



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: 9PAR30SNDIM/9CCTS/BAS

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ23110050h

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

Review by:

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Engineer: Wei Fei
Jan. 02, 2024

Manager: April Zou
Jan. 02, 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	9PAR30SNDIM/9CC	9PAR30SNDIM/9CC	9PAR30SNDIM/9CCT	9PAR30SNDIM/9CC
	TS/BAS 2700K 25° Setting	TS/BAS 2700K 40° Setting	S/BAS 5000K 25° Setting	TS/BAS 5000K 40° Setting
Luminous Efficacy (Lumens /Watt)	107.1	109.3	116.5	119.7
Total Luminous Flux (Lumens)	905.7	924.6	988.9	1016.3
Power (Watts)	8.46	8.46	8.49	8.49
Power Factor	0.9756	0.9755	0.9758	0.9758
CCT (K)	2732	2755	5191	5143
CRI	93.5	93.4	94.3	94.3
Stabilization Time (Light & Power)	50 mins	50 mins	50 mins	50 mins
Note	2700K	2700K	5000K	5000K

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Nov. 27, 2023

Date of Test : Nov. 30, 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

TABLE OF CONTENT

LM-79-19 TEST REPORT.....	1
TEST SUMMARY	2
SAMPLE PHOTO	5
TEST RESULTS of Model 9PAR30SNDIM/9CCTS/BAS (2700K 25 °Setting)	6
Sphere-Spectroradiometer Method.....	6
Spectral Power Distribution - Sphere Spectroradiometer Method	7
Chromaticity Diagram - Sphere Spectroradiometer Method.....	8
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	9
Color Rendition Report – Sphere Spectroradiometer Method	10
Goniophotometer Method	11
Zonal Lumen Tabulation- Goniophotometer Method	12
Illuminance Plots- Goniophotometer Method	13
Luminous Intensity Distribution Plots- Goniophotometer Method.....	14
Luminous Intensity Data- Goniophotometer Method	15
TEST RESULTS of Model 9PAR30SNDIM/9CCTS/BAS (2700K 40 °Setting)	17
Sphere-Spectroradiometer Method.....	17
Spectral Power Distribution - Sphere Spectroradiometer Method	18
Chromaticity Diagram - Sphere Spectroradiometer Method.....	19
Nominal CCT Quadrangles – Sphere Spectroradiometer Method	20
Color Rendition Report – Sphere Spectroradiometer Method	21
Goniophotometer Method	22
Zonal Lumen Tabulation- Goniophotometer Method	23
Illuminance Plots- Goniophotometer Method	24
Luminous Intensity Distribution Plots- Goniophotometer Method.....	25
Luminous Intensity Data- Goniophotometer Method	26
TEST RESULTS of Model 9PAR30SNDIM/9CCTS/BAS (5000K 25 °Setting)	28
Sphere-Spectroradiometer Method.....	28

Spectral Power Distribution - Sphere Spectroradiometer Method 29

Chromaticity Diagram - Sphere Spectroradiometer Method..... 30

Nominal CCT Quadrangles – Sphere Spectroradiometer Method 31

Color Rendition Report – Sphere Spectroradiometer Method 32

TEST RESULTS of Model 9PAR30SNDIM/9CCTS/BAS (5000K 40 °Setting) 33

 Sphere-Spectroradiometer Method..... 33

 Spectral Power Distribution - Sphere Spectroradiometer Method 34

 Chromaticity Diagram - Sphere Spectroradiometer Method..... 35

 Nominal CCT Quadrangles – Sphere Spectroradiometer Method 36

 Color Rendition Report – Sphere Spectroradiometer Method 37

EQUIPMENT LIST 38

TEST METHODS 38

 Seasoning of SSL Product..... 38

 Sphere-Spectroradiometer Method- Photometric and Electrical Measurements..... 38

 Goniophotometer Method 39

 Photometric and Electrical Measurements 39

 Color Characteristics Measurements..... 39

SAMPLE PHOTO



Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Lamp
Model	: 9PAR30SNDIM/9CCTS/BAS
Electrical Ratings	: 120-277V, 60Hz, 9W
Product Description	: Color- Tunable 2700K/3000K/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 of Model 9PAR30SNDIM/9CCTS/BAS (2700K 25 °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
Voltage frequency (Hz)	60
Test Current (A)	0.072
Power Factor	0.9756
Test Power (W)	8.46
THD A%	12.75
Luminous Efficacy (lm/W)	107.1
Total Luminous Flux (lm)	905.7
Color Rendering Index (CRI)	93.5
R9	55.4
Correlated Color Temperature (CCT)(K)	2732
Chromaticity Chroma x	0.4573
Chromaticity Chroma y	0.4103
Chromaticity Chroma u	0.2610
Chromaticity Chroma v	0.3512
Duv	0.0001
Chromaticity Chroma u'	0.2610
Chromaticity Chroma v'	0.5268

Special Color Rendering Indices	
R1	97.2
R2	98.9
R3	94.8
R4	98.1
R5	98.6
R6	92.8
R7	88.9
R8	78.6
R9	55.4
R10	97.2
R11	95.7
R12	90
R13	99
R14	97.8

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

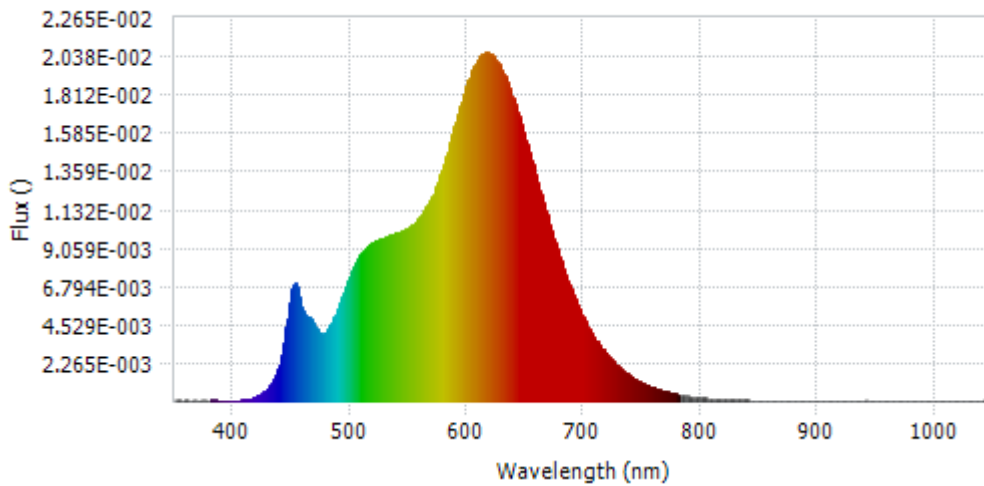
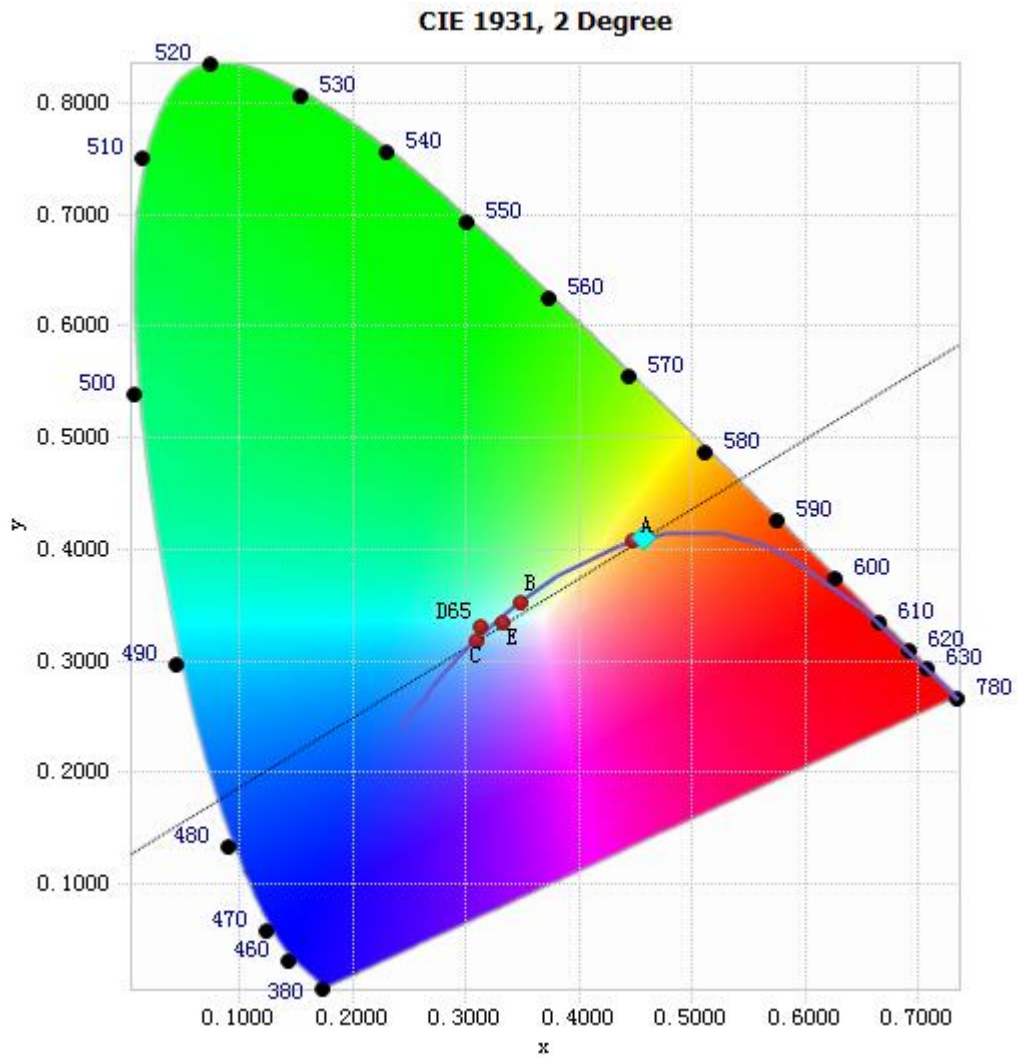


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	3.57E-05	485	4.84E-03	590	1.65E-02	695	5.60E-03
385	6.24E-05	490	5.63E-03	595	1.77E-02	700	4.86E-03
390	5.74E-05	495	6.59E-03	600	1.88E-02	705	4.18E-03
395	3.80E-05	500	7.53E-03	605	1.96E-02	710	3.60E-03
400	5.37E-05	505	8.24E-03	610	2.03E-02	715	3.14E-03
405	5.45E-05	510	8.79E-03	615	2.06E-02	720	2.71E-03
410	1.06E-04	515	9.18E-03	620	2.05E-02	725	2.34E-03
415	1.79E-04	520	9.36E-03	625	2.01E-02	730	1.99E-03
420	3.13E-04	525	9.57E-03	630	1.95E-02	735	1.70E-03
425	4.97E-04	530	9.73E-03	635	1.87E-02	740	1.45E-03
430	8.32E-04	535	9.80E-03	640	1.78E-02	745	1.25E-03
435	1.40E-03	540	9.93E-03	645	1.66E-02	750	1.06E-03
440	2.41E-03	545	1.01E-02	650	1.54E-02	755	9.13E-04
445	4.37E-03	550	1.02E-02	655	1.42E-02	760	7.78E-04
450	6.60E-03	555	1.06E-02	660	1.30E-02	765	6.56E-04
455	6.50E-03	560	1.09E-02	665	1.18E-02	770	5.66E-04
460	5.25E-03	565	1.15E-02	670	1.05E-02	775	4.86E-04
465	4.89E-03	570	1.21E-02	675	9.37E-03	780	4.09E-04
470	4.42E-03	575	1.30E-02	680	8.30E-03		
475	3.94E-03	580	1.40E-02	685	7.31E-03		
480	4.19E-03	585	1.53E-02	690	6.42E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4573, 0.4103)

