

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: 11T8/3F/8CCTS/UEB

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ23040022b

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

Review by:

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Apr. 26, 2023



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Manager: Jim Zhang
Apr. 26, 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	11T8/3F/8CCTS/UEB (3000K Setting)	11T8/3F/8CCTS/UEB (3500K Setting)	11T8/3F/8CCTS/UEB (4000K Setting)
Luminous Efficacy (Lumens /Watt)	132.6	140.1	144.9
Total Luminous Flux (Lumens)	1501.5	1586.0	1618.1
Power (Watts)	11.32	11.32	11.17
Power Factor	0.9841	0.9842	0.9846
CCT (K)	3023	3525	3975
CRI	83.0	85.3	86.2
Stabilization Time (Light & Power)	50 mins	50 mins	50 mins
Note	3000K	3500K	4000K

Tested Model	11T8/3F/8CCTS/UEB (5000K Setting)	11T8/3F/8CCTS/UEB (6500K Setting)
Luminous Efficacy (Lumens /Watt)	143.3	137.7
Total Luminous Flux (Lumens)	1629.0	1570.3
Power (Watts)	11.37	11.40
Power Factor	0.9841	0.9840
CCT (K)	5033	6572
CRI	85.9	83.3
Stabilization Time (Light & Power)	50 mins	50 mins
Note	5000K	6500K

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Apr. 21, 2023
Date of Test	: Apr. 23, 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 ANSI/UL 8750 Light Emitting Diode (LED) Equipment for Use in Lighting Products UL 1993 Self-Ballasted Lamps and Lamp Adapters

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SAMPLE PHOTO



Figure 1- Overview of the sample

Equipment Under Test(EUT)	
Name	: LED Tube
Model	: 11T8/3F/8CCCTS/UEB
Electrical Ratings	: 120-277V, 50/60Hz, 11W Color- Tunable 3000K/3500K/4000K/5000K/6500K
Product Description	: Manufacturer of light source: Lumileds Holding B.V. Model of LED light source: L128-3080RA35003J3 (3000K) L128-6580RA35003J3 (6500K)
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 11T8/3F/8CCTS/UEB (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)	0.096	0.045
Power Factor	0.9841	0.9125
Test Power (W)	11.32	11.34
THD A%	15.08	20.59
Luminous Efficacy (lm/W)	132.6	131.9
Total Luminous Flux (lm)	1501.5	1495.6
Color Rendering Index (CRI)	83.0	
R9	8.1	
Correlated Color Temperature (CCT)(K)	3023	
Chromaticity Chroma x	0.4377	
Chromaticity Chroma y	0.4088	
Chromaticity Chroma u	0.2491	
Chromaticity Chroma v	0.3489	
Duv	0.0018	
Chromaticity Chroma u'	0.2491	
Chromaticity Chroma v'	0.5233	

Special Color Rendering Indices	
R1	81.5
R2	91.9
R3	95.7
R4	80.5
R5	81.7
R6	90.7
R7	82.8
R8	59.3
R9	8.1
R10	81.8
R11	80.1
R12	71.2
R13	84.1
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

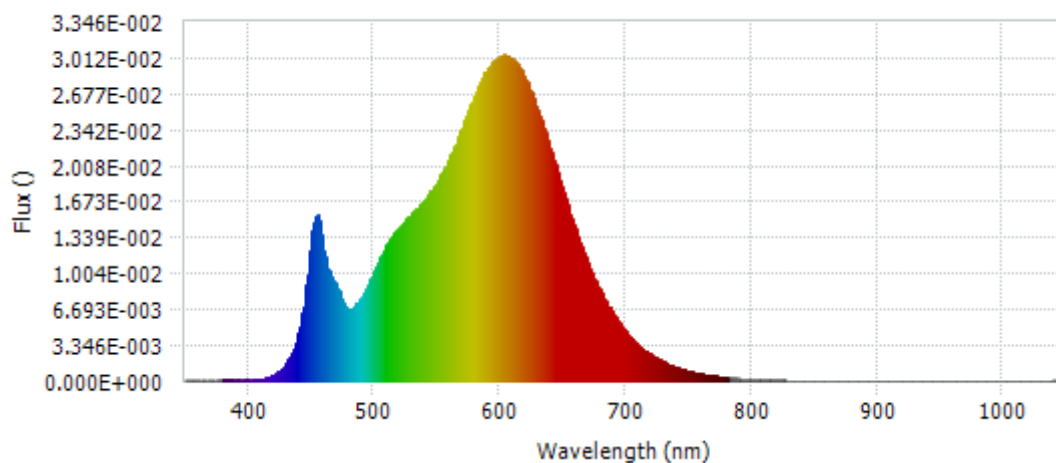
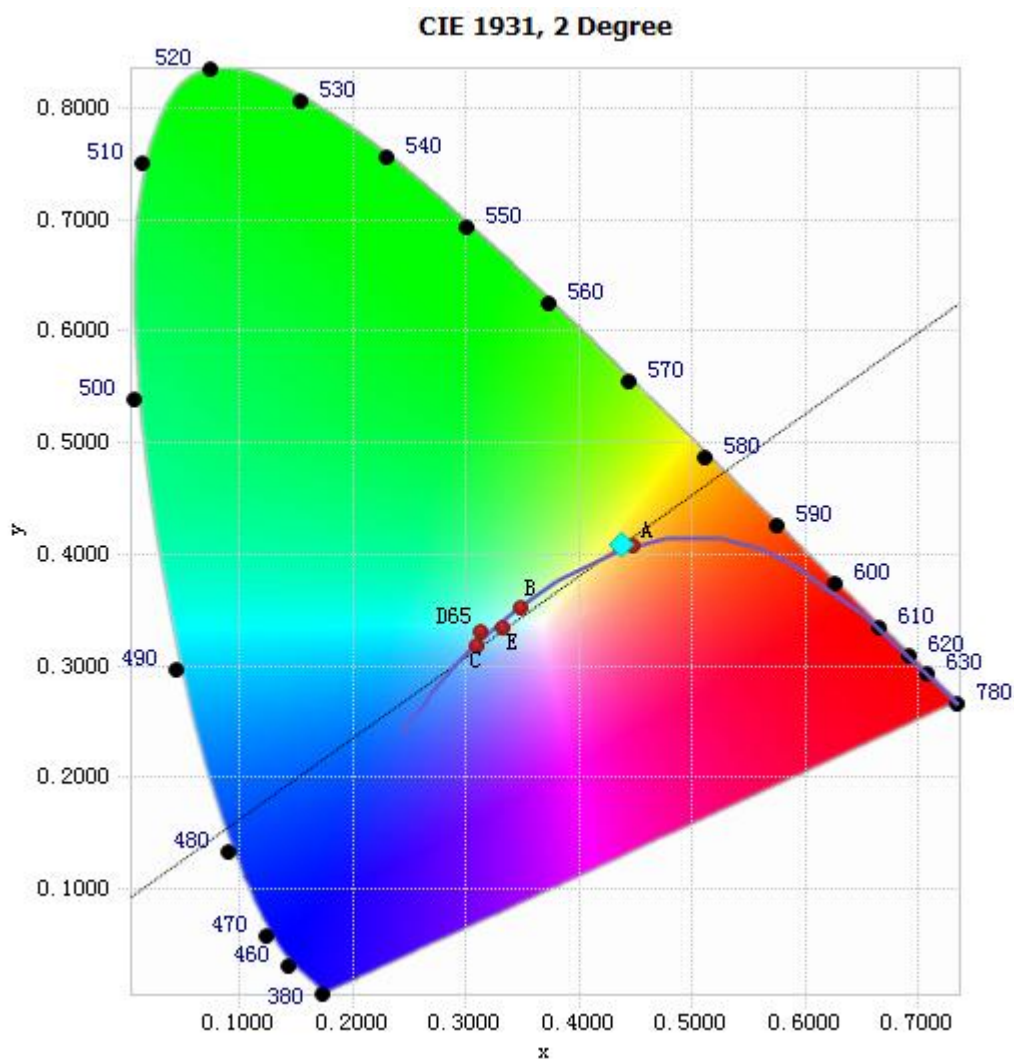


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.25E-04	485	7.11E-03	590	2.91E-02	695	5.41E-03
385	1.02E-04	490	7.87E-03	595	2.98E-02	700	4.63E-03
390	8.86E-05	495	8.94E-03	600	3.03E-02	705	3.98E-03
395	9.11E-05	500	1.03E-02	605	3.03E-02	710	3.38E-03
400	9.96E-05	505	1.15E-02	610	2.99E-02	715	2.88E-03
405	1.22E-04	510	1.26E-02	615	2.93E-02	720	2.44E-03
410	1.85E-04	515	1.36E-02	620	2.82E-02	725	2.11E-03
415	3.27E-04	520	1.43E-02	625	2.69E-02	730	1.80E-03
420	5.83E-04	525	1.50E-02	630	2.53E-02	735	1.53E-03
425	9.83E-04	530	1.56E-02	635	2.35E-02	740	1.30E-03
430	1.63E-03	535	1.61E-02	640	2.17E-02	745	1.11E-03
435	2.69E-03	540	1.68E-02	645	1.98E-02	750	9.48E-04
440	4.49E-03	545	1.77E-02	650	1.78E-02	755	8.08E-04
445	7.95E-03	550	1.85E-02	655	1.60E-02	760	6.87E-04
450	1.32E-02	555	1.96E-02	660	1.42E-02	765	5.81E-04
455	1.54E-02	560	2.08E-02	665	1.26E-02	770	5.08E-04
460	1.22E-02	565	2.21E-02	670	1.10E-02	775	4.28E-04
465	9.99E-03	570	2.36E-02	675	9.61E-03	780	3.68E-04
470	8.93E-03	575	2.52E-02	680	8.39E-03		
475	7.41E-03	580	2.66E-02	685	7.27E-03		
480	6.76E-03	585	2.81E-02	690	6.28E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4377, 0.4088)

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

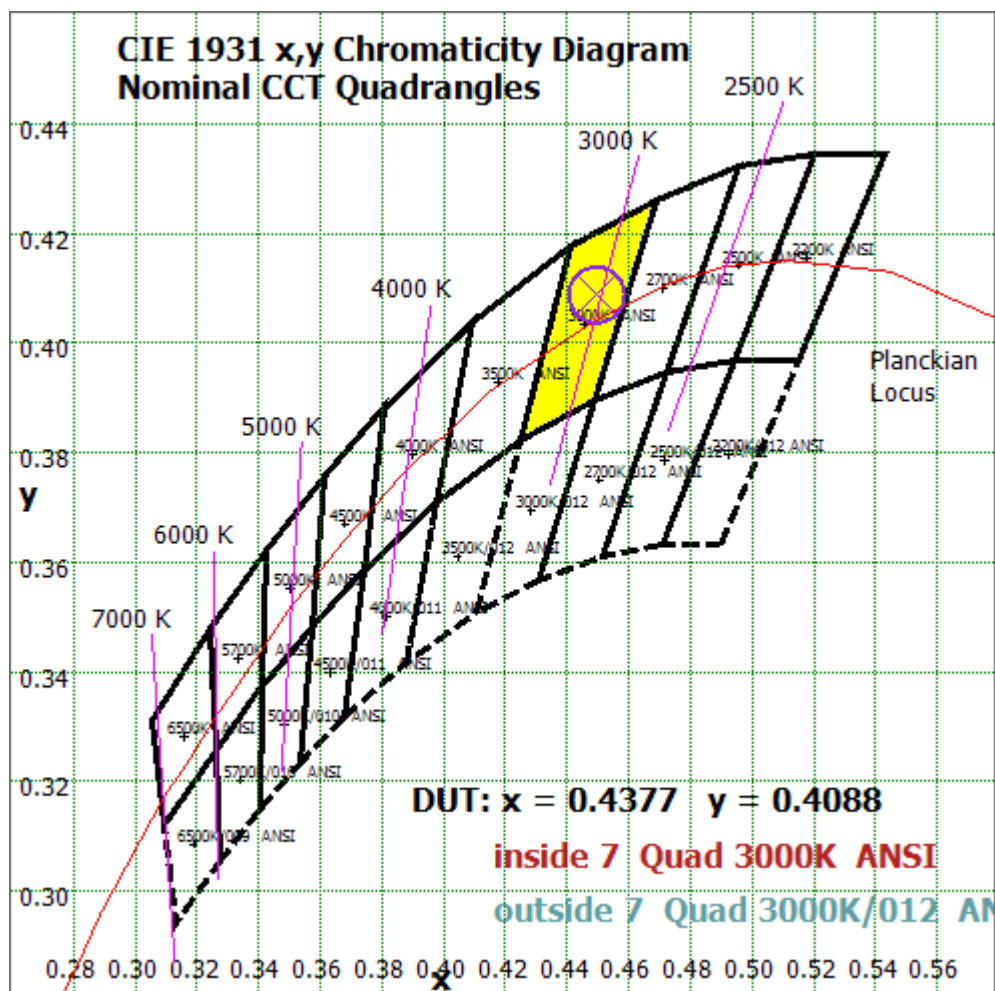


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

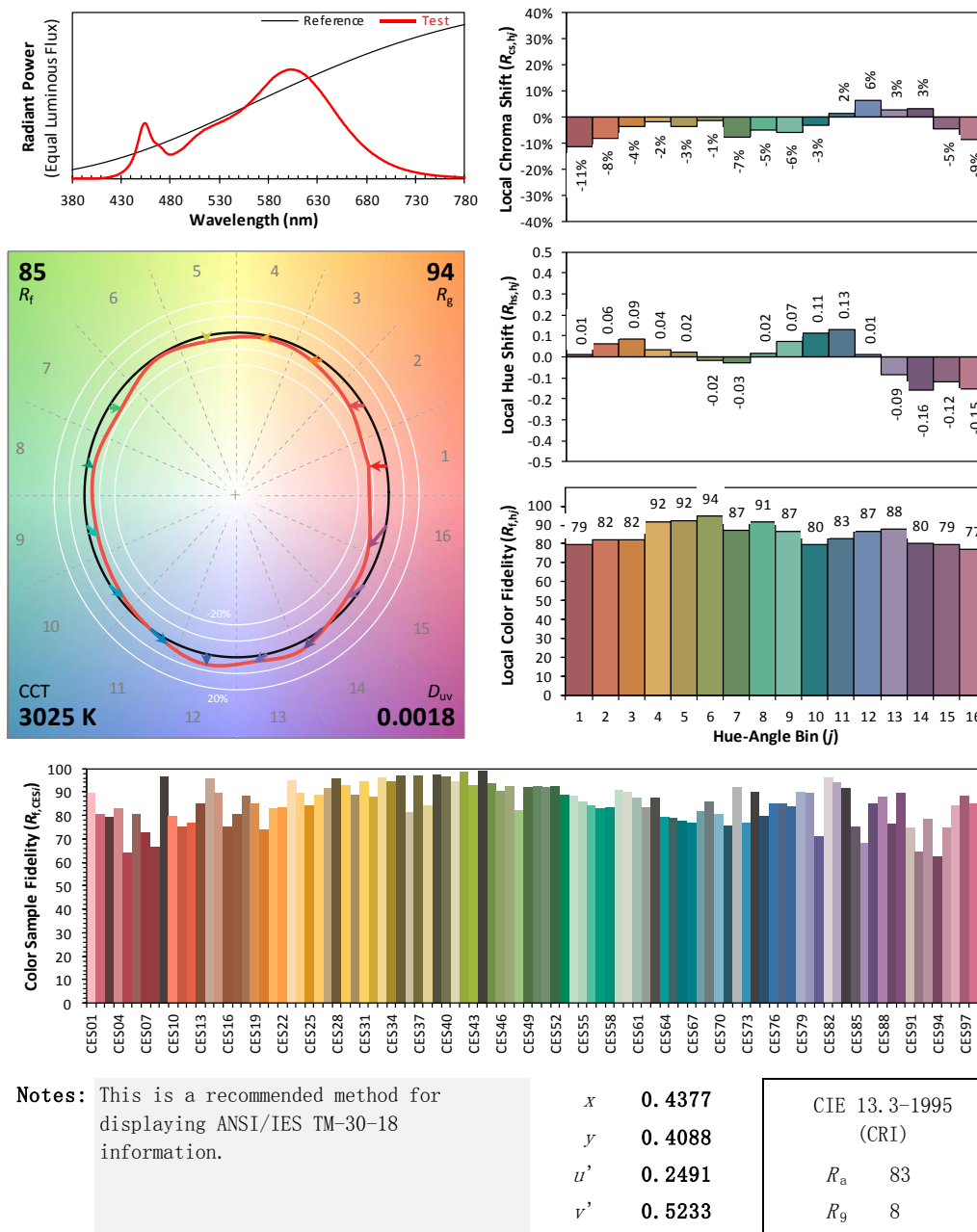
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/04/23

Model: 11T8/3F/8CCTS/UEB



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)	0.096
Power Factor	0.9841
Power (W)	11.35
Luminous Efficacy (lm/W)	133.5
Total Luminous Flux (lm)	1515.7
Beam Angle (°)	114.9 (0°-180°) / 253.3 (90°-270°)
Center Beam Candle Power (cd)	233
Maximum Beam Candle Power (cd)	233.6 (At: C=270.0, Gamma=8.0)
Spacing Criteria	1.28 (0°-180°) / 1.47 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	40.72%
Zonal Lumens in the 60 °-90 °Zone	27.13%
Zonal Lumens in the 90 °-120 °Zone	19.05%
Zonal Lumens in the 120 °-180 °Zone	13.10%

Table 4: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	22.134	1.46%
10- 20	64.433	4.25%
20- 30	101.065	6.67%
30- 40	129.17	8.52%
40- 50	146.857	9.69%
50- 60	153.499	10.13%
60- 70	149.718	9.88%
70- 80	138.211	9.12%
80- 90	123.247	8.13%
90-100	109.35	7.21%
100-110	96.314	6.35%
110-120	83.101	5.48%
120-130	69.222	4.57%
130-140	54.732	3.61%
140-150	39.474	2.60%
150-160	24.272	1.60%
160-170	9.344	0.62%
170-180	1.52	0.10%
Total	1515.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	617.158	40.72%
60- 90	411.176	27.13%
0-90	1028.33	67.85%
90- 180	487.329	32.15%
0- 180	1515.7	100%

