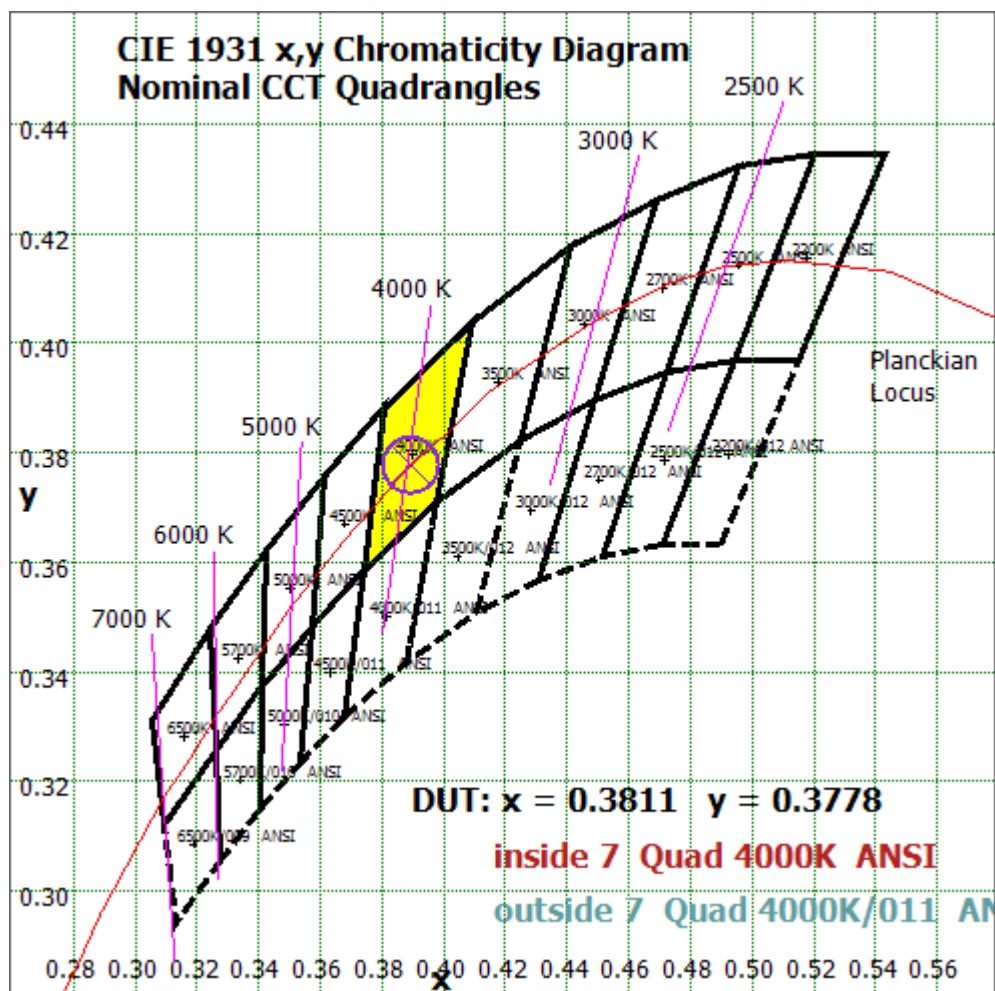


Chart 18: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

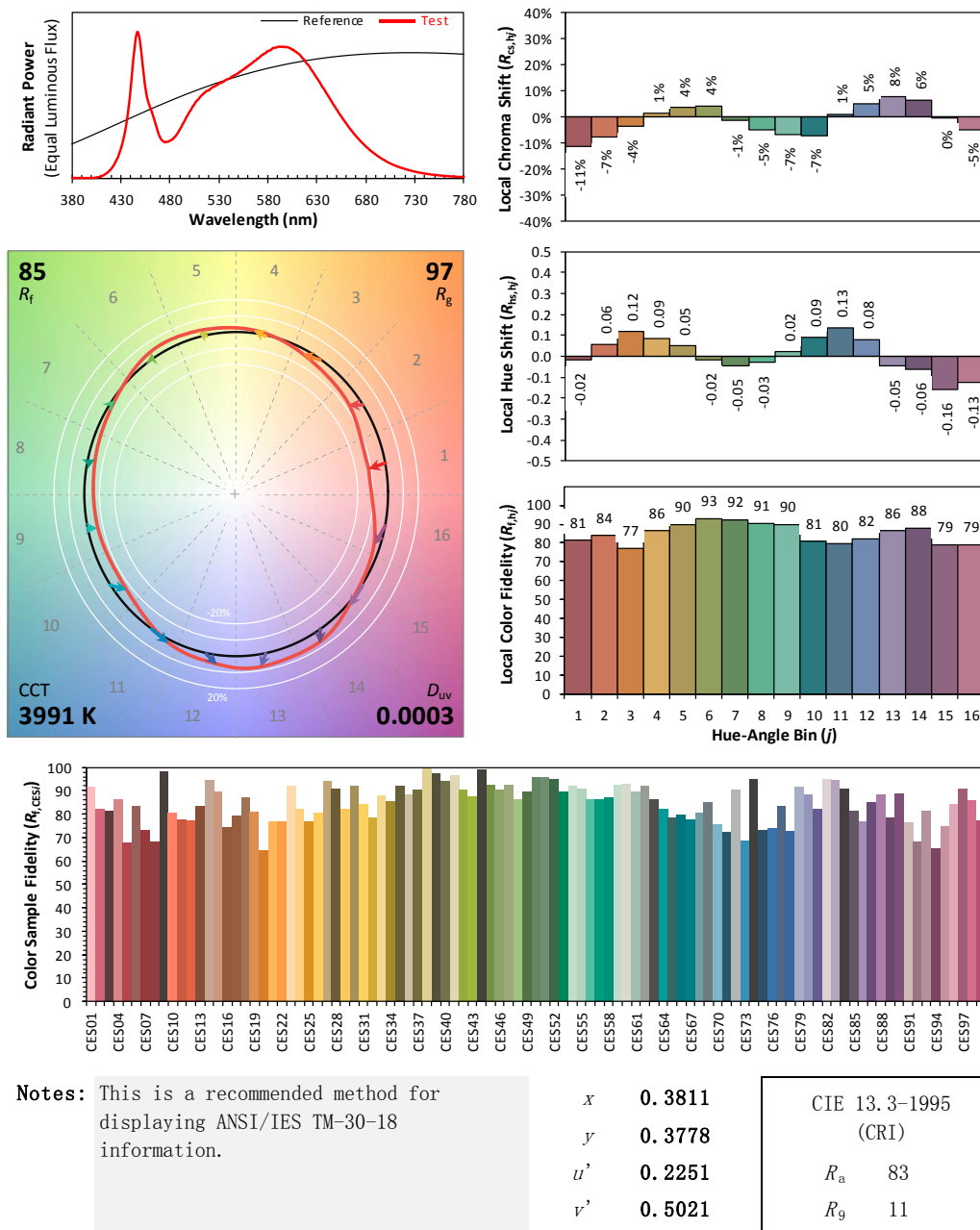
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/07/12

Model: 8PLV/8CCTS/HYBM



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

Chart 19: 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 12 due to rounding.

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 14: 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

Prepared by: Leading Testing Laboratories

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Hangzhou, Zhejiang Province, China 311100

Tel: +86 571 86376106 www.ltlqa.com

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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