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

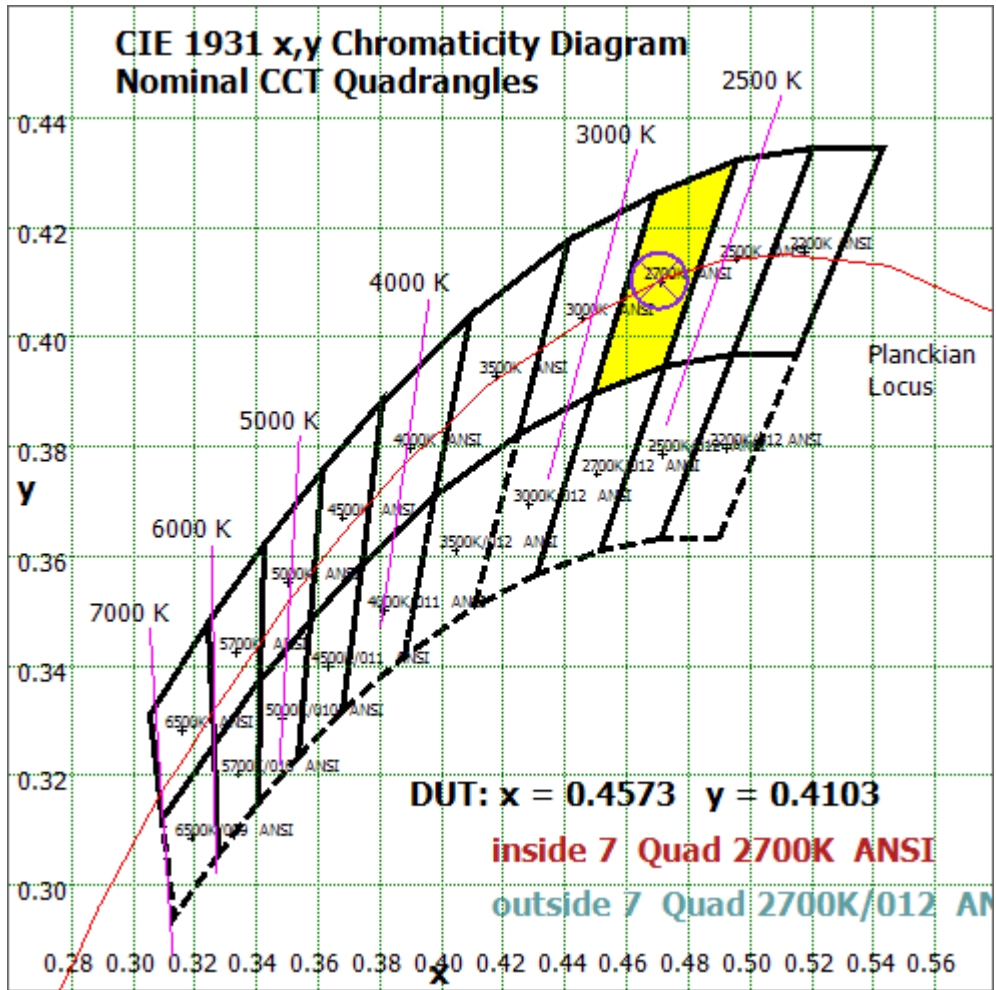


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

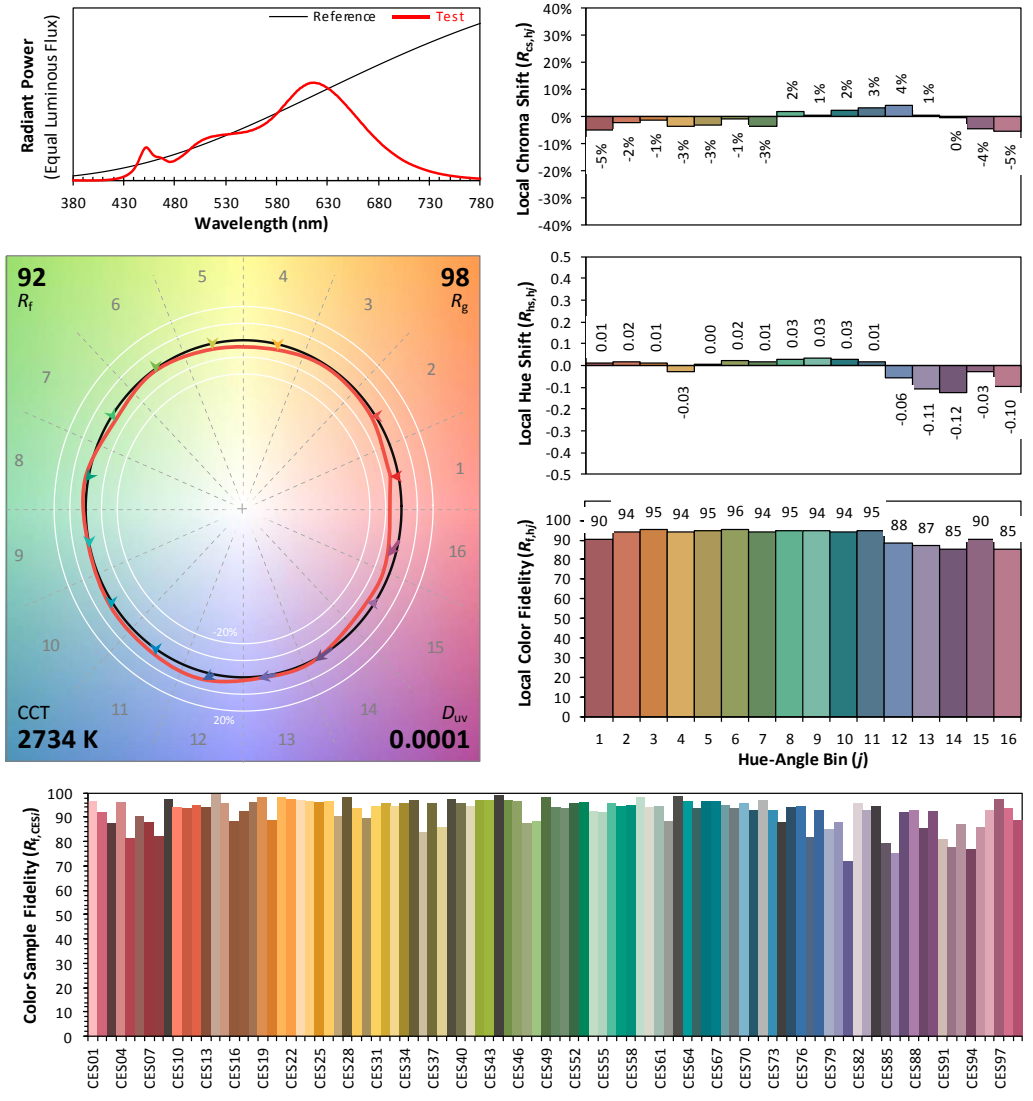
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/11/30

Model: 9PAR30SNDIM/9CCTS/BAS



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.	x	0.4573	CIE 13.3-1995 (CRI) R_a 94 R_g 56
	y	0.4103	
	u'	0.2610	
	v'	0.5268	

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 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)	0.073
Power Factor	0.9758
Power (W)	8.49
Luminous Efficacy (lm/W)	108.2
Total Luminous Flux (lm)	918.9
Beam Angle (°)	27.6 (0°-180°) / 27.2 (90°-270°)
Center Beam Candle Power (cd)	2727
Maximum Beam Candle Power (cd)	2727 (At: C=0.0, Gamma=0.0)
Spacing Criteria	0.47 (0°-180°) / 0.45 (90°-270°)
Zonal Lumens in the 0°-60° Zone	95.83%
Zonal Lumens in the 60°-90° Zone	4.00%
Zonal Lumens in the 90°-120° Zone	0.05%
Zonal Lumens in the 120°-180° Zone	0.12%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	217.931	23.72%
10- 20	326.035	35.48%
20- 30	169.689	18.47%
30- 40	85.29	9.28%
40- 50	48.84	5.32%
50- 60	32.834	3.57%
60- 70	21.658	2.36%
70- 80	11.481	1.25%
80- 90	3.659	0.40%
90-100	0.364	0.04%
100-110	0.029	0.00%
110-120	0.023	0.00%
120-130	0.039	0.00%
130-140	0.122	0.01%
140-150	0.252	0.03%
150-160	0.316	0.03%
160-170	0.247	0.03%
170-180	0.083	0.01%
Total	918.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	880.619	95.83%
60- 90	36.798	4.00%
0-90	917.417	99.84%
90- 180	1.475	0.16%
0- 180	918.9	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