Table 5: Zonal Lumen

Illuminance Plots- Goniophotometer Method

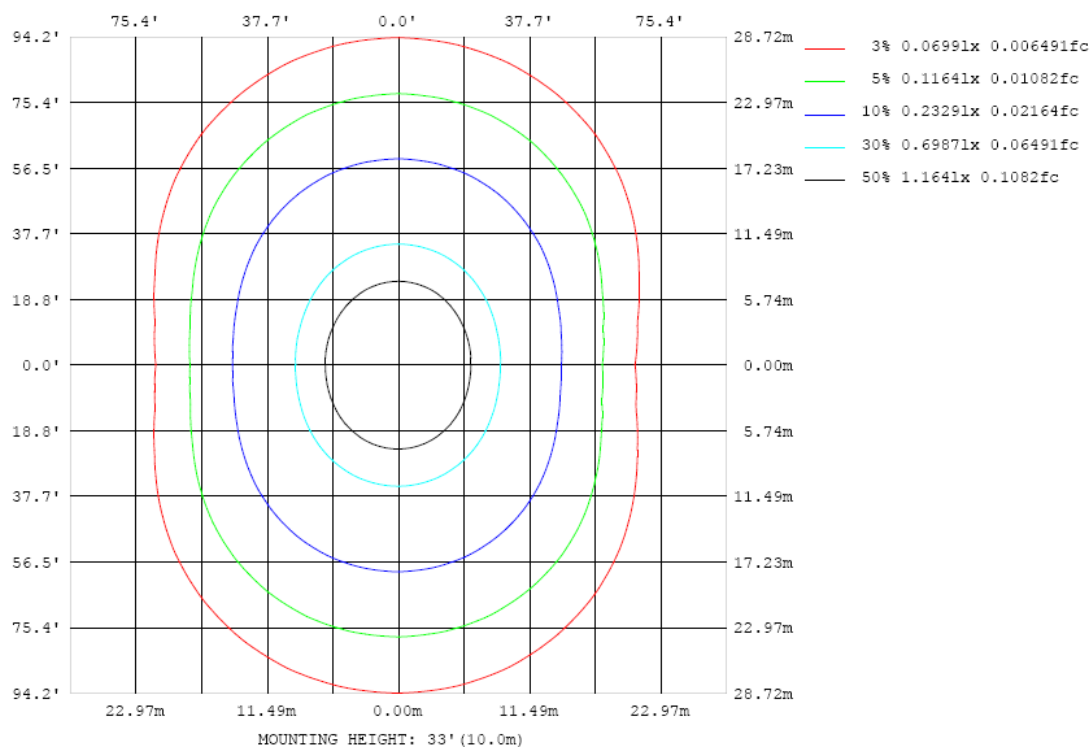


Chart 5: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

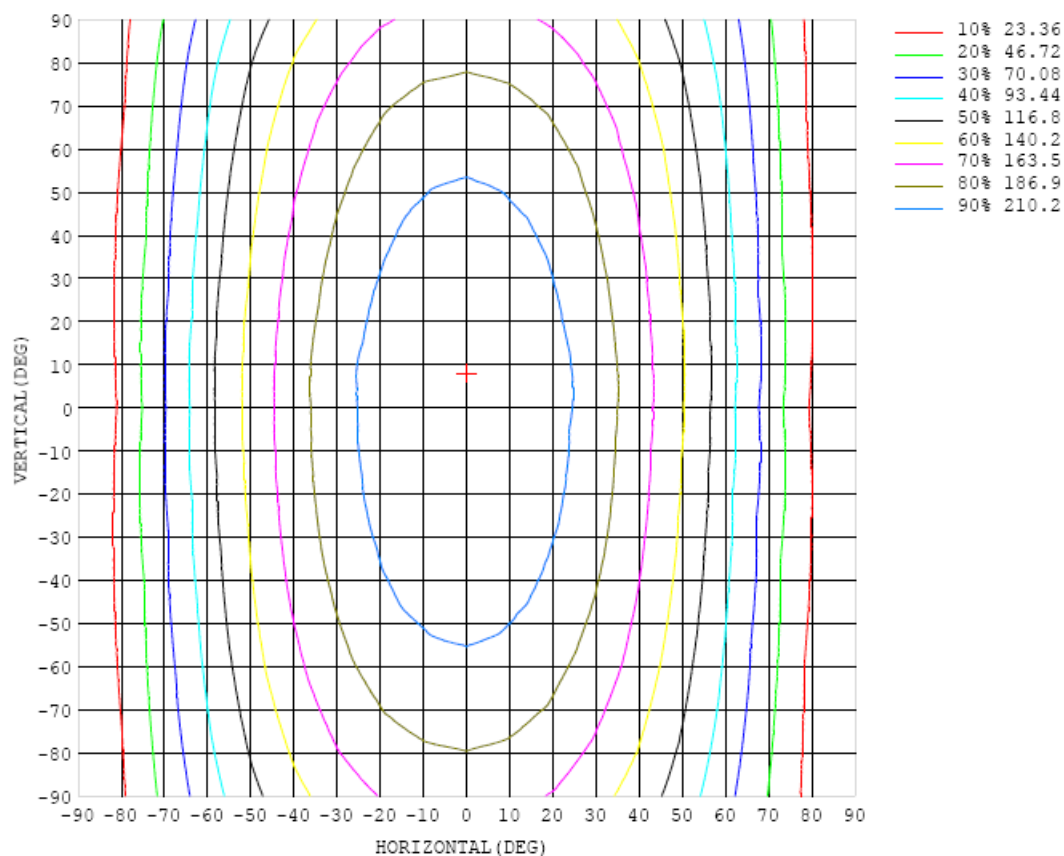


Chart 6: Isocandela Plot

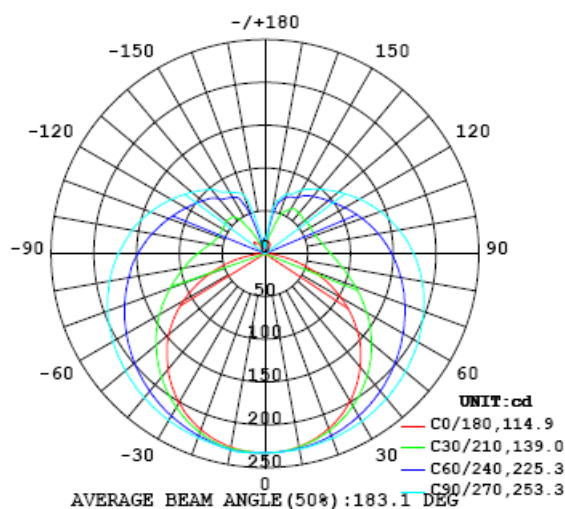


Chart 7: Polar Candela Distribution

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	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
5	232	232	232	232	232	232	232	233	233	232	232	232	232	232	232	232	232	232	232
10	229	229	229	229	230	230	231	231	232	232	232	232	232	231	231	230	229	230	230
15	224	224	224	226	227	228	229	230	231	231	231	231	229	229	228	227	225	225	225
20	218	217	218	220	222	225	227	228	229	230	229	229	227	226	224	222	220	219	219
25	209	209	211	213	217	220	223	226	227	228	228	227	224	222	219	215	213	211	211
30	199	199	201	206	210	215	219	223	225	226	225	224	221	217	212	208	204	202	201
35	187	187	191	196	203	209	215	220	222	224	223	221	216	211	206	199	194	191	189
40	173	174	179	186	195	203	210	216	220	221	220	217	212	205	197	189	183	178	176
45	158	159	165	175	185	196	204	212	216	218	217	213	207	198	189	179	170	164	162
50	141	143	151	163	175	188	198	207	213	214	213	209	201	191	180	167	156	149	147
55	123	125	136	150	166	181	192	202	208	210	209	204	196	184	170	155	141	132	129
60	102	106	120	137	156	173	186	198	204	206	205	199	190	176	161	143	126	114	110
65	81.5	87.2	104	124	146	165	180	192	199	202	200	194	184	169	151	131	111	95.2	89.6
70	61.0	68.0	87.8	112	136	157	174	187	194	197	195	189	177	161	142	119	95.5	76.2	68.5
75	40.6	49.9	73.4	101	127	150	168	181	189	192	190	183	171	154	133	108	81.3	58.4	47.3
80	20.9	33.4	61.8	91.7	119	143	161	175	183	187	184	177	165	147	125	98.2	68.6	41.5	27.2
85	6.01	21.3	52.3	83.6	112	136	155	169	177	180	178	171	158	140	117	89.8	59.3	28.2	10.3
90	0.65	15.2	45.9	77.0	105	129	148	162	170	174	171	164	152	133	110	82.7	52.0	20.4	0.82
95	0.77	12.5	41.7	71.8	99.3	123	141	155	164	167	165	157	145	127	104	77.0	47.3	17.9	0.53
100	1.22	13.0	39.1	68.1	93.7	116	134	148	156	159	157	150	138	120	98.5	72.7	45.0	18.8	0.89
105	3.15	15.3	38.3	64.8	88.8	110	127	141	149	152	150	143	131	114	93.5	70.0	44.3	21.8	1.60
110	4.52	18.3	39.1	62.6	84.5	104	121	133	141	144	142	136	124	108	89.0	67.6	44.8	25.7	2.75
115	4.89	20.9	41.0	61.6	80.9	99.1	114	126	133	136	134	128	118	103	85.1	66.0	46.3	30.5	4.59
120	1.71	15.7	41.9	61.5	78.3	94.1	108	118	125	128	126	121	111	97.7	81.9	65.2	48.0	34.0	8.62
125	1.37	16.5	45.7	61.6	76.3	89.9	102	111	117	120	118	113	105	93.0	79.3	65.2	49.3	37.0	12.3
130	0.90	18.6	47.1	60.4	75.0	86.3	96.5	105	110	112	111	107	99.3	89.0	77.2	64.8	52.6	38.8	15.7
135	1.31	20.5	48.3	61.2	73.8	83.2	91.7	98.7	103	105	104	100	93.9	85.2	75.3	63.5	54.6	40.5	18.5
140	2.82	17.6	46.4	61.5	70.3	80.2	87.4	93.2	96.7	98.3	97.4	94.4	89.3	81.9	73.1	64.3	57.3	39.5	16.0
145	8.85	13.0	41.7	62.8	69.0	74.9	82.9	87.9	90.8	92.1	91.5	89.1	84.6	77.5	70.3	64.8	57.9	38.9	14.9
150	11.9	12.1	39.5	60.2	68.6	72.2	75.8	81.2	84.5	85.8	85.1	82.7	77.9	73.3	69.7	64.2	54.1	31.3	9.37
155	13.3	9.70	26.4	54.1	65.3	70.1	73.3	75.2	76.2	77.1	76.6	75.7	74.4	71.9	66.4	58.9	49.5	24.5	6.82
160	13.8	10.3	19.3	41.7	59.0	65.3	69.3	71.9	73.0	74.0	73.8	72.4	70.3	66.4	60.9	54.5	36.7	20.1	9.82
165	14.3	11.0	13.9	23.9	41.7	54.8	62.2	64.2	64.8	65.5	65.0	64.2	63.1	59.7	52.8	38.8	23.1	12.6	6.03
170	15.8	13.7	10.7	16.4	19.9	27.1	36.9	44.6	49.3	51.3	51.2	48.9	44.2	36.4	27.7	19.7	14.6	9.61	7.54
175	16.6	15.2	11.2	9.86	12.8	15.9	17.4	18.5	19.2	19.6	19.7	19.3	17.8	15.6	13.2	10.6	7.73	8.13	9.55
180	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9

Table 6: Luminous Intensity Data

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233		
5	232	232	232	233	233	233	233	233	233	233	233	233	233	233	233	232	232		
10	230	230	231	231	232	232	233	233	233	232	232	232	232	231	230	230	229		
15	225	226	228	229	229	230	230	230	230	230	230	230	229	227	227	226	225		
20	220	221	222	223	225	226	228	228	229	228	227	226	224	222	221	220	218		
25	212	214	215	218	220	223	225	226	227	226	225	223	220	216	214	212	210		
30	203	205	207	211	215	219	222	224	225	224	222	219	214	210	206	202	200		
35	192	194	198	204	209	214	219	221	222	221	219	214	208	202	196	191	189		
40	178	183	188	196	203	209	215	218	220	218	215	209	202	194	186	179	175		
45	164	169	178	187	196	204	211	215	216	214	211	204	195	185	175	166	161		
50	150	156	166	178	189	199	207	211	213	211	206	198	188	176	164	153	145		
55	133	142	155	168	182	193	202	207	209	207	201	192	180	166	152	138	128		
60	115	126	143	160	174	187	197	203	205	203	197	187	173	157	140	122	109		
65	95.4	110	130	150	167	181	192	198	201	198	192	181	165	148	127	106	89.2		
70	75.7	94.6	118	140	160	175	187	193	196	193	186	174	159	139	115	90.5	69.8		
75	56.7	79.8	106	132	153	168	181	188	190	187	180	168	152	130	104	76.3	51.3		
80	39.4	66.8	96.3	123	146	162	175	182	185	182	174	161	144	122	94.5	64.1	35.1		
85	25.7	56.3	87.5	115	138	156	168	175	178	175	168	156	138	114	86.3	54.8	23.5		
90	17.1	47.7	78.8	107	131	149	161	169	171	168	161	149	131	107	79.6	48.4	17.7		
95	10.8	40.1	71.3	99.4	123	141	155	162	164	162	155	142	124	101	74.1	44.4	16.4		
100	10.5	35.4	65.0	92.4	116	134	148	155	158	156	148	135	118	95.8	69.9	42.4	17.6		
105	11.6	34.7	60.7	86.3	109	127	140	148	150	148	141	128	112	90.9	66.8	42.1	20.1		
110	13.2	35.2	58.7	81.9	103	120	132	140	142	140	133	122	106	86.5	64.7	43.2	23.1		
115	14.8	36.7	57.5	78.4	97.4	113	125	132	135	132	126	115	101	83.0	63.6	45.3	26.1		
120	16.0	38.1	57.2	75.6	92.7	107	118	124	127	124	119	109	95.8	80.1	63.1	48.0	28.9		
125	11.1	36.3	58.0	73.5	88.5	101	111	117	119	117	112	103	91.5	77.5	63.0	51.1	31.2		
130	6.40	32.9	59.2	71.8	84.9	95.9	105	110	112	110	106	97.9	87.7	74.5	60.6	52.4	31.0		
135	5.51	29.0	58.2	67.1	80.0	91.2	98.6	103	105	103	99.5	92.7	82.3	70.7	62.3	48.7	25.1		
140	7.31	23.2	56.0	66.9	74.7	83.1	92.0	96.7	98.1	96.8	92.6	84.4	77.3	70.5	63.4	40.7	15.1		
145	10.4	15.1	43.8	65.4	73.3	78.7	83.5	86.7	88.0	87.3	84.9	80.8	75.4	69.2	62.2	31.3	8.55		
150	13.9	8.74	25.2	60.1	69.1	76.1	79.6	81.9	82.9	82.5	80.7	77.6	73.4	68.2	51.1	20.4	7.07		
155	15.1	8.34	10.3	28.8	60.1	70.7	76.1	77.6	78.6	78.3	77.1	74.5	70.6	60.2	31.7	10.1	8.45		
160	13.3	14.6	10.3	8.71	15.5	38.6	57.3	70.6	72.4	72.7	71.1	66.4	54.6	34.0	16.7	7.09	11.6		
165	8.76	16.8	14.8	11.0	8.85	9.24	8.82	23.6	35.6	37.5	34.8	28.6	23.0	12.4	8.94	7.56	13.8		
170	8.86	10.6	15.8	15.8	14.5	10.5	8.16	8.85	8.02	11.6	7.91	8.03	11.3	11.1	8.55	12.8	14.8		
175	9.25	8.33	11.3	15.1	18.0	17.5	16.8	15.6	10.5	12.2	12.9	16.0	19.1	17.5	14.7	14.9	15.5		
180	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9		

Table 7: Luminous Intensity Data

TEST RESULTS of Model 11T8/3F/8CCTS/UEB (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)	0.096	0.045
Power Factor	0.9842	0.9125
Test Power (W)	11.32	11.34
THD A%	15.13	20.54
Luminous Efficacy (lm/W)	140.1	139.3
Total Luminous Flux (lm)	1586.0	1579.3
Color Rendering Index (CRI)	85.3	
R9	18.4	
Correlated Color Temperature (CCT)(K)	3525	
Chromaticity Chroma x	0.4025	
Chromaticity Chroma y	0.3865	
Chromaticity Chroma u	0.2356	
Chromaticity Chroma v	0.3394	
Duv	-0.0013	
Chromaticity Chroma u'	0.2356	
Chromaticity Chroma v'	0.5091	

Special Color Rendering Indices	
R1	84.6
R2	93.2
R3	96.1
R4	83.3
R5	84.7
R6	90.6
R7	84.9
R8	65.3
R9	18.4
R10	83.7
R11	83.1
R12	69.1
R13	87.1
R14	98.7

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

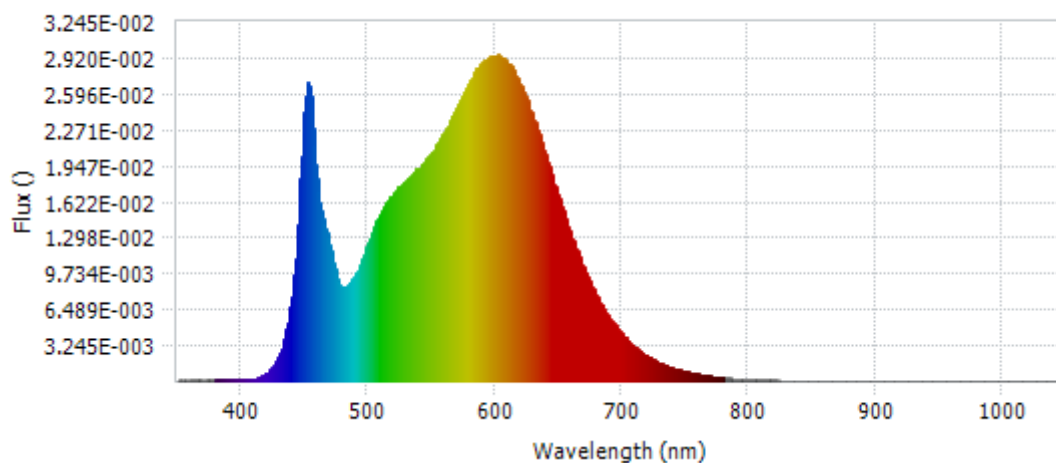
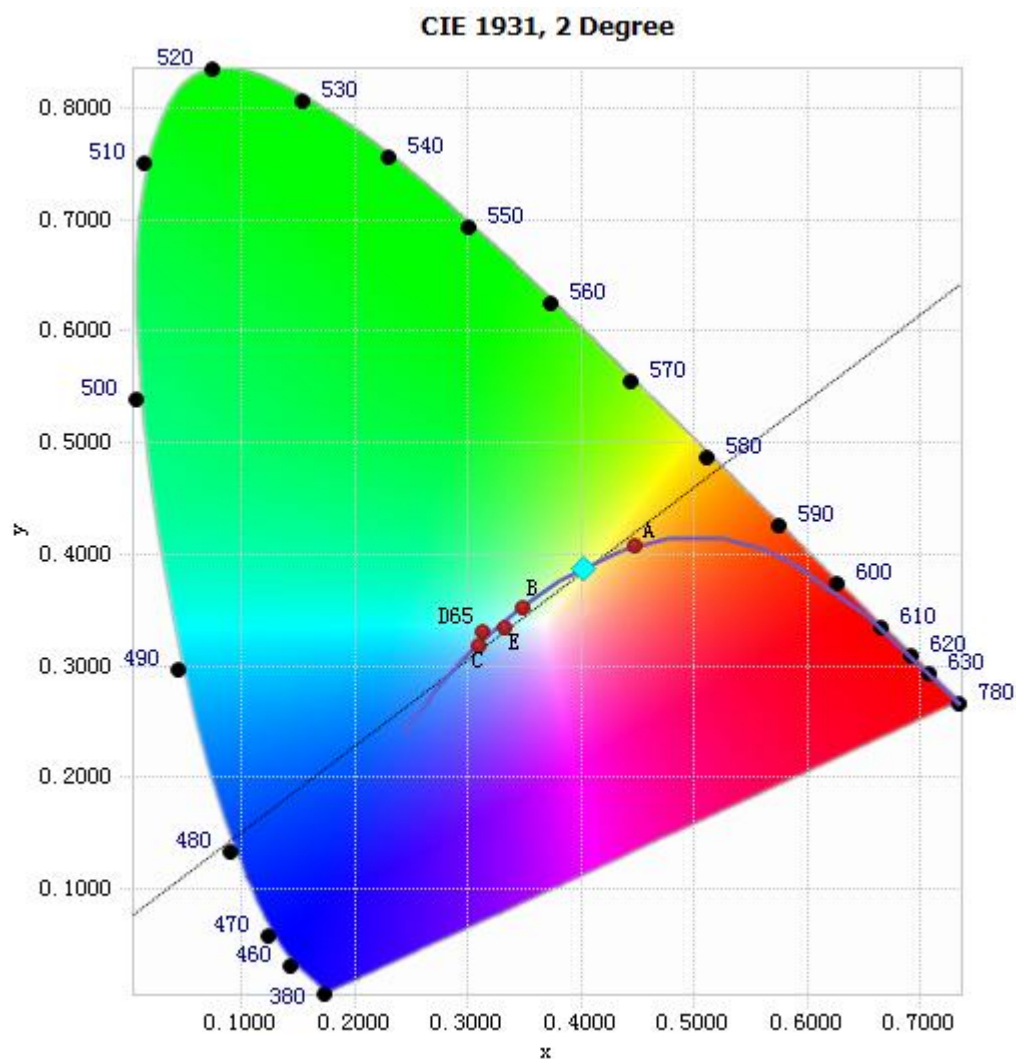


Chart 8: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.41E-04	485	8.87E-03	590	2.88E-02	695	5.03E-03
385	1.17E-04	490	9.58E-03	595	2.92E-02	700	4.31E-03
390	1.24E-04	495	1.08E-02	600	2.94E-02	705	3.69E-03
395	1.06E-04	500	1.24E-02	605	2.92E-02	710	3.15E-03
400	1.29E-04	505	1.39E-02	610	2.87E-02	715	2.68E-03
405	1.34E-04	510	1.51E-02	615	2.80E-02	720	2.29E-03
410	2.02E-04	515	1.62E-02	620	2.69E-02	725	1.95E-03
415	4.02E-04	520	1.69E-02	625	2.56E-02	730	1.66E-03
420	7.27E-04	525	1.76E-02	630	2.39E-02	735	1.43E-03
425	1.32E-03	530	1.81E-02	635	2.23E-02	740	1.20E-03
430	2.35E-03	535	1.86E-02	640	2.05E-02	745	1.03E-03
435	4.14E-03	540	1.92E-02	645	1.87E-02	750	8.81E-04
440	7.55E-03	545	1.99E-02	650	1.68E-02	755	7.51E-04
445	1.42E-02	550	2.06E-02	655	1.50E-02	760	6.41E-04
450	2.43E-02	555	2.15E-02	660	1.33E-02	765	5.49E-04
455	2.58E-02	560	2.25E-02	665	1.18E-02	770	4.67E-04
460	1.83E-02	565	2.35E-02	670	1.03E-02	775	3.96E-04
465	1.46E-02	570	2.47E-02	675	9.01E-03	780	3.42E-04
470	1.24E-02	575	2.58E-02	680	7.82E-03		
475	9.57E-03	580	2.69E-02	685	6.81E-03		
480	8.54E-03	585	2.81E-02	690	5.88E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4025, 0.3865)

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

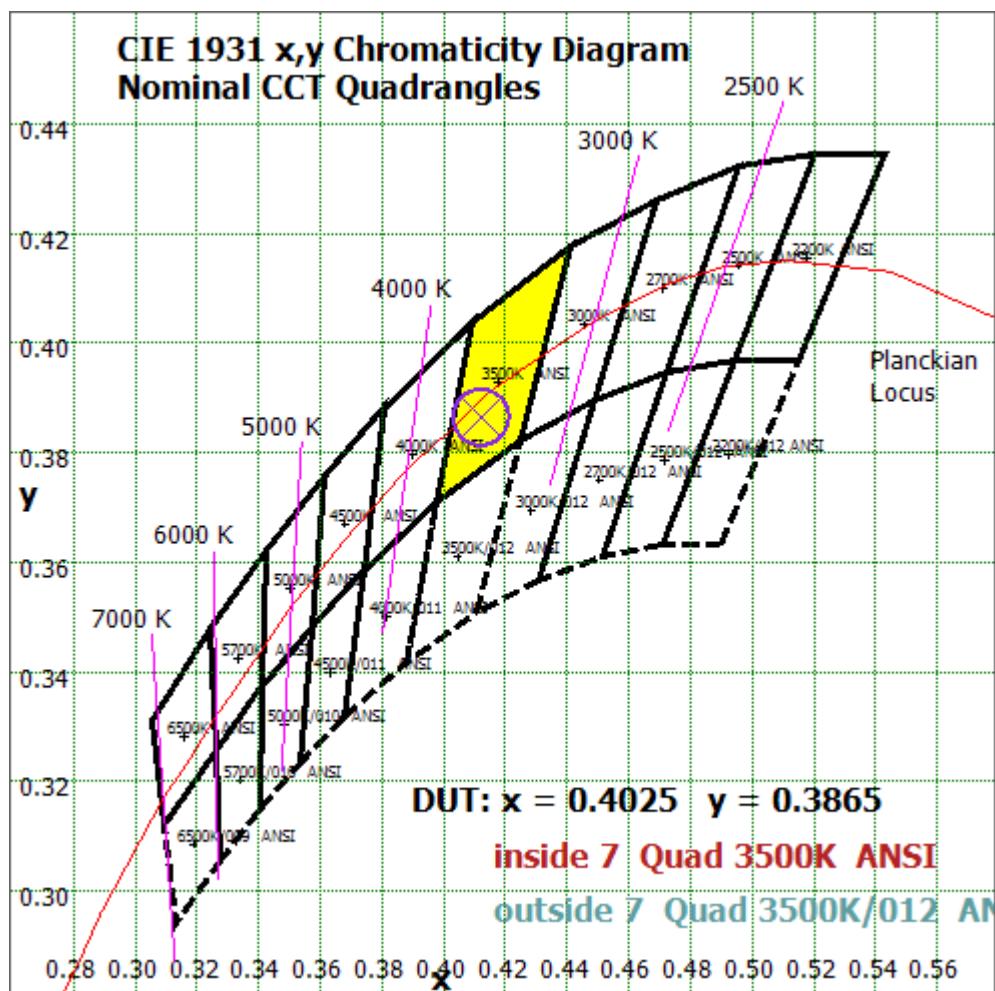


Chart 10: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

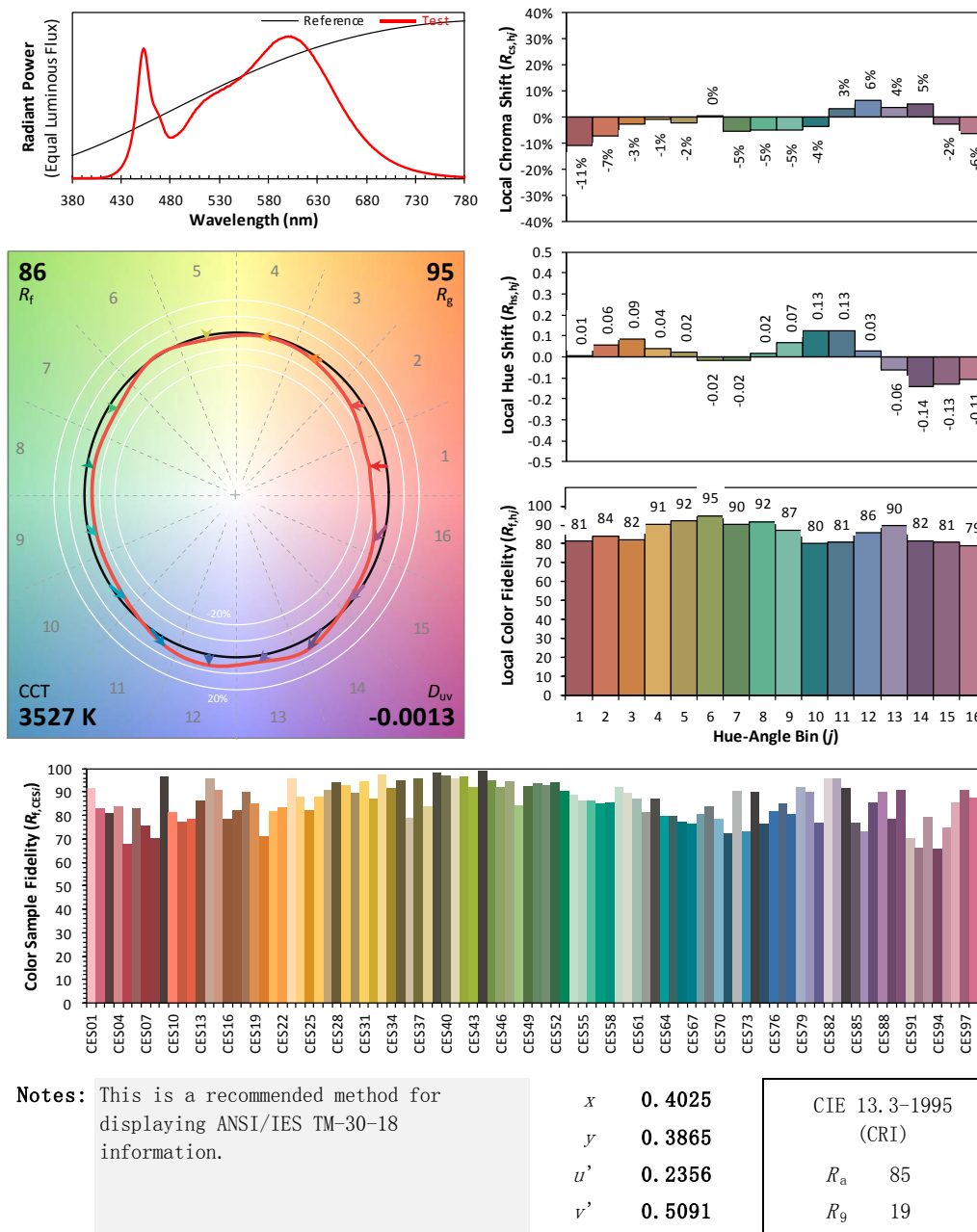
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/04/23

Model: 11T8/3F/8CCTS/UEB



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)	0.096
Power Factor	0.9842
Power (W)	11.36
Luminous Efficacy (lm/W)	140.9
Total Luminous Flux (lm)	1600.2
Beam Angle (°)	114.8 (0°-180°) / 253.9 (90°-270°)
Center Beam Candle Power (cd)	245
Maximum Beam Candle Power (cd)	246.5 (At: C=280.0, Gamma=7.5)
Spacing Criteria	1.28 (0°-180°) / 1.47 (90°-270°)
Zonal Lumens in the 0°-60° Zone	40.68%
Zonal Lumens in the 60°-90° Zone	27.13%
Zonal Lumens in the 90°-120° Zone	19.07%
Zonal Lumens in the 120°-180° Zone	13.11%

Table 10: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	23.345	1.46%
10- 20	67.96	4.25%
20- 30	106.594	6.66%
30- 40	136.266	8.52%
40- 50	154.912	9.68%
50- 60	161.96	10.12%
60- 70	158.014	9.87%
70- 80	145.929	9.12%
80- 90	130.174	8.13%
90-100	115.5	7.22%
100-110	101.789	6.36%
110-120	87.903	5.49%
120-130	73.214	4.58%
130-140	57.858	3.62%
140-150	41.712	2.61%
150-160	25.634	1.60%
160-170	9.846	0.62%
170-180	1.595	0.10%
Total	1600.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	651.037	40.68%
60- 90	434.117	27.13%
0-90	1085.15	67.81%
90- 180	515.051	32.19%
0- 180	1600.2	100%

Table 11: Zonal Lumen

Illuminance Plots- Goniophotometer Method

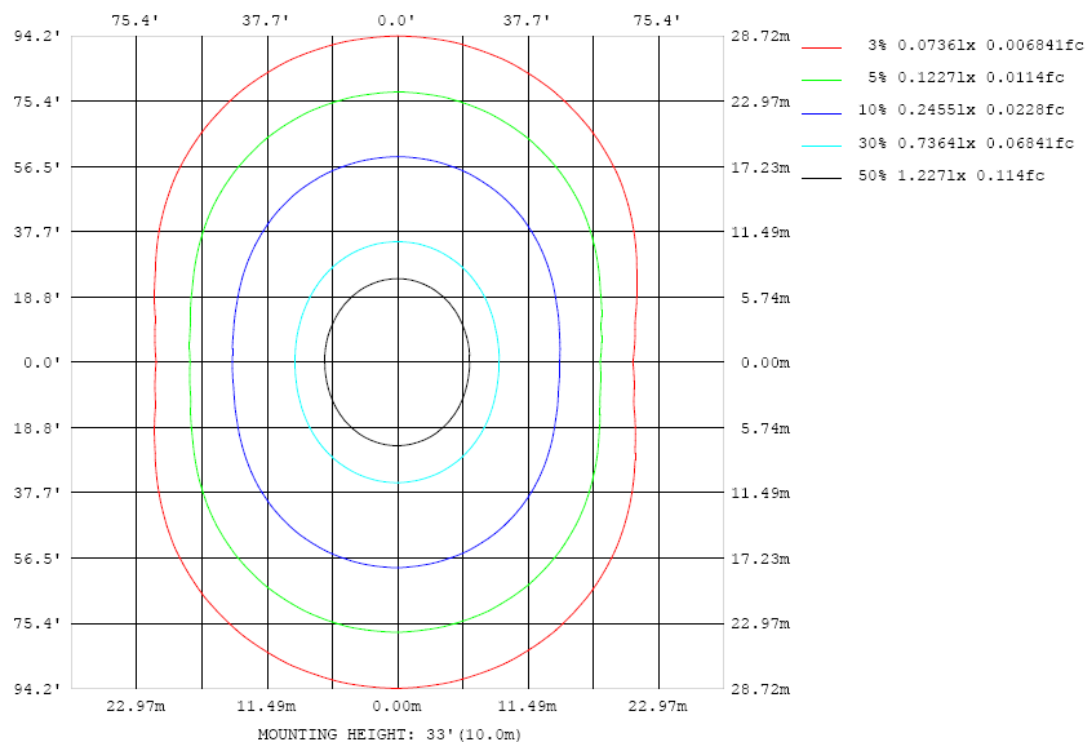


Chart 12: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

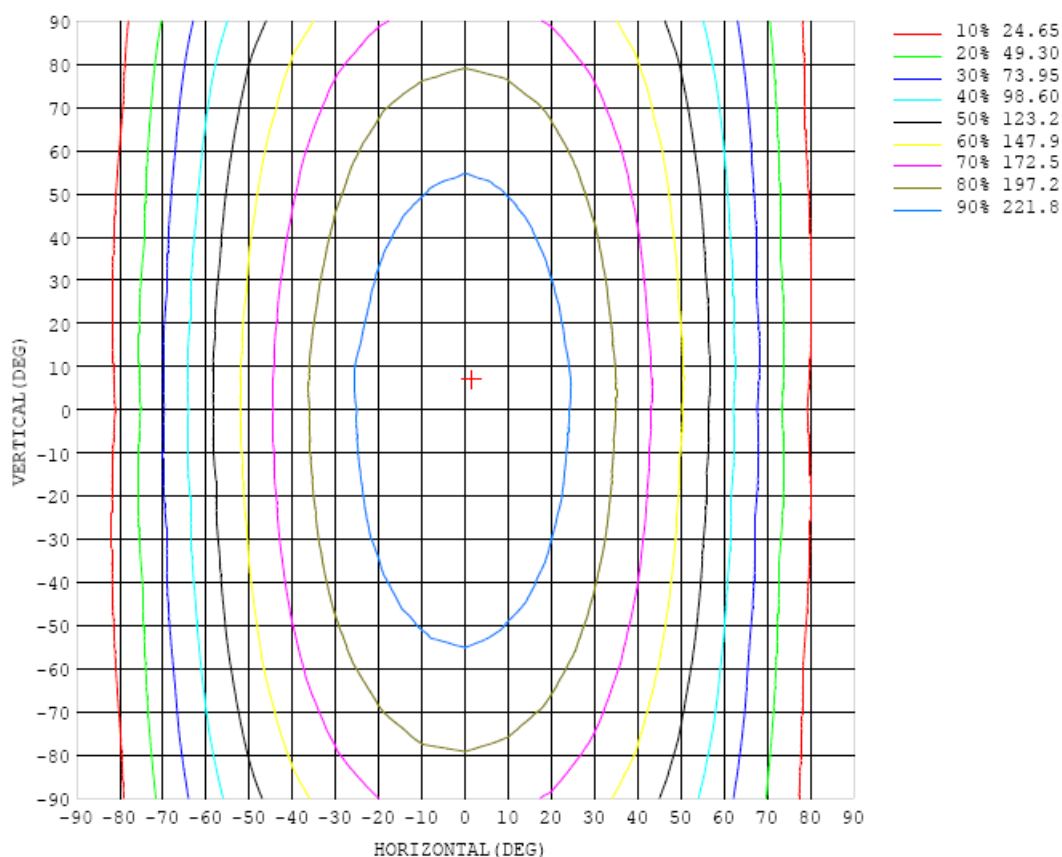


Chart 13: Isocandela Plot

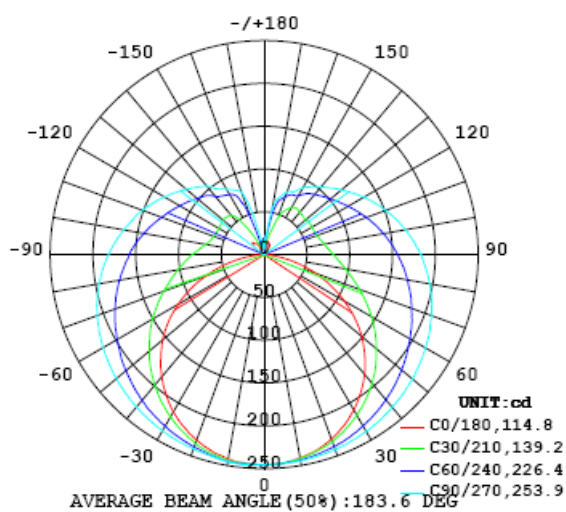


Chart 14: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245
5	245	245	244	244	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245
10	241	241	241	242	242	243	244	244	244	244	245	244	244	243	243	242	242	242	242
15	237	236	237	238	239	241	241	243	243	243	243	243	242	241	240	239	238	237	237
20	229	229	230	232	235	236	239	241	241	242	242	241	240	238	236	234	232	231	230
25	220	220	222	225	228	232	235	238	239	240	240	239	237	234	230	227	225	223	222
30	209	210	212	217	222	226	231	235	236	238	238	236	233	228	223	219	215	213	212
35	197	197	201	207	214	220	226	231	234	236	235	232	228	223	216	210	205	201	200
40	182	183	188	196	205	213	221	227	231	233	232	228	223	216	208	200	192	188	186
45	166	168	174	184	195	206	216	223	227	230	228	224	218	209	199	188	179	173	171
50	149	150	159	171	185	198	209	218	223	226	225	220	212	202	189	176	165	157	155
55	129	132	143	158	175	190	203	213	219	222	220	215	206	194	179	164	149	139	137
60	108	112	126	145	164	181	197	208	214	218	216	210	200	186	169	151	133	120	116
65	86.0	91.9	109	131	154	174	190	202	210	213	211	204	193	178	159	138	117	100	94.7
70	64.1	71.4	92.7	119	144	165	183	197	204	208	206	199	187	170	149	125	101	80.3	72.5
75	42.5	52.6	77.4	107	134	158	177	191	198	202	200	193	180	162	140	114	85.6	61.6	50.0
80	22.1	35.2	64.8	96.5	126	150	170	184	193	196	194	186	173	155	131	103	72.3	43.8	28.9
85	6.48	22.4	55.1	88.0	118	143	163	177	186	190	187	180	166	148	123	94.5	62.5	29.7	10.9
90	0.70	16.1	48.3	81.1	111	136	156	170	179	183	180	173	159	140	116	87.1	54.8	21.4	0.90
95	0.83	13.2	43.8	75.5	104	129	149	163	171	176	173	165	152	133	110	80.9	49.8	18.7	0.55
100	1.30	13.7	41.2	71.4	98.5	122	142	155	164	167	166	158	145	127	104	76.3	47.2	19.7	0.93
105	3.39	16.1	40.3	68.1	93.3	116	134	148	156	160	157	150	138	120	98.2	72.9	46.4	22.9	1.67
110	4.86	19.3	41.1	65.7	88.7	110	127	140	148	151	149	142	130	114	93.5	70.9	47.1	26.8	2.87
115	5.17	22.0	43.1	64.7	84.9	104	120	132	140	143	141	135	123	108	89.5	69.3	48.7	32.0	4.80
120	1.77	16.5	44.1	64.5	82.1	98.8	113	124	131	134	133	127	117	103	86.0	68.5	50.4	35.5	8.97
125	1.49	17.4	48.1	64.8	80.2	94.5	107	117	123	126	124	119	110	97.8	83.3	68.4	51.9	38.6	12.6
130	1.02	19.6	49.6	63.3	78.6	90.8	101	110	115	118	117	112	104	93.5	81.1	68.0	55.2	40.8	16.6
135	1.43	21.6	50.9	64.0	77.0	87.5	96.3	103	108	110	109	105	98.5	89.6	79.2	66.7	57.2	42.9	19.8
140	3.16	18.2	48.6	64.6	73.7	84.3	91.8	97.6	101	103	102	99.0	93.6	86.2	76.0	66.8	60.1	41.3	16.8
145	9.64	13.6	43.8	66.0	72.0	78.6	87.1	92.1	95.3	96.9	96.2	93.4	88.7	81.3	73.9	68.2	60.6	40.5	15.6
150	12.7	12.8	41.2	63.3	71.5	75.7	79.6	85.1	88.6	90.2	89.5	86.7	81.5	76.6	73.0	67.4	56.8	32.9	9.40
155	14.3	10.1	27.2	56.5	68.2	73.5	77.2	79.1	80.1	81.0	80.6	79.8	78.2	75.1	69.1	61.7	51.7	25.7	7.36
160	14.7	11.1	20.1	43.1	61.7	68.2	71.8	74.9	76.7	77.9	77.6	76.1	73.5	68.8	64.0	56.9	38.6	21.2	10.3
165	15.1	11.5	14.6	25.2	43.3	57.3	65.0	67.6	68.7	69.3	69.0	67.7	66.1	62.4	55.1	40.6	24.6	13.2	6.33
170	16.6	14.6	11.2	17.1	21.1	28.3	38.4	46.2	51.2	53.4	53.3	50.8	45.8	38.1	29.3	20.8	15.3	9.95	7.91
175	17.5	16.3	12.3	10.5	13.3	16.6	18.1	19.2	20.1	20.6	20.8	20.3	18.6	16.3	13.8	11.0	7.86	8.46	10.0
180	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5