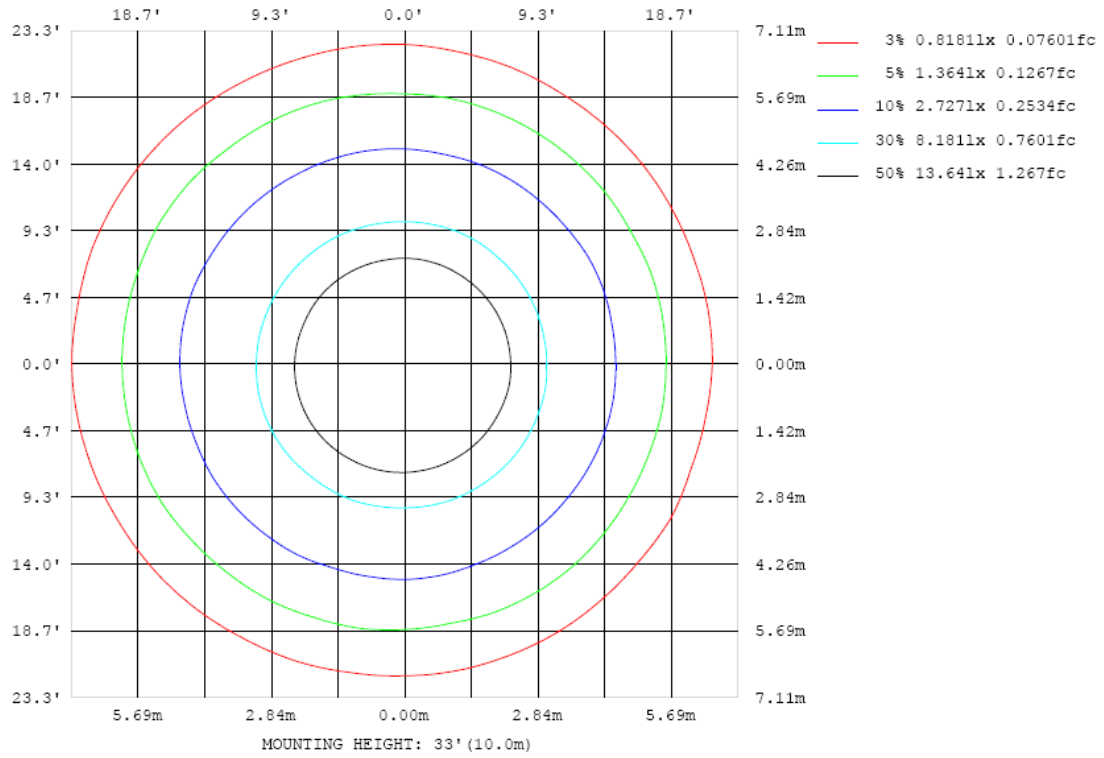


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

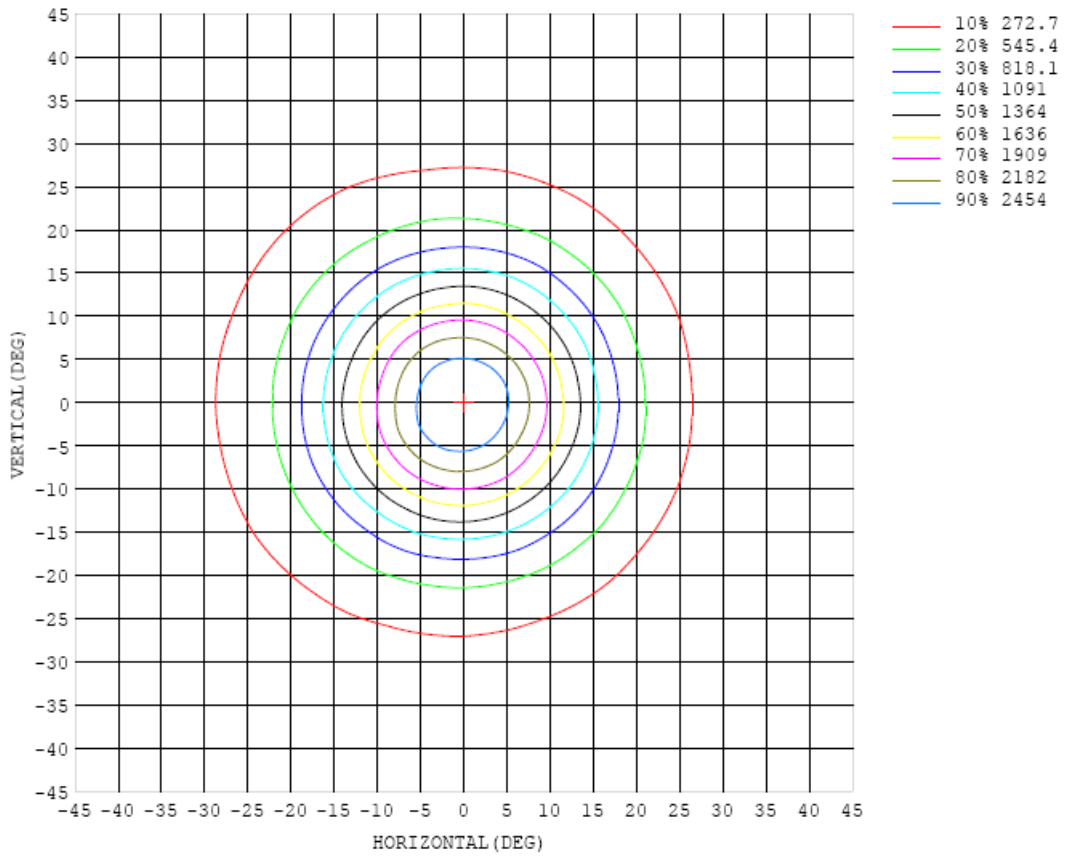


Chart 6: Isocandela Plot

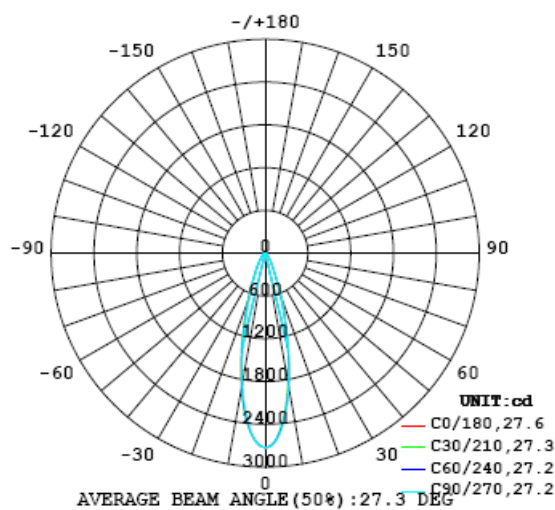


Chart 7: Polar Candela Distribution

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	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727
5	2476	2472	2477	2473	2478	2485	2491	2503	2509	2514	2524	2530	2535	2534	2533	2533	2520	2505	2495
10	1856	1865	1862	1863	1873	1883	1898	1904	1906	1914	1922	1928	1939	1944	1944	1943	1944	1928	1915
15	1160	1170	1167	1165	1174	1173	1177	1186	1190	1201	1212	1222	1227	1239	1248	1255	1258	1254	1245
20	625	627	632	636	633	634	640	642	641	649	657	671	683	685	694	700	710	708	704
25	324	328	327	325	324	327	328	333	343	350	350	353	368	374	383	388	388	393	397
30	187	187	183	187	188	191	193	195	192	197	204	206	213	218	224	233	237	238	240
35	120	117	119	118	118	120	122	121	124	126	127	131	133	138	143	146	150	153	156
40	78.3	78.0	78.1	79.1	79.3	79.0	79.8	80.8	81.6	81.7	84.4	85.7	88.3	90.4	92.7	95.9	97.9	100	102
45	56.7	56.5	56.6	55.8	56.9	56.9	57.0	57.2	57.7	59.0	59.4	60.9	62.1	63.8	65.2	66.0	67.4	67.8	70.6
50	43.7	43.4	43.4	43.3	43.6	43.7	44.0	44.1	44.3	44.8	45.7	46.1	46.9	47.9	48.7	49.1	50.2	51.3	52.1
55	34.5	34.5	34.5	34.6	34.6	34.9	35.1	35.2	35.3	35.6	35.7	36.0	36.6	37.3	37.9	38.2	38.7	39.1	39.5
60	27.1	27.1	27.2	27.1	27.2	27.3	27.5	27.7	27.9	28.0	28.1	28.4	28.9	29.2	29.7	30.0	30.2	30.3	30.5
65	20.7	20.6	20.6	20.6	20.7	20.9	21.1	21.2	21.4	21.4	21.6	21.8	22.0	22.4	22.7	22.9	23.1	23.2	23.4
70	15.0	15.0	15.0	15.0	15.1	15.2	15.3	15.5	15.6	15.7	15.9	16.2	16.3	16.5	16.6	16.8	17.0	17.1	17.2
75	10.2	10.2	10.1	10.1	10.2	10.3	10.4	10.5	10.6	10.6	10.9	11.1	11.2	11.3	11.3	11.5	11.6	11.7	11.7
80	6.06	6.05	6.01	6.01	6.11	6.23	6.33	6.35	6.36	6.42	6.59	6.75	6.85	6.86	6.87	7.01	7.09	7.17	7.15
85	2.93	2.94	2.93	2.93	2.97	3.02	3.05	3.05	3.06	3.09	3.20	3.28	3.32	3.32	3.33	3.37	3.45	3.52	3.57
90	1.03	1.01	0.99	0.99	1.01	1.04	1.05	1.06	1.06	1.09	1.13	1.17	1.19	1.19	1.18	1.19	1.22	1.24	1.26
95	0.18	0.17	0.16	0.15	0.14	0.15	0.15	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.21	0.21	0.21	0.21	0.22
100	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.03
105	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02
110	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
120	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
125	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.03	0.04
130	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.09
135	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.17
140	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.23	0.22	0.22	0.22	0.22	0.29
145	0.33	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.33	0.33	0.32	0.32	0.32	0.31	0.44
150	0.42	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.43	0.43	0.43	0.41	0.60
155	0.51	0.52	0.53	0.53	0.54	0.54	0.54	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.54	0.54	0.54	0.51	0.74
160	0.60	0.62	0.62	0.63	0.63	0.63	0.64	0.64	0.64	0.65	0.65	0.64	0.64	0.64	0.64	0.63	0.63	0.60	0.82
165	0.68	0.68	0.69	0.69	0.70	0.70	0.71	0.71	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.71	0.71	0.70	0.82
170	0.73	0.74	0.74	0.75	0.75	0.76	0.76	0.77	0.77	0.77	0.78	0.78	0.78	0.77	0.77	0.76	0.75	0.74	0.72
175	0.75	0.75	0.76	0.76	0.77	0.77	0.77	0.78	0.78	0.78	0.78	0.78	0.79	0.79	0.79	0.79	0.79	0.79	0.78
180	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

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	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727		
5	2490	2488	2487	2488	2485	2478	2474	2469	2465	2464	2464	2464	2468	2471	2475	2477	2477		
10	1905	1901	1900	1901	1891	1876	1861	1851	1845	1839	1833	1828	1827	1832	1836	1845	1848		
15	1233	1221	1210	1202	1190	1180	1168	1159	1153	1151	1152	1148	1143	1148	1151	1154	1153		
20	705	698	692	681	675	665	652	644	640	633	633	634	626	627	626	620	623		
25	397	394	384	377	370	362	358	353	347	339	337	334	329	327	333	332	325		
30	241	237	238	237	230	227	221	213	207	206	202	198	195	193	189	189	188		
35	154	156	154	151	148	144	141	137	136	131	129	126	124	122	122	120	120		
40	104	103	103	101	98.2	94.5	91.8	91.2	88.6	87.4	86.3	84.8	82.9	81.1	79.9	79.7	79.8		
45	71.6	72.3	71.7	70.7	68.3	66.1	64.0	62.5	62.3	61.4	59.7	58.6	57.7	57.0	56.8	56.7	56.8		
50	52.6	52.6	52.5	51.8	50.0	48.8	47.3	46.8	46.3	45.6	45.0	44.3	43.9	43.6	43.3	43.3	43.5		
55	39.8	40.1	40.0	39.4	38.8	37.8	37.0	36.6	36.0	35.7	35.1	34.7	34.5	34.3	34.3	34.2	34.3		
60	30.9	31.1	31.1	30.7	29.9	29.4	29.0	28.7	28.3	27.9	27.4	27.2	27.1	27.0	27.0	27.0	27.0		
65	23.6	23.7	23.6	23.3	22.9	22.5	22.1	21.8	21.5	21.3	21.0	20.8	20.7	20.5	20.5	20.5	20.6		
70	17.3	17.3	17.2	17.0	16.7	16.4	16.2	15.8	15.6	15.5	15.3	15.1	15.0	14.9	14.9	14.9	15.0		
75	11.7	11.7	11.6	11.5	11.3	11.1	10.8	10.6	10.4	10.4	10.3	10.1	9.97	9.86	9.90	9.95	10.0		
80	7.12	7.08	6.99	6.89	6.77	6.61	6.43	6.25	6.16	6.13	6.09	6.00	5.87	5.81	5.84	5.91	5.99		
85	3.57	3.55	3.50	3.44	3.36	3.25	3.14	3.03	2.98	2.97	2.96	2.91	2.85	2.80	2.81	2.85	2.91		
90	1.26	1.25	1.26	1.26	1.25	1.21	1.16	1.11	1.09	1.07	1.06	1.05	1.03	1.01	1.01	1.03	1.04		
95	0.22	0.23	0.24	0.25	0.25	0.25	0.25	0.24	0.24	0.24	0.24	0.23	0.22	0.21	0.21	0.20	0.19		
100	0.04	0.04	0.04	0.05	0.05	0.06	0.07	0.08	0.09	0.10	0.10	0.10	0.09	0.08	0.07	0.06	0.05		
105	0.02	0.02	0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.07	0.08	0.08	0.07	0.06	0.05	0.04	0.03		
110	0.01	0.01	0.01	0.01	0.02	0.03	0.05	0.06	0.07	0.07	0.08	0.07	0.07	0.06	0.05	0.04	0.03		
115	0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.06	0.06	0.05	0.04	0.03	0.02		
120	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.03	0.03	0.02		
125	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04		
130	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08		
135	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.17		
140	0.30	0.30	0.30	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.32	0.30		
145	0.47	0.47	0.47	0.48	0.48	0.48	0.48	0.48	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.50	0.47		
150	0.67	0.66	0.67	0.67	0.67	0.67	0.68	0.68	0.68	0.68	0.69	0.69	0.69	0.69	0.69	0.70	0.64		
155	0.86	0.85	0.86	0.86	0.86	0.86	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.89	0.78		
160	1.02	1.01	1.01	1.01	1.02	1.02	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01	1.00	1.02	0.86		
165	1.12	1.10	1.10	1.11	1.11	1.11	1.11	1.11	1.10	1.10	1.09	1.09	1.08	1.08	1.07	1.09	0.86		
170	1.09	1.07	1.08	1.09	1.10	1.10	1.10	1.10	1.09	1.09	1.09	1.09	1.08	1.08	1.08	1.06	0.77		
175	0.76	0.93	0.94	0.95	0.95	0.95	0.94	0.94	0.95	0.95	0.95	0.95	0.95	0.97	0.94	0.78	0.74		
180	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83		

Table 7: Luminous Intensity Data

TEST RESULTS of Model 9PAR30SNDIM/9CCTS/BAS (2700K 40 °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
Voltage frequency (Hz)	60
Test Current (A)	0.072
Power Factor	0.9755
Test Power (W)	8.46
THD A%	12.71
Luminous Efficacy (lm/W)	109.3
Total Luminous Flux (lm)	924.6
Color Rendering Index (CRI)	93.4
R9	55.6
Correlated Color Temperature (CCT)(K)	2755
Chromaticity Chroma x	0.4542
Chromaticity Chroma y	0.4076
Chromaticity Chroma u	0.2602
Chromaticity Chroma v	0.3502
Duv	-0.0006
Chromaticity Chroma u'	0.2602
Chromaticity Chroma v'	0.5253

Special Color Rendering Indices	
R1	97.3
R2	98.7
R3	94.6
R4	98
R5	98.6
R6	92.6
R7	88.7
R8	78.6
R9	55.6
R10	96.9
R11	95.9
R12	89.4
R13	99.1
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