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	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245		
5	244	245	245	245	245	245	246	246	246	246	246	246	246	246	245	245	245		
10	242	242	243	244	245	245	245	245	246	245	245	245	244	244	243	242	242		
15	238	239	240	241	242	242	243	243	243	243	243	242	241	240	239	238	237		
20	232	234	235	236	237	239	240	241	241	241	240	238	236	235	234	232	230		
25	224	226	227	230	233	235	237	239	240	239	237	235	232	229	226	224	222		
30	214	216	219	223	227	231	234	237	237	237	234	231	226	222	217	213	211		
35	202	205	210	215	222	227	231	234	235	234	231	226	220	214	207	202	199		
40	188	193	199	207	215	222	227	231	232	231	227	221	213	205	196	189	184		
45	173	179	188	197	208	216	223	227	229	227	223	216	206	195	184	175	169		
50	158	164	175	188	200	211	219	223	225	223	218	210	199	186	172	160	153		
55	140	149	163	178	192	205	214	219	221	220	213	203	191	176	160	145	134		
60	121	133	151	167	184	198	209	215	217	215	208	197	183	165	147	128	114		
65	101	117	138	158	176	192	203	210	213	210	203	191	175	156	134	112	93.7		
70	80.1	100	125	149	168	185	198	205	208	205	197	184	167	147	122	95.6	73.4		
75	59.9	84.3	113	139	161	179	191	199	202	199	191	178	160	137	110	80.5	53.9		
80	41.7	70.8	102	131	154	172	186	193	196	193	185	171	153	129	99.8	67.8	37.0		
85	27.2	59.7	92.8	122	146	164	178	186	189	186	178	164	146	121	91.3	58.0	24.7		
90	18.2	50.5	84.0	114	139	158	171	179	182	179	171	158	139	114	84.3	51.3	18.7		
95	11.6	42.8	76.1	106	131	151	163	171	174	172	163	151	132	108	78.4	47.1	17.4		
100	11.2	37.8	69.4	98.5	123	143	156	164	167	164	157	144	125	102	74.0	45.1	18.7		
105	12.4	37.0	64.9	92.0	116	135	149	157	159	157	149	136	119	96.5	70.9	44.9	21.4		
110	14.1	37.7	62.8	87.4	109	128	141	149	151	149	142	129	113	92.1	68.8	46.0	24.6		
115	15.8	39.2	61.6	83.7	104	121	133	140	143	141	134	122	107	88.3	67.6	48.2	27.8		
120	17.2	40.8	61.1	80.8	98.9	114	125	132	135	133	126	116	102	85.1	67.1	51.0	30.8		
125	12.4	38.9	61.9	78.5	94.4	108	118	124	127	125	119	110	97.5	82.5	67.0	54.3	33.2		
130	7.11	35.2	63.2	76.6	90.5	102	111	116	119	117	112	104	93.4	79.3	64.4	55.7	33.1		
135	5.96	31.0	62.1	71.7	85.3	97.3	105	109	111	110	106	98.6	87.7	75.1	66.1	52.0	26.9		
140	7.82	24.9	59.9	71.4	79.7	88.7	97.9	103	104	103	98.3	89.6	82.3	74.9	67.2	43.5	16.4		
145	11.1	16.4	47.5	69.8	78.1	84.1	89.0	92.2	93.7	92.9	90.2	85.9	80.3	73.4	66.2	33.5	9.20		
150	14.9	9.50	27.4	64.4	73.7	81.1	84.9	87.1	88.3	87.8	85.7	82.5	78.1	72.4	54.7	22.1	7.57		
155	16.1	8.45	11.0	31.4	64.3	75.3	80.9	82.2	83.5	83.3	81.8	79.2	75.2	64.2	34.2	11.0	9.01		
160	14.2	15.4	11.0	9.14	17.0	41.7	61.8	75.2	77.2	77.4	75.4	71.1	58.8	36.6	17.8	7.57	12.2		
165	9.32	17.9	15.5	11.5	9.58	9.76	9.36	25.7	38.6	40.6	37.7	30.9	24.8	13.3	9.52	7.96	14.5		
170	9.42	11.6	16.8	16.7	15.1	10.8	7.65	9.28	8.65	12.1	8.49	7.86	11.7	11.8	8.82	13.3	15.5		
175	9.53	8.93	12.6	16.7	18.8	18.1	17.4	16.5	10.9	12.8	13.1	16.2	19.8	18.6	15.5	15.6	16.3		
180	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5		

Table 13: Luminous Intensity Data

TEST RESULTS of Model 11T8/3F/8CCTS/UEB (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)	0.095	0.044
Power Factor	0.9846	0.9106
Test Power (W)	11.17	11.19
THD A%	14.82	20.81
Luminous Efficacy (lm/W)	144.9	144.4
Total Luminous Flux (lm)	1618.1	1615.4
Color Rendering Index (CRI)	86.2	
R9	23.1	
Correlated Color Temperature (CCT)(K)	3975	
Chromaticity Chroma x	0.3800	
Chromaticity Chroma y	0.3721	
Chromaticity Chroma u	0.2267	
Chromaticity Chroma v	0.3330	
Duv	-0.0021	
Chromaticity Chroma u'	0.2267	
Chromaticity Chroma v'	0.4994	

Special Color Rendering Indices	
R1	85.6
R2	93.1
R3	96.1
R4	84.6
R5	85.5
R6	89.3
R7	86.5
R8	68.8
R9	23.1
R10	82.8
R11	84.3
R12	66.4
R13	87.9
R14	98.5

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

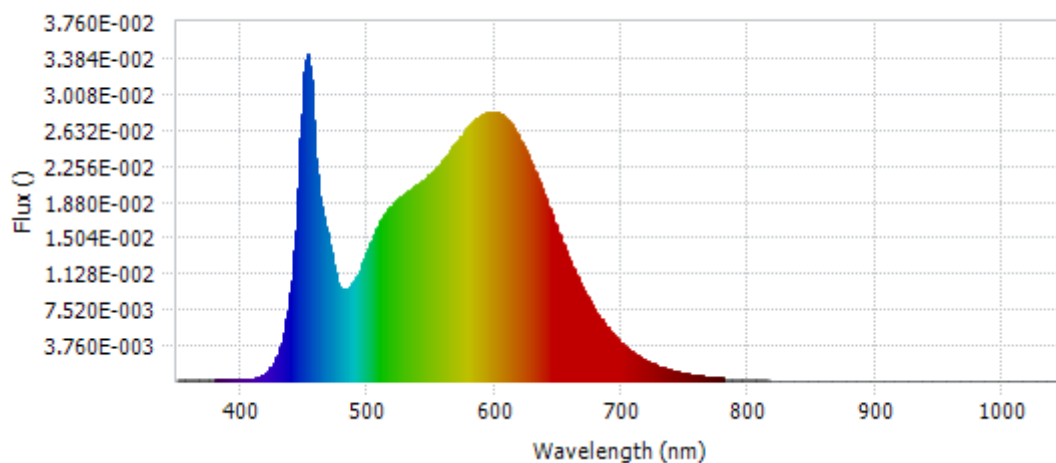
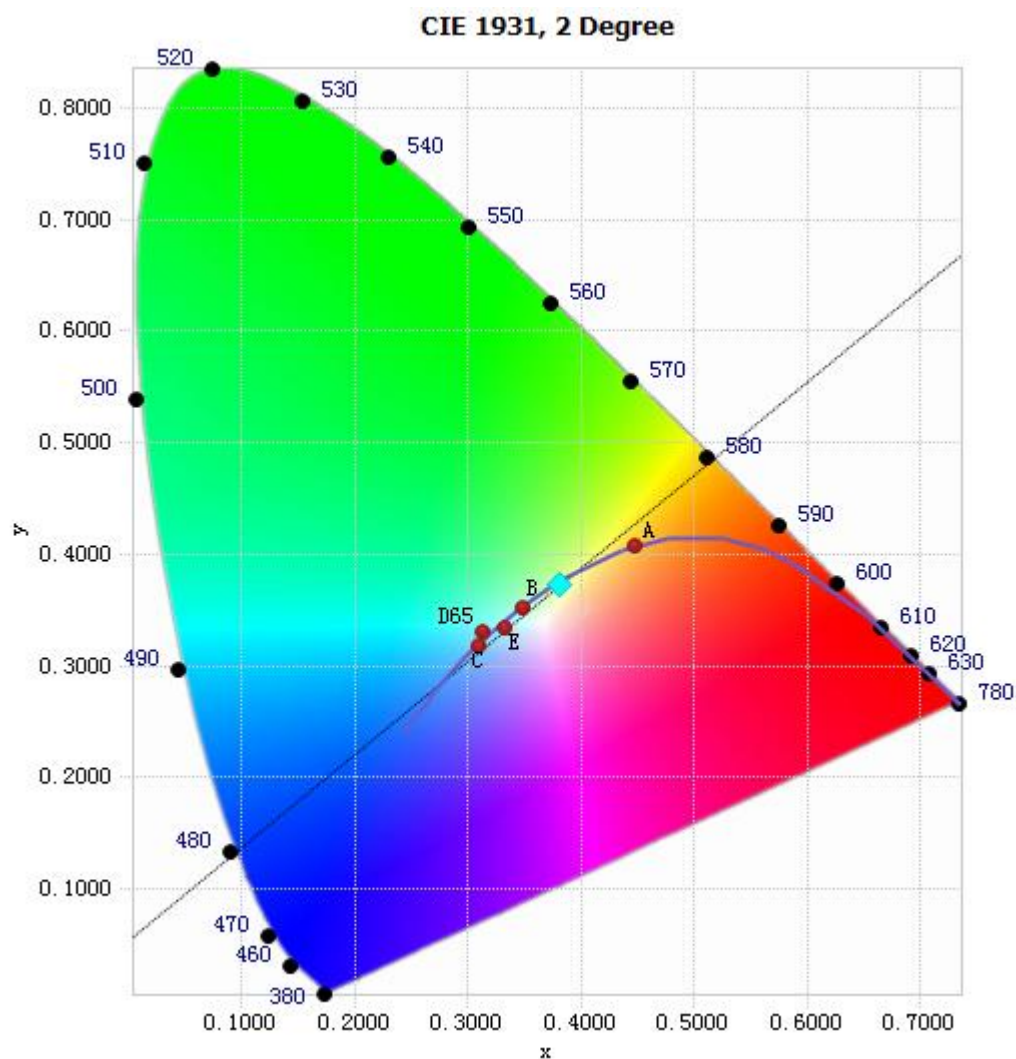


Chart 15: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.73E-04	485	9.85E-03	590	2.80E-02	695	4.65E-03
385	1.40E-04	490	1.06E-02	595	2.82E-02	700	3.97E-03
390	1.58E-04	495	1.20E-02	600	2.82E-02	705	3.40E-03
395	1.29E-04	500	1.38E-02	605	2.79E-02	710	2.90E-03
400	1.38E-04	505	1.53E-02	610	2.73E-02	715	2.48E-03
405	1.54E-04	510	1.67E-02	615	2.65E-02	720	2.11E-03
410	2.66E-04	515	1.79E-02	620	2.52E-02	725	1.81E-03
415	4.97E-04	520	1.85E-02	625	2.40E-02	730	1.54E-03
420	9.37E-04	525	1.92E-02	630	2.24E-02	735	1.30E-03
425	1.75E-03	530	1.97E-02	635	2.08E-02	740	1.12E-03
430	3.25E-03	535	2.02E-02	640	1.91E-02	745	9.43E-04
435	5.82E-03	540	2.06E-02	645	1.74E-02	750	8.13E-04
440	1.06E-02	545	2.13E-02	650	1.56E-02	755	6.95E-04
445	2.01E-02	550	2.18E-02	655	1.40E-02	760	5.85E-04
450	3.23E-02	555	2.25E-02	660	1.24E-02	765	5.11E-04
455	3.16E-02	560	2.32E-02	665	1.10E-02	770	4.33E-04
460	2.17E-02	565	2.41E-02	670	9.53E-03	775	3.69E-04
465	1.73E-02	570	2.50E-02	675	8.31E-03	780	3.11E-04
470	1.42E-02	575	2.59E-02	680	7.22E-03		
475	1.08E-02	580	2.67E-02	685	6.27E-03		
480	9.60E-03	585	2.75E-02	690	5.42E-03		

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

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3800, 0.3721)

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

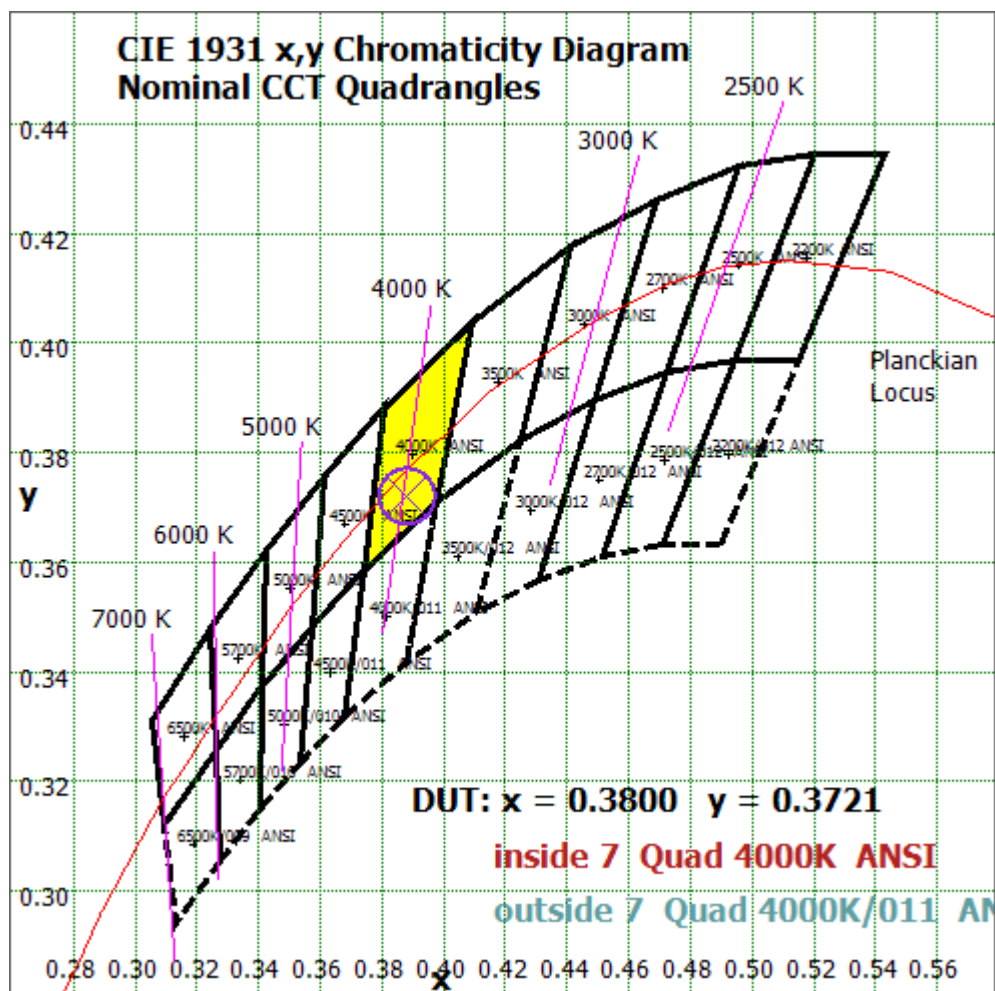


Chart17: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

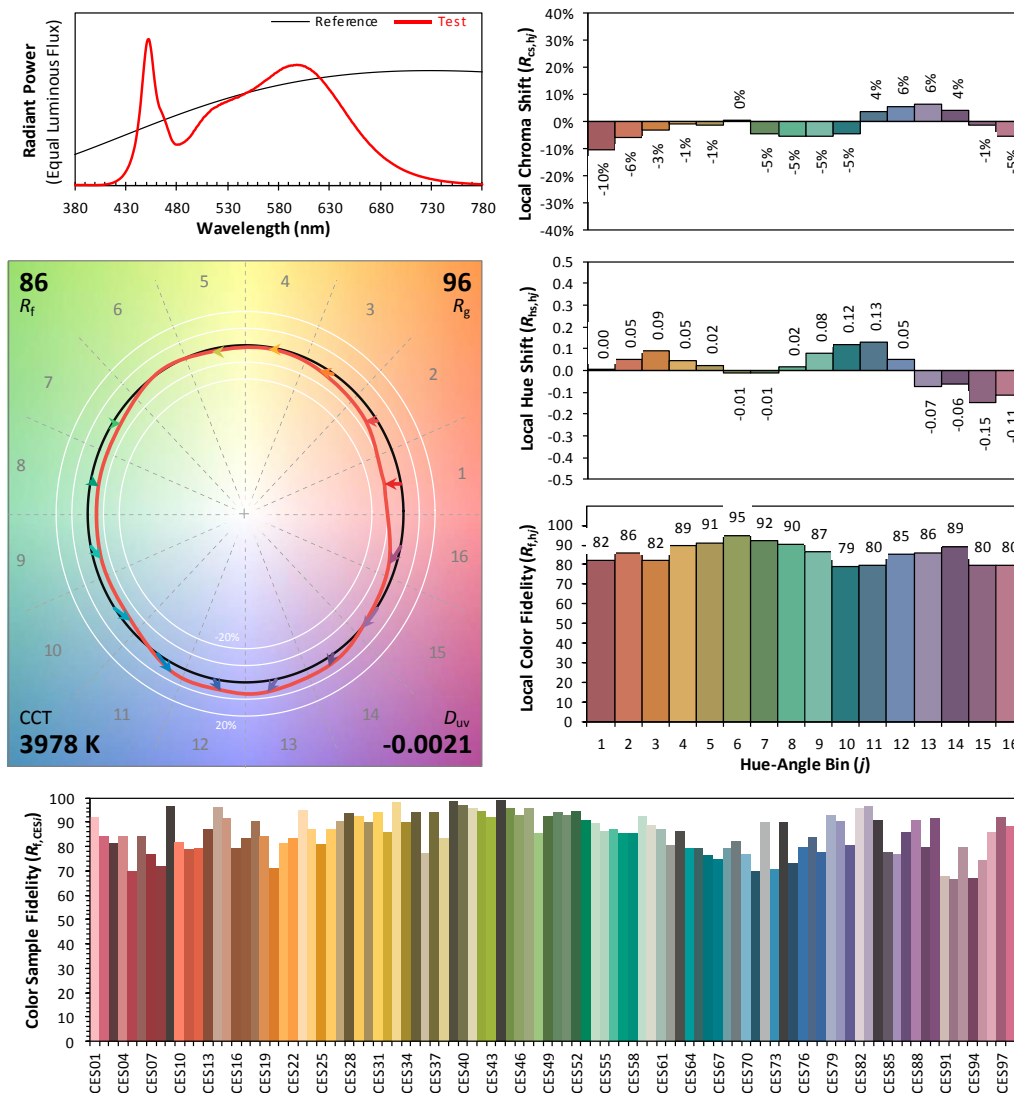
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/04/23

Model: 11T8/3F/8CCTS/UEB



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

x 0.3800
 y 0.3721
 u' 0.2267
 v' 0.4994

CIE 13.3-1995
(CRI)

R_a 86
 R_g 23

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.