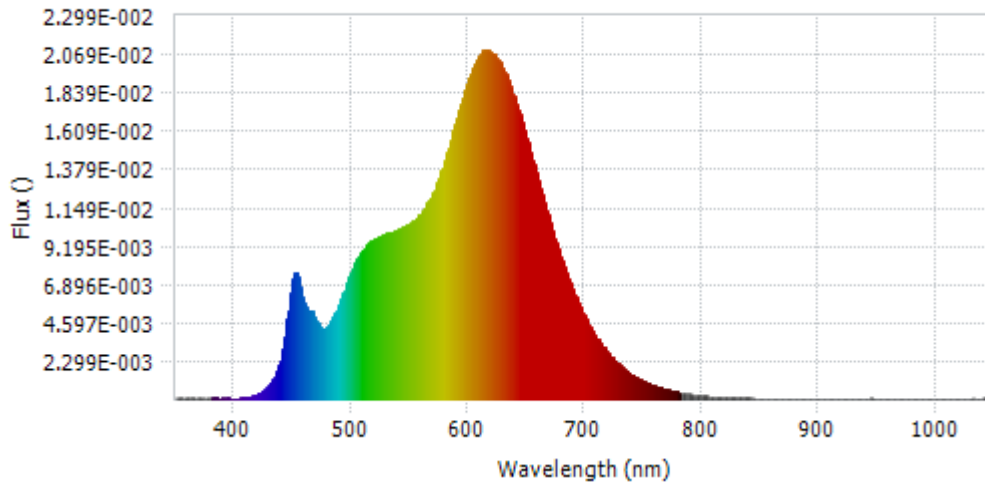
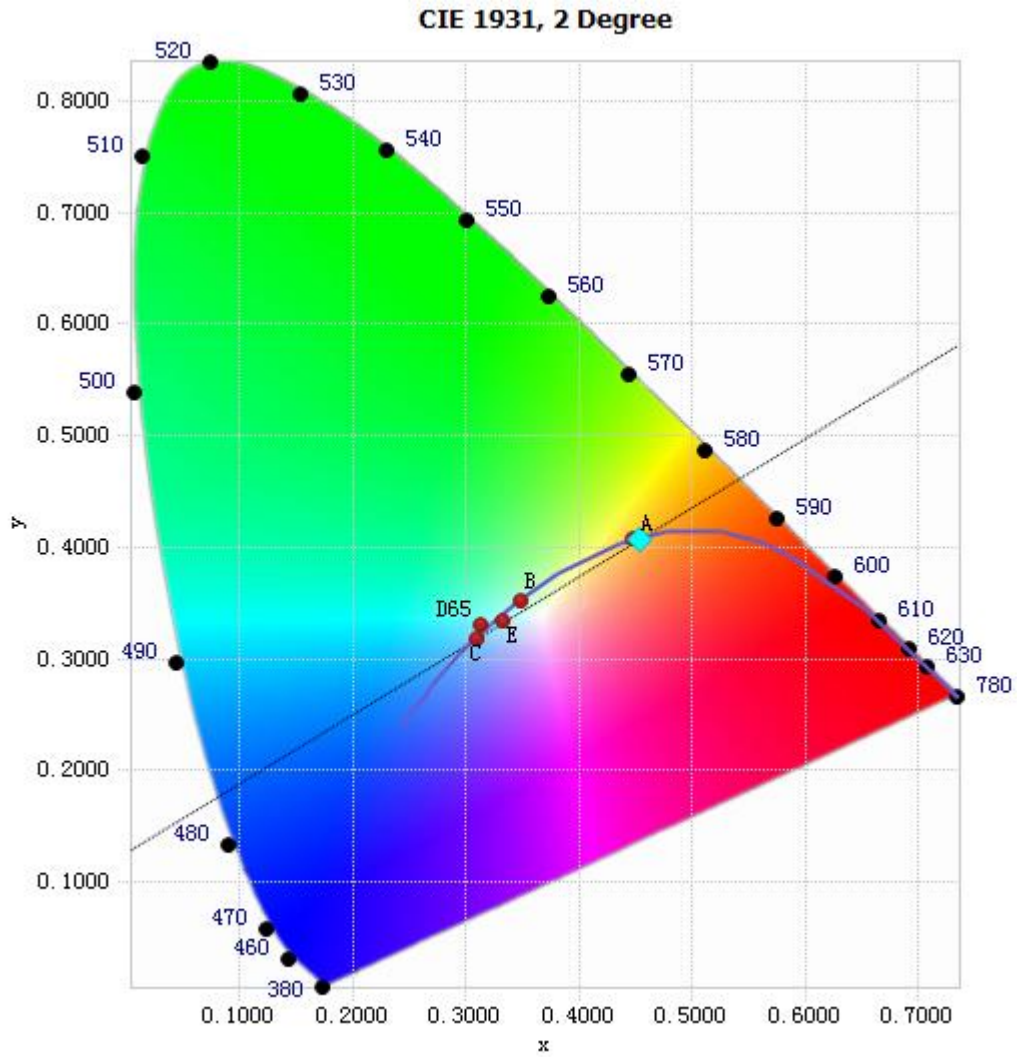


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	6.07E-05	485	5.02E-03	590	1.68E-02	695	5.63E-03
385	6.64E-05	490	5.81E-03	595	1.80E-02	700	4.89E-03
390	5.44E-05	495	6.77E-03	600	1.91E-02	705	4.23E-03
395	3.85E-05	500	7.71E-03	605	2.00E-02	710	3.65E-03
400	5.42E-05	505	8.43E-03	610	2.06E-02	715	3.16E-03
405	7.08E-05	510	8.92E-03	615	2.09E-02	720	2.72E-03
410	1.05E-04	515	9.41E-03	620	2.07E-02	725	2.34E-03
415	1.87E-04	520	9.57E-03	625	2.04E-02	730	2.02E-03
420	3.32E-04	525	9.78E-03	630	1.97E-02	735	1.73E-03
425	5.39E-04	530	9.94E-03	635	1.89E-02	740	1.47E-03
430	9.18E-04	535	1.00E-02	640	1.80E-02	745	1.26E-03
435	1.53E-03	540	1.02E-02	645	1.68E-02	750	1.08E-03
440	2.63E-03	545	1.03E-02	650	1.56E-02	755	9.19E-04
445	4.77E-03	550	1.05E-02	655	1.44E-02	760	7.83E-04
450	7.27E-03	555	1.08E-02	660	1.31E-02	765	6.70E-04
455	7.13E-03	560	1.12E-02	665	1.19E-02	770	5.71E-04
460	5.68E-03	565	1.17E-02	670	1.06E-02	775	4.87E-04
465	5.27E-03	570	1.24E-02	675	9.44E-03	780	4.11E-04
470	4.72E-03	575	1.33E-02	680	8.34E-03		
475	4.17E-03	580	1.43E-02	685	7.38E-03		
480	4.38E-03	585	1.56E-02	690	6.47E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4542, 0.4076)

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

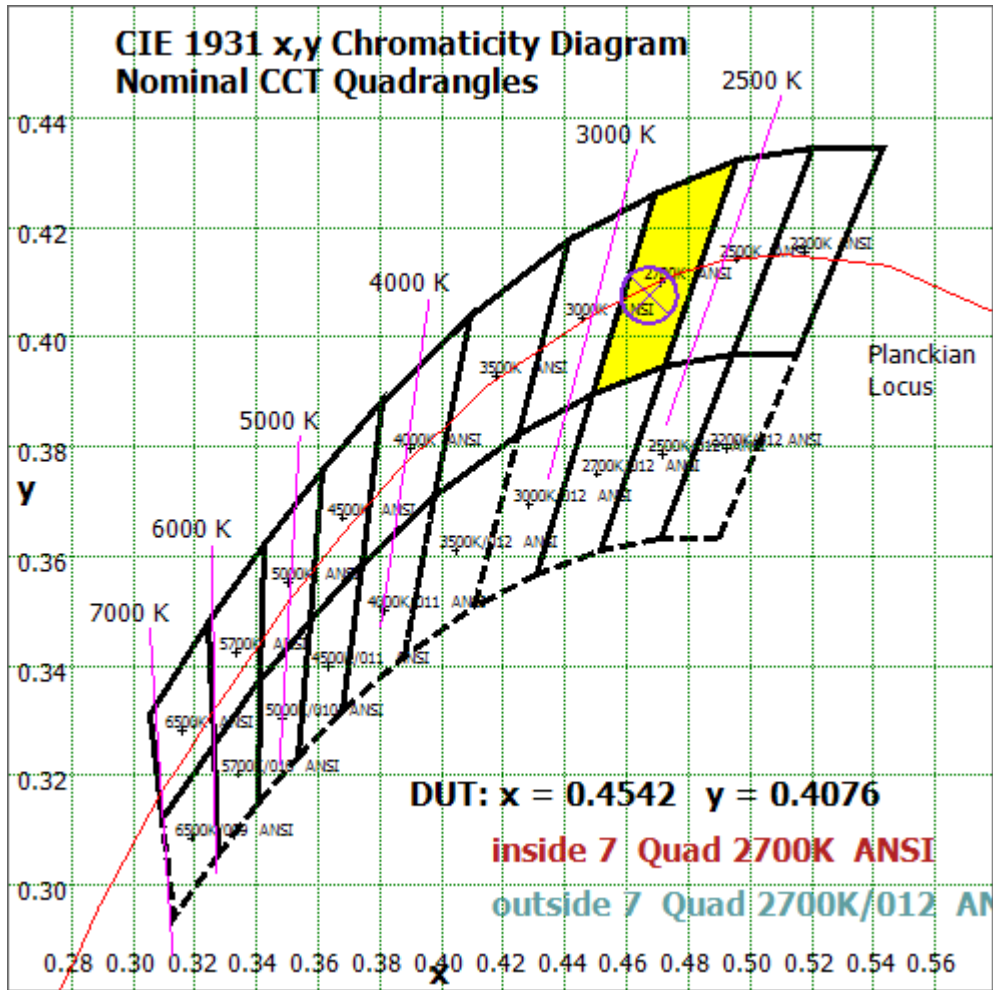


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

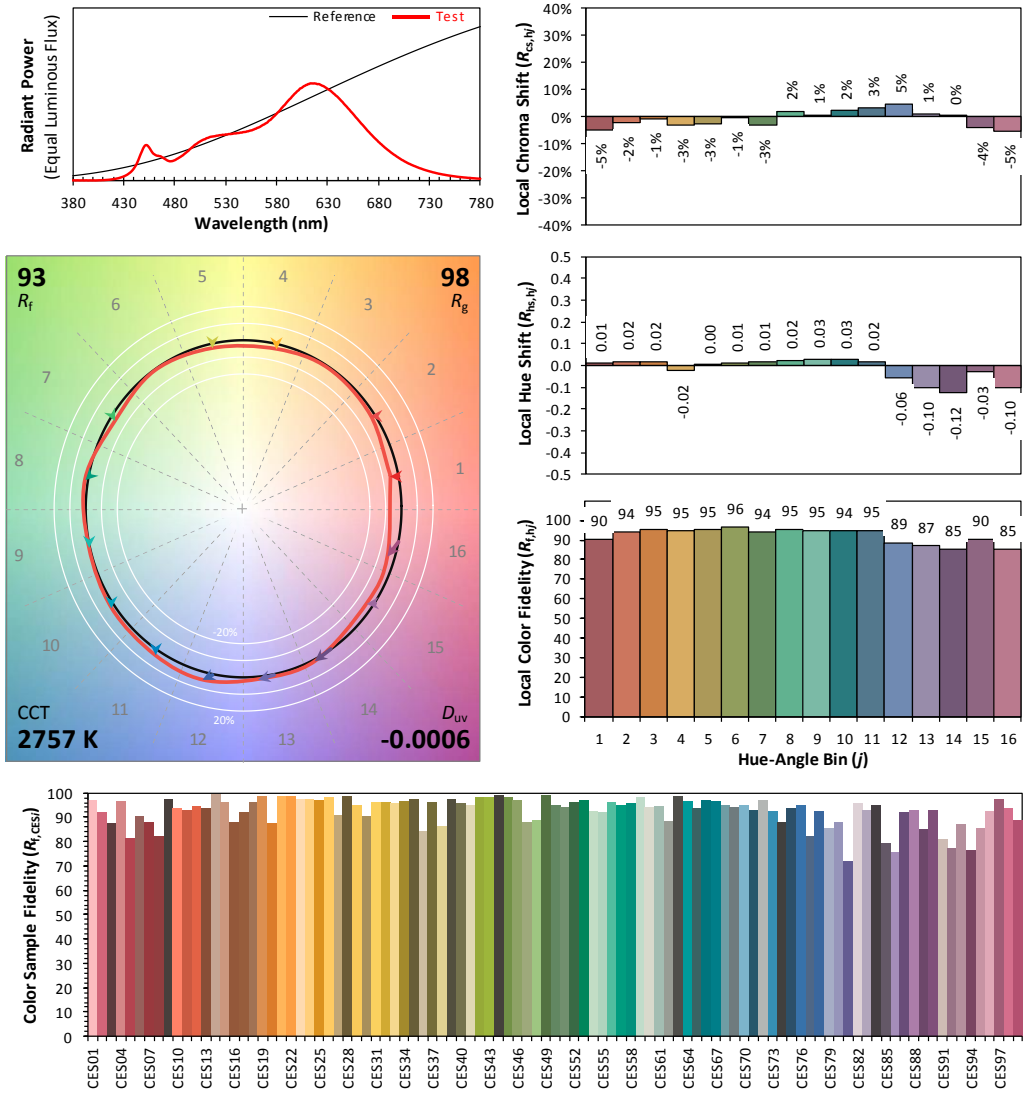
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/11/30

Model: 9PAR30SNDIM/9CCTS/BAS



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.	x	0.4542	CIE 13.3-1995 (CRI) R_a 93 R_g 56
	y	0.4076	
	u'	0.2602	
	v'	0.5253	

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.

Goniophotometer Method

Test ambient temperature was 24.9 °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)	0.072
Power Factor	0.9758
Power (W)	8.47
Luminous Efficacy (lm/W)	110.4
Total Luminous Flux (lm)	935.3
Beam Angle (°)	43.6 (0°-180°) / 42.8 (90°-270°)
Center Beam Candle Power (cd)	1236
Maximum Beam Candle Power (cd)	1237 (At: C=280.0, Gamma=1.0)
Spacing Criteria	0.60 (0°-180°) / 0.62 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	95.00%
Zonal Lumens in the 60 °-90 °Zone	4.83%
Zonal Lumens in the 90 °-120 °Zone	0.07%
Zonal Lumens in the 120 °-180 °Zone	0.11%

Table 10: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	110.142	11.78%
10- 20	248.045	26.52%
20- 30	223.355	23.88%
30- 40	150.618	16.10%
40- 50	99.461	10.63%
50- 60	56.873	6.08%
60- 70	28.484	3.05%
70- 80	12.641	1.35%
80- 90	4.047	0.43%
90-100	0.539	0.06%
100-110	0.038	0.00%
110-120	0.04	0.00%
120-130	0.076	0.01%
130-140	0.157	0.02%
140-150	0.238	0.03%
150-160	0.257	0.03%
160-170	0.193	0.02%
170-180	0.067	0.01%
Total	935.3	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	888.494	95.00%
60- 90	45.172	4.83%
0-90	933.666	99.83%
90- 180	1.605	0.17%
0- 180	935.3	100%

Table 11: Zonal Lumen

Illuminance Plots- Goniophotometer Method

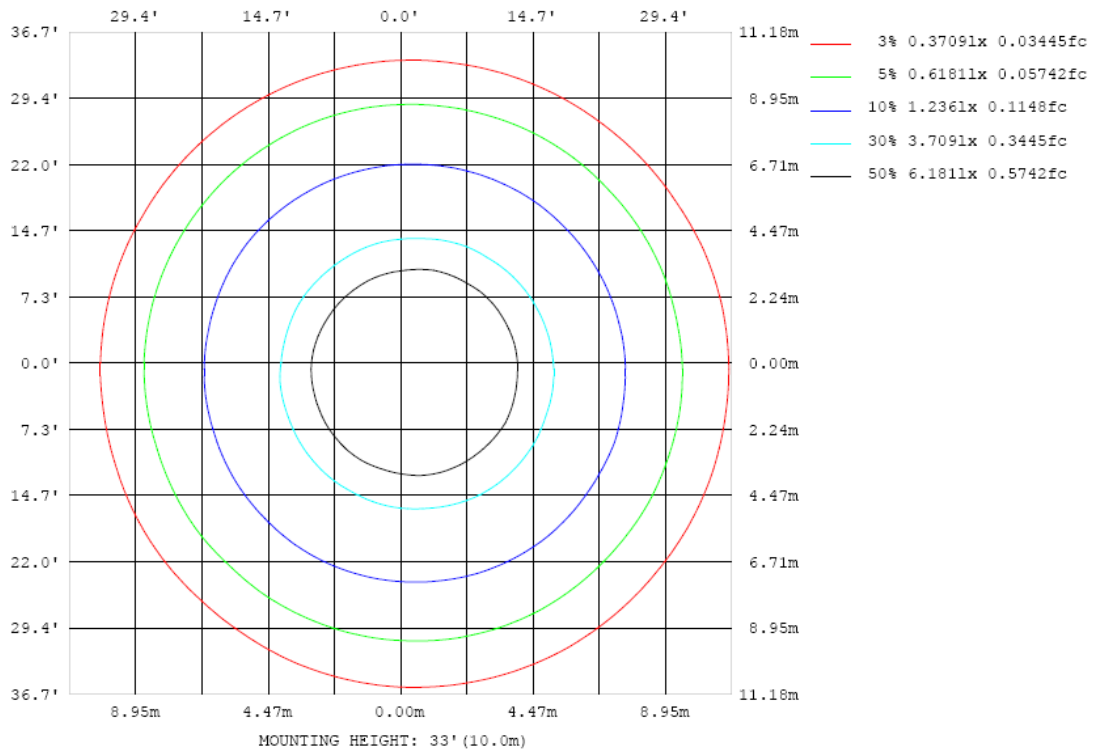


Chart 12: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

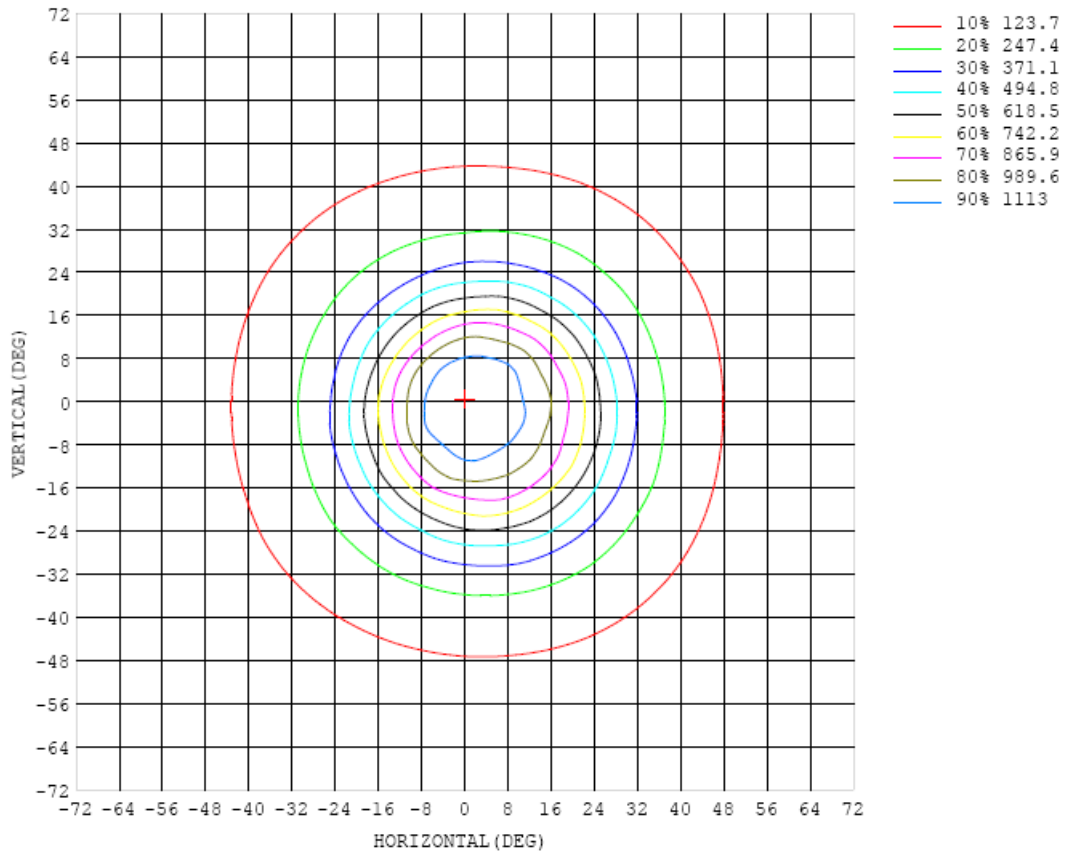


Chart 13: Isocandela Plot

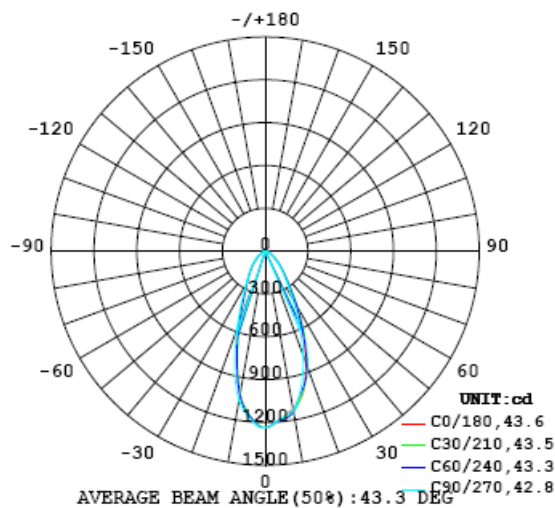


Chart 14: Polar Candela Distribution

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	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236
5	1184	1180	1180	1184	1190	1192	1193	1191	1186	1181	1180	1182	1186	1190	1192	1191	1188	1182	1177
10	1125	1135	1138	1140	1143	1140	1139	1138	1137	1130	1116	1102	1090	1082	1077	1064	1044	1025	1017
15	1025	1026	1015	1019	1021	1011	1007	998	989	977	968	948	919	892	866	839	814	797	787
20	833	839	847	866	869	860	850	837	809	775	745	721	691	656	634	603	581	568	549
25	622	639	647	649	644	637	626	605	582	558	529	497	475	450	425	404	390	382	367
30	432	440	442	453	454	448	439	420	394	378	361	340	324	308	295	281	270	264	261
35	289	294	302	303	299	296	290	281	273	261	250	242	233	223	216	210	205	201	198
40	204	207	210	211	210	211	209	203	197	192	186	179	174	168	165	159	155	153	151
45	149	151	152	153	152	153	152	150	147	143	138	133	128	124	120	117	113	111	110
50	107	108	110	111	110	110	109	107	105	102	98.6	95.0	90.7	86.8	84.8	82.6	79.7	78.2	76.9
55	74.6	75.3	77.1	77.3	76.8	76.4	75.7	74.1	72.4	70.5	68.0	65.2	62.8	60.2	58.6	57.1	55.1	53.4	52.1
60	51.3	52.0	53.4	53.6	52.9	52.4	51.7	50.9	49.9	48.3	46.6	44.7	42.6	40.6	39.4	38.2	36.6	35.4	34.4
65	34.5	35.2	36.1	35.9	36.0	35.4	35.0	34.0	33.2	32.2	31.1	29.7	28.3	27.2	26.2	25.1	24.0	23.2	22.6
70	22.9	23.4	24.0	24.3	24.0	23.8	23.3	22.8	22.1	21.3	20.5	19.6	18.7	17.8	17.1	16.4	15.5	14.8	14.5
75	15.1	15.4	15.9	16.0	16.0	15.8	15.5	15.1	14.5	13.9	13.3	12.7	12.0	11.3	10.6	10.0	9.42	8.88	8.50
80	9.59	9.91	10.1	10.3	10.3	10.2	9.94	9.57	9.09	8.66	8.18	7.65	7.07	6.55	5.96	5.47	5.00	4.64	4.39
85	5.49	5.71	5.91	6.01	6.04	5.96	5.76	5.44	5.07	4.70	4.30	3.90	3.46	3.04	2.66	2.33	2.04	1.82	1.69
90	2.60	2.76	2.86	2.91	2.92	2.86	2.73	2.50	2.26	2.01	1.75	1.49	1.23	0.98	0.79	0.63	0.49	0.39	0.34
95	0.81	0.88	0.94	0.97	0.97	0.94	0.86	0.75	0.62	0.50	0.39	0.29	0.20	0.13	0.09	0.06	0.05	0.05	0.05
100	0.13	0.14	0.14	0.14	0.13	0.12	0.09	0.06	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.04
105	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.03
110	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02
115	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
120	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.07
125	0.05	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.10	0.12
130	0.08	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.15	0.18
135	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.14	0.15	0.16	0.18	0.19	0.19	0.21	0.22	0.22	0.26
140	0.19	0.19	0.18	0.18	0.18	0.18	0.19	0.20	0.21	0.22	0.22	0.23	0.25	0.26	0.27	0.28	0.28	0.28	0.33
145	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.35	0.36	0.39
150	0.34	0.34	0.34	0.34	0.34	0.34	0.35	0.35	0.36	0.37	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.45	0.45
155	0.41	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.43	0.44	0.45	0.46	0.47	0.49	0.50	0.52	0.53	0.53	0.52
160	0.48	0.48	0.48	0.48	0.48	0.49	0.49	0.50	0.51	0.52	0.53	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.61
165	0.57	0.56	0.56	0.56	0.56	0.57	0.57	0.58	0.59	0.60	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.66	0.65
170	0.62	0.62	0.62	0.62	0.63	0.63	0.63	0.64	0.64	0.65	0.65	0.66	0.67	0.68	0.68	0.69	0.69	0.70	0.72
175	0.66	0.66	0.66	0.66	0.67	0.67	0.67	0.67	0.67	0.68	0.68	0.69	0.69	0.70	0.70	0.70	0.71	0.72	0.74
180	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69