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)	0.095
Power Factor	0.9846
Power (W)	11.18
Luminous Efficacy (lm/W)	145.9
Total Luminous Flux (lm)	1631.7
Beam Angle (°)	114.7 (0°-180°) / 253.8 (90°-270°)
Center Beam Candle Power (cd)	250
Maximum Beam Candle Power (cd)	251.0 (At: C=260.0, Gamma=9.0)
Spacing Criteria	1.28 (0°-180°) / 1.48 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	40.65%
Zonal Lumens in the 60 °-90 °Zone	27.13%
Zonal Lumens in the 90 °-120 °Zone	19.08%
Zonal Lumens in the 120 °-180 °Zone	13.14%

Table 16: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	23.759	1.46%
10- 20	69.239	4.24%
20- 30	108.597	6.66%
30- 40	138.832	8.51%
40- 50	157.841	9.67%
50- 60	165.03	10.11%
60- 70	161.079	9.87%
70- 80	148.758	9.12%
80- 90	132.813	8.14%
90-100	117.876	7.22%
100-110	103.853	6.36%
110-120	89.67	5.50%
120-130	74.778	4.58%
130-140	59.184	3.63%
140-150	42.655	2.61%
150-160	26.348	1.61%
160-170	10.042	0.62%
170-180	1.387	0.09%
Total	1631.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	663.298	40.65%
60- 90	442.65	27.13%
0-90	1105.95	67.78%
90- 180	525.793	32.22%
0- 180	1631.7	100%

Table 17: Zonal Lumen

Illuminance Plots- Goniophotometer Method

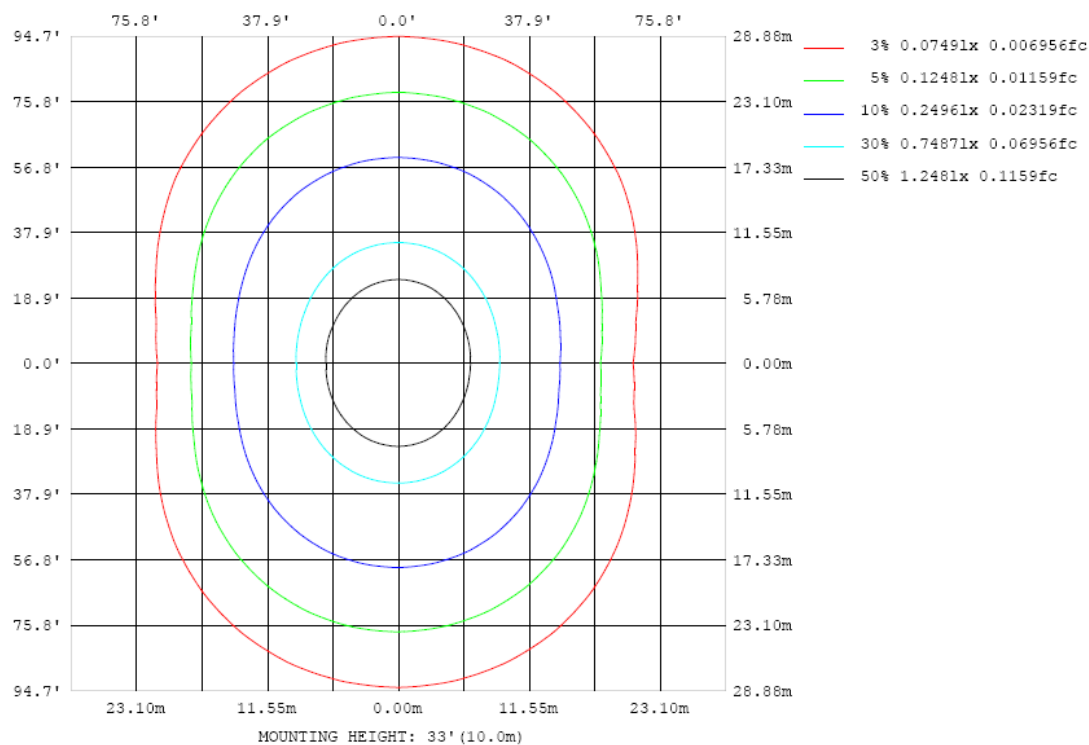


Chart 19: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

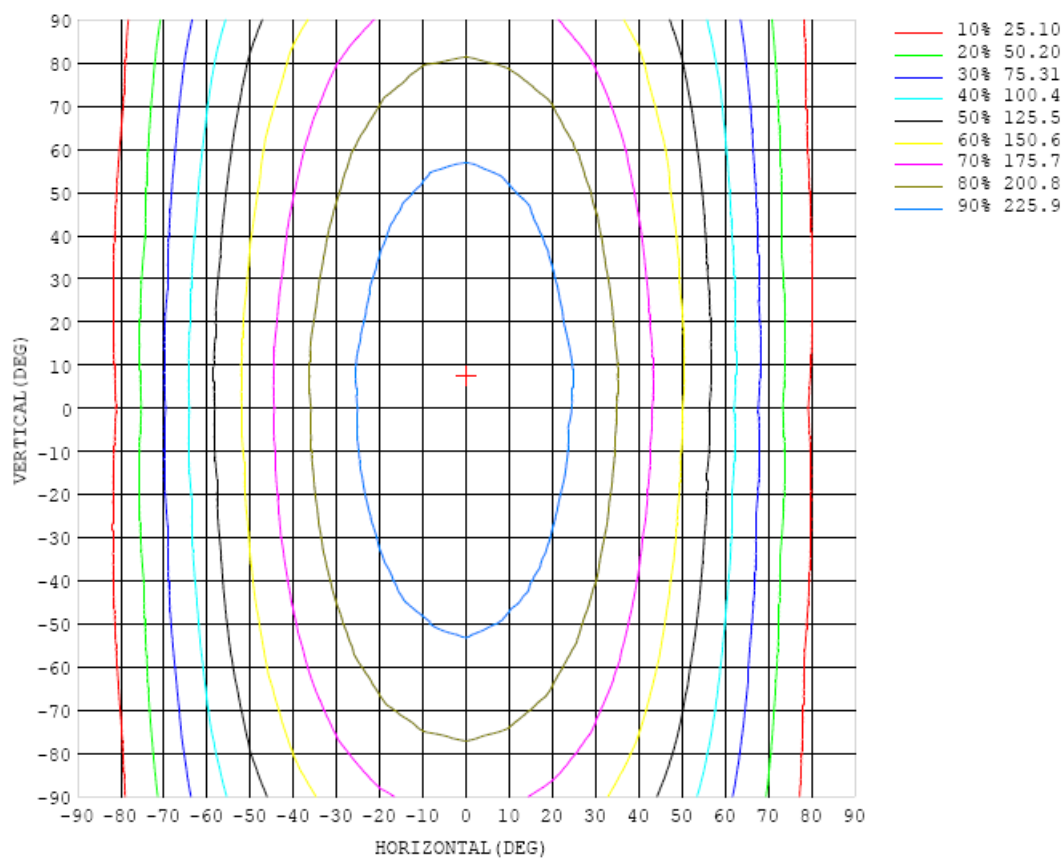


Chart 20: Isocandela Plot

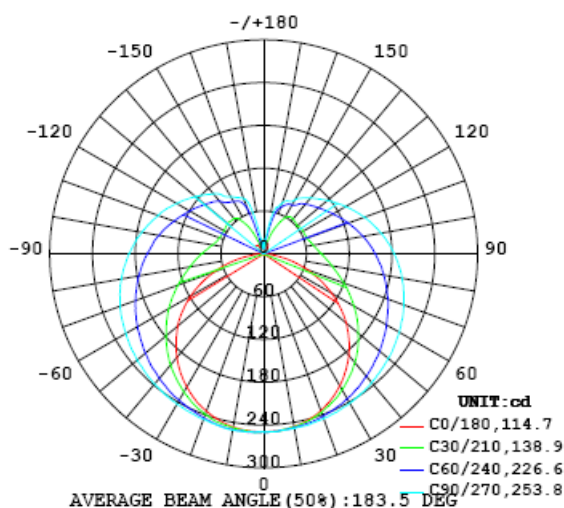


Chart 21: Polar Candela Distribution

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	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
5	249	249	249	249	249	249	249	249	249	249	250	249	250	249	249	249	249	249	248
10	246	246	245	246	247	247	248	248	248	248	249	249	248	248	247	247	246	246	246
15	241	240	241	243	242	244	245	247	247	248	247	247	246	245	244	243	243	242	241
20	234	233	234	237	238	240	242	244	246	246	245	245	243	241	239	238	237	235	235
25	225	224	226	229	232	236	239	242	243	244	244	242	240	237	234	231	229	227	226
30	214	213	216	220	224	230	234	238	240	242	241	239	236	231	227	223	219	217	216
35	200	201	205	210	216	223	230	234	237	238	237	235	231	225	219	214	208	205	203
40	186	186	191	199	208	216	224	231	234	236	234	231	226	219	211	203	196	191	189
45	169	171	177	187	198	208	218	226	230	232	231	227	220	211	202	191	182	176	174
50	151	153	162	173	188	200	212	221	226	228	226	222	215	204	192	179	167	160	157
55	131	134	145	160	176	192	206	215	221	224	223	217	208	196	181	166	152	141	139
60	110	114	128	146	166	184	199	210	217	220	218	212	202	188	171	153	135	122	118
65	87.3	93.2	111	133	155	175	192	204	211	215	213	206	195	179	160	140	119	102	96.3
70	65.2	72.4	94.0	120	145	167	186	198	206	209	207	200	188	171	150	127	102	81.7	73.6
75	43.3	53.2	78.5	108	136	159	178	192	200	203	201	194	181	163	141	115	86.8	62.3	51.1
80	22.3	35.6	66.1	97.3	126	151	171	185	194	197	195	188	174	156	132	104	73.1	44.4	29.4
85	6.21	22.7	55.7	88.3	119	144	164	178	187	190	188	180	167	148	124	95.1	62.9	30.1	11.1
90	0.78	16.1	48.5	80.8	111	136	156	171	180	183	181	173	160	140	116	87.5	55.0	21.6	0.97
95	0.88	12.8	43.6	75.0	104	129	149	163	172	175	173	166	152	133	109	81.0	49.8	18.7	0.48
100	1.95	13.2	40.5	70.6	98.2	122	141	155	164	167	165	158	145	126	103	76.0	46.8	19.4	0.67
105	4.46	15.4	39.7	67.2	92.7	115	134	147	155	159	157	150	137	120	97.7	72.3	45.9	22.5	1.08
110	4.76	18.4	40.5	64.7	87.9	109	126	139	147	150	148	142	130	113	92.6	70.3	46.4	26.5	1.76
115	3.98	20.0	42.3	63.9	84.2	103	119	131	138	142	140	133	122	107	88.5	68.6	48.1	31.1	2.76
120	2.10	12.8	42.9	63.7	81.6	97.8	112	123	130	133	131	126	115	102	85.0	67.8	49.4	34.2	6.10
125	2.41	13.3	46.7	63.6	79.6	93.6	106	116	122	124	123	118	109	96.7	82.3	67.7	51.5	37.2	9.32
130	2.23	13.9	47.7	61.5	78.0	90.1	101	109	114	116	115	111	103	92.4	80.1	66.7	54.2	39.0	12.9
135	2.65	14.7	48.0	63.1	75.4	86.9	95.6	103	107	109	108	104	97.5	88.7	78.0	66.5	56.2	39.8	16.1
140	4.37	11.7	40.3	63.8	72.8	82.9	91.0	96.8	100	102	101	98.1	92.6	85.1	74.1	66.4	58.8	34.1	14.7
145	9.42	11.8	32.5	63.8	72.2	77.1	85.2	91.3	94.4	95.6	95.0	92.2	87.3	79.0	73.0	67.0	57.5	31.4	14.6
150	11.6	12.0	28.4	57.3	69.9	75.9	79.3	82.1	85.6	87.4	86.4	83.3	80.4	77.2	71.3	64.8	50.8	22.8	10.9
155	14.4	11.2	15.9	43.5	65.1	71.5	76.6	79.4	81.0	81.8	81.5	80.2	77.8	72.9	66.2	59.0	40.6	15.5	10.4
160	15.2	13.6	14.1	27.6	50.2	64.7	69.2	72.3	74.8	75.5	75.1	73.1	69.9	66.7	60.3	46.3	28.6	14.3	10.5
165	15.1	14.5	10.4	17.4	27.0	43.0	55.8	62.0	65.8	67.1	66.9	64.7	60.5	53.6	41.0	28.1	16.6	7.25	7.88
170	15.5	16.5	14.9	11.8	16.4	20.5	23.9	29.2	34.4	37.0	37.4	35.2	30.5	23.7	17.2	14.3	9.13	7.73	9.86
175	15.6	16.6	17.2	18.0	15.8	12.1	10.9	12.2	13.7	14.7	14.5	12.7	9.42	7.68	8.14	9.20	10.0	9.11	10.5
180	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34

Table 18: 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	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250		
5	249	249	250	250	251	251	250	250	250	250	250	250	250	249	249	249	249		
10	246	247	248	249	250	250	251	251	251	250	250	250	249	248	247	247	246		
15	242	242	245	246	248	248	249	249	249	248	248	248	246	245	244	242	241		
20	236	237	239	241	243	245	246	247	247	246	245	244	242	240	238	236	235		
25	228	230	232	235	238	241	243	245	245	244	243	240	236	233	231	228	226		
30	218	221	224	228	232	237	241	243	243	242	240	236	231	226	221	218	215		
35	206	210	214	220	227	233	237	240	241	239	237	232	225	218	212	206	203		
40	192	197	203	212	220	228	233	237	238	236	233	226	218	209	201	193	189		
45	177	183	192	202	213	223	230	234	235	233	229	221	211	200	189	179	173		
50	160	168	179	192	206	216	225	230	232	229	224	215	204	190	176	163	156		
55	143	153	166	182	197	210	220	226	228	225	220	210	196	180	163	148	138		
60	124	137	154	172	189	204	215	222	223	221	215	203	188	169	151	131	117		
65	103	120	141	162	181	198	210	217	219	216	209	197	180	160	137	114	95.9		
70	81.9	103	128	153	174	191	204	212	214	211	204	190	172	151	125	97.9	75.1		
75	61.5	86.8	116	144	166	185	198	206	209	206	198	184	165	141	113	82.6	55.1		
80	42.9	72.9	105	135	158	178	192	200	203	200	191	177	157	133	103	69.6	37.8		
85	28.2	61.8	95.9	127	152	171	185	193	196	193	185	170	151	125	94.6	59.8	25.3		
90	19.2	52.9	87.2	118	144	163	178	186	189	186	178	163	144	118	87.5	53.1	19.3		
95	12.6	45.3	79.4	110	136	156	170	179	181	179	170	156	137	112	82.0	49.1	18.3		
100	12.3	40.1	72.9	103	129	149	163	171	174	171	163	150	130	106	77.8	47.2	19.9		
105	14.0	39.4	68.3	97.0	122	142	156	163	166	163	156	143	124	101	74.5	47.0	23.2		
110	16.3	40.3	66.1	92.2	115	134	148	155	158	156	148	135	118	96.6	72.4	48.2	27.0		
115	18.9	42.0	65.0	88.4	109	127	140	147	150	147	141	128	112	92.7	71.2	50.4	31.0		
120	21.1	44.0	64.5	85.3	104	120	132	139	141	139	133	122	107	89.6	70.7	53.4	35.2		
125	16.6	44.5	65.2	82.8	99.5	114	124	131	133	131	125	115	102	87.0	71.0	56.6	39.0		
130	9.32	43.6	66.1	80.9	95.5	108	117	123	125	123	118	109	98.3	84.2	67.8	58.9	40.8		
135	6.56	42.2	65.1	76.2	91.3	103	111	115	117	116	111	104	93.4	79.3	69.3	57.4	35.9		
140	6.72	37.7	64.8	74.3	84.3	96.5	104	108	110	109	105	97.4	86.4	78.2	70.4	53.5	24.8		
145	8.57	28.2	59.1	74.2	81.8	88.1	94.0	97.9	99.4	98.0	94.7	89.9	83.9	77.2	70.7	47.6	14.6		
150	12.4	14.5	45.1	71.9	79.4	84.9	88.9	91.5	92.8	91.9	90.0	86.4	81.7	76.7	65.8	37.5	10.7		
155	14.2	7.07	23.4	53.1	74.3	81.5	84.5	86.3	87.2	87.1	85.6	82.9	79.7	73.7	52.2	22.2	7.93		
160	17.6	12.6	10.1	16.3	40.9	66.7	78.9	81.9	82.5	82.6	81.6	78.8	73.0	55.6	31.2	12.5	8.09		
165	17.3	16.1	10.3	11.0	9.90	14.3	32.3	53.7	62.4	63.9	60.9	52.7	40.1	26.4	15.4	8.87	9.83		
170	13.3	17.8	16.2	12.3	9.61	10.7	11.3	9.09	19.0	23.0	22.0	18.6	11.9	8.64	9.97	9.38	12.2		
175	14.3	16.1	16.5	17.1	17.1	17.9	18.2	16.6	11.1	10.6	17.3	13.5	11.0	10.1	14.1	17.8	16.6		
180	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34	8.34		

Table 19: Luminous Intensity Data

TEST RESULTS of Model 11T8/3F/8CCTS/UEB (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)	0.096	0.045
Power Factor	0.9841	0.9132
Test Power (W)	11.37	11.36
THD A%	15.11	20.46
Luminous Efficacy (lm/W)	143.3	142.8
Total Luminous Flux (lm)	1629.0	1621.8
Color Rendering Index (CRI)	85.9	
R9	22.1	
Correlated Color Temperature (CCT)(K)	5033	
Chromaticity Chroma x	0.3439	
Chromaticity Chroma y	0.3490	
Chromaticity Chroma u	0.2116	
Chromaticity Chroma v	0.3222	
Duv	-0.0008	
Chromaticity Chroma u'	0.2116	
Chromaticity Chroma v'	0.4832	

Special Color Rendering Indices	
R1	85.3
R2	90.9
R3	93.5
R4	85.8
R5	85.7
R6	86.1
R7	87.8
R8	71.7
R9	22.1
R10	77.5
R11	85.7
R12	65.3
R13	87
R14	96.7

Table 20: 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

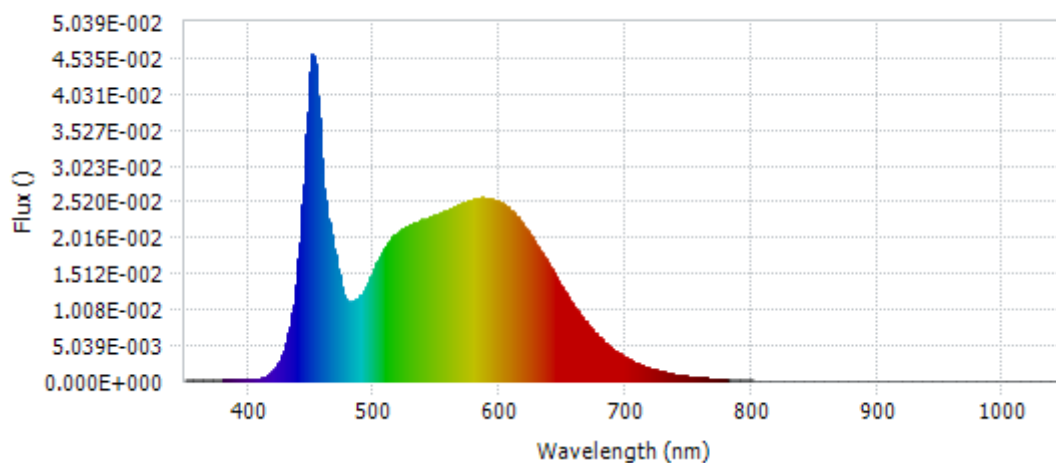
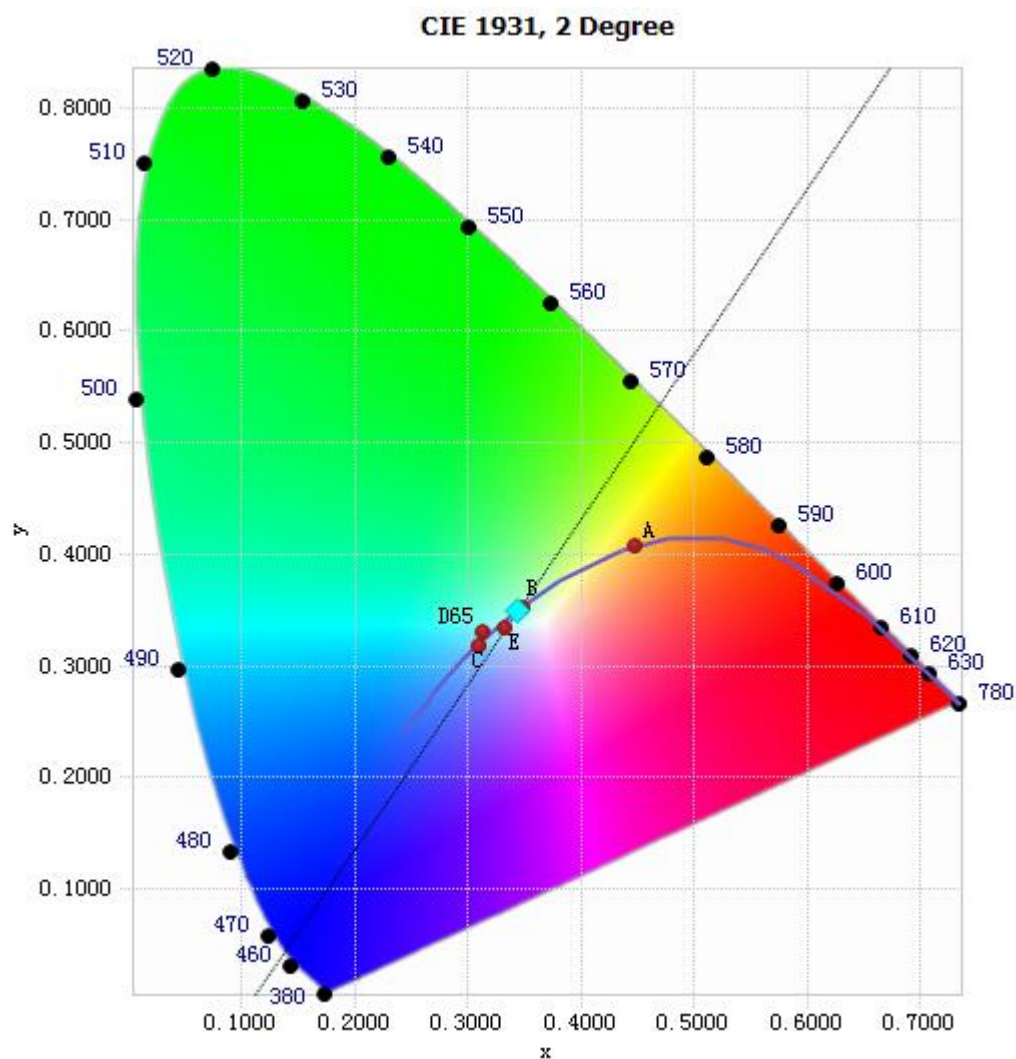