Table 12: 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	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236		
5	1173	1171	1169	1168	1168	1168	1171	1176	1183	1192	1200	1205	1207	1207	1203	1196	1188		
10	1015	1015	1016	1015	1017	1025	1036	1049	1062	1071	1079	1091	1111	1129	1132	1127	1122		
15	776	764	755	754	758	768	784	806	829	858	881	905	934	969	984	988	1006		
20	533	526	526	526	528	538	554	567	581	607	646	676	703	743	771	793	819		
25	359	356	350	349	348	350	360	376	394	412	436	466	486	520	551	577	606		
30	257	254	252	252	254	256	257	262	267	281	292	308	328	349	371	391	410		
35	194	193	193	193	193	194	196	198	202	207	214	222	233	241	254	266	277		
40	149	147	146	146	147	148	150	152	154	157	162	167	172	178	184	192	198		
45	109	107	106	106	107	108	109	111	113	115	119	123	127	131	136	142	146		
50	75.0	74.1	74.5	74.1	73.9	74.5	75.7	77.4	78.9	80.8	83.7	86.6	89.7	93.2	97.2	101	105		
55	51.0	50.3	49.7	50.1	49.9	50.4	51.1	52.6	53.7	55.1	57.2	59.8	61.7	64.1	67.2	70.5	73.1		
60	33.9	33.3	33.2	33.0	32.9	33.1	34.0	34.7	35.7	36.8	38.2	39.9	41.7	43.6	45.8	47.7	49.9		
65	22.0	21.7	21.6	21.3	21.4	21.6	22.0	22.5	23.2	24.1	25.2	26.4	28.0	29.3	30.8	32.2	33.4		
70	14.1	13.7	13.5	13.4	13.4	13.6	14.0	14.4	15.0	15.6	16.4	17.5	18.4	19.4	20.3	21.4	22.2		
75	8.19	7.95	7.81	7.78	7.83	7.97	8.23	8.56	9.01	9.56	10.2	11.0	11.7	12.4	13.2	14.1	14.7		
80	4.15	3.98	3.89	3.88	3.93	4.06	4.26	4.52	4.86	5.28	5.80	6.38	6.96	7.54	8.12	8.70	9.19		
85	1.53	1.45	1.42	1.42	1.48	1.57	1.69	1.87	2.09	2.38	2.73	3.11	3.51	3.94	4.39	4.82	5.23		
90	0.29	0.27	0.27	0.28	0.31	0.35	0.41	0.49	0.59	0.73	0.91	1.11	1.34	1.59	1.87	2.15	2.42		
95	0.05	0.05	0.05	0.05	0.06	0.07	0.08	0.10	0.13	0.17	0.22	0.26	0.32	0.41	0.51	0.62	0.73		
100	0.03	0.03	0.03	0.03	0.04	0.05	0.06	0.08	0.09	0.10	0.11	0.11	0.10	0.10	0.10	0.11	0.12		
105	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.09	0.08	0.08	0.07	0.06	0.05		
110	0.02	0.02	0.02	0.02	0.03	0.04	0.06	0.07	0.09	0.10	0.10	0.10	0.08	0.07	0.06	0.05	0.04		
115	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.07	0.07	0.08	0.09	0.09	0.08	0.07	0.07	0.06	0.04		
120	0.07	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.07	0.07	0.06	0.05	0.04		
125	0.13	0.14	0.14	0.14	0.13	0.13	0.12	0.11	0.10	0.10	0.09	0.09	0.08	0.07	0.07	0.06	0.05		
130	0.21	0.22	0.22	0.22	0.21	0.21	0.20	0.19	0.17	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.09		
135	0.32	0.32	0.32	0.32	0.31	0.31	0.30	0.28	0.27	0.25	0.23	0.21	0.20	0.18	0.16	0.15	0.14		
140	0.43	0.43	0.43	0.43	0.43	0.42	0.41	0.39	0.38	0.36	0.34	0.32	0.30	0.28	0.26	0.25	0.22		
145	0.55	0.54	0.54	0.54	0.54	0.53	0.52	0.51	0.49	0.48	0.46	0.44	0.42	0.40	0.38	0.37	0.30		
150	0.66	0.66	0.66	0.66	0.65	0.64	0.63	0.62	0.60	0.59	0.57	0.56	0.54	0.52	0.51	0.49	0.38		
155	0.75	0.76	0.76	0.76	0.75	0.74	0.73	0.72	0.70	0.69	0.67	0.66	0.65	0.63	0.63	0.59	0.42		
160	0.73	0.83	0.84	0.84	0.83	0.82	0.81	0.80	0.78	0.77	0.76	0.74	0.73	0.72	0.72	0.64	0.48		
165	0.63	0.85	0.85	0.85	0.85	0.85	0.84	0.84	0.83	0.82	0.81	0.80	0.79	0.80	0.77	0.63	0.57		
170	0.73	0.74	0.81	0.81	0.80	0.80	0.81	0.82	0.82	0.83	0.83	0.83	0.84	0.79	0.67	0.62	0.62		
175	0.76	0.77	0.77	0.77	0.75	0.73	0.71	0.72	0.73	0.71	0.69	0.67	0.66	0.66	0.66	0.66	0.66		
180	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69		

Table 13: Luminous Intensity Data

TEST RESULTS of Model 9PAR30SNDIM/9CCTS/BAS (5000K 25 °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
Voltage frequency (Hz)	60
Test Current (A)	0.073
Power Factor	0.9758
Test Power (W)	8.49
THD A%	12.59
Luminous Efficacy (lm/W)	116.5
Total Luminous Flux (lm)	988.9
Color Rendering Index (CRI)	94.3
R9	64.6
Correlated Color Temperature (CCT)(K)	5191
Chromaticity Chroma x	0.3401
Chromaticity Chroma y	0.3517
Chromaticity Chroma u	0.2080
Chromaticity Chroma v	0.3226
Duv	0.0021
Chromaticity Chroma u'	0.2080
Chromaticity Chroma v'	0.4840

Special Color Rendering Indices	
R1	95
R2	97.7
R3	98
R4	94.9
R5	94.5
R6	94.4
R7	93.8
R8	86.4
R9	64.6
R10	93.7
R11	96.2
R12	75.6
R13	96.5
R14	99.3

Table 14: 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

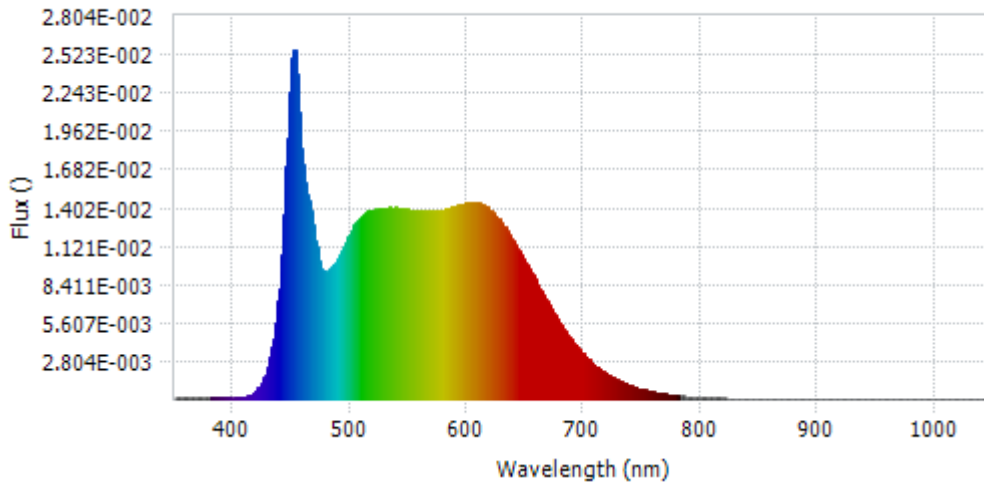
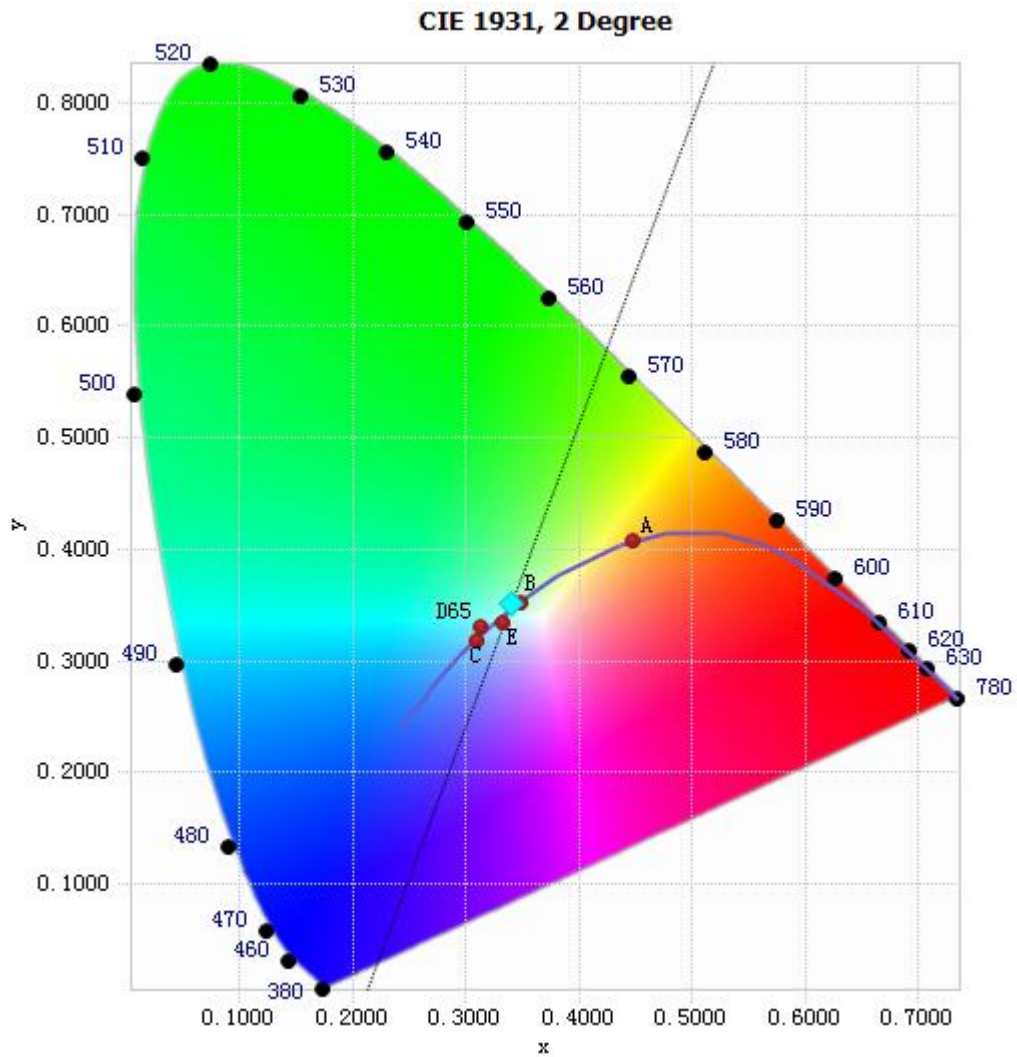


Chart 15: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.12E-04	485	9.80E-03	590	1.41E-02	695	3.71E-03
385	1.07E-04	490	1.04E-02	595	1.42E-02	700	3.22E-03
390	9.68E-05	495	1.14E-02	600	1.44E-02	705	2.79E-03
395	1.05E-04	500	1.22E-02	605	1.44E-02	710	2.42E-03
400	8.06E-05	505	1.29E-02	610	1.43E-02	715	2.11E-03
405	1.02E-04	510	1.33E-02	615	1.41E-02	720	1.81E-03
410	1.84E-04	515	1.37E-02	620	1.38E-02	725	1.57E-03
415	3.61E-04	520	1.38E-02	625	1.33E-02	730	1.34E-03
420	7.08E-04	525	1.39E-02	630	1.28E-02	735	1.15E-03
425	1.41E-03	530	1.40E-02	635	1.22E-02	740	9.78E-04
430	2.69E-03	535	1.40E-02	640	1.15E-02	745	8.43E-04
435	5.02E-03	540	1.39E-02	645	1.08E-02	750	7.18E-04
440	9.27E-03	545	1.39E-02	650	1.00E-02	755	6.19E-04
445	1.70E-02	550	1.38E-02	655	9.24E-03	760	5.21E-04
450	2.49E-02	555	1.38E-02	660	8.44E-03	765	4.49E-04
455	2.24E-02	560	1.38E-02	665	7.66E-03	770	3.82E-04
460	1.65E-02	565	1.37E-02	670	6.84E-03	775	3.23E-04
465	1.42E-02	570	1.37E-02	675	6.14E-03	780	2.78E-04
470	1.16E-02	575	1.38E-02	680	5.46E-03		
475	9.54E-03	580	1.38E-02	685	4.83E-03		
480	9.31E-03	585	1.40E-02	690	4.24E-03		

Table 15: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3401, 0.3517)

Chart 16: 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

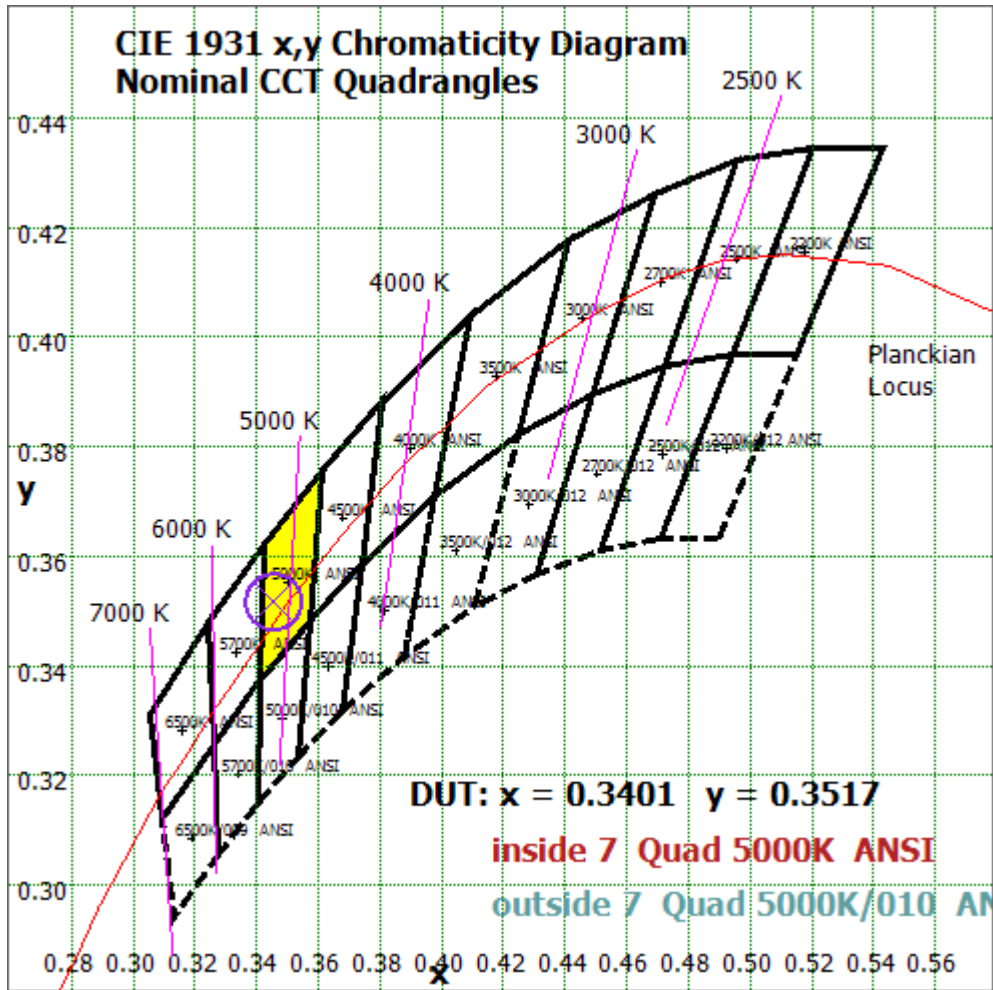


Chart17: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

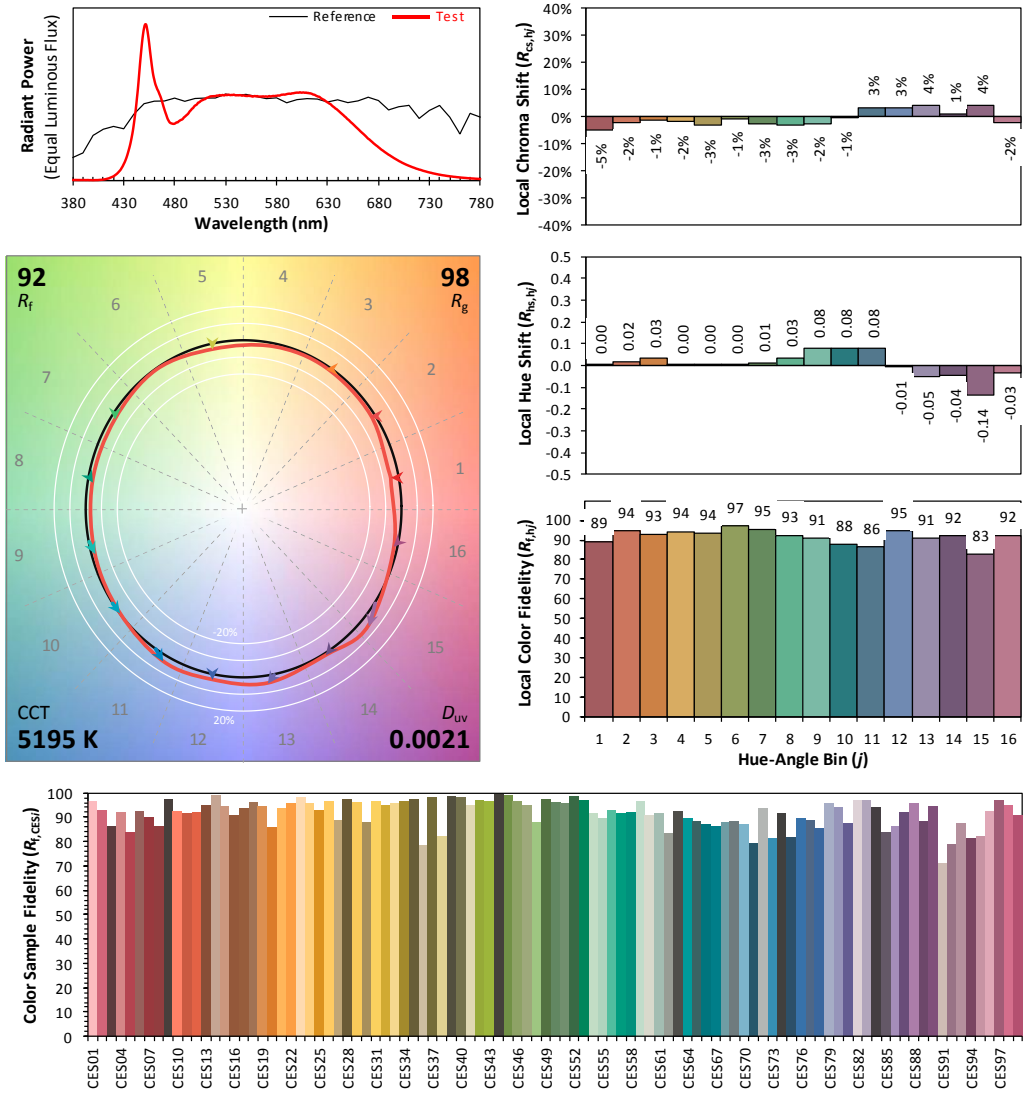
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/11/30

Model: 9PAR30SNDIM/9CCTS/BAS



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.	x	0.3401	CIE 13.3-1995 (CRI) R_a 94 R_g 65
	y	0.3517	
	u'	0.2080	
	v'	0.4840	

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

Chart 18: 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 14 due to rounding.

TEST RESULTS of Model 9PAR30SNDIM/9CCTS/BAS (5000K 40 °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
Voltage frequency (Hz)	60
Test Current (A)	0.073
Power Factor	0.9758
Test Power (W)	8.49
THD A%	12.58
Luminous Efficacy (lm/W)	119.7
Total Luminous Flux (lm)	1016.3
Color Rendering Index (CRI)	94.3
R9	64.4
Correlated Color Temperature (CCT)(K)	5143
Chromaticity Chroma x	0.3413
Chromaticity Chroma y	0.3519
Chromaticity Chroma u	0.2088
Chromaticity Chroma v	0.3228
Duv	0.0017
Chromaticity Chroma u'	0.2088
Chromaticity Chroma v'	0.4843

Special Color Rendering Indices	
R1	95
R2	97.5
R3	97.8
R4	95
R5	94.6
R6	94.3
R7	93.8
R8	86.4
R9	64.4
R10	93.4
R11	96.2
R12	76.1
R13	96.4
R14	99.1

Table 16: 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

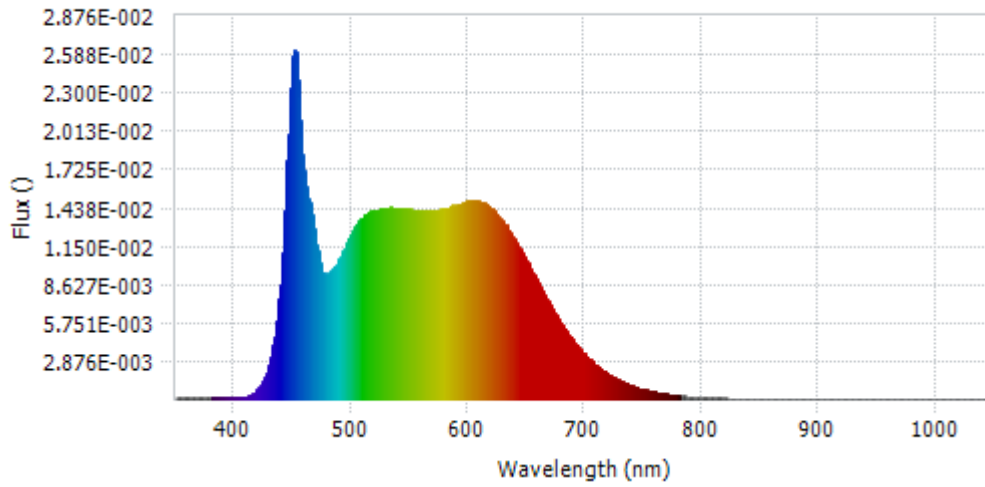
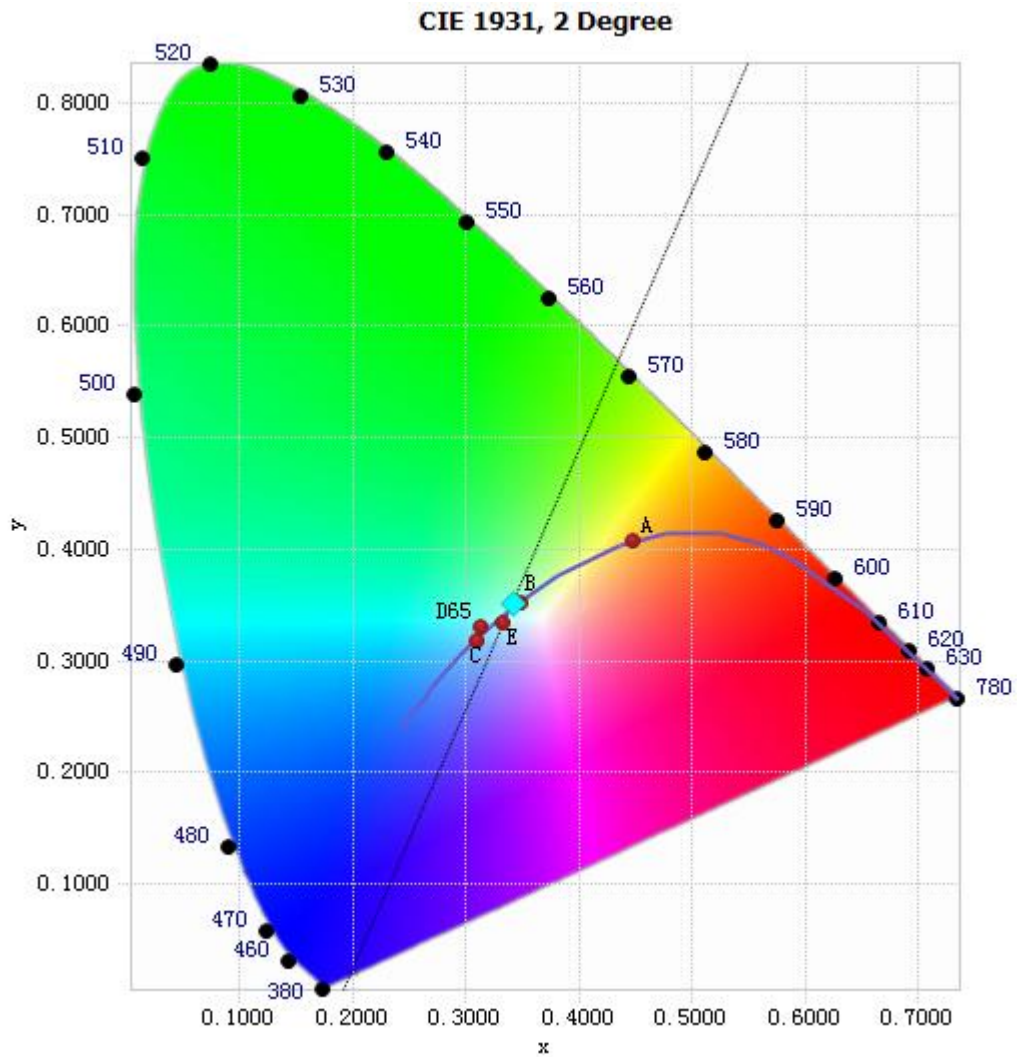