Chart 22: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.02E-04	485	1.13E-02	590	2.57E-02	695	3.83E-03
385	1.78E-04	490	1.21E-02	595	2.54E-02	700	3.29E-03
390	1.82E-04	495	1.38E-02	600	2.51E-02	705	2.80E-03
395	1.79E-04	500	1.58E-02	605	2.45E-02	710	2.40E-03
400	1.65E-04	505	1.75E-02	610	2.36E-02	715	2.06E-03
405	2.10E-04	510	1.90E-02	615	2.27E-02	720	1.74E-03
410	3.69E-04	515	2.03E-02	620	2.15E-02	725	1.50E-03
415	7.67E-04	520	2.09E-02	625	2.03E-02	730	1.28E-03
420	1.57E-03	525	2.16E-02	630	1.89E-02	735	1.08E-03
425	2.89E-03	530	2.20E-02	635	1.74E-02	740	9.32E-04
430	5.30E-03	535	2.23E-02	640	1.60E-02	745	7.84E-04
435	9.50E-03	540	2.27E-02	645	1.44E-02	750	6.81E-04
440	1.72E-02	545	2.31E-02	650	1.29E-02	755	5.85E-04
445	3.11E-02	550	2.33E-02	655	1.15E-02	760	5.02E-04
450	4.51E-02	555	2.37E-02	660	1.02E-02	765	4.26E-04
455	3.99E-02	560	2.41E-02	665	9.00E-03	770	3.61E-04
460	2.69E-02	565	2.45E-02	670	7.87E-03	775	3.07E-04
465	2.13E-02	570	2.49E-02	675	6.86E-03	780	2.68E-04
470	1.67E-02	575	2.53E-02	680	5.98E-03		
475	1.24E-02	580	2.55E-02	685	5.17E-03		
480	1.11E-02	585	2.58E-02	690	4.47E-03		

Table 21: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3439, 0.3490)

Chart 23: 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

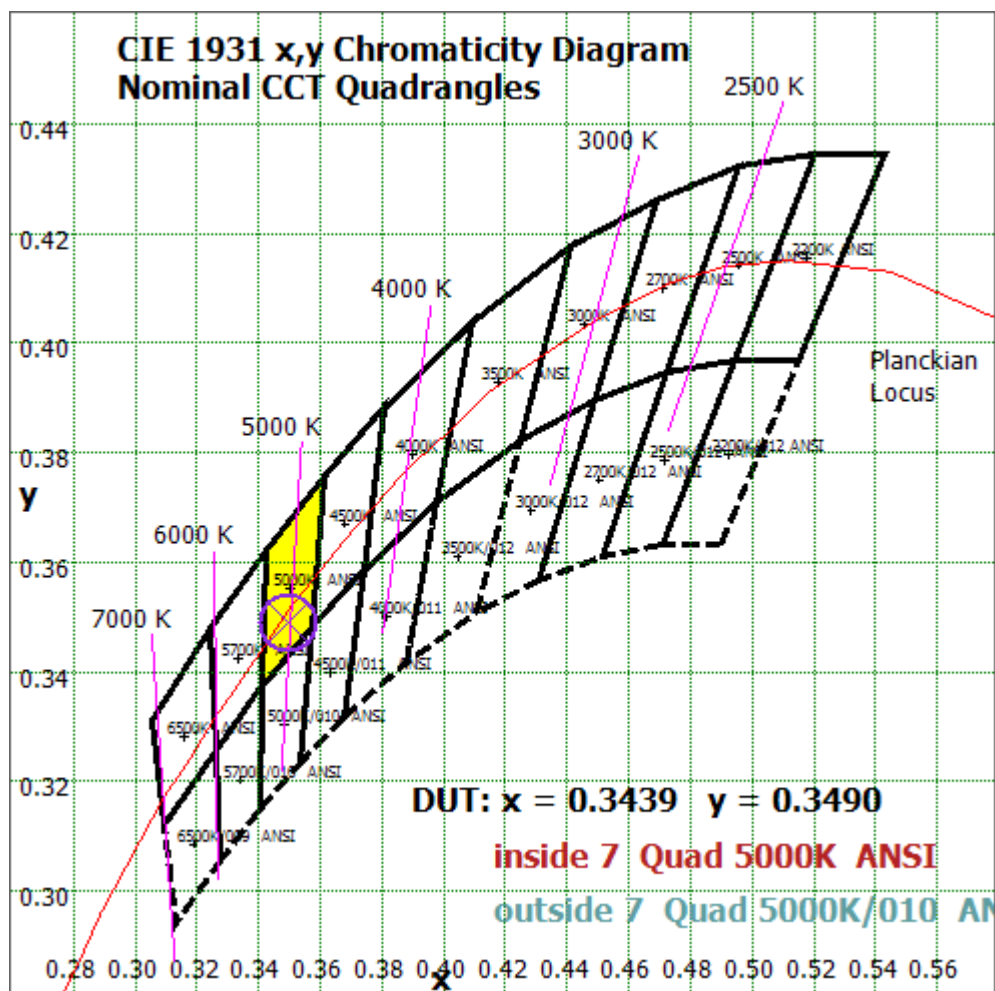


Chart 24: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

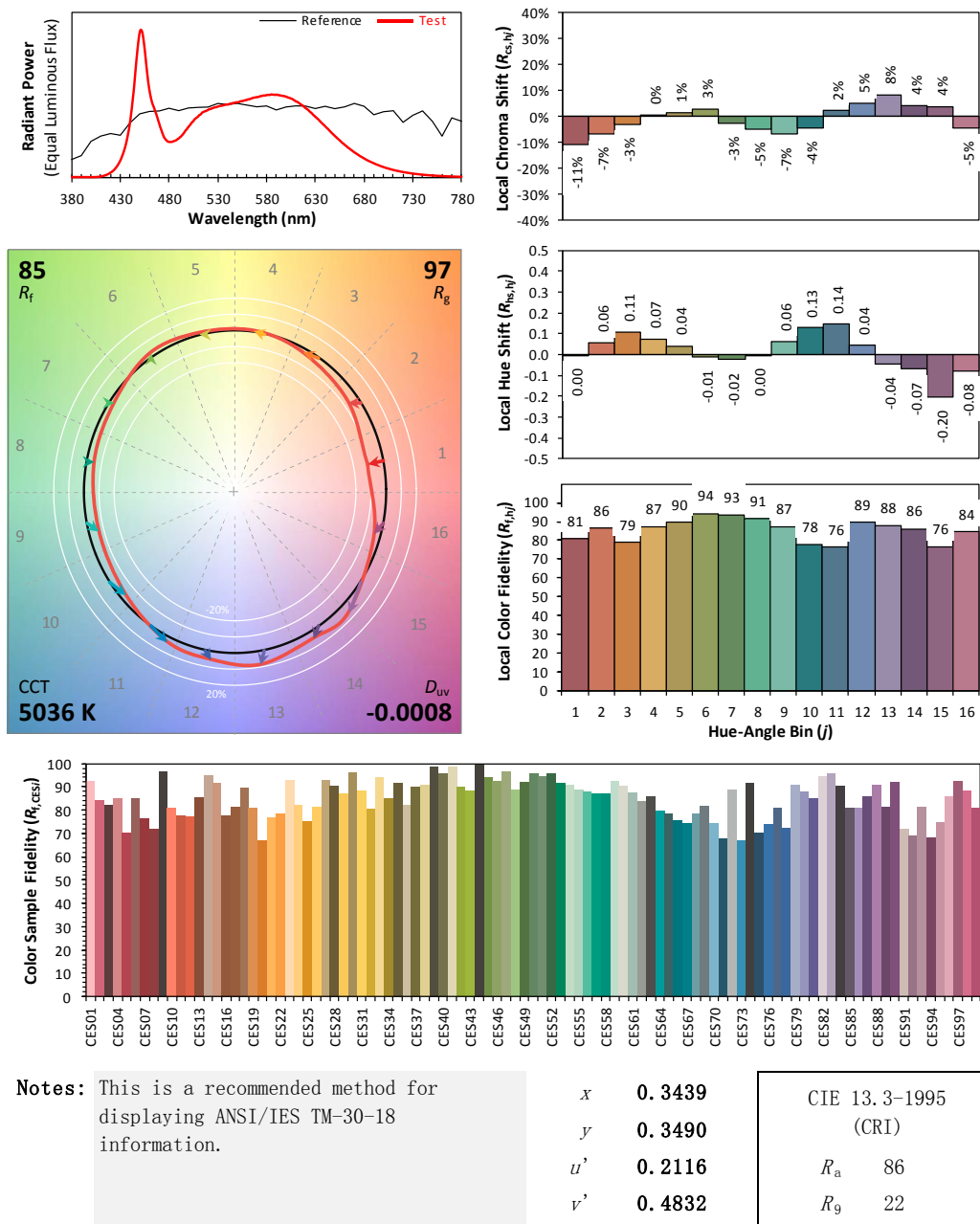
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/04/23

Model: 11T8/3F/8CCTS/UEB



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

Chart 25: 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 20 due to rounding.

Goniophotometer Method

Test ambient temperature was 25.8 °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)	0.097
Power Factor	0.9842
Power (W)	11.41
Luminous Efficacy (lm/W)	144.1
Total Luminous Flux (lm)	1643.9
Beam Angle (°)	114.9 (0°-180°) / 254.5 (90°-270°)
Center Beam Candle Power (cd)	252
Maximum Beam Candle Power (cd)	253.2 (At: C=260.0, Gamma=4.0)
Spacing Criteria	1.28 (0°-180°) / 1.48 (90°-270°)
Zonal Lumens in the 0°-60° Zone	40.61%
Zonal Lumens in the 60°-90° Zone	27.14%
Zonal Lumens in the 90°-120° Zone	19.13%
Zonal Lumens in the 120°-180° Zone	13.12%

Table 22: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	23.953	1.46%
10- 20	69.631	4.24%
20- 30	109.269	6.65%
30- 40	139.719	8.50%
40- 50	158.883	9.66%
50- 60	166.192	10.11%
60- 70	162.308	9.87%
70- 80	149.986	9.12%
80- 90	133.924	8.15%
90-100	118.872	7.23%
100-110	104.891	6.38%
110-120	90.655	5.51%
120-130	75.395	4.59%
130-140	59.205	3.60%
140-150	42.745	2.60%
150-160	25.459	1.55%
160-170	10.425	0.63%
170-180	2.404	0.15%
Total	1643.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	667.647	40.61%
60- 90	446.218	27.14%
0-90	1113.87	67.76%
90- 180	530.051	32.24%
0- 180	1643.9	100%

Table 23: Zonal Lumen

Illuminance Plots- Goniophotometer Method

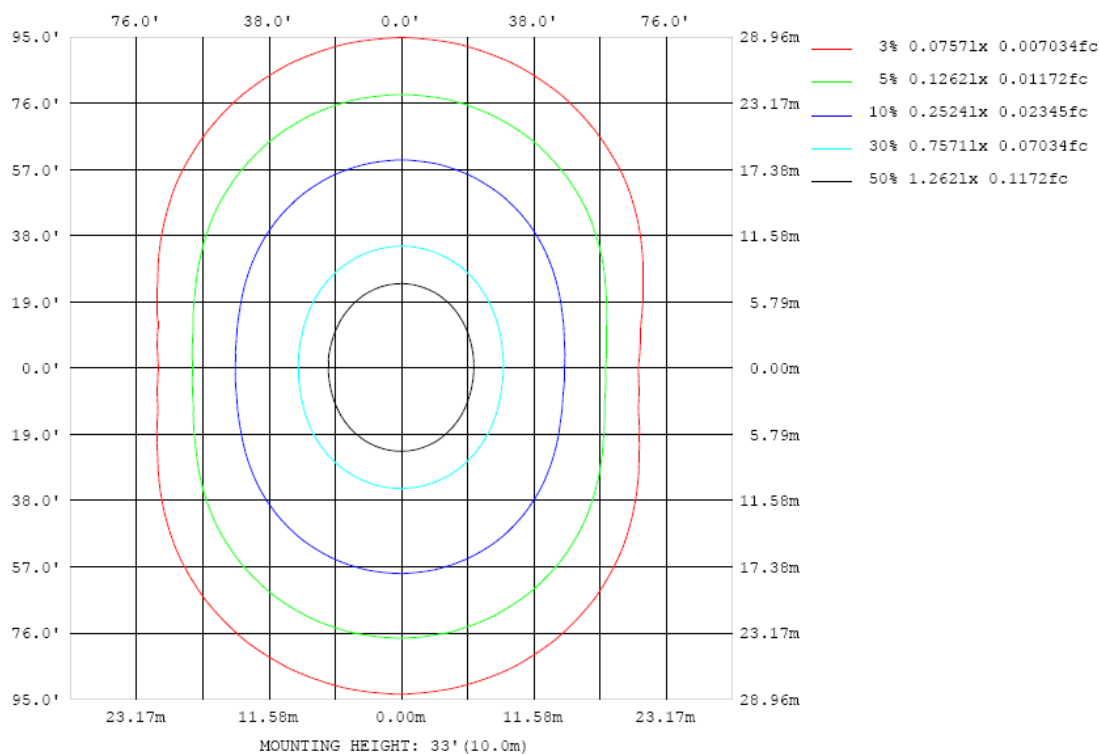


Chart 26: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

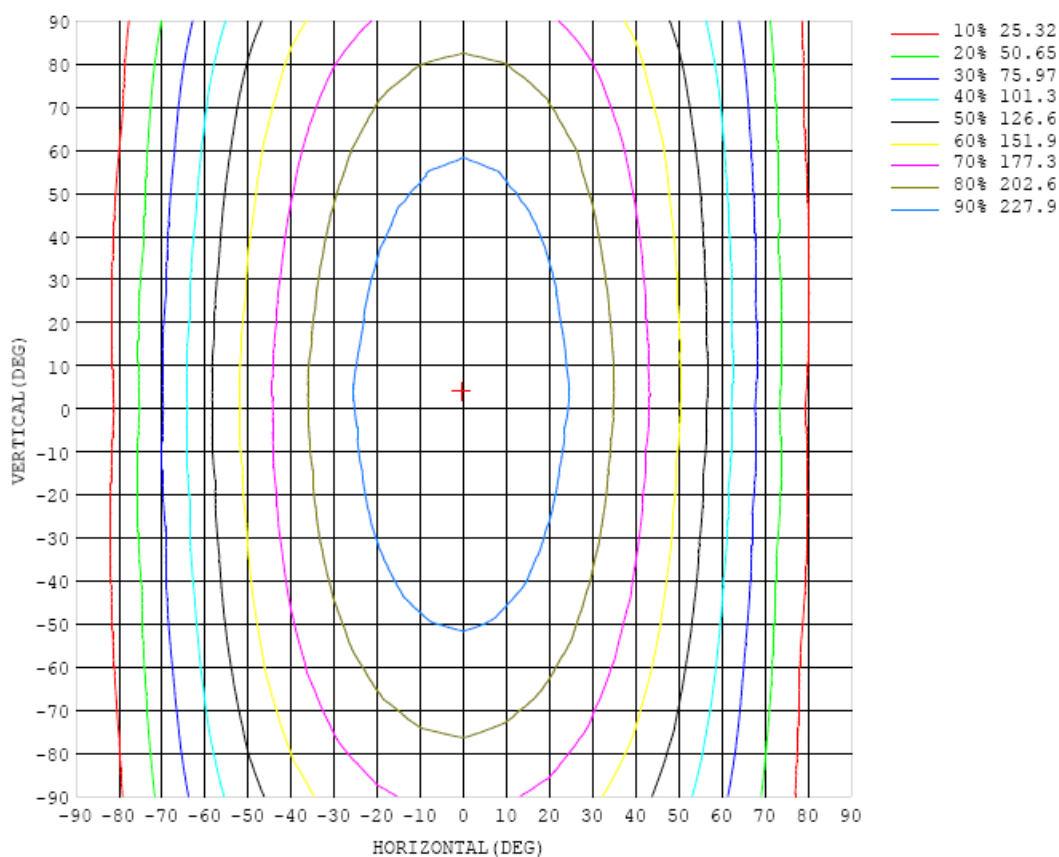


Chart 27: Isocandela Plot

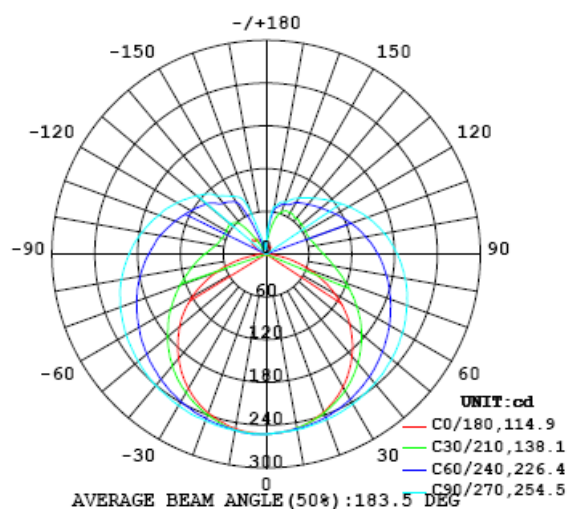


Chart 28: Polar Candela Distribution

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	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252
5	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251
10	248	248	248	248	248	248	249	250	250	250	250	250	250	249	249	248	248	248	249
15	243	242	243	243	244	246	247	248	249	249	248	248	247	246	245	244	244	243	243
20	236	235	236	237	239	241	244	245	247	247	247	246	245	243	241	239	237	237	237
25	227	226	227	230	233	237	240	243	244	245	244	243	241	239	235	232	230	228	228
30	215	215	217	221	226	231	235	239	242	243	242	240	237	233	228	223	220	218	218
35	202	202	205	211	218	224	230	235	238	240	239	237	232	227	221	214	209	206	205
40	187	188	192	200	208	217	225	231	235	237	236	233	227	220	212	204	197	192	191
45	171	171	178	187	198	209	219	226	231	234	232	228	221	213	203	192	183	177	175
50	153	153	162	175	188	201	213	221	227	230	228	223	215	205	193	180	168	160	158
55	133	135	145	161	178	193	206	216	222	225	224	218	209	197	183	167	152	143	140
60	111	114	128	147	166	184	199	210	218	221	219	212	203	189	172	154	136	123	119
65	88.3	93.5	110	133	155	176	192	205	213	216	214	207	196	180	162	141	119	103	97.2
70	65.7	72.7	93.4	120	145	167	185	199	206	210	208	201	189	172	152	128	103	82.9	74.4
75	43.4	53.3	78.1	107	135	159	178	192	201	204	202	195	182	164	142	116	87.7	63.7	51.6
80	22.9	35.5	64.6	96.7	126	151	171	185	194	198	196	188	175	157	133	106	74.5	45.5	30.0
85	6.87	22.2	54.9	88.0	118	143	164	178	187	191	189	181	168	149	125	96.1	64.0	31.2	11.5
90	0.80	15.6	47.8	80.5	111	136	156	171	180	184	181	174	161	142	118	88.4	56.2	22.6	1.08
95	0.93	12.9	43.3	74.7	104	129	149	163	172	176	174	166	153	134	111	82.1	51.0	19.6	0.78
100	2.11	13.4	40.7	70.9	98.1	122	142	156	164	168	166	158	145	127	104	77.0	48.0	20.3	1.50
105	5.15	16.1	39.8	67.3	92.7	115	134	148	156	160	158	150	138	120	98.7	73.8	47.0	23.4	2.96
110	6.71	19.7	40.8	64.7	87.8	109	127	140	148	151	149	142	130	114	93.9	71.1	47.3	27.7	5.19
115	6.00	23.1	43.0	63.6	83.9	103	119	132	139	142	141	134	123	108	89.5	69.2	48.9	33.1	9.12
120	1.71	20.6	45.4	63.6	81.2	97.8	113	123	131	133	132	126	116	102	85.9	68.4	51.1	37.5	15.3
125	2.08	25.2	49.0	64.4	79.2	93.4	106	116	122	125	124	118	110	97.5	83.1	68.2	53.1	40.4	21.9
130	2.01	30.4	51.2	64.8	77.8	89.7	101	109	114	117	116	111	104	93.1	80.9	68.4	56.2	45.5	26.6
135	3.87	34.0	52.8	65.6	77.1	86.8	95.7	103	107	109	108	105	98.1	89.3	79.2	68.4	57.7	49.1	27.2
140	6.76	29.7	55.9	65.4	75.5	84.2	91.3	97.0	101	103	102	98.5	93.2	86.2	77.9	68.3	60.6	53.9	23.6
145	12.0	25.2	58.0	66.4	73.4	81.4	87.4	91.9	94.9	96.4	95.7	93.1	89.0	83.3	75.7	67.4	62.6	55.8	25.9
150	12.2	26.6	56.6	67.1	70.9	77.0	83.2	87.1	89.6	90.8	90.5	88.2	84.7	79.3	71.8	69.4	64.6	51.0	23.3
155	10.4	22.6	51.1	67.0	71.0	73.9	76.5	80.5	83.4	84.7	84.2	82.0	78.1	74.6	72.5	68.1	62.1	48.7	20.0
160	11.8	19.1	44.2	62.6	68.9	72.7	75.3	76.4	76.9	77.4	77.3	76.9	76.0	73.9	70.4	66.2	59.7	41.1	21.4
165	11.5	16.6	32.2	52.9	64.2	68.1	69.7	72.1	73.8	74.6	74.2	73.0	71.2	68.5	66.0	61.6	48.9	32.2	16.3
170	13.2	17.0	22.4	35.7	48.4	56.2	62.6	66.3	67.2	67.3	67.2	66.9	65.8	61.6	56.5	47.6	35.3	22.7	15.2
175	16.0	17.7	18.8	20.0	24.0	29.8	34.8	38.4	41.0	42.3	42.3	41.0	38.7	35.7	30.9	25.1	20.2	16.1	14.7
180	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6

Table 24: 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	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252		
5	252	252	252	253	253	253	253	253	253	253	253	253	252	252	252	252	251		
10	250	250	251	251	251	251	251	251	251	251	251	251	250	250	250	249	248		
15	245	246	246	247	248	248	249	250	250	249	248	247	245	245	244	244	244		
20	238	239	240	242	244	246	247	248	249	248	247	245	243	240	239	237	237		
25	230	231	233	236	239	243	245	247	248	247	245	242	239	235	232	229	228		
30	219	221	225	229	234	239	243	245	245	245	242	238	234	228	223	219	217		
35	208	209	215	221	228	235	239	242	243	241	239	234	228	220	214	208	204		
40	194	197	205	213	222	229	235	239	241	239	235	229	221	212	203	195	189		
45	177	183	193	204	215	224	231	236	238	236	231	224	213	202	191	180	173		
50	161	169	180	194	207	218	227	232	234	232	226	218	206	192	178	165	156		
55	144	153	167	183	199	212	222	228	230	228	222	212	199	182	166	149	138		
60	124	137	154	173	191	206	217	224	227	224	217	206	191	172	153	133	118		
65	103	120	141	164	183	200	212	219	222	220	212	200	182	163	139	116	96.8		
70	81.8	103	128	154	175	193	206	214	217	214	207	193	175	153	127	99.6	76.0		
75	61.2	86.5	116	144	167	187	201	209	212	209	200	187	167	144	116	84.4	56.0		
80	42.2	72.5	105	136	160	179	194	203	206	203	194	180	160	136	106	71.5	38.7		
85	27.3	61.2	95.4	127	153	172	187	196	199	196	187	173	154	128	97.0	61.8	26.4		
90	17.6	51.1	86.1	118	145	165	179	189	192	189	180	166	147	121	89.8	54.9	20.5		
95	11.1	43.0	78.1	110	137	157	172	181	185	182	173	159	140	115	84.3	50.8	19.3		
100	10.8	38.9	71.6	103	130	151	164	174	177	174	165	153	133	109	79.7	49.0	20.5		
105	11.4	38.3	68.1	97.1	122	143	157	165	169	166	158	146	127	104	76.5	48.8	22.8		
110	11.9	38.9	65.9	92.6	116	136	150	157	160	158	151	139	121	98.9	74.3	50.2	24.6		
115	12.0	40.3	64.7	88.8	111	129	141	150	153	151	143	131	115	95.0	72.8	52.6	25.7		
120	12.6	40.0	64.6	85.6	105	122	134	141	144	142	135	124	109	91.7	72.3	55.4	26.0		
125	8.07	31.3	65.4	83.1	101	115	126	133	136	134	128	118	105	87.0	71.2	58.4	24.7		
130	7.39	21.8	66.0	78.9	94.5	110	119	125	127	125	120	112	97.4	83.2	69.0	58.0	20.2		
135	10.4	13.1	62.7	75.4	87.6	101	112	117	119	118	113	103	91.2	81.0	69.2	49.8	12.1		
140	13.8	8.16	52.8	73.9	85.2	93.8	100	105	107	106	102	95.9	88.4	79.3	67.3	32.9	7.31		
145	15.0	9.70	27.3	64.2	81.8	89.5	95.0	98.5	99.8	99.0	96.2	91.7	85.6	76.6	56.5	17.9	10.3		
150	11.0	14.1	9.79	39.4	68.1	84.1	90.0	92.5	93.9	93.5	91.4	87.5	82.1	65.6	33.0	10.2	13.3		
155	7.34	18.3	10.7	12.0	22.9	51.8	77.4	86.3	87.9	87.9	86.1	81.5	65.8	37.8	13.1	8.87	16.2		
160	11.0	13.6	17.4	11.0	11.0	10.7	14.3	33.9	57.3	60.3	55.6	44.4	29.4	15.8	7.74	12.9	15.4		
165	8.80	7.00	13.9	19.2	15.6	10.4	9.29	11.5	16.0	19.6	15.4	9.24	9.13	9.53	12.0	15.7	14.7		
170	11.4	7.32	8.40	11.2	16.4	17.5	17.1	17.3	8.14	11.2	10.3	12.8	15.8	14.4	16.5	17.2	14.2		
175	13.1	9.70	7.48	8.06	7.67	8.30	7.91	6.71	10.1	15.1	16.3	18.0	18.5	18.7	15.0	12.0	12.9		
180	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6		

Table 25: Luminous Intensity Data

TEST RESULTS of Model 11T8/3F/8CCTS/UEB (6500K 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)	0.097	0.045
Power Factor	0.9840	0.9147
Test Power (W)	11.40	11.44
THD A%	15.24	20.48
Luminous Efficacy (lm/W)	137.7	137.0
Total Luminous Flux (lm)	1570.3	1566.9
Color Rendering Index (CRI)	83.3	
R9	11.1	
Correlated Color Temperature (CCT)(K)	6572	
Chromaticity Chroma x	0.3115	
Chromaticity Chroma y	0.3283	
Chromaticity Chroma u	0.1973	
Chromaticity Chroma v	0.3118	
Duv	0.0034	
Chromaticity Chroma u'	0.1973	
Chromaticity Chroma v'	0.4677	

Special Color Rendering Indices	
R1	81.7
R2	87.2
R3	89.9
R4	83.5
R5	82.3
R6	81.5
R7	88.6
R8	71.6
R9	11.1
R10	68.8
R11	82.8
R12	57.7
R13	83.3
R14	94.7

Table 26: 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

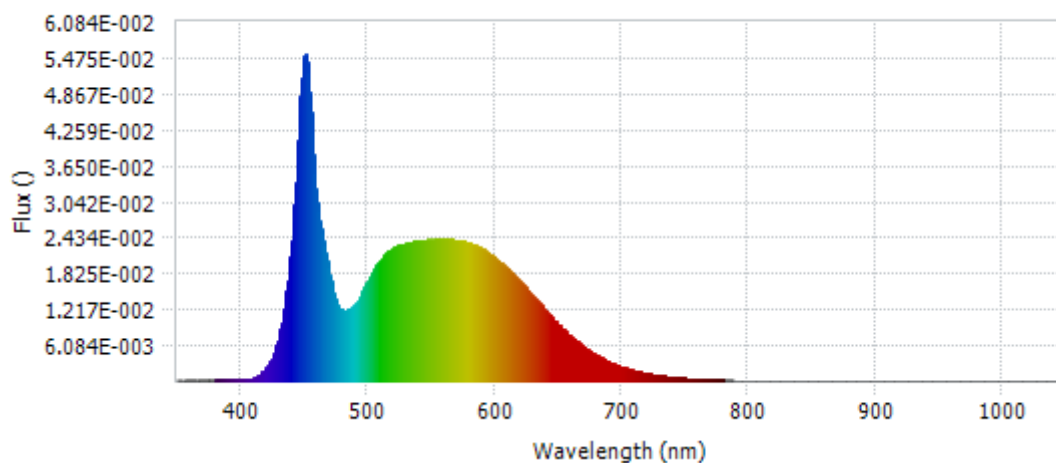


Chart 29: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.16E-04	485	1.21E-02	590	2.24E-02	695	2.86E-03
385	2.16E-04	490	1.30E-02	595	2.17E-02	700	2.45E-03
390	2.10E-04	495	1.49E-02	600	2.10E-02	705	2.10E-03
395	2.01E-04	500	1.70E-02	605	2.00E-02	710	1.79E-03
400	1.91E-04	505	1.89E-02	610	1.90E-02	715	1.54E-03
405	2.55E-04	510	2.05E-02	615	1.80E-02	720	1.31E-03
410	5.52E-04	515	2.18E-02	620	1.69E-02	725	1.14E-03
415	1.18E-03	520	2.25E-02	625	1.57E-02	730	9.69E-04
420	2.30E-03	525	2.30E-02	630	1.44E-02	735	8.31E-04
425	4.33E-03	530	2.34E-02	635	1.32E-02	740	7.13E-04
430	7.83E-03	535	2.36E-02	640	1.20E-02	745	6.16E-04
435	1.37E-02	540	2.37E-02	645	1.08E-02	750	5.21E-04
440	2.38E-02	545	2.39E-02	650	9.64E-03	755	4.46E-04
445	4.09E-02	550	2.40E-02	655	8.59E-03	760	3.92E-04
450	5.50E-02	555	2.40E-02	660	7.59E-03	765	3.35E-04
455	4.56E-02	560	2.40E-02	665	6.71E-03	770	2.89E-04
460	3.04E-02	565	2.39E-02	670	5.86E-03	775	2.49E-04
465	2.39E-02	570	2.39E-02	675	5.10E-03	780	2.12E-04
470	1.80E-02	575	2.37E-02	680	4.43E-03		
475	1.33E-02	580	2.34E-02	685	3.86E-03		
480	1.20E-02	585	2.30E-02	690	3.33E-03		

Table 27: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method

Chromaticity Diagram - Sphere Spectroradiometer Method

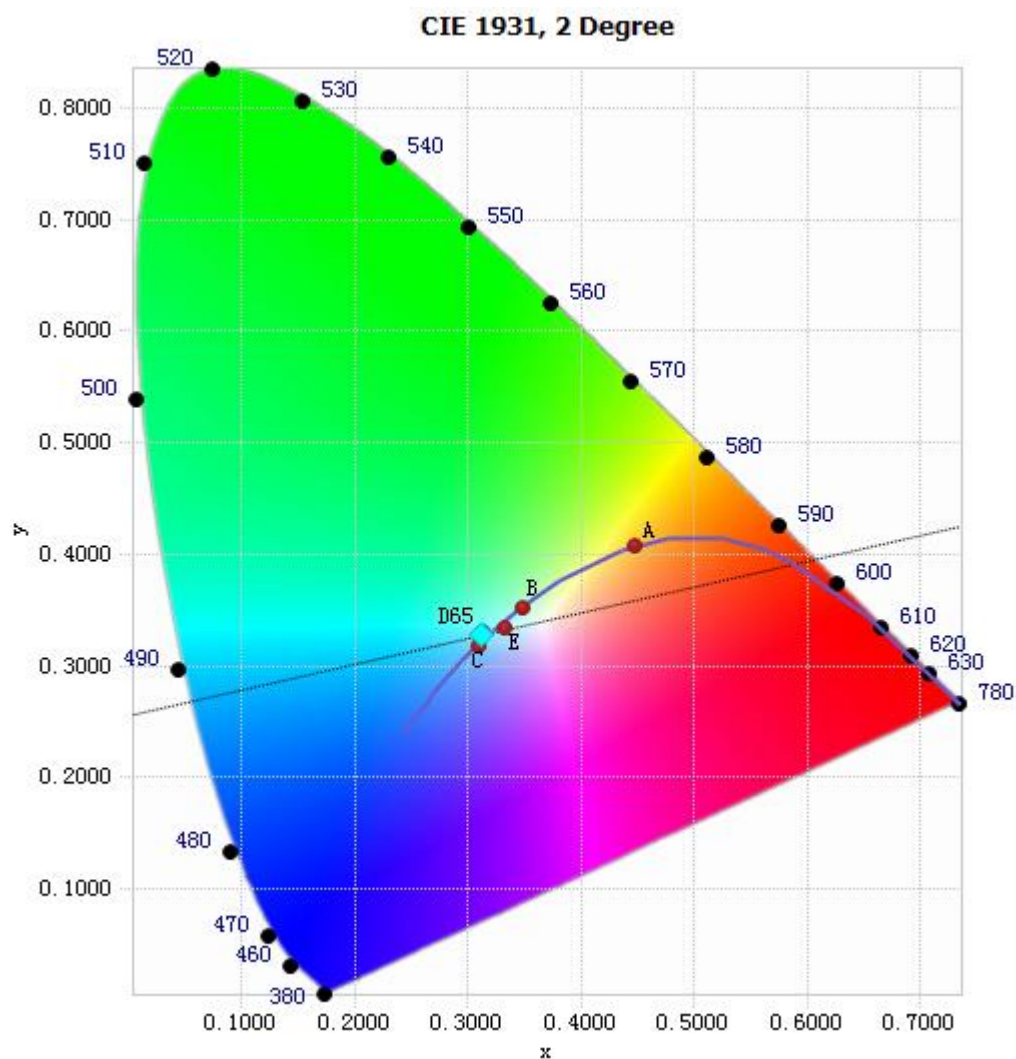


Chart 30: Chromaticity Diagram per Sphere - Spectroradiometer Method

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

Nominal CCT Quadrangles – Sphere Spectroradiometer Method

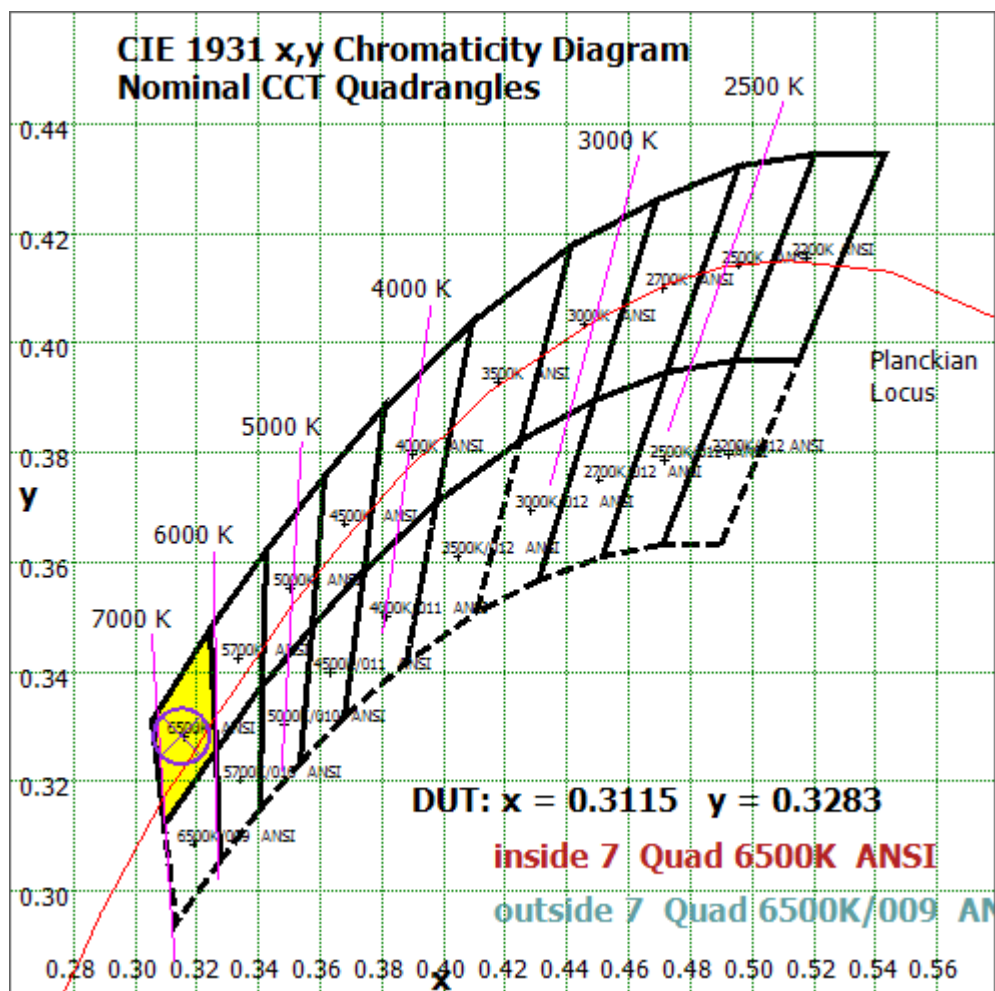


Chart 31: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

Color Rendition Report – Sphere Spectroradiometer Method

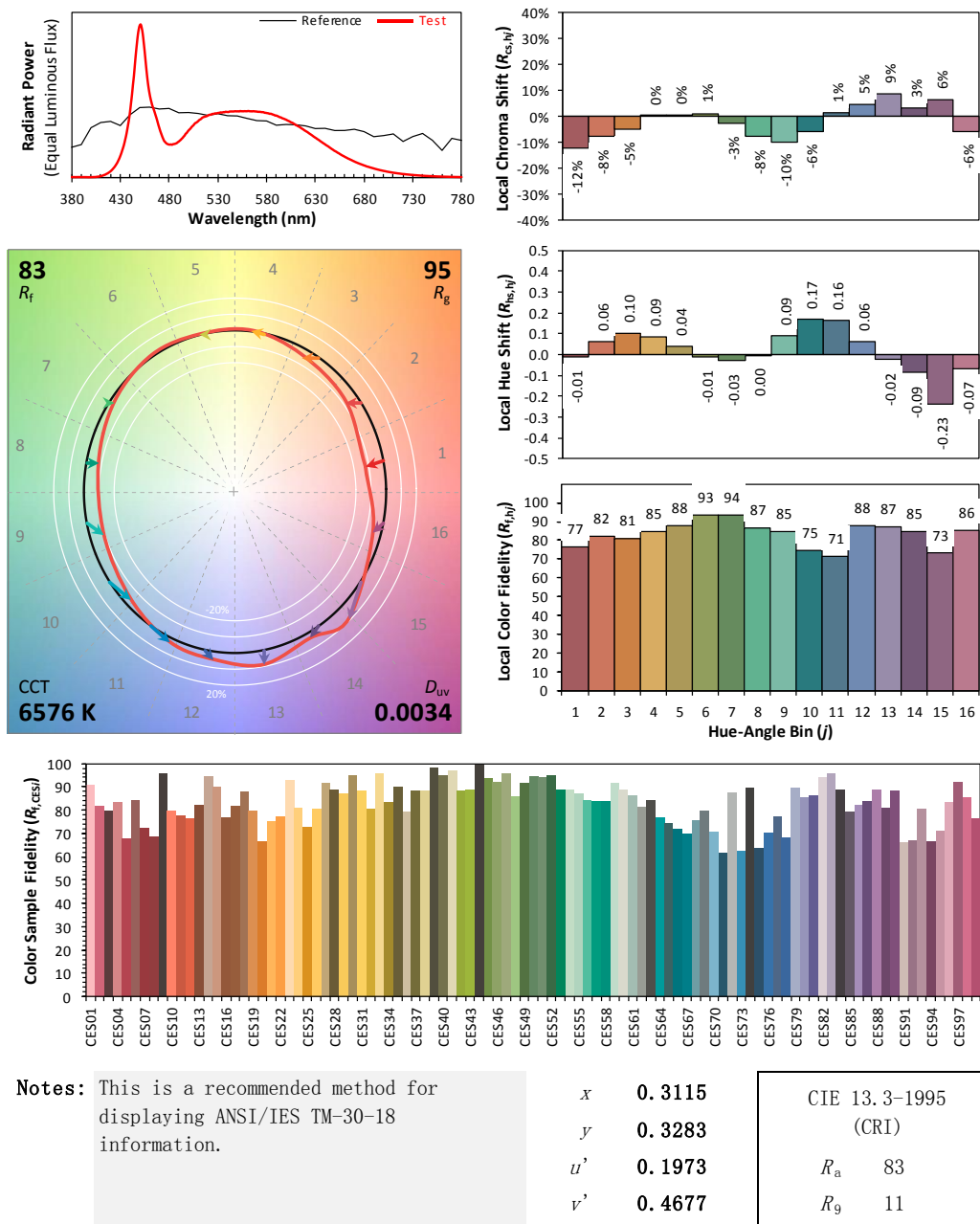
ANSI/IES TM-30-18 Color Rendition Report

Source: LED

Manufacturer: GREEN CREATIVE LTD

Date: 2023/04/23

Model: 11T8/3F/8CCTS/UEB



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

Chart 32: 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 26 due to rounding.