Chart 19: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.18E-04	485	9.93E-03	590	1.46E-02	695	3.83E-03
385	1.01E-04	490	1.06E-02	595	1.47E-02	700	3.33E-03
390	1.09E-04	495	1.15E-02	600	1.48E-02	705	2.89E-03
395	1.02E-04	500	1.25E-02	605	1.48E-02	710	2.50E-03
400	8.06E-05	505	1.32E-02	610	1.48E-02	715	2.16E-03
405	1.16E-04	510	1.36E-02	615	1.46E-02	720	1.87E-03
410	1.95E-04	515	1.40E-02	620	1.42E-02	725	1.61E-03
415	4.01E-04	520	1.41E-02	625	1.38E-02	730	1.38E-03
420	7.83E-04	525	1.43E-02	630	1.32E-02	735	1.18E-03
425	1.49E-03	530	1.43E-02	635	1.26E-02	740	1.01E-03
430	2.84E-03	535	1.43E-02	640	1.19E-02	745	8.63E-04
435	5.26E-03	540	1.43E-02	645	1.12E-02	750	7.37E-04
440	9.70E-03	545	1.43E-02	650	1.03E-02	755	6.33E-04
445	1.79E-02	550	1.42E-02	655	9.54E-03	760	5.40E-04
450	2.58E-02	555	1.42E-02	660	8.70E-03	765	4.61E-04
455	2.26E-02	560	1.41E-02	665	7.90E-03	770	3.92E-04
460	1.66E-02	565	1.41E-02	670	7.08E-03	775	3.37E-04
465	1.43E-02	570	1.41E-02	675	6.35E-03	780	2.87E-04
470	1.16E-02	575	1.42E-02	680	5.62E-03		
475	9.55E-03	580	1.43E-02	685	4.98E-03		
480	9.39E-03	585	1.45E-02	690	4.38E-03		

Table 17: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3413, 0.3519)

Chart 20: 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

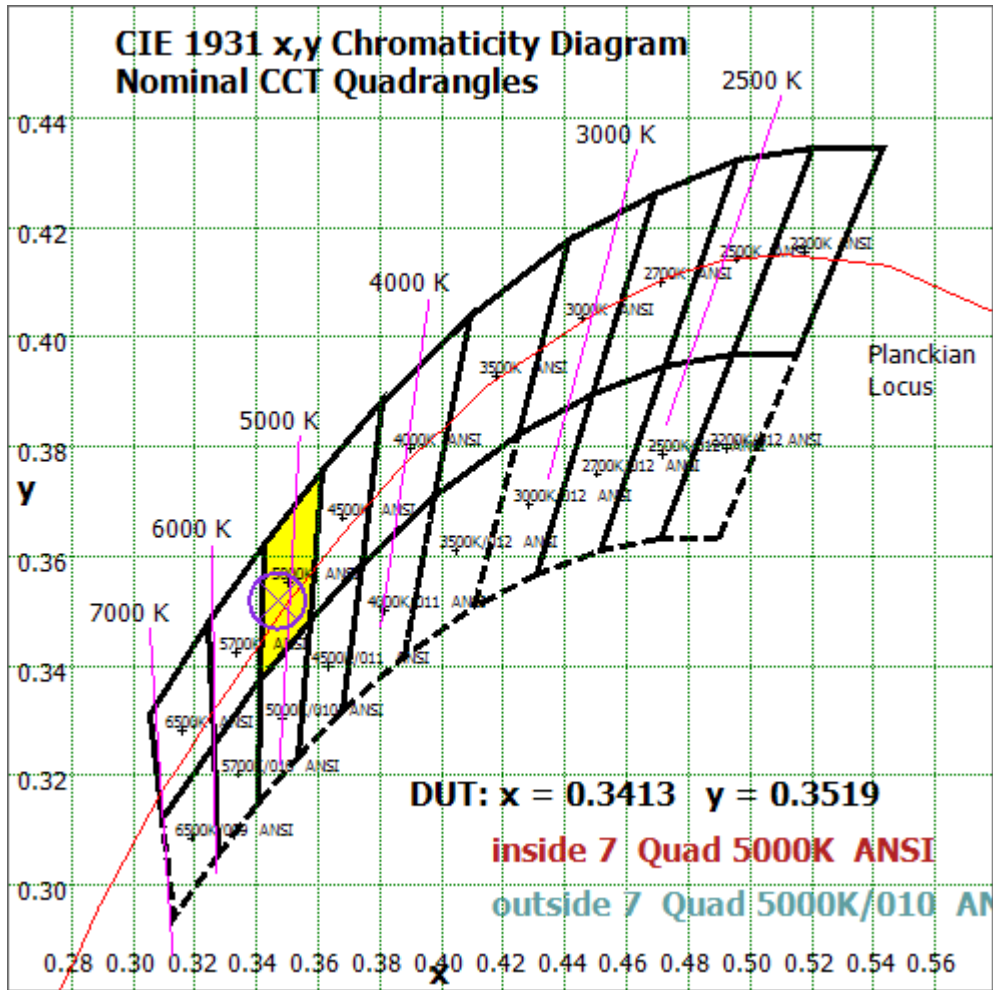


Chart 21: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

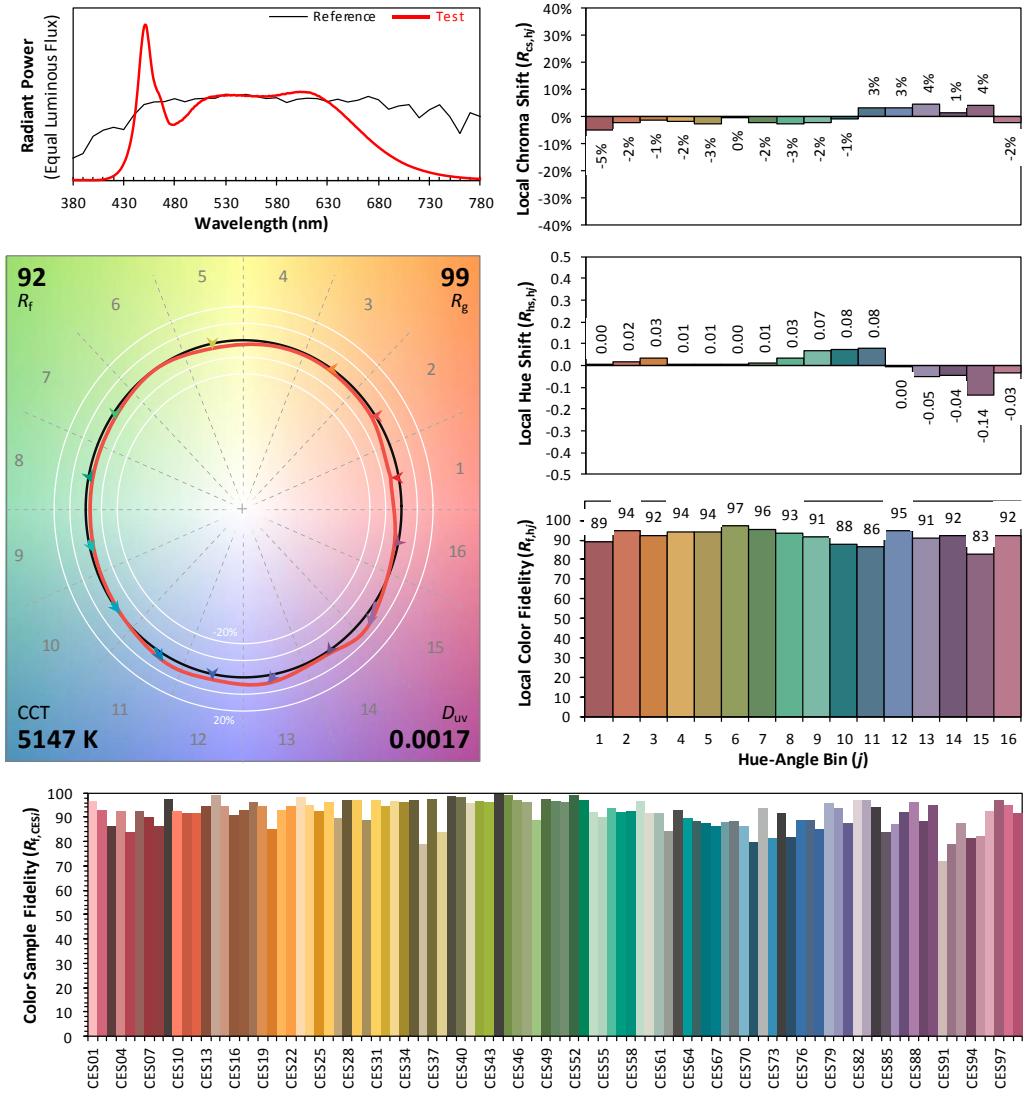
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/11/30

Model: 9PAR30SNDIM/9CCTS/BAS



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.	x	0.3413	CIE 13.3-1995 (CRI) R_a 94 R_g 64
	y	0.3519	
	u'	0.2088	
	v'	0.4843	

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

Chart 22: 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 16 due to rounding.

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jun. 05, 2023	-
Digital Power Meter	PF2010A	HZTE028-01	Aug. 01, 2023	Jul. 31, 2024
AC Power Supply	DPS1060	HZTE001-06	Aug. 01, 2023	Jul. 31, 2024
DC Power Supply	WY12010	HZTE004-03	Aug. 01, 2023	Jul. 31, 2024
Temperature recorder	JM624U	HZTE018-08	Aug. 04, 2023	Aug. 03, 2024
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 04, 2023	Aug. 03, 2024
Standard source	D908	HZTE012-01	Aug. 14, 2018	-
Integrate Sphere system	3M	HZTE015-04	Jul. 24, 2023	-
Digital Power Meter	WT210	HZTE008-01	Aug. 01, 2023	Jul. 31, 2024
AC Power Supply	PCR 500L	HZTE001-07	Aug. 01, 2023	Jul.31, 2024
DC Power Supply	IT6154	HZTE004-04	Aug. 01, 2023	Jul. 31, 2024
Standard source	SCL-1400	HZTE012-06	Nov. 04, 2021	-
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 04, 2023	Aug. 03, 2024
Temperature Meter	TES1310	HZTE017-01	Aug. 04, 2023	Aug. 03, 2024
Multi-Meter	FLUKE15B	HZTE020-01	Aug. 01, 2023	Jul. 31, 2024

Table 26: 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 ***

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