Goniophotometer Method

Test ambient temperature was 25.8 °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)	0.097
Power Factor	0.9840
Power (W)	11.45
Luminous Efficacy (lm/W)	138.3
Total Luminous Flux (lm)	1583.5
Beam Angle (°)	114.7 (0°-180°) / 255.1 (90°-270°)
Center Beam Candle Power (cd)	243
Maximum Beam Candle Power (cd)	243.3 (At: C=270.0, Gamma=5.5)
Spacing Criteria	1.28 (0°-180°) / 1.48 (90°-270°)
Zonal Lumens in the 0°-60° Zone	40.53%
Zonal Lumens in the 60°-90° Zone	27.14%
Zonal Lumens in the 90°-120° Zone	19.17%
Zonal Lumens in the 120°-180° Zone	13.15%

Table 28: Test data per Goniophotometer Method

Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	23.008	1.45%
10- 20	66.889	4.22%
20- 30	104.982	6.63%
30- 40	134.299	8.48%
40- 50	152.776	9.65%
50- 60	159.925	10.10%
60- 70	156.227	9.87%
70- 80	144.468	9.12%
80- 90	129.112	8.15%
90-100	114.75	7.25%
100-110	101.346	6.40%
110-120	87.544	5.53%
120-130	72.818	4.60%
130-140	57.178	3.61%
140-150	41.262	2.61%
150-160	24.573	1.55%
160-170	10.056	0.64%
170-180	2.318	0.15%
Total	1583.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	641.879	40.53%
60- 90	429.807	27.14%
0-90	1071.69	67.68%
90- 180	511.845	32.32%
0- 180	1583.5	100%

Table 29: Zonal Lumen

Illuminance Plots- Goniophotometer Method

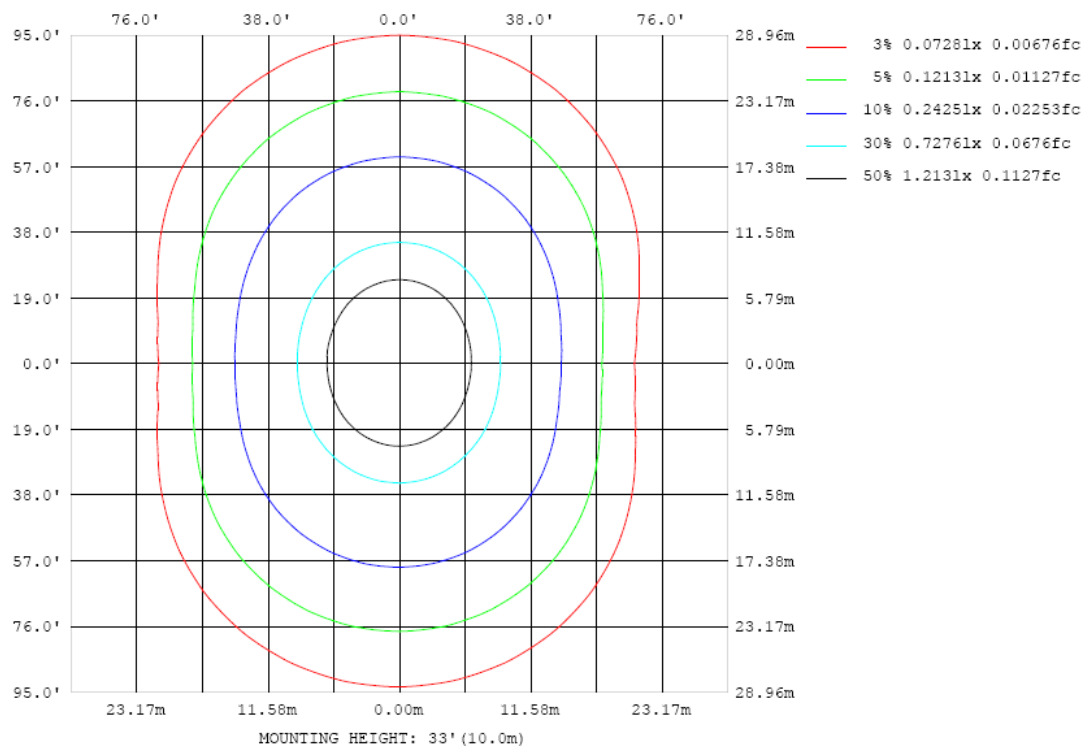


Chart 33: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

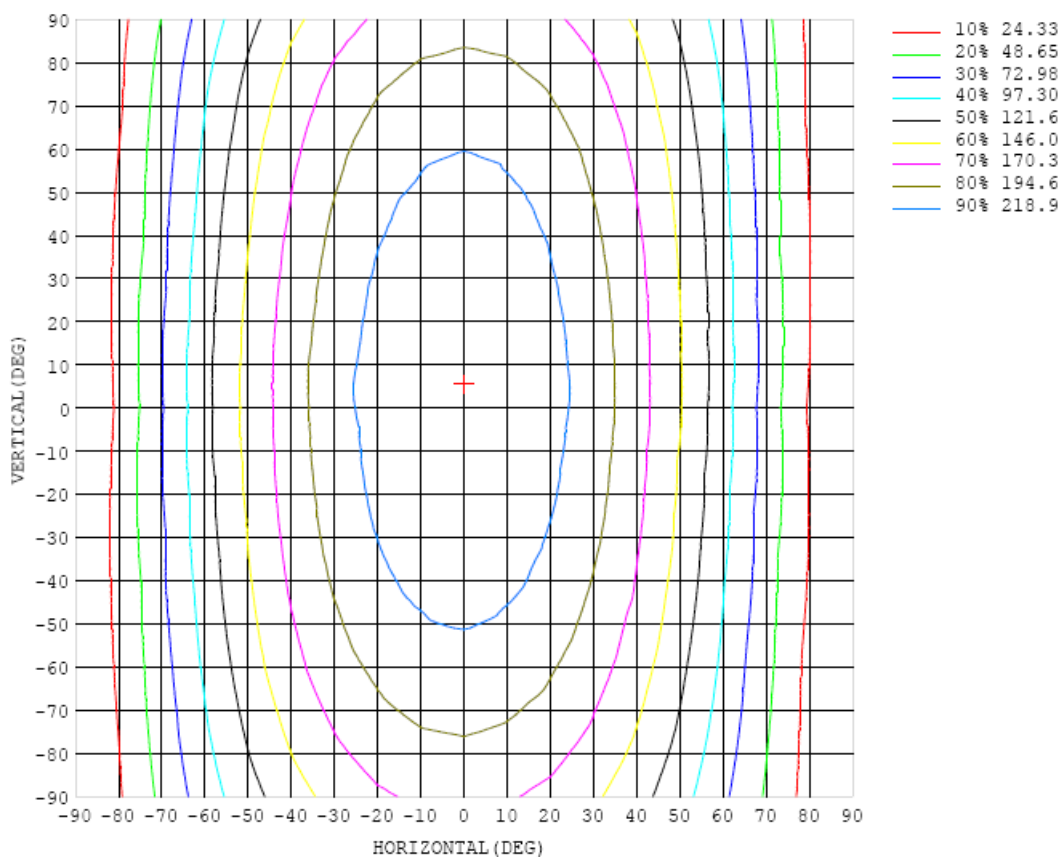


Chart 34: Isocandela Plot

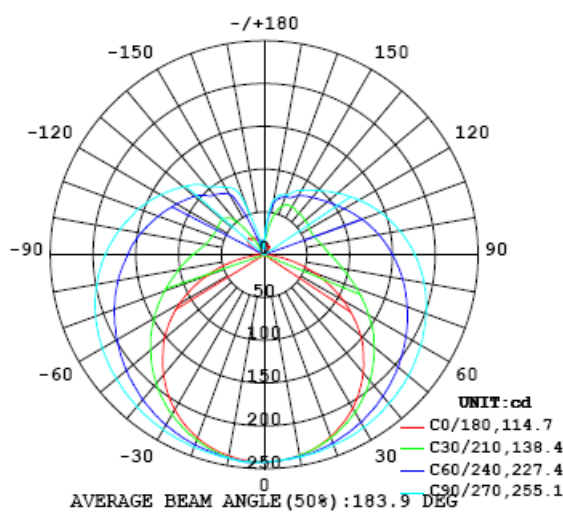


Chart 35: Polar Candela Distribution

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	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243
5	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241
10	238	238	238	238	238	238	239	240	240	240	240	240	240	239	239	239	239	239	238
15	233	233	233	234	235	236	237	238	239	239	239	238	237	236	236	234	234	234	234
20	226	226	226	227	230	232	234	236	237	237	237	236	235	233	231	229	228	227	228
25	217	217	218	221	224	228	230	233	234	235	235	233	231	229	225	222	220	218	219
30	207	207	209	213	217	222	226	230	232	233	232	230	227	224	219	214	211	209	209
35	194	194	197	203	209	216	221	226	229	230	230	227	223	218	212	206	201	197	197
40	180	180	185	192	200	209	216	222	226	227	226	223	218	211	203	195	189	184	183
45	164	165	171	180	191	201	210	218	222	224	223	219	212	204	194	184	176	170	168
50	147	147	156	168	181	193	204	213	218	220	219	214	207	197	185	173	161	155	153
55	128	129	140	155	171	185	198	208	213	216	214	209	201	189	175	160	146	137	134
60	107	110	123	141	160	177	191	202	209	211	210	204	194	181	165	148	130	118	114
65	84.9	90.0	106	128	149	169	185	197	204	207	205	199	188	173	156	135	114	98.8	93.1
70	63.3	69.9	90.0	115	139	161	178	191	198	202	200	193	182	166	146	123	98.9	79.5	71.1
75	41.8	51.4	75.1	104	130	153	171	185	193	196	194	187	175	158	137	111	84.5	61.1	49.2
80	22.2	34.3	62.5	93.1	122	145	164	178	186	190	188	181	168	150	128	101	71.4	43.7	28.5
85	6.57	21.5	52.8	84.7	114	138	157	171	180	183	181	174	161	143	120	92.4	61.6	30.0	10.9
90	0.77	15.0	46.1	77.5	106	131	150	164	173	176	174	167	154	136	113	85.0	53.9	21.7	1.02
95	0.90	12.4	41.8	72.0	100	124	143	157	165	169	167	159	147	129	106	78.7	48.9	18.8	0.74
100	2.04	12.9	39.1	68.3	94.2	117	136	150	158	161	159	152	140	122	100	73.6	46.0	19.4	1.42
105	4.99	15.5	38.3	64.7	88.9	111	129	142	150	153	151	144	132	116	94.7	70.9	44.9	22.4	2.80
110	6.52	18.9	39.2	62.3	84.3	105	122	134	142	145	143	137	125	109	89.8	68.1	45.3	26.5	4.92
115	5.84	22.2	41.4	61.2	80.6	98.8	115	126	133	136	135	129	118	104	85.6	66.2	46.8	31.7	8.71
120	1.75	19.9	43.7	61.2	77.7	93.7	108	118	125	128	127	121	111	98.2	82.2	65.4	48.8	36.0	14.7
125	2.10	24.2	47.1	62.3	76.5	89.3	102	111	117	120	119	114	105	93.4	79.5	65.3	50.8	38.8	21.1
130	2.02	29.4	49.2	62.8	75.2	86.0	96.2	104	110	112	111	107	99.2	89.1	77.5	65.5	53.8	43.7	25.6
135	3.79	32.7	50.9	63.1	74.2	83.1	91.5	98.4	103	105	104	100	93.9	85.5	76.3	66.2	55.2	47.0	26.2
140	6.52	28.5	53.8	63.0	72.5	80.6	87.5	92.9	96.4	98.1	97.5	94.5	89.3	82.4	74.8	66.2	58.1	51.7	22.7
145	11.7	24.2	55.9	64.0	70.5	78.0	83.8	88.1	90.9	92.2	91.8	89.3	85.4	79.8	72.7	64.6	60.1	53.6	24.9
150	11.8	25.6	54.6	64.7	68.8	74.1	79.8	83.6	85.9	86.9	86.6	84.6	81.2	75.9	69.8	66.7	62.1	49.1	22.4
155	10.1	21.8	49.3	64.6	69.1	71.6	73.6	77.3	80.1	81.3	80.8	78.7	74.9	71.4	70.4	65.8	59.7	46.8	19.3
160	11.4	18.4	42.4	60.1	66.7	70.4	72.4	73.3	73.8	74.1	74.2	73.9	73.0	71.1	67.8	63.6	57.4	39.6	20.5
165	11.2	16.0	30.9	50.8	61.6	66.1	68.2	69.8	71.0	71.6	71.5	70.6	69.2	66.4	63.4	59.2	47.0	31.0	15.7
170	12.7	16.3	21.6	34.3	46.5	54.2	60.4	63.7	64.6	64.7	64.6	64.4	63.5	59.4	54.3	45.7	34.0	22.0	14.6
175	15.4	17.0	18.0	19.3	23.3	28.9	33.6	37.2	39.6	40.9	40.9	39.6	37.4	34.5	30.0	24.4	19.5	15.5	14.0
180	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9

Table 30: 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		243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	
5		242	242	243	243	243	243	243	243	243	243	243	243	243	242	242	242	241	
10		239	240	241	241	241	241	241	241	241	241	241	241	240	240	240	239	239	
15		235	236	236	237	238	239	240	240	240	239	238	237	236	235	235	235	235	
20		229	229	230	232	234	236	238	239	239	239	238	236	234	232	230	228	228	
25		221	222	224	227	230	233	235	237	238	237	236	233	230	226	223	220	219	
30		211	213	216	220	225	230	233	235	236	235	233	229	225	220	215	211	208	
35		199	202	207	213	220	226	230	233	234	233	230	225	219	212	206	200	196	
40		186	189	196	205	213	221	227	230	232	231	226	221	213	204	195	187	182	
45		170	176	185	196	206	216	223	227	229	227	223	215	206	195	184	174	166	
50		155	162	173	186	199	210	219	224	226	224	218	210	199	186	172	159	151	
55		138	148	162	176	192	205	214	220	222	220	214	205	191	176	160	144	132	
60		119	132	149	167	184	199	210	216	219	216	210	199	184	166	147	128	113	
65		98.8	115	136	158	176	193	205	212	214	212	205	193	176	157	135	112	93.2	
70		78.5	98.6	124	148	169	187	199	207	210	207	200	187	169	148	123	95.8	72.9	
75		58.7	83.3	112	139	162	180	194	201	205	202	194	181	162	139	112	81.3	53.9	
80		40.6	69.8	102	131	155	174	187	196	199	197	188	174	156	132	102	69.0	37.3	
85		26.2	58.9	92.2	122	148	167	181	190	193	190	182	168	150	124	94.0	59.7	25.5	
90		16.9	49.4	83.4	114	140	160	174	183	186	183	175	161	143	117	87.2	53.2	19.9	
95		10.7	41.8	75.9	107	133	154	167	176	179	176	168	156	136	111	81.9	49.4	18.8	
100		10.5	38.0	69.7	99.8	126	146	160	168	171	169	161	149	130	106	77.7	47.6	20.0	
105		11.1	37.4	66.4	94.3	119	139	153	160	163	161	155	141	123	101	74.6	47.6	22.3	
110		11.6	38.0	64.4	90.1	113	132	145	154	157	154	147	135	117	96.3	72.3	49.0	24.0	
115		11.8	39.3	63.1	86.4	108	125	138	145	148	146	139	128	112	92.4	71.0	51.2	25.0	
120		12.3	39.1	63.0	83.4	102	118	130	137	140	138	131	121	106	89.2	70.5	53.9	25.3	
125		7.93	30.5	63.9	81.0	97.9	112	123	129	132	130	124	114	102	84.6	69.3	56.9	24.0	
130		7.23	21.3	64.3	76.9	91.9	107	116	121	124	122	117	109	94.9	81.0	67.3	56.6	19.7	
135		10.1	12.7	60.9	73.6	85.2	98.3	109	114	116	115	109	99.7	88.5	78.9	67.4	48.5	11.8	
140		13.4	7.87	51.4	72.3	82.9	91.2	97.6	102	104	103	99.0	93.2	86.0	77.1	65.5	32.3	7.11	
145		14.5	9.40	26.6	62.7	79.6	87.2	92.5	95.7	97.1	96.3	93.6	89.1	83.0	74.6	55.0	17.5	10.0	
150		10.7	13.6	9.53	38.4	66.1	81.7	87.4	89.8	91.3	90.9	88.6	85.1	79.6	63.7	32.2	10.0	13.0	
155		7.08	17.8	10.4	11.6	21.9	50.1	75.2	83.8	85.4	85.2	83.4	78.9	63.8	36.9	12.9	8.63	15.8	
160		10.6	13.2	16.8	10.7	10.7	10.4	15.6	32.3	55.4	58.3	53.9	43.0	28.4	15.4	7.56	12.5	14.9	
165		8.46	6.75	13.5	18.5	15.0	10.0	8.97	11.0	15.5	19.0	14.7	8.85	8.88	9.29	11.6	15.1	14.2	
170		10.9	6.30	8.03	10.8	15.7	16.8	16.4	16.8	7.74	10.7	9.93	12.2	15.0	13.8	16.0	16.7	13.8	
175		12.6	9.47	7.27	7.75	7.27	7.92	7.63	6.48	9.90	14.9	15.9	17.5	17.9	18.0	14.4	11.6	12.6	
180		16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	

Table 31: Luminous Intensity Data

ISTMT Test Results of Model 11T8/3F/8CCTS/UEB (3000K Setting)

Test ambient temperature was 24.7 °C.

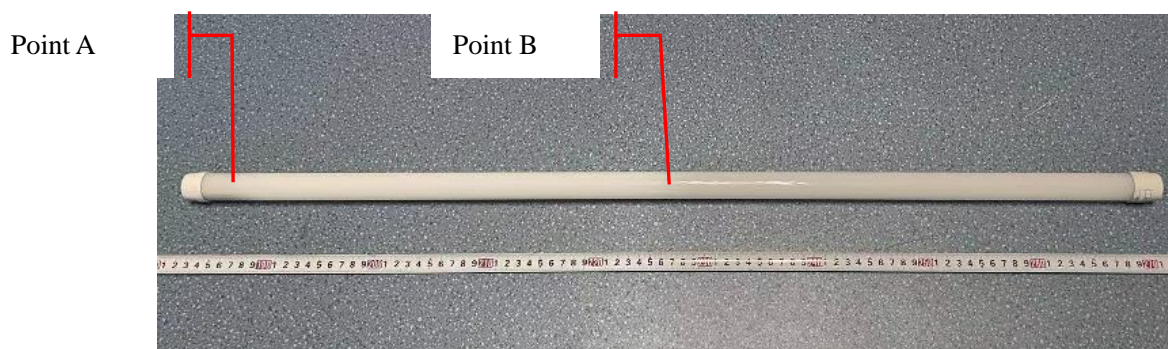
Test orientation was light down.

Model of light source: L128-3080RA35003J3

The stabilization time of the sample was 7.5 hours.



View of In-Situ Point- Ts



Location of In-Situ Point from overall view

Input Voltage (V)	Input Power (W)	Tested LED source current (mA)	Measured In-Situ Maximum Temperature(Corrected to Ta=25°C)	
			Point A	Point B
120.0	11.32	64.2	43.9	46.9
277.0	11.34	65.4	44.4	46.4

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
Multi-Meter	FLUKE15B	HZTE020-01	Aug. 05, 2022	Aug. 04, 2023

Table 32: 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.

ISTMT Measurements

The luminaire was installed to simulate intended usage, in accordance with the manufacturer's instructions.

Temperatures were measured after they stabilized, when the test was run for a minimum of 7.5 h.

The tests were conducted in an ambient temperature of 25 ± 5 °C. Ambient temperature variations above or

below 25 °C were respectively subtracted from or added to temperatures recorded at points on the luminaire. Temperatures recorded at points on a luminaire were measured by means of thermocouples.

The thermocouples had conductors no larger than No. 24 AWG (0.21mm²) and no smaller than No. 30 AWG (0.05mm²). Thermocouples complied with the requirements specified in ASTM MNL 12 and thermocouples as listed in the table of the limits of error specified in NIST ITS 90, or ISA MC96.1.

The luminaire was installed in the test box in the configuration that resulted in the highest operating temperatures, considering different trim and maximum lamp wattage combinations, lamp holder adjustment heights, and the like.

The test box was constructed of 12mm thick plywood as described below:

The test box was rectangular and had four sides and a bottom.

The four sides of the test box for a ceiling-mounted luminaire were a minimum distance of 8.5 in (215mm) from the nearest part of the lamp housing or heat-producing parts. The top edge of the sides of the test box were a minimum of 8.5 in (215mm) above the highest point of any permanently attached part of the lamp housing.

Thermal insulation of the loose-fill type was poured into the test box through the open top, until level with the top, without applying any compacting procedure.

The thermal insulation was conditioned to the density specified by the insulation manufacturer to obtain a required rated thermal resistance of Rsi 0.56 to 0.678 (R3.2 to R3.85).

All spaces around the luminaire and between it and the sides of the box were filled with the thermal insulation.

*** 